ENGLISH

General Safety Instructions:

READ SAFETY INSTRUCTIONS

Servicing:
These products are not customer serviceable TDK-Lambda UK LTD and their authorised agents only are permitted to carry out repairs.

Critical Components:
These products are not authorised for use as critical components in nuclear control systems, life support systems or equipment for use in hazardous environments without the express written approval of the Managing Director of TDK-Lambda EMEA.

Product Usage:
These products are designed for use within a host equipment which restricts access to authorised competent personnel.

This product is a component power supply and is only to be installed by qualified persons within other equipment and must be not operated as a stand alone product.
This product is for sale to business to business customers and can be obtained via distribution channels.
It is not intended for sale to end users.

This product is a component power supply and does not fall within the scope of the EMC directive. Compliance with the EMC directive must be considered in the final installation. Please contact your local TDK-Lambda office.

Environmental:
These products are IPX0, and therefore chemicals/solvents, cleaning agents and other liquids must not be used.

Environment:
This power supply is a switch mode power supply for use in applications within a Pollution Degree 2, overvoltage category II environment. Material Group IIIb PCB's are used within it.

Output Loading:
The output power taken from the power supply must not exceed the rating stated on the power supply label, except as stated in the product limitations in this handbook.

Input Parameters:
This product must be operated within the input parameters stated in the product limitations in this handbook.

End of Life Disposal:
The unit contains components that require special disposal. Make sure that the unit is properly disposed of at the end of its service life and in accordance with local regulations.

RISK OF ELECTRIC SHOCK

High Voltage Warning:
Dangerous voltages are present within the power supply**.** The professional installer must protect service personnel from inadvertent contact with these dangerous voltages in the end equipment.

WARNING: When installed in a Class 1 end equipment, this product must be reliably earthed and professionally installed.

The (+) or (-) output(s) can be earthed or left floating.

The unit cover(s)/chassis (where applicable) must not be made user accessible.

The mains input connector is not acceptable for use as field wiring terminals.

For encased products, do not use mounting screws, which penetrate the unit more than; See drawings.

Internal fuses protect the unit and must not be replaced by the user. In case of internal defect, the unit must be returned to TDK-Lambda UK LTD or one of their authorised agents.

A suitable mechanical, electrical and fire enclosure must be provided by the end use equipment for mechanical, electric shock and fire hazard protection.

The unit cover/chassis, where applicable, is designed to protect skilled personnel from hazards. They must not be used as part of the external covers of any equipment where they may be accessible to operators, since under full load conditions, part or parts of the unit chassis may reach temperatures in excess of those considered safe for operator access.

DEUTSCH

Allgemeine Sicherheitsvorschriften:

LESEN SIE DIE SICHERHEITSVORSCHRIFTEN

Wartung:
Diese Produkte können nicht durch den Kunden gewartet werden. Nur TDK-Lambda UK LTD. und deren zugelassene Vertriebshändler sind zur Durchführung von Reparaturen berechtigt.

Kritische Komponenten:
Diese Produkte sind nicht für die Verwendung als kritische Komponenten in nuklearen Kontrollsystemen, Lebenserhaltungssystemen oder Geräten in gefährlichen Umgebungen geeignet, sofern dies nicht ausdrücklich und in Schriftform durch den Geschäftsführer von TDK-Lambda EMEA genehmigt wurde.

Produktverwendung:
Diese Produkte sind zur Verwendung innerhalb von Host-Anlagen gedacht, die einen auf das Fachpersonal beschränkten Zugang haben.
Dieses Produkt ist eine Stromversorgungs-Komponente und sie darf nur von qualifiziertem Personal in andere Geräte eingebaut werden und sie darf NICHT als eigenständiges ("Stand-Alone") Gerät betrieben werden.
Dieses Produkt ist für den Verkauf an Geschäftskunden entwickelt worden und es kann über Distributionskanäle bezogen werden.
Es ist NICHT für den Verkauf an Endkunden gedacht und konzipiert.

Dieses Produkt ist eine Stromversorgungsbaugruppe und sie fällt NICHT in den Bereich der EMV Direktive.
Die Konformität mit der EMV Richtlinie muss in der finalen Gesamtinstallation betrachtet werden.
Bitte kontaktieren Sie Ihr regionales TDK-Lambda Vertriebsbüro im Falle von Rückfragen.

Umwelt:
Diese Produkte sind IPX0, aus diesem Grund dürfen keine Chemikalien/Lösungsmittel, Reinigungsmittel und andere Flüssigkeiten verwendet werden.

Umgebung:
Dieses Netzteil ist ein Schaltnetzteil zur Verwendung in einer Umgebung mit einem Verschmutzungsgrad 2, Überspannungskategorie II. Materialgruppe IIIb mit darin verwendeten PCBs.

Ausgangsstrom:
Der Ausgangsstrom des Netzteiles darf die Leistung, die auf dem Label des Netzteiles vermerkt ist, nur dann überschreiten, wenn dies in den Produktgrenzen dieses Handbuches ausgezeichnet ist.

Eingangsparameter:
Dieses Produkt muss innerhalb der Eingangsparameter, die in den Produktgrenzen dieses Handbuches angegeben sind, betrieben werden.

Entsorgung am Ende der Betriebszeit:
Das Gerät enthält Komponenten die unter Sondermüll fallen. Das Gerät muss am Ende der Betriebszeit ordnungsgemäß und in Übereinstimmung mit den regionalen Bestimmungen entsorgt werden.

GEFAHR DURCH ELEKTRISCHEN SCHLAG

Hochspannungswarnung:
Innerhalb des Netzteiles gibt es gefährliche Spannungen**.** Der Elektroinstallateur muss das Wartungspersonal vor versehentlichem Kontakt mit den gefährlichen Spannungen im Endgerät schützen.

WARNUNG! Falls Sie unser Netzgerät in eine Anwendung mit Schutzklasse 1 eingebaut haben, stellen Sie sicher, dass es fachgerecht installiert und zuverlässig geerdet ist.

Die (+) oder (-) Ausgänge können geerdet werden oder unangeschlossen bleiben.

Die Abdeckung des Gerätes/das Gehäuse darf für den Benutzer nicht zugänglich sein.

Der Haupteingangsanschluss ist nicht für die Verwendung als Feldverdrahtungsanschluss geeignet.

Für ummantelt Produkte, verwenden Sie keine Schrauben, die das Gerät mehr als durchdringen; siehe Zeichnung
Eine interne Sicherung schützt das Gerät und darf durch den Benutzer nicht ausgetauscht werden. Im Fall von internen Defekten muss das Gerät an TDK-Lambda UK LTD oder einen der autorisierten Vertriebshändler zurückgeschickt werden.

Ein geeignetes mechanisches, elektrisches und brandgeschütztes Gehäuse muss als Schutz vor der Gefahr von mechanischen Risiken, Stromschlägen und Brandschutz in dem Endgerät vorgesehen werden.

Die Geräteabdeckung/das Gehäuse ist so entworfen, dass das Fachpersonal vor Gefahren geschützt wird. Sie dürfen nicht als Teil der externen Abdeckung für Geräte verwendet werden, die für den Betreiber zugänglich sein müssen, da Teile oder das gesamte Gerätegehäuse unter voller Auslastung übermäßige Temperaturen erreichen kann, die für den Zugang des Betreibers nicht mehr als sicher betrachtet werden.

FRANÇAIS

Consignes générales de sécurité:

LIRE LES CONSIGNES DE SECURITE

Entretien:
Ces produits ne peuvent pas être réparés par l'utilisateur. Seuls, TDK-Lambda UK LTD et ses agents agréés sont autorisés à effectuer des réparations.

Composants critiques:
Ces produits ne doivent pas être utilisés en tant que composants critiques dans des systèmes de commande nucléaire, dans des systèmes de sauvetage ou dans des équipements utilisés dans des environnements dangereux, sans l'autorisation écrite expresse du directeur général de TDK-Lambda EMEA.

Utilisation du produit:
Ces produits sont conçus pour être utilisés dans un équipement hôte dont l'accès n'est autorisé qu'aux personnes compétentes.
Ce produit est une alimentation considérée comme un composant devant être installé par des personnes qualifiées, dans un autre équipement. Il ne doit pas être utilisé en tant que produit fini.
Ce produit est destiné à la vente entre entreprises et peut être obtenu via des canaux de distribution.
Il n'est pas prévu à la vente pour les particuliers.

Ce produit est une alimentation considérée comme un composant, il ne relève pas du champ d'application de la directive CEM. Le respect de la directive CEM doit être pris en compte dans l'installation finale. Veuillez contacter votre bureau TDK-Lambda le plus proche.

Environnement:
Ces produits sont IPX0, et donc on ne doit pas utiliser des produits chimiques/solvants, des produits de nettoyage et d'autres liquides.

Environnement fonctionnel :
Cette alimentation fonctionne en mode commutation pour utilisation dans des applications fonctionnant dans un environnement avec Degré de Pollution 2 et catégorie de surtension II. Elle utilise des cartes des circuits imprimés (PCB) de Groupe IIIb.

Intensité soutirée:
L'intensité soutirée de l'alimentation ne doit pas dépasser l'intensité nominale marquée sur la plaque signalétique, sauf indications contraires dans les limitations du produit décrit dans ce manuel.

Paramètres d'entrée:
Ce produit doit être utilisé à l'intérieur des paramètres d'entrée indiqués dans les limitations du produit dans ce manuel.

Elimination en fin de vie:
L'alimentation contient des composants nécessitant des dispositions spéciales pour leur élimination. Vérifiez que cette alimentation est mise au rebut correctement en fin de vie utile et conformément aux réglementations locales en vigueur.

RISQUE DE CHOC ELECTRIQUE

Attention-Danger haute tension:
Des tensions dangereuses sont présentes dans l'alimentation. L'installateur doit protéger le personnel d'entretien contre un contact involontaire avec ces tensions dangereuses dans l'équipement final.

AVERTISSEMENT: Si ce produit est installé dans un équipement final de classe I, il doit être mis à la terre de manière fiable et installé par un professionnel averti.

Les sorties (+) ou (-) peuvent être raccordées à la terre ou laissées flotttantes.

Le couvercle/châssis de l'alimentation ne doit pas être accessible à l'utilisateur.Le connecteur d'entrée d'alimentation principale ne doit pas être utilisé comme borne de raccordement.

N'utilisez pas de vis pénétrant dans le module sur une profondeur supérieure à :Voir dessins.

Un fusible interne protège le module et ne doit pas être remplacé par l'utilisateur. En cas de défaut interne, le module doit être renvoyé à TDK-Lambda UK LTD ou l'un de ses agents agréés.

Une enceinte appropriée doit être prévue par l'utilisateur final pour assurer la protection contre les chocs mécaniques, les chocs électriques et l'incendie.

Le couvercle et le châssis du module sont conçus pour protéger des personnels expérimentés. Ils ne doivent pas être utilisés comme couvercles extérieurs d'un équipement, accessible aux opérateurs car en condition de puissance maximum, des parties du châssis peuvent atteindre des températures considérées comme dangereuses pour l'opérateur.

ITALIANO

Norme generali di sicurezza:

SI PREGA DI LEGGERE LE NORME DI SICUREZZA

Manutenzione:
Il cliente non può eseguire alcuna manutenzione su questi prodotti. L'esecuzione delle eventuali riparazioni è consentita solo a TDK-Lambda UK LTD e ai suoi agenti autorizzati.

Componenti critici:
Non si autorizza l'uso di questi prodotti come componenti critici all'interno di sistemi di controllo nucleari, sistemi necessari alla sopravvivenza o apparecchiature destinate all'impiego in ambienti pericolosi, senza l'esplicita approvazione scritta dell'Amministratore Delegato di TDK-Lambda EMEA.

Uso dei prodotti:
Questi prodotti sono progettati per l'uso all'interno di un'apparecchiatura ospite che limiti l'accesso al solo personale competente e autorizzato.
Questo prodotto è da considerarsi come un alimentatore professionale componente e come tale deve essere installato da personale qualificato all'interno di altre apparecchiature e non può essere utilizzato come prodotto indipendente.
Questo prodotto non è inteso per la vendita al dettaglio o agli utilizzatori finali.

Questo alimentatore è da considerarsi come un componente e come tale non è assogettato dagli scopi della direttiva EMC. Conformità alla direttiva EMC deve essere considerata nell'installazione finale di utilizzo. Gli uffici di TDK-Lambda Sas Succursale Italiana sono a vostra disposizione per ulteriori ragguagli.

Condizioni ambientali:
Questi prodotti sono classificati come IPX0, dunque non devono essere utilizzati sostanze chimiche/solventi, prodotti per la pulizia o liquidi di altra natura.

Ambiente:
Questo prodotto è un alimentatore a commutazione, destinato all'uso in applicazioni rientranti in ambienti con le seguenti caratteristiche: Livello inquinamento 2, Categoria sovratensione II. Questo prodotto contiene schede di circuiti stampati in materiali di Gruppo IIIb.

Carico in uscita:
La potenza in uscita ottenuta dall'alimentatore non deve superare la potenza nominale indicata sulla targhetta dell'alimentatore, fatto salvo dove indicato nei limiti per i prodotto specificati in questo manuale.

Parametri di alimentazione:
Questo prodotto deve essere utilizzato entro i parametri di alimentazione indicati nei limiti per il prodotto, specificati in questo manuale.

Smaltimento:
L'unità contiene componenti che richiedono procedure speciali di smaltimento. Accertarsi che l'unità venga smaltita in modo corretto al termine della vita utile e nel rispetto delle normative locali.

RISCHIO DI SCOSSA ELETTRICA

Avvertimento di alta tensione:
All'interno dell'alimentatore sono presenti tensioni pericolose. Gli installatori professionali devono proteggere il personale di manutenzione dal rischio di contatto accidentale con queste tensioni pericolose all'interno dell'apparecchiatura finale.

ATTENZIONE: Se installato in un'attrezzatura di classe I, questo prodotto deve essere collegato a terra in modo affidabile ed installato in modo professionale.

Le uscite (+) o (-) possono essere messa a terra o lasciate isolate.

I coperchi/il telaio dell'unità non devono essere accessibili da parte dell'utente.

Il connettore dell'alimentazione principale non può essere utilizzato come terminale di collegamento di campo.

Non utilizzare viti che penetrano nell'unità per più di : Vedi disegni

Un fusibile interno protegge l'unità e non deve essere sostituito dall'utente. Nell'eventualità di un difetto interno, restituire l'unità a TDK-Lambda UK LTD o a uno dei suoi agenti autorizzati.

L'apparecchiatura finale deve includere una recinzione meccanica, elettrica e antincendio per proteggere dai pericoli di natura meccanica, dalle scosse elettriche e dai pericoli di incendio.

Il coperchio/telaio dell'unità è realizzato per proteggere il personale esperto dai pericoli. Non deve essere usato come parte degli involucri esterni di qualsiasi apparecchiatura, se risulta accessibile da parte degli addetti, poiché è possibile che in condizioni di pieno carico una o più parti del telaio dell'unità giunga/giungano a temperature superiori ai limiti considerati sicuri per l'accesso da parte degli addetti.

ESPAÑOL

Instrucciones generales de seguridad:

LEA LAS INSTRUCCIONES DE SEGURIDAD

Servicio:
Estos productos no pueden ser reparados por los clientes. TDK-Lambda UK LTD. y sus agentes autorizados son los únicos que pueden llevar a cabo las reparaciones.

Componentes fundamentales:
Estos productos no pueden ser utilizados como componentes fundamentales en sistemas de control nuclear, sistemas de soporte vital o equipos a utilizar en entornos peligrosos sin el consentimiento expreso por escrito del Director General de TDK-Lambda EMEA.

Uso de los productos:
Estos productos han sido diseñados para ser utilizados en un equipo central que restrinja el acceso al personal cualificado autorizado.
Este producto es una fuente de alimentación y sólo puede ser instalado por personal cualificado dentro de otros equipos y no debe ser tratado como un producto independiente. Este producto debe ser vendido entre empresas profesionales y solo puede obtenerse a través de los canales de distribución .No está destinado para la venta a usuarios finales

Este producto es una fuente de alimentación y no se ve afectada por la directiva EMC . El cumplimiento de la directiva EMC se debe considerar en la instalación final. Por favor, póngase en contacto con su oficina local de TDK – Lambda.

Medioambiental:
Estos productos son IPX0 y, por tanto, no pueden utilizarse sustancias químicas/disolventes, agentes de limpieza ni otros líquidos.

Medio ambiente:
Esta fuente de alimentación es una fuente de alimentación de modo conmutado a utilizar en aplicaciones dentro de un entorno con un Grado de contaminación 2 y una Categoría de sobretensión II. En él se utilizan policloruros de bifenilo del Grupo de materiales IIIb.

Carga de salida:
La potencia de salida tomada de la fuente de alimentación no puede sobrepasar el valor nominal indicado en la etiqueta de la fuente de alimentación, excepto en los casos indicados en las limitaciones del producto en este manual.

Parámetros de entrada:
Este producto debe ser utilizado dentro de los parámetros de entrada indicados en las limitaciones del producto en este manual.

Desecho de la unidad:
La unidad contiene componentes que deben ser desechados de una manera especial. Asegúrese de desechar correctamente la unidad al final de su vida útil y conforme a las normas locales vigentes.

PELIGRO DE DESCARGAS ELÉCTRICAS

Advertencia de alta tensión:
En esta fuente de alimentación hay tensiones peligrosas. El instalador profesional debe proteger al personal de servicio contra cualquier contacto accidental con estas tensiones peligrosas en el equipo final.

ADVERTENCIA: La instalación de este producto en un equipo de clase I la deben llevar a cabo profesionales y el producto debe estar conectado a tierra.

La salida o salidas (+) o (-) pueden conectarse a tierra o se las puede dejar flotando.

Debe impedirse el acceso de los usuarios a la cubierta o cubiertas y al chasis de la unidad.

El conector de entrada de la red no es apto para ser utilizado a modo de bornes de cableado de campo.

No utilice tornillos de montaje susceptibles de penetrar en la unidad más de: Ver dibujos.

Un fusible interno protege la unidad y este no debe ser nunca reemplazado por el usuario. En caso de existir algún defecto interno, la unidad debe ser enviada a TDK-Lambda UK LTD o a uno de sus agentes autorizados.

El equipo de uso final debe constituir un recinto de protección mecánica, eléctrica y contra incendios de protección mecánica, contra descargas eléctricas y contra el peligro de incendios.

La cubierta/chasis de la unidad ha sido diseñada para que proteja a las personas cualificadas de los peligros. No deben ser utilizadas como parte de las cubiertas externas de cualquier equipo al que pueden acceder los operarios, ya que bajo unas condiciones de carga completa, la pieza o piezas del chasis de la unidad pueden alcanzar temperaturas superiores a las consideradas seguras para el acceso de los operarios.

PORTUGUÊS

Instruções gerais de segurança:

LEIA AS INSTRUÇÕES DE SEGURANÇA

Manutenção:
Estes produtos não são podem ser submetidos a manutenção por parte do cliente. Apenas a TDK-Lambda UK LTD e os seus agentes autorizados têm permissão para realizar reparações.

Componentes essenciais:
Não é autorizada a utilização destes produtos como componentes essenciais de sistemas de controlo nuclear, sistemas de suporte de vida ou equipamento para utilização em ambientes perigosos sem a expressa autorização por escrito do Director-Geral da TDK-Lambda EMEA.

Utilização do produto:
Estes produtos foram concebidos para utilização dentro de um equipamento de alojamento que apenas permita o acesso a pessoal qualificado autorizado.
Este produto é uma alimentaçao considerado com um componente para ser instalado por pessoas qualificadas, em outros equipamentos. Não deve ser usado como um produto acabado.
Este produto é destinado para venda entre as empresas e pode ser obtido através de canais de distribuição.
Não se destina à venda aos particulares.

Este produto é uma alimentaçao considerado com um componente, não é dentro do appliquation âmbito da directiva CEM.
Conformidade com a directiva CEM devem ser considerados na instalação final.
Entre em contacto com seu escritório TDK-Lambda mais próximo.

Ambiental:
Estes produtos são IPX0 e, como tal, não se devem utilizar químicos/solventes, agentes de limpeza e outros líquidos.

Ambiente:
Esta fonte de alimentação é uma fonte de alimentação do modo de comutação para utilização em aplicações com um Nível de Poluição 2 e ambientes da categoria de sobretensão II. São utilizadas placas de circuitos impressos do grupo de materiais IIIb.

Carga de saída:
A potência de saída extraída da fonte de alimentação não deve exceder a classificação assinalada na etiqueta da fonte de alimentação, excepto quando indicado nas limitações do produto neste guia.

Parâmetros de entrada:
Este produto deve ser utilizado dentro dos parâmetros de entrada indicados nas limitações do produto neste guia.

Eliminação no fim de vida:
A unidade contém componentes que necessitam de procedimentos especiais de eliminação. Certifique-se de que a unidade é devidamente eliminada no fim da sua vida útil e que tal é feito em conformidade com os regulamentos locais.

RISCO DE CHOQUE ELÉCTRICO

Aviso de alta tensão:
Estão presentes tensões perigosas dentro da fonte de alimentação. O profissional que realizar a instalação deve proteger o pessoal de assistência contra contactos inadvertidos com estas tensões perigosas do equipamento final.

AVISO: Quando instalado num equipamento de Classe I, este produto deve ser ligado à terra de forma fiável e instalado por um profissional.
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As saídas (+) e (-) podem ser ligadas à terra ou deixadas soltas.

O chassis/cobertura(s) da unidade não deve estar acessível ao utilizador.

O conector de entrada de alimentação não deve ser utilizado como terminal de cablagens no local.

Não utilize parafusos de montagem, uma vez que estes penetrarão na unidade em mais do que: Veja os desenhos

Existe um fusível interno que protege a unidade e que não deve ser substituído pelo utilizador. Em caso de defeito interno, a unidade deve ser devolvida à TDK-Lambda UK LTD ou a um dos seus agentes autorizados.

O equipamento de utilização final deve fornecer um bastidor com protecção mecânica, eléctrica e contra incêndios adequada.

O chassis/cobertura da unidade está concebido de forma a proteger o pessoal especializado de perigos. Não devem ser utilizados como parte das coberturas externas de qualquer equipamento em que possam estar acessíveis aos operadores, uma vez que em condições de carga máxima, algumas peças do chassis da unidade podem atingir temperaturas superiores às consideradas seguras para o acesso do operador.

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TDK·Lambda

Advance Data Sheet: Belleta® iEA Series –Single Output Eighth Brick

Belleta® iEA Series DC/DC Power Modules
48V Input, 4.5A Output
Eighth Brick

The Belleta Series offers an industry standard eighth brick power module with true useable power. Thanks to its low component count and single-board open-frame design, it provides both better electrical and thermal performance, and lower cost than many other suppliers' eighth brick product offerings. Belleta® modules are perfect for both next generation planning and cost reduction design environments

Standard Features:

- Size – 58.4mm x 22.9 mm x 8.8 mm (2.3 in. x 0.9 in. x 0.347 in.)
- Thru-hole pins 3.68 mm (0.145")
- High efficiency – greater than 90%
- 1500Vdc isolation voltage
- Meets basic insulation spacing requirements
- Constant switching frequency
- Industry Standard Footprint
- Output Voltage Adjustment
- Remote on/off (positive logic)
- Remote sense
- Auto-recovering output over-voltage protection
- Auto-recovering output over-current protection
- Auto-recovering output short circuit protection
- Auto-recovering over-temperature protection
- UL 60950 (US and Canada), VDE 0805, CB scheme (IEC950), CE Mark (EN60950)
- ISO Certified manufacturing facilities
- Patented Design

Optional Features:

- Remote on/off (negative logic)
- Latching output over-voltage protection
- Short Thru-hole pins 2.79 mm (0.110")
- Long Thru-hole pins 5.08 mm (0.200")

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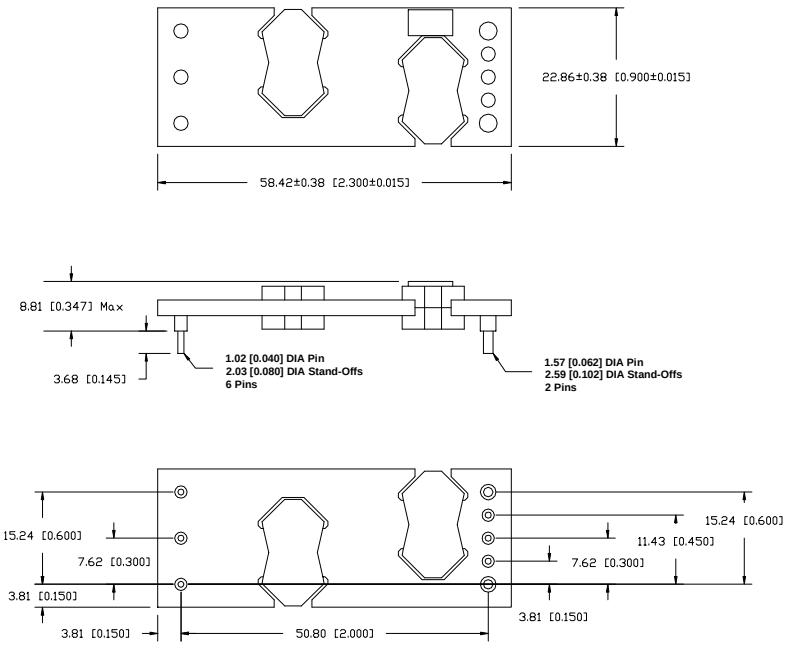
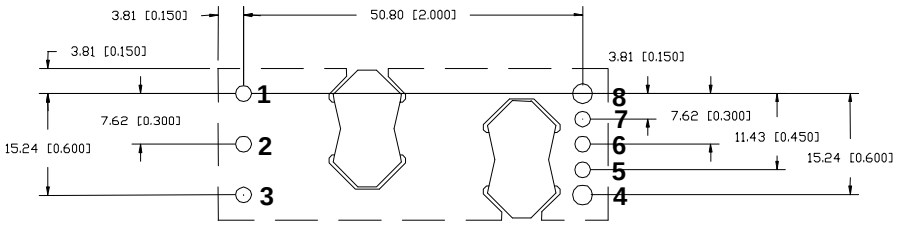
Mechanical Specification:

Dimensions are in mm [in]. Unless otherwise specified tolerances are: x.x ± 0.5 [0.02], x.xx and x.xxx ± 0.25 [0.010].



Recommended Hole Pattern: (top view)



Pin Assignment:

PIN	FUNCTION	PIN	FUNCTION
1	Vin(+)	4	Vo(-)
2	On/Off	5	Sense(-)
3	Vin(-)	6	Trim
		7	Sense(+)
		8	Vo(+)

Pin base material is brass with tin plating; the maximum module weight is 30.4g (1.07 oz).

Absolute Maximum Ratings:

Stress in excess of Absolute Maximum Ratings may cause permanent damage to the device.

Characteristic	Min	Max	Unit	Notes & Conditions
Continuous Input Voltage	-0.5	80	Vdc	
Transient Input Voltage	---	100	Vdc	100mS max.
Isolation Voltage	---	1500	Vdc	
Storage Temperature	-55	125	˚C	
Operating Temperature Range (Tc)	-40	125	˚C	Measured at the location specified in the thermal measurement figure. Maximum temperature varies with model number, output current, and module orientation – see curve in thermal performance section of the data sheet.

Input Characteristics:

Unless otherwise specified, specifications apply over all Rated Input Voltage, Resistive Load, and Temperature conditions.

Characteristic	Min	Typ	Max	Unit	Notes & Conditions
Operating Input Voltage	36	48	75	Vdc	
Maximum Input Current	---	---	4	A	Vin = 0 to Vin,max
Turn-on Voltage	---	33	---	Vdc	
Turn-off Voltage	26	30	---	Vdc	
Hysteresis	0.5	3	---	Vdc	
Startup Delay Time from application of input voltage (28V output)	---	45	---	mS	Vo = 0 to 0.1*Vo,nom; on/off =on, Io=Io,max, Tc=25˚C
Startup Delay Time from application of input voltage (15V, 18V outputs)	---	10	---		
Startup Delay Time from on/off (28V output)	---	45	---	mS	Vo = 0 to 0.1*Vo,nom; Vin= Vin,nom, Io=Io,max, Tc=25˚
Startup Delay Time from on/off (15V, 18V outputs)	---	10	---		
Output Voltage Rise Time (28V output)	---	35	---	mS	Io=Io,max,Tc=25˚C, Vo=0.1 to 0.9*Vo,nom
Output Voltage Rise Time (15V, 18V outputs)	---	8	---		
Inrush Transient	---	---	0.2	A^2s	
Input Reflected Ripple	---	15*	---	mApp	See input/output ripple and noise measurements figure; BW = 20 MHz
Input Ripple Rejection	---	55*	---	dB	@120Hz

Caution: The power modules are not internally fused. An external input line normal blow fuse with a maximum value of 10A is required, see the Safety Considerations section of the data sheet.

Electrical Data:

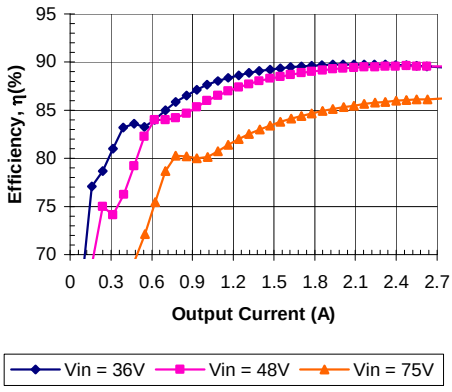
iEA48003A280V-000 through -007: 28V, 2.67A Output

Characteristic	Min	Typ	Max	Unit	Notes & Conditions
Output Voltage Initial Setpoint	27.16	28	28.84	Vdc	Vin=Vin,nom; Io=Io,max; Tc = 25˚C
Output Voltage Tolerance	26.88	28	29.12	Vdc	Over all rated input voltage, load, and temperature conditions to end of life
Efficiency	---	90	---	%	Vin=Vin,nom; Io=Io,max; Tc = 25˚C
Line Regulation	---	20	70	mV	Vin=Vin,min to Vin,max
Load Regulation	---	15	70	mV	Io=Io,min to Io,max
Temperature Regulation	---	90	450	mV	Tc=Tc,min to Tc,max
Output Current	0.3*	---	2.67	A	At loads less than Io,min the module will continue to regulate the output voltage, but the output ripple may increase
Output Current Limiting Threshold	---	4	---	A	Vo = 0.9*Vo,nom, Tc<Tc,max
Short Circuit Current	---	3	---	A	Vo = 0.25V, Tc = 25˚C
Output Ripple and Noise Voltage	---	80	250*	mVpp	Measured across one 3.3 uF ceramic capacitor and a 10uF tantalum capacitor – see input/output ripple measurement figure; BW = 20MHz
	---	20	---	mVrms	
Output Voltage Adjustment Range	70	---	110	%Vo,nom	
Output Voltage Sense Range	---	---	10	%Vo,nom	
Dynamic Response: Recovery Time Transient Voltage	--- ---	100 370	--- ---	uS mV	di/dt = 0.1A/uS, Vin=Vin,nom; load step from 50% to 75% of Io,max
Output Voltage Overshoot during startup	---	---	10*	%	Vin=Vin,nom; Io=Io,max,Tc=25˚C
Switching Frequency	---	450	---	kHz	Fixed
Output Over Voltage Protection	32*	---	38*	V	
External Load Capacitance	0	---	470&*	uF	
Isolation Capacitance	---	1000	---	pF	
Isolation Resistance	10	---	---	MΩ	
Vref		1.225		V	Required for trim calculation

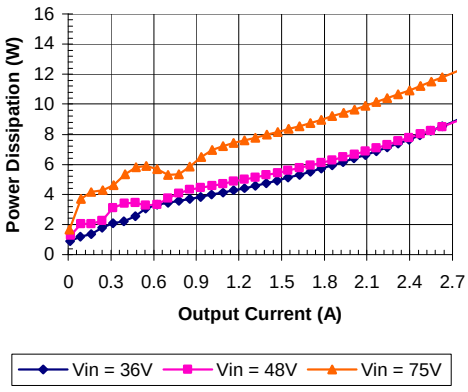
& Contact TDK - Lambda Americas for applications that require additional capacitance or very low esr
* engineering estimate

Electrical Characteristics (continued):

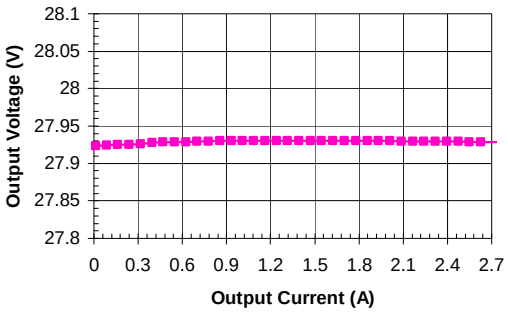
iEA48003A280V-000 through -007: 28V, 2.67A Output



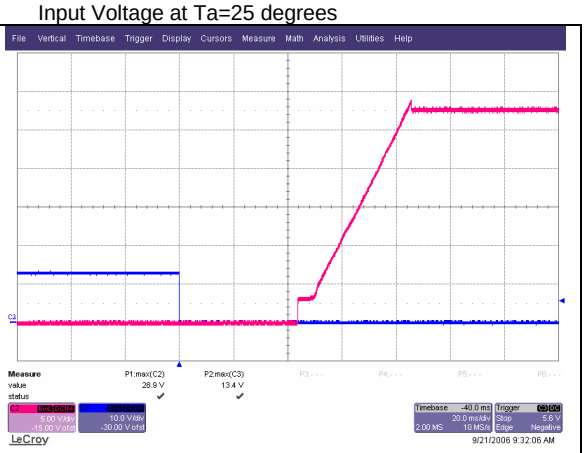
iEA48003A280V-000 Typical Efficiency vs. Input Voltage at Ta=25 degrees.



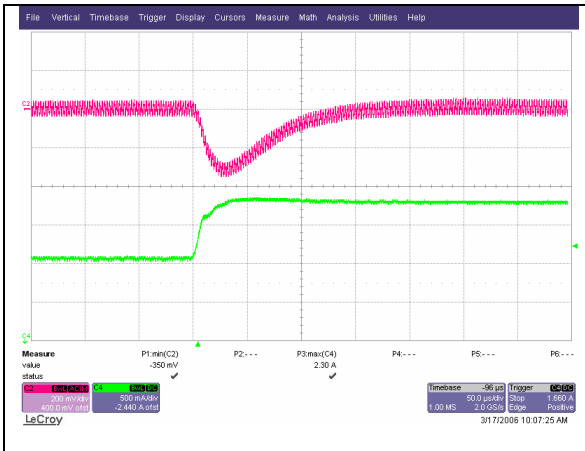
iEA48003A280V-000 Typical Power Dissipation vs. Input Voltage at Ta=25 degrees



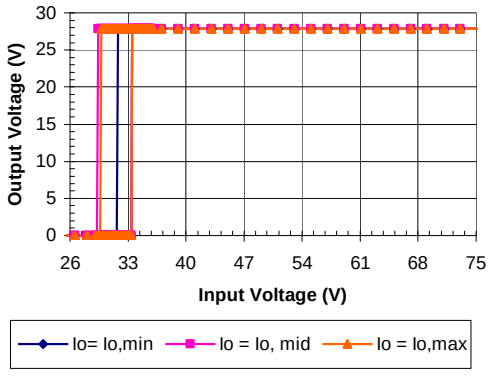
iEA48003A280V-000 Typical Output Voltage vs. Load Current at Ta = 25 degrees and Vin = 48V.



iEA48003A280V-001 Typical startup characteristic from on/off at full load. Blue - on/off signal, Red – output voltage (20ms/div)



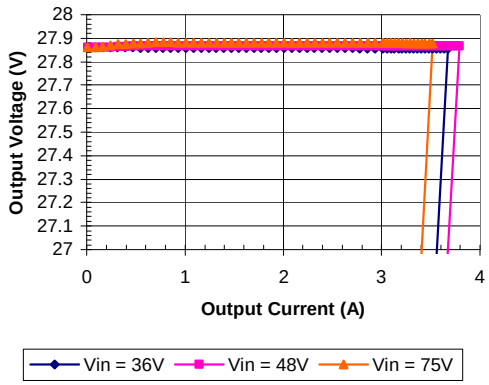
iEA48003A280V-000 Typical Output voltage response to load step from 50% to 75% of full load with output current slew rate of 0.1A/uS.



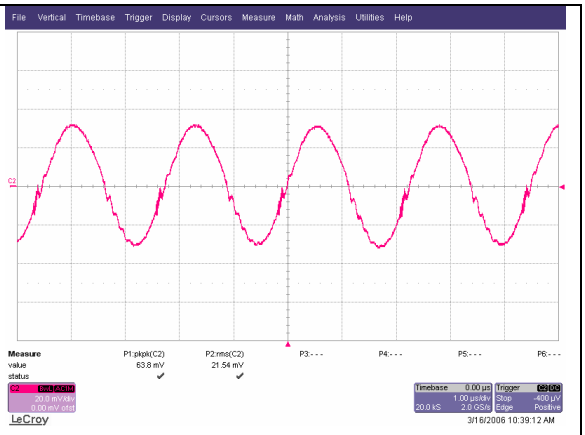
iEA48003A280V-000 Typical Output Voltage vs. Input Voltage Characteristics

Electrical Characteristics (continued):

iEA48003A280V-000 through -007: 28V, 2.67A Output



iEA48003A280V-000 Typical Output Current Limit Characteristics vs. Input Voltage at Ta=25 degrees.



iEA48003A280V-000 Typical Output Ripple at nominal input voltage and full load at Ta=25 degrees (20mV/div)

% Change of Vout	Trim Down Resistor	% Change of Vout	Trim Up Resistor
-5%	51.9K	+5%	1372K
-10%	21.9K	+10%	716K

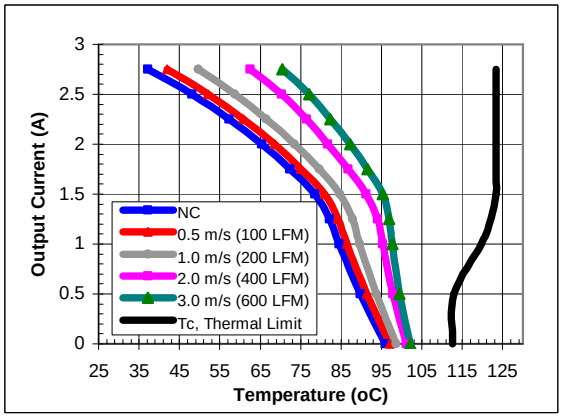
e.g. trim up 5%

$$Rup := \left[\frac{3 \times 28 \cdot (100 + 5)}{1.225 \times 5} - \frac{300}{5} - 8.1 \right] \cdot K$$

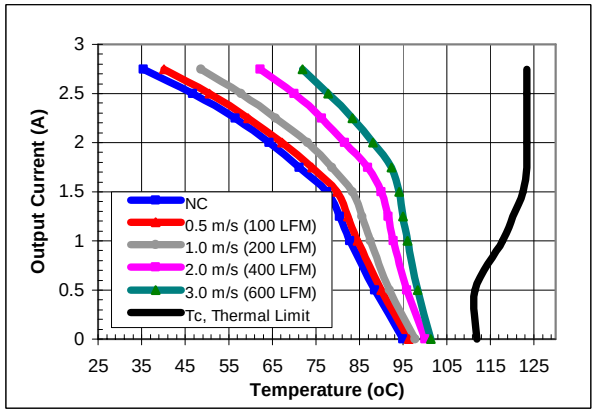
iEA48003A280V-000 Calculated resistor values for output voltage adjustment

Thermal Performance:

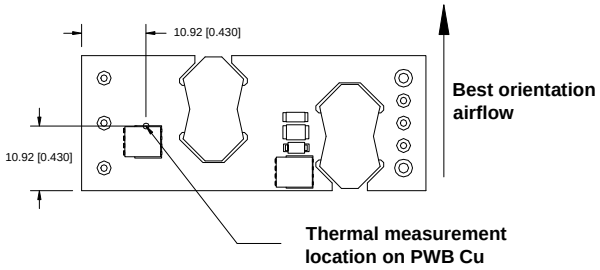
iEA48003A280V-000 through -007: 28V, 2.67A Output



iEA48003A280V-000 maximum output current vs. ambient temperature at nominal input voltage for airflow rates natural convection (60lfm) to 600lfm with airflow from pin 3 to pin 1.



iEA48003A280V-000 maximum output current vs.ambient temperature at nominal input voltage for airflow rates natural convection (60lfm) to 600lfm with airflow from pin 1 to pin 3.



iEA48003A280V-000 thermal measurement location – top view

The thermal curves provided above are based upon measurements made in TDK - Lambda Americas' experimental test setup that is described in the Thermal Management section. Due to the large number of variables in system design, TDK - Lambda Americas recommends that the user verify the module's thermal performance in the end application. The critical component should be thermo coupled and monitored, and should not exceed the temperature limit specified in the derating curve above. It is critical that the thermocouple be mounted in a manner that gives direct thermal contact or significant measurement errors may result. TDK - Lambda Americas can provide modules with a thermocouple pre-mounted to the critical component for system verification tests.

Electrical Data:

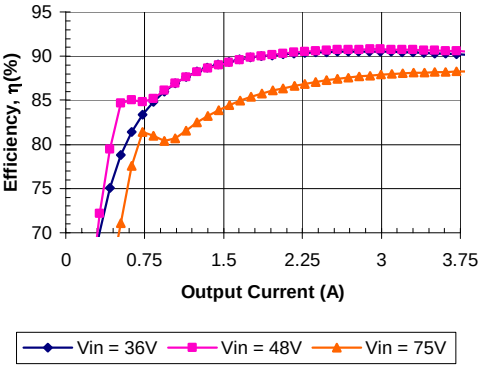
iEA48004A180V-000 through -007: 18V, 3.75A Output

Characteristic	Min	Typ	Max	Unit	Notes & Conditions
Output Voltage Initial Setpoint	17.5	18	18.5	Vdc	Vin=Vin,nom; Io=Io,max; Tc = 25˚C
Output Voltage Tolerance	17.28	18	18.72	Vdc	Over all rated input voltage, load, and temperature conditions to end of life
Efficiency	---	90.5	---	%	Vin=Vin,nom; Io=Io,max; Tc = 25˚C
Line Regulation	---	10	45	mV	Vin=Vin,min to Vin,max
Load Regulation	---	10	45	mV	Io=Io,min to Io,max
Temperature Regulation	---			mV	Tc=Tc,min to Tc,max
Output Current	0.37	---	3.75	A	At loads less than Io,min the module will continue to regulate the output voltage, but the output ripple may increase
Output Current Limiting Threshold	---	4.4	---	A	Vo = 0.9*Vo,nom, Tc<Tc,max
Short Circuit Current	---	1	---	A	Vo = 0.25V, Tc = 25˚C
Output Ripple and Noise Voltage	---	50	200*	mVpp	Measured across one 3.3 uF ceramic capacitor and a 10uF tantalum capacitor – see input/output ripple measurement figure; BW = 20MHz
	---	15	---	mVrms	
Output Voltage Adjustment Range	90	---	110	%Vo,nom	Module should be trimmed down or left at nominal voltage until input voltage is above 40Vin.
Output Voltage Sense Range	---	---	10	%Vo,nom	
Dynamic Response: Recovery Time Transient Voltage	--- ---	100 300	--- ---	uS mV	di/dt = 0.1A/uS, Vin=Vin,nom; load step from 50% to 75% of Io,max
Output Voltage Overshoot during startup	---	---	10*	%	Vin=Vin,nom; Io=0.5*Io,max,Tc=25˚C
Switching Frequency	---	375	---	kHz	Fixed
Output Over Voltage Protection	20*	---	26*	V	
External Load Capacitance	0	---	1000&	uF	
Isolation Capacitance	---	1000	---	pF	
Isolation Resistance	10	---	---	MΩ	
Vref		1.225		V	Required for trim calculation

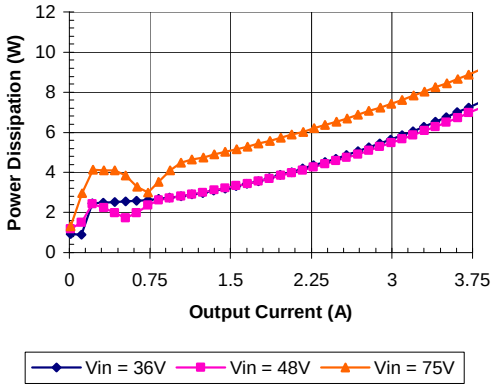
& Contact TDK - Lambda Americas for applications that require additional capacitance or very low esr
* engineering estimate

Electrical Characteristics (continued):

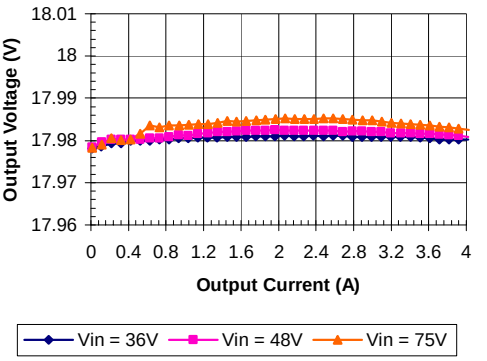
iEA48004A180V-000 through -007: 18V, 3.75A Output



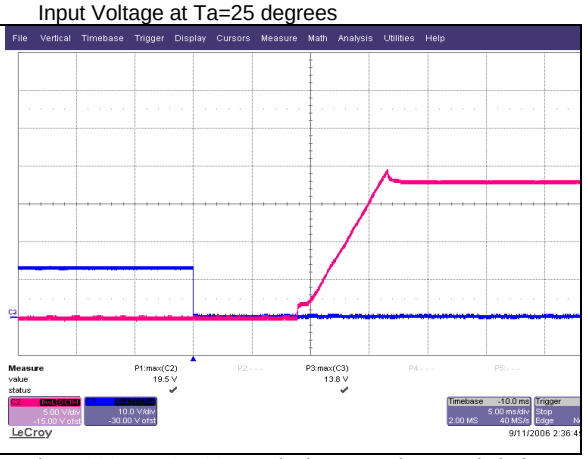
iEA48004A180V-000 Typical Efficiency vs. Input Voltage at Ta=25 degrees.



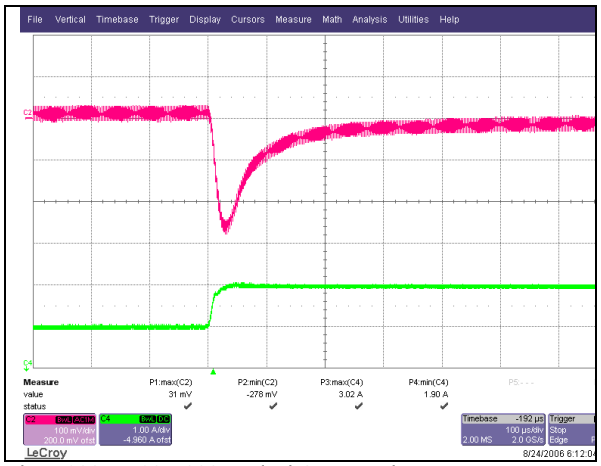
iEA48004A180V-000 Typical Power Dissipation vs. Input Voltage at Ta=25 degrees



iEA48004A180V-000 Typical Output Voltage vs. Load Current at Ta = 25 degrees



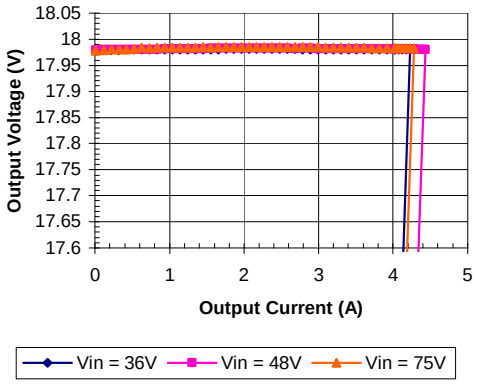
iEA48004A180V-001 Typical startup characteristic from on/off at full load. Ch 3 - on/off signal, Ch 2 – output voltage (5ms/div)



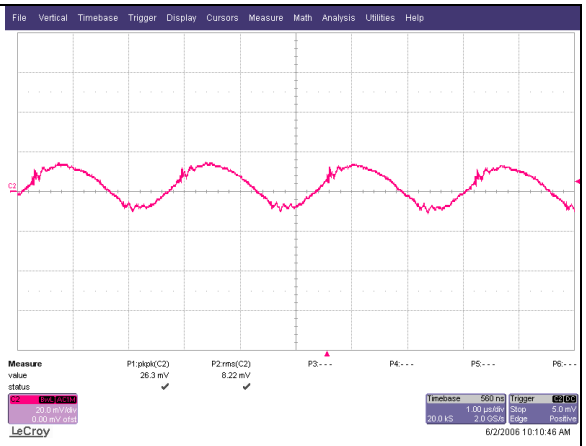
iEA48004A180V-000 Typical Output voltage response to load step from 50% to 75% of full load with output current slew rate of 0.1A/uS.

Electrical Characteristics (continued):

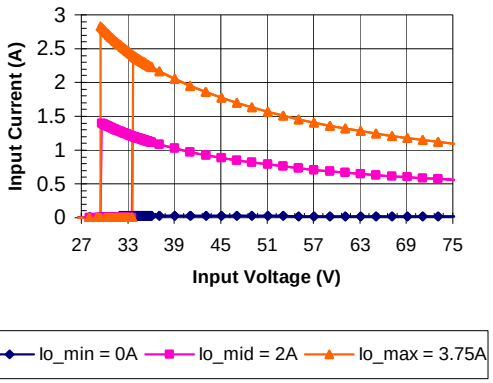
iEA48004A180V-000 through -007: 18V, 3.75A Output



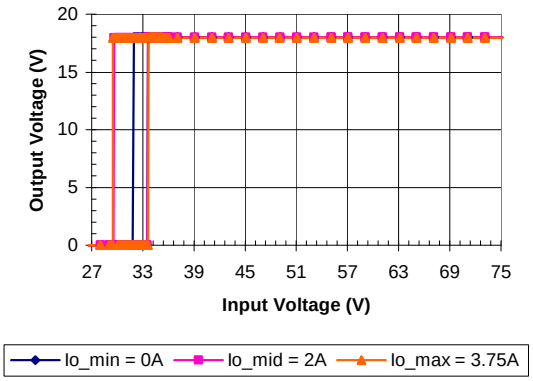
iEA48004A180V-000 Typical Output Current Limit Characteristics vs. Input Voltage at Ta=25 degrees.



iEA48004A180V-000 Typical Output Ripple at nominal input voltage and full load at Ta=25 degrees (20mV/div)



iEA48004A180V-000 Typical Input Current vs. Input Voltage Characteristics



iEA48004A180V-000 Typical Output Voltage vs. Input Voltage Characteristics

% Change of Vout	Trim Down Resistor	% Change of Vout	Trim Up Resistor
-5%	91.8K	+5%	1462K
-10%	40.8K	+10%	763K

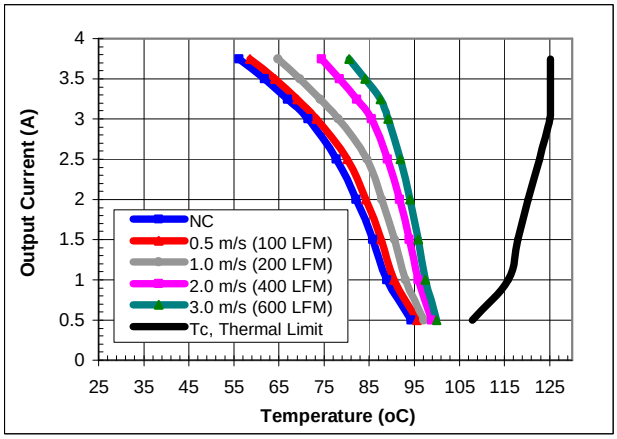
e.g. trim up 5%

$$Rup := \left[\frac{5.1 \times 18 \cdot (100 + 5)}{1.225 \times 5} - \frac{510}{5} - 10.2 \right] \cdot K$$

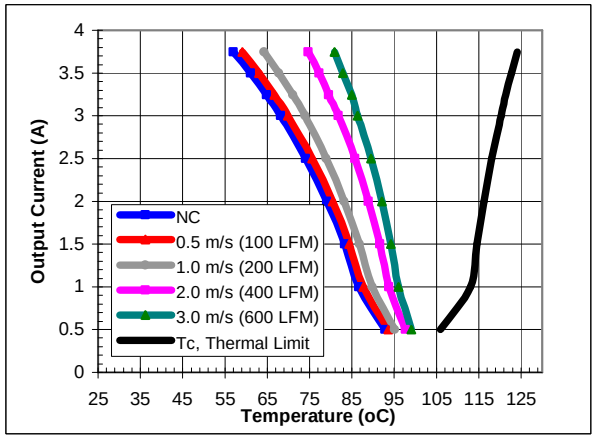
iEA48004A180V-000 Calculated resistor values for output voltage adjustment

Thermal Performance:

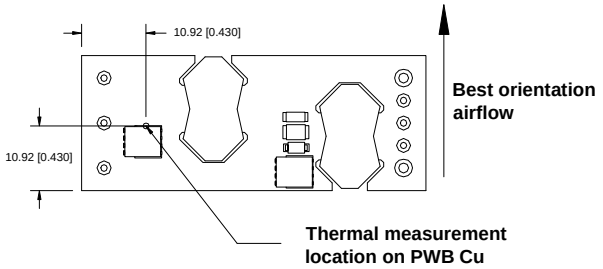
iEA48004A180V-000 through -007: 18V, 3.75A Output



iEA48004A180V-000 maximum output current vs. ambient temperature at nominal input voltage for airflow rates natural convection (60lfm) to 600lfm with airflow from pin 3 to pin 1.



iEA48004A180V-000 maximum output current vs.ambient temperature at nominal input voltage for airflow rates natural convection (60lfm) to 600lfm with airflow from pin 1 to pin 3.



iEA48004A180V-000 thermal measurement location – top view

The thermal curves provided above are based upon measurements made in TDK - Lambda Americas' experimental test setup that is described in the Thermal Management section. Due to the large number of variables in system design, TDK - Lambda Americas recommends that the user verify the module's thermal performance in the end application. The critical component should be thermo coupled and monitored, and should not exceed the temperature limit specified in the derating curve above. It is critical that the thermocouple be mounted in a manner that gives direct thermal contact or significant measurement errors may result. TDK - Lambda Americas can provide modules with a thermocouple pre-mounted to the critical component for system verification tests.

Electrical Data:

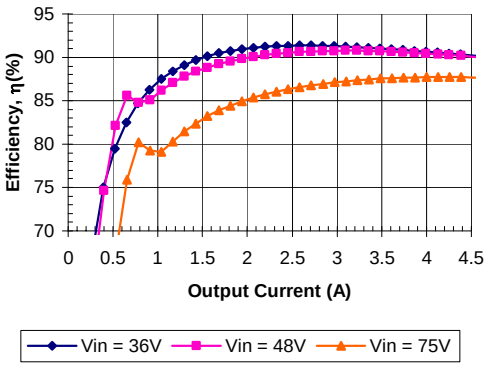
iEA48005A150V-000 through -007: 15V, 4.5A Output

Characteristic	Min	Typ	Max	Unit	Notes & Conditions
Output Voltage Initial Setpoint	14.55	15	15.45	Vdc	Vin=Vin,nom; Io=Io,max; Tc = 25˚C
Output Voltage Tolerance	14.47	15	15.52	Vdc	Over all rated input voltage, load, and temperature conditions to end of life
Efficiency	---	90	---	%	Vin=Vin,nom; Io=Io,max; Tc = 25˚C
Line Regulation	---	10	35	mV	Vin=Vin,min to Vin,max
Load Regulation	---	10	35	mV	Io=Io,min to Io,max
Temperature Regulation	---	60	300	mV	Tc=Tc,min to Tc,max
Output Current	0.45*	---	4.5	A	At loads less than Io,min the module will continue to regulate the output voltage, but the output ripple may increase
Output Current Limiting Threshold	---	6	---	A	Vo = 0.9*Vo,nom, Tc<Tc,max
Short Circuit Current	---	9	---	A	Vo = 0.25V, Tc = 25˚C
Output Ripple and Noise Voltage	---	40	150*	mVpp	Measured across one 3.3 uF ceramic capacitor and a 10uF tantalum capacitor – see input/output ripple measurement figure; BW = 20MHz
	---	10	---	mVrms	
Output Voltage Adjustment Range	90	---	110	%Vo,nom	
Output Voltage Sense Range	---	---	10	%Vo,nom	
Dynamic Response: Recovery Time Transient Voltage	--- ---	200 250	--- ---	uS mV	di/dt = 0.1A/uS, Vin=Vin,nom; load step from 50% to 75% of Io,max
Output Voltage Overshoot during startup	---	---	10*	%	Vin=Vin,nom; Io=Io,max,Tc=25˚C
Switching Frequency	---	300	---	kHz	Fixed
Output Over Voltage Protection	16.8	---	22	V	
External Load Capacitance	0	---	1500&	uF	
Isolation Capacitance	---	1000	---	pF	
Isolation Resistance	10	---	---	MΩ	
Vref		1.225		V	Required for trim calculation

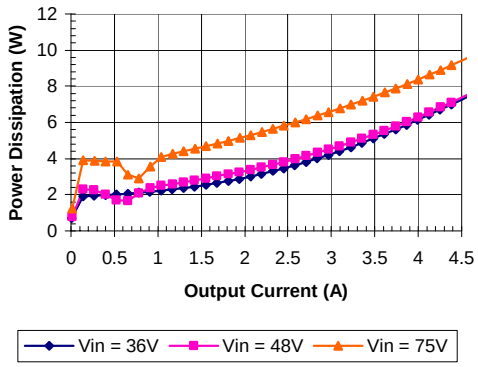
& Contact TDK - Lambda Americas for applications that require additional capacitance or very low esr
* engineering estimate

Electrical Characteristics (continued):

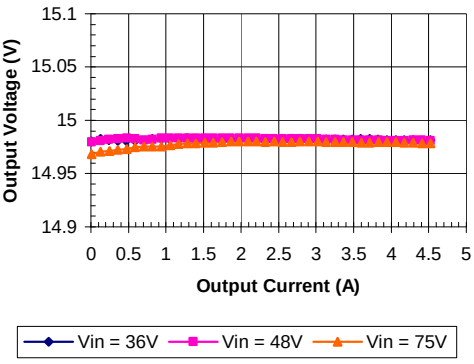
iEA48005A150V-000 through -007: 15V, 4.5A Output



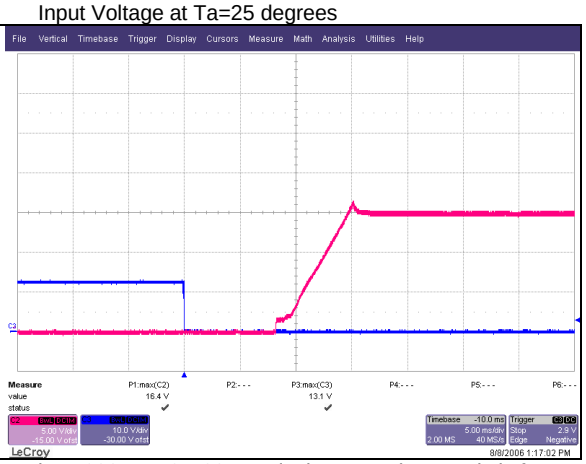
iEA48005A150V-000 Typical Efficiency vs. Input Voltage at Ta=25 degrees.



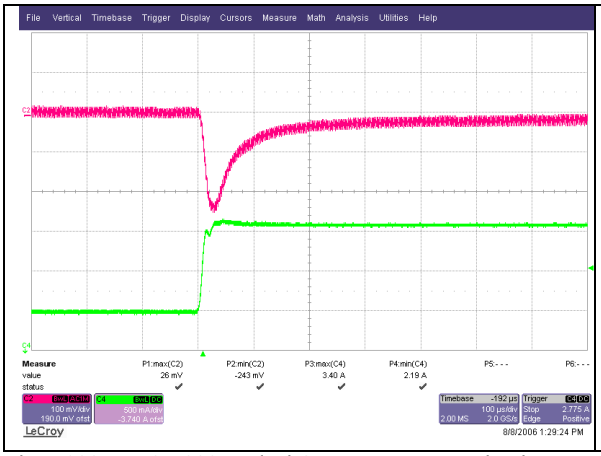
iEA48005A150V-000 Typical Power Dissipation vs. Input Voltage at Ta=25 degrees



iEA48005A150V-000 Typical Output Voltage vs. Load Current at Ta = 25 degrees



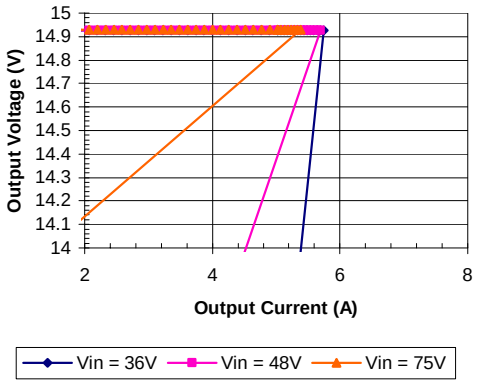
iEA48005A150V-001 Typical startup characteristic from on/off at full load. Ch 2 - on/off signal, Ch 1 – output voltage (5ms/div)



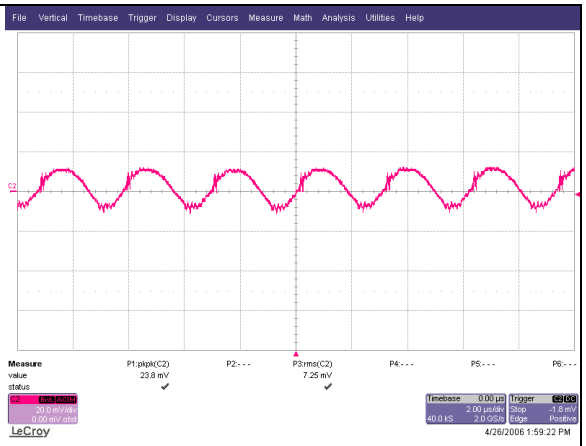
iEA48005A150V-000 Typical Output response to load step from 50% to 75% of full load with output current slew rate of 0.1A/uS. Ch2 – 100mV/div, 100uS/div

Electrical Characteristics (continued):

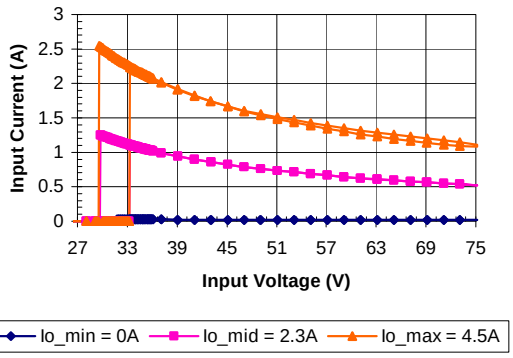
iEA48005A150V-000 through -007: 15V, 4.5A Output



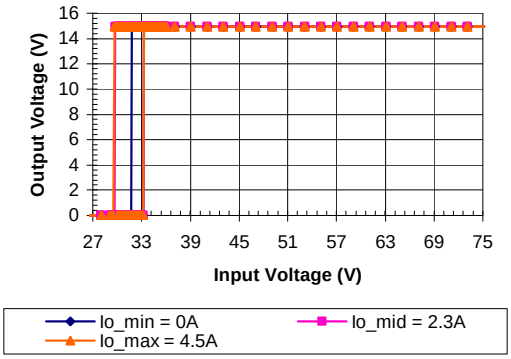
iEA48005A150V-000 Typical Output Current Limit Characteristics vs. Input Voltage at Ta=25 degrees.



iEA48005A150V-000 Typical Output Ripple at nominal input voltage and full load at Ta=25 degrees (20mV/div)



iEA48005A150V-000 Typical Input Current vs. Input Voltage Characteristics



iEA48005A150V-000 Typical Output Voltage vs. Input Voltage Characteristics

% Change of Vout	Trim Down Resistor (Kohm)	% Change of Vout	Trim Up Resistor (Kohm)
-5%	91.8K	+5%	1199K
-10%	40.8K	+10%	626K

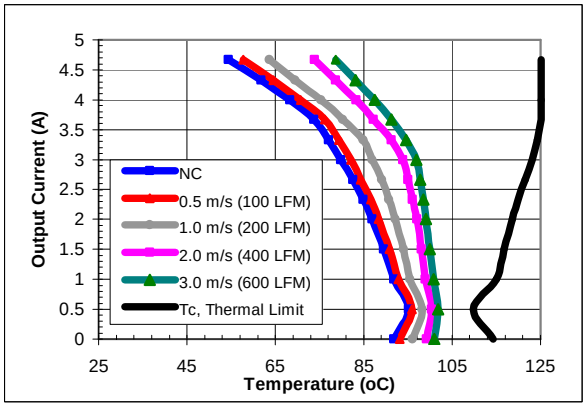
e.g. trim up 5%

$$Rup := \left[\frac{5.1 \times 15 \cdot (100 + 5)}{1.225 \times 5} - \frac{510}{5} - 10.2 \right] \cdot K$$

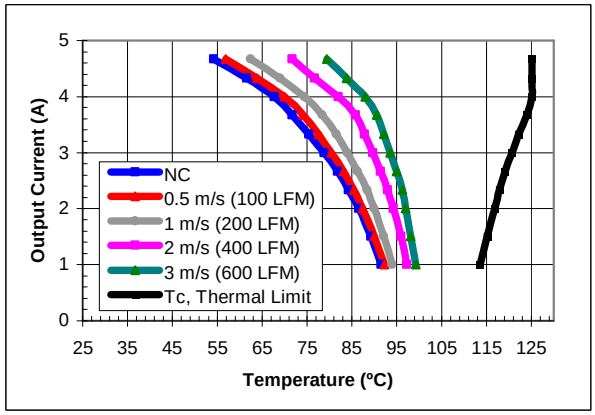
iEA48005A150V-000 Calculated resistor values for output voltage adjustment

Thermal Performance:

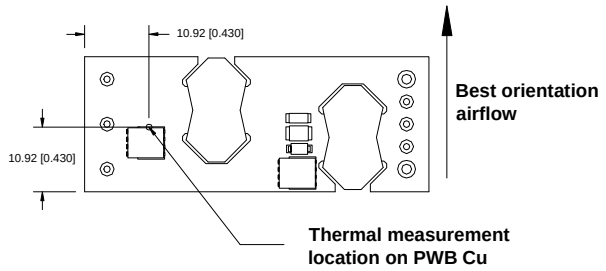
iEA48005A150V-000 through -007: 15V, 4.5A Output



iEA48005A150V-000 maximum output current vs. ambient temperature at nominal input voltage for airflow rates natural convection (60lfm) to 600lfm with airflow from pin 3 to pin 1.



iEA48005A150V-000 maximum output current vs.ambient temperature at nominal input voltage for airflow rates natural convection (60lfm) to 600lfm with airflow from pin 1 to pin 3.



iEA48005A150V-000 thermal measurement location – top view

The thermal curves provided above are based upon measurements made in TDK - Lambda Americas' experimental test setup that is described in the Thermal Management section. Due to the large number of variables in system design, TDK - Lambda Americas recommends that the user verify the module's thermal performance in the end application. The critical component should be thermo coupled and monitored, and should not exceed the temperature limit specified in the derating curve above. It is critical that the thermocouple be mounted in a manner that gives direct thermal contact or significant measurement errors may result. TDK - Lambda Americas can provide modules with a thermocouple pre-mounted to the critical component for system verification tests.

Thermal Management:

An important part of the overall system design process is thermal management; thermal design must be considered at all levels to ensure good reliability and lifetime of the final system. Superior thermal design and the ability to operate in severe application environments are key elements of a robust, reliable power module.

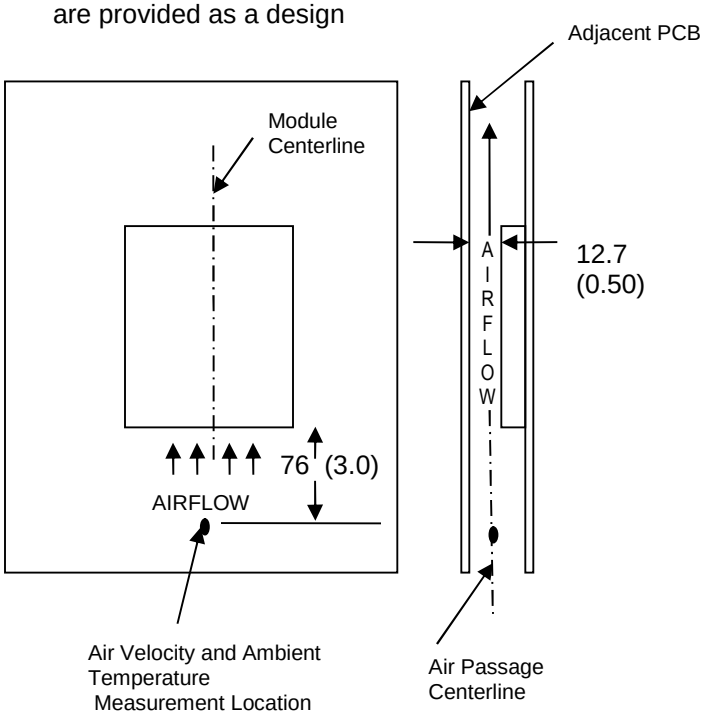
A finite amount of heat must be dissipated from the power module to the surrounding environment. This heat is transferred by the three modes of heat transfer: convection, conduction and radiation. While all three modes of heat transfer are present in every application, convection is the dominant mode of heat transfer in most applications. However, to ensure adequate cooling and proper operation, all three modes should be considered in a final system configuration.

The open frame design of the power module provides an air path to individual components. This air path improves convection cooling to the surrounding environment, which reduces areas of heat concentration and resulting hot spots.

Test Setup: The thermal performance data of the power module is based upon measurements obtained from a wind tunnel test with the setup shown in the wind tunnel figure. This thermal test setup replicates the typical thermal environments encountered in most modern electronic systems with distributed power architectures. The electronic equipment in networking, telecom, wireless, and advanced computer systems operates in similar environments and utilizes vertically mounted PCBs or circuit cards in cabinet racks.

The power module, as shown in the figure, is mounted on a printed circuit board (PCB) and is vertically oriented within the wind tunnel. The cross section of the airflow passage is rectangular. The spacing between the top of the module and a parallel facing PCB is kept at a constant (0.5 in). The power module's orientation with respect to the airflow direction can have a significant impact on the module's thermal performance.

Thermal Derating: For proper application of the power module in a given thermal environment, output current derating curves are provided as a design guideline on the Thermal Performance section for the power module of interest. The module temperature should be measured in the final system configuration to ensure proper thermal management of the power module. For thermal performance verification, the module temperature should be measured at the component indicated in the thermal measurement location figure on the thermal performance page for the power module of interest. In all conditions, the power module should be operated below the maximum operating temperature shown on the derating curve. For improved design margins and enhanced system reliability, the power module may be operated at temperatures below the maximum rated operating temperature.



Wind Tunnel Test Setup Figure Dimensions are in millimeters and (inches).

Heat transfer by convection can be enhanced by increasing the airflow rate that the power module experiences. The maximum output current of the power module is a function of ambient temperature (T_{AMB}) and airflow rate as shown in the thermal performance figures on the thermal performance page for the power module of interest. The curves in the figures are shown for natural convection through 2 m/s (400 ft/min). The data for the natural convection condition has been collected at 0.3 m/s (60 ft/min) of airflow, which is the typical airflow generated by other heat dissipating components in many of the systems that these types of modules are used in. In the final system configurations, the airflow rate for the natural convection condition can vary due to temperature gradients from other heat dissipating components.

Operating Information:

Over-Current Protection: The power modules have current limit protection to protect the module during output overload and short circuit conditions. During overload conditions, the power modules may protect themselves by entering a hiccup current limit mode. The modules will operate normally once the output current returns to the specified operating range. There is a typical delay of 30mS from the time an overload condition appears at the module output until the hiccup mode will occur.

Output Over-Voltage Protection: The power modules have a control circuit, independent of the primary control loop that reduces the risk of over voltage appearing at the output of the power module during a fault condition. If there is a fault in the primary regulation loop, the over voltage protection circuitry will cause the power module to enter a hiccup over-voltage mode once it detects that the output voltage has reached the level indicated on the Electrical Data section for the power module of interest. When the condition causing the over-voltage is corrected, the module will operate normally.

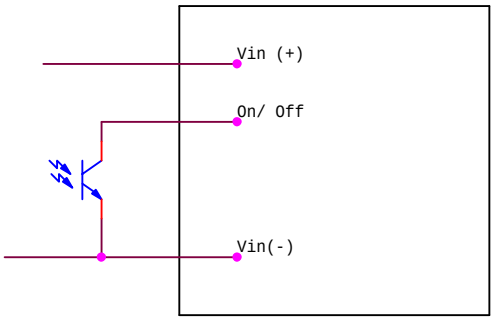
An optional latching over-voltage protection is available. On modules with this feature, the power module will shut down once it detects that the output voltage has reached the level indicated on the Electrical Data section for the power module of interest. The module remains off unless the input voltage is recycled.

Thermal Protection: When the power modules exceed the maximum operating temperature, the modules may turn off to safeguard the power unit against thermal damage. The module will auto restart as the unit is cooled below the over temperature threshold. On modules with the latching over-voltage protection feature, the unit may latch off during a severe over temperature condition; the module remains off unless the input voltage is recycled.

Remote On/Off: - The power modules have an internal remote on/off circuit. The user must supply an open-collector or compatible switch between the Vin(-) pin and the on/off pin. The maximum voltage generated by the power module at the on/off terminal is 15V. The maximum allowable leakage current of the switch is 50uA. The switch must be capable of maintaining a low signal Von/off < 1.2V while sinking 1mA.

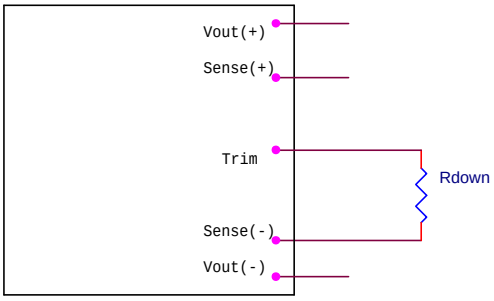
The standard on/off logic is positive logic. The power module will turn on if terminal 2 is left open and will be off if terminal 2 is connected to terminal 3. If the positive logic circuit is not being used, terminal 2 should be left open.

An optional negative logic is available. The power module will turn on if terminal 2 is connected to terminal 3, and it will be off if terminal 2 is left open. If the negative logic feature is not being used, terminal 2 should be shorted to terminal 3.



On/Off Circuit for positive or negative logic

Output Voltage Adjustment: The output voltage of the power module may be adjusted by using an external resistor connected between the Vout trim terminal (pin 6) and either the Sense (+) or Sense (-) terminal. If the output voltage adjustment feature is not used, pin 6 should be left open. Care should be taken to avoid injecting noise into the power module's trim pin. A small 0.01uF capacitor between the power module's trim pin and Sense (-) pin may help avoid this.



Circuit to decrease output voltage

With a resistor between the trim and Sense (-) terminals, the output voltage is adjusted down. To adjust the output voltage down a percentage of Vout (%Vo) from Vo,nom, the trim resistor should be chosen according to the following equation:

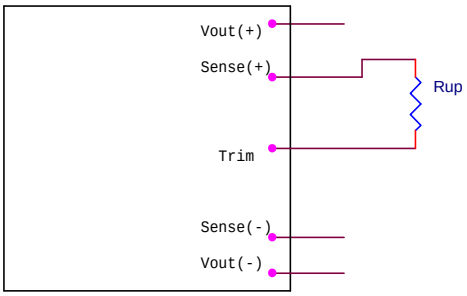
For all outputs except 28V:

$$\text{Rdown} := \left(\frac{510}{\%\text{Vo}} - 10.2\right)\cdot 1000$$

For 28V output:

$$\text{Rdown} := \left(\frac{300}{\%\text{Vo}} - 8.1\right)\cdot 1000$$

The current limit set point does not increase as the module is trimmed down, so the available output power is reduced.



Circuit to increase output voltage

With a resistor between the trim and sense (+) terminals, the output voltage is adjusted up. To adjust the output voltage up a percentage of Vout (%Vo) from Vo,nom the trim resistor should be chosen according to the following equation:

For all outputs except 28V:

$$\text{Rup} := \left[\frac{5.1\text{Vonom}\cdot(100 + \%\text{Vo})}{\text{Vref}\cdot\%\text{Vo}} - \frac{510}{\%\text{Vo}} - 10.2\right]\cdot 1000$$

For 28V output:

$$\text{Rup} := \left[\frac{3\text{Vonom}\cdot(100 + \%\text{Vo})}{1.225\%\text{Vo}} - \frac{300}{\%\text{Vo}} - 8.1\right]\cdot 1000$$

The value of Vref is found in the Electrical Data section for the power module of interest. The maximum power available from the power module is fixed. As the output voltage is trimmed up, the maximum output current must be decreased to maintain the maximum rated power of the module. As the output voltage is trimmed, the output over-voltage set point is not adjusted. Trimming the output voltage too high may cause the output over voltage protection circuit to be triggered.

Remote Sense: The power modules feature remote sense to compensate for the effect of output distribution drops. The output voltage sense range defines the maximum voltage allowed between the output power terminals and output sense terminals, and it is found on the electrical data page for the power module of interest. If the remote sense feature is not being used, the Sense(+) terminal should be connected to the Vo(+) terminal and the Sense (-) terminal should be connected to the Vo(-) terminal.

The output voltage at the Vo(+) and Vo(-) terminals can be increased by either the remote sense or the output voltage adjustment feature. The maximum voltage increase allowed is the larger of the remote sense range or the output voltage adjustment range; it is not the sum of both.

As the output voltage increases due to the use of the remote sense, the maximum output current must be decreased for the power module to remain below its maximum power rating.

EMC Considerations: TDK - Lambda Americas' power modules are designed for use in a wide variety of systems and applications. For assistance with designing for EMC compliance, please contact TDK - Lambda Americas' technical support.

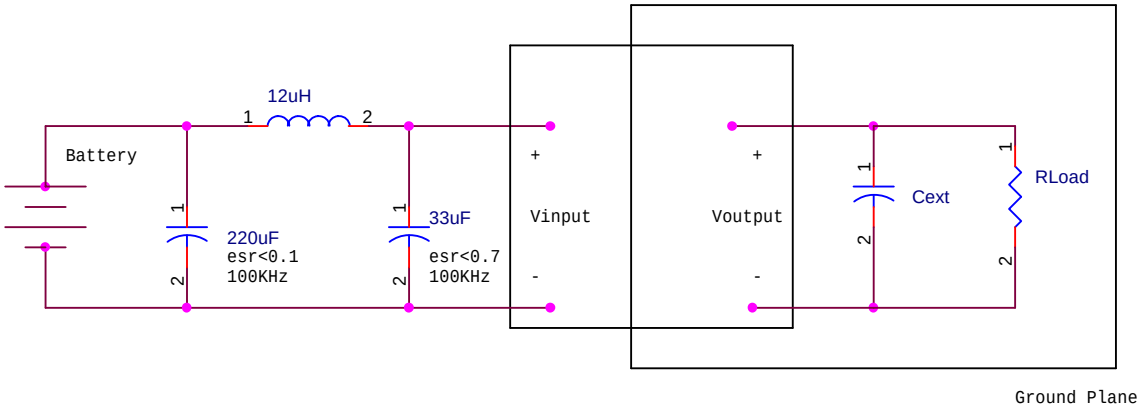
Input Impedance:
The source impedance of the power feeding the DC/DC converter module will interact with the DC/DC converter. To minimize the interaction, a 10-100uF input electrolytic capacitor should be present if the source inductance is greater than 1.5uH.

Reliability:
The power modules are designed using TDK - Lambda Americas' stringent design guidelines for component derating, product qualification, and design reviews. Early failures are screened out by both burn-in and an automated final test. The MTBF is calculated to be greater than 4.8M hours at full output power and Ta = 40˚C using the Telcordia SR-332 calculation method.

Improper handling or cleaning processes can adversely affect the appearance, testability, and reliability of the power modules. Contact TDK - Lambda Americas' technical support for guidance regarding proper handling, cleaning, and soldering of TDK - Lambda Americas' power modules.

Quality:
TDK - Lambda Americas' product development process incorporates advanced quality planning tools such as FMEA and Cpk analysis to ensure designs are robust and reliable. All products are assembled at ISO certified assembly plants.

Input/Output Ripple and Noise Measurements:



The input reflected ripple is measured with a current probe and oscilloscope. The ripple current is the current through the 12uH inductor.

The output ripple measurement is made approximately 9 cm (3.5 in.) from the power module using an oscilloscope and BNC socket. The capacitor Cext is located about 5 cm (2 in.) from the power module; its value varies from code to code and is found on the electrical data page for the power module of interest under the ripple & noise voltage specification in the Notes & Conditions column.

Safety Considerations:

For safety agency approval of the system in which the DC-DC power module is installed, the power module must be installed in compliance with the creepage and clearance requirements of the safety agency. The isolation is basic insulation. For applications requiring basic insulation, care must be taken to maintain minimum creepage and clearance distances when routing traces near the power module.

As part of the production process, the power modules are hi-pot tested from primary and secondary at a test voltage of 1500Vdc.

To preserve maximum flexibility, the power modules are not internally fused. An external input line normal blow fuse with a maximum value of 10A is required by safety agencies. A lower value fuse can be selected based upon the maximum dc input current and maximum inrush energy of the power module.

When the supply to the DC-DC converter is less than 60Vdc, the power module meets all of the requirements for SELV. If the input voltage is a hazardous voltage that exceeds 60Vdc, the output can be considered SELV only if the following conditions are met:

1) The input source is isolated from the ac mains by reinforced insulation.
2) The input terminal pins are not accessible.
3) One pole of the input and one pole of the output are grounded or both are kept floating.
4) Single fault testing is performed on the end system to ensure that under a single fault, hazardous voltages do not appear at the module output.

Warranty:

TDK - Lambda Americas' comprehensive line of power solutions includes efficient, high-density DC-DC converters. TDK - Lambda Americas offers a three-year limited warranty. Complete warranty information is listed on our web site or is available upon request from TDK - Lambda Americas.

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