0RQP-Q2T12L

Isolated DC-DC Converter

The 0RQP-Q2T12L is an isolated DC/DC converter that operates from a nominal 48 VDC source. This unit provides up to 420 W of output power from a nominal 48 VDC input.

This unit is designed to be highly efficient and low cost. Features include remote on/off, short circuit protection, over current protection, under-voltage lockout, over-temperature protection, Power Management Bus communications, and so on.

The converter is provided in an industry standard quarter brick package.

RoHS Compliant

Key Features & Benefits

- 36-75 VDC Input
- 9-12.6 VDC (Power Management Bus and trim) @ 35 A Output
- 1/4th Brick Converter
- Fixed Frequency
- High Efficiency
- Input Under Voltage Lockout
- Input Over Voltage Lockout
- OCP/SCP
- Over Temperature Protection
- Over Overvoltage protection
- Power Management Bus Communications Protocol
- Approved to UL/CSA60950-1, 2nd +A2 version (TBD)
- Class II, Category 2, Non-Isolated DC/DC Converter (refer to IPC-9592B)

Applications

- Industrial
- Railways
- Telecommunications

1. MODEL SELECTION

MODEL NUMBER	OUTPUT VOLTAGE	INPUT VOLTAGE	MAX. OUTPUT CURRENT	MAX. OUTPUT POWER	TYPICAL EFFICIENCY
0RQP-Q2T12L	9-12.6 VDC (Power Management Bus and Trim)	36 VDC – 75 VDC	35 A	440 W	96%

NOTE: Add "G" suffix at the end of the model number to indicate Tray Packaging.

PART NUMBER EXPLANATION

0	R	QP	-	Q2	T	12	L	x
Mounting Type	RoHS Status	Series Name		Output Power	Input Range	Output Voltage	Active Logic	Package Type
Through Hole Mount	RoHS	DOSA Quarter Brick		420 W	36 – 75 V	12 V	Active Low, with baseplate	G – Tray package R – Tape and Reel package

2. ABSOLUTE MAXIMUM RATINGS

PARAMETER	DESCRIPTION	MIN	TYP	MAX	UNITS
Continuous non-operating Input Voltage	Vin	-0.3	-	80	V
Remote On/Off		-0.3	-	18	V
Current Sink		0	-	10	mA
Isolation Voltage	Input to output	-	-	2250	V
Operating Temperature	Temperature measured at the center of the baseplate, full load	-40	-	85	°C
Storage Temperature		-55	-	125	°C
Thermal resistance		-	0.3	-	C/W
Altitude		-	-	2000	m

NOTE: Ratings used beyond the maximum ratings may cause a reliability degradation of the converter or may permanently damage the device.

3. INPUT SPECIFICATIONS

All specifications are typical at 25°C unless otherwise stated.

PARAMETER	DESCRIPTION	MIN	TYP	MAX	UNIT
Operating Input Voltage	Vin	36	48	75	V
Input Current (full load)	Iin	-	-	13.0	A
Input Current (no load)		-	70	150	mA
Remote Off Input Current		-	15	20	mA
Input Reflected Ripple Current is (rms)	Vin= 48V, Io= Iomax; with 10μH source impedance and 100uF*2 at input; 1μF ceramic capacitor and a 270μF AL. cap at output	-	50	-	mA
Input Reflected Ripple Current is (pk-pk)		-	160	-	mA
Under-voltage Turn on Threshold	Lockout turn on	–	34.5	–	V
Under-voltage Turn off Threshold	Lockout turn off, non-latching	31	34	–	V
Over-voltage Shutdown Threshold	Auto-recovery and non-latching	-	85	-	V
Over-voltage Recovery Threshold		-	-	-	V

CAUTION: This converter is not internally fused. An input line fuse must be used in application. Recommended input fast-acting fuse on system board.

4. OUTPUT SPECIFICATIONS

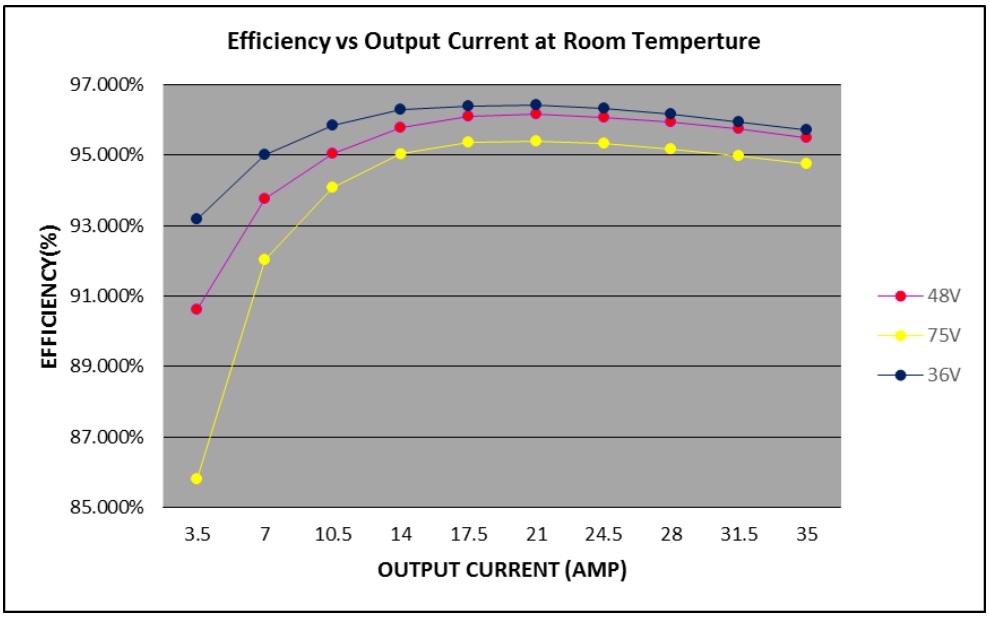
All specifications are typical at nominal input, full load at 25°C unless otherwise stated.

PARAMETER	DESCRIPTION	MIN	TYP	MAX	UNIT
Output Voltage Set Point	Test condition of the output setpoint: Vin=48V, Io=50% load at 25C ambient.	11.76	12.0	12.24	V
Output Voltage Regulation		-	-	-	V
Output Voltage Regulation					
Load Regulation	Io=0~100% load	-	20	40	mV
Line Regulation	Vin=36~75V	-	20	60	mV
Regulation Over Temperature		-	50	100	mV
Output Ripple and Noise (pk-pk)	Vin=48V, Io=100%load at 25°C ambient, 0-20MHz BW, with a 1μF ceramic capacitor and a 270uF AL. cap at output	-	40	100	mV
Output Ripple and Noise (rms)		-	5	30	mV
Output Current Range		0	-	35	A
Output DC Current Limit	Enter a hiccup mode, non-latching	43	45	47	A
Rise time	Vin=48V, Io=35A, with 1μF ceramic capacitor and 270uF bulk electrolytic at output	-	25	-	ms
Start-up time		-	40	45	ms
Overshoot at Turn on		-	0	3	%
Undershoot at Turn off		-	0	3	%
Output Capacitance		270	-	10000	uF
Transient Response					
ΔV 50%~75% of Max Load	di/dt=0.1A/μs, Vin=48Vdc, Ta=25°C, with a 1μF ceramic capacitor and a 270μF AL. cap at output	-	-	400	mV
Settling Time		-	-	1	ms
ΔV 75%~50% of Max Load		-	-	400	mV
Settling Time		-	-	1	ms

5. GENERAL SPECIFICATIONS

PARAMETER		DESCRIPTION	MIN	TYP	MAX	UNIT
Efficiency	Io=60% Irate - 100% Irate	TA = 25 °C, natural-convection air cooler	94	95	-	Efficiency
	Io=40% Irate - 60% Irate		95	96	-	
Switching Frequency			-	260	-	kHz
MTBF[2]		Calculated Per Bell Core SR-332 (Vin=48 V, Vo=12 V, Io=28 A, Ta = 25°C, FIT=10^9/MTBF)	-	TBD	-	M hrs
FIT[2]			-	TBD	-	-
Over Temperature Protection		Temperature measured at the center of the baseplate, full load	-	125	-	℃
Over Voltage Protection (Static)		Enter a latching. non-hiccup mode	-	13.5	-	V
Weight			-	68	-	g
Dimensions (L × W × H)				2.30 x 1.45 x 0.55 58.42 x 36.83 x 14.00		in mm
Isolation Characteristics						
Input to Output			-	-	2250	VDC
Input to Heatsink			-	-	2250	VDC
Output to Heatsink			-	-	2250	VDC
Isolation Resistance			10M	-	-	Ohm
Isolation Capacitance			-	-	3300	pF

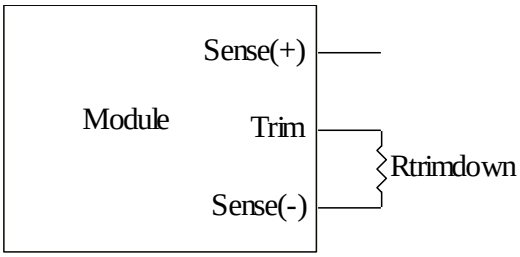
6. EFFICIENCY DATA

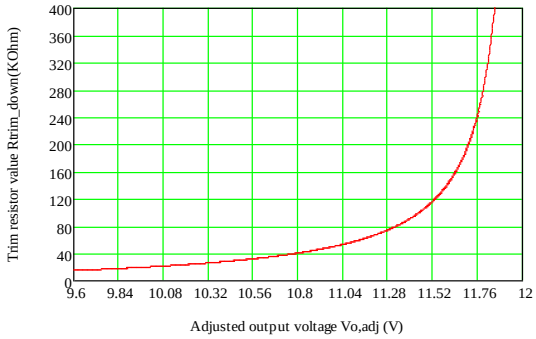


7. OUTPUT TRIM EQUATIONS

Equations for calculating the trim resistor are shown below. The Trim Down resistor should be connected between the Trim pin and Sense (-) pin. The Trim Up resistor should be connected between the Trim pin and the Sense (+). Only one of the resistors should be used for any given application.

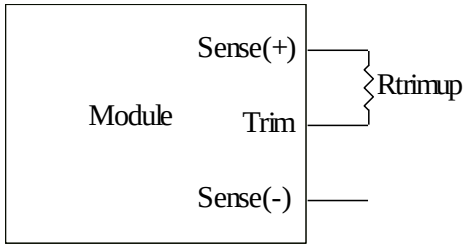
Trim down test circuit

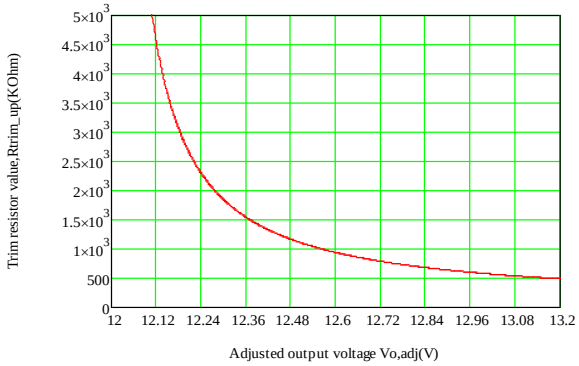




$$Rtrimdown = \frac{511}{|delta|} - 10.22[k\Omega]$$

Trim up test circuit





$$Rtrimup = \frac{(100 + delta) \cdot Vo \cdot 5.11 - 626}{1.225 \cdot delta} - 10.22[k\Omega]$$

Note:

Vo_req=Desired (trimmed) output voltage [V].

Output voltage Vo=12V.

$$delta = \frac{(Vo\_req - Vo)}{Vo} \times 100[\%]$$

Note:

1 The trim used the VOUT_COMMAND of Power Management Bus and the trim used the function of trim pin(6 pin) can not be used at the same time.

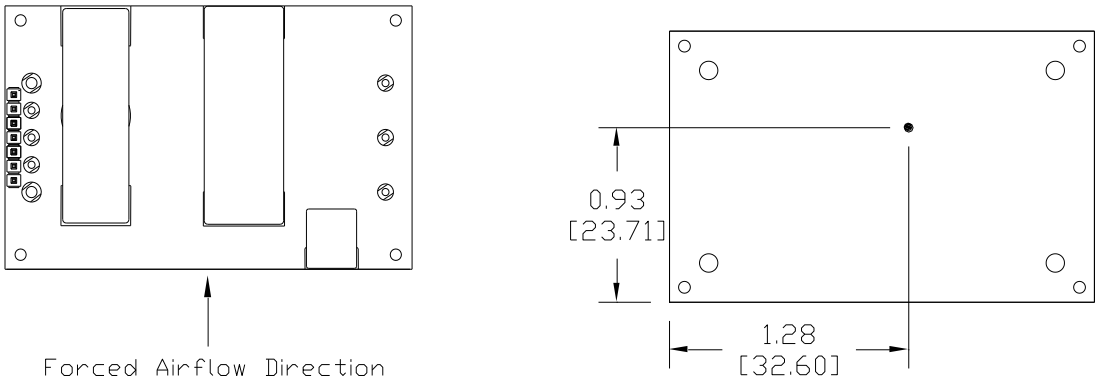
2 If use VOUT_COMMAND of Power Management Bus to trim Vout set point, then the function of trim pin(6 pin) will be disabled immediately. And if need enable the function of trim pin(6pin) to trim Vout set point again, should turn off and turn on the input voltage of module to restart module.

8. THERMAL DERATING CURVES

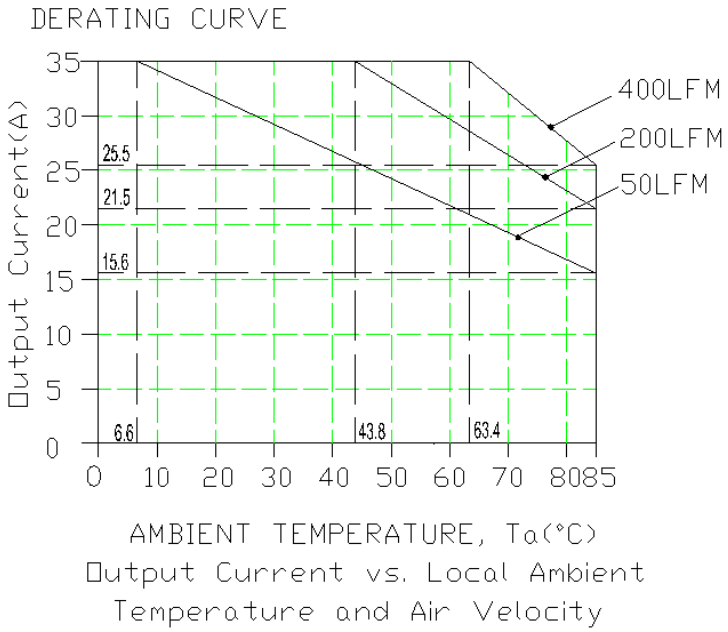
1. In order to make it convenient for safety and test engineer, each curve has 3 air velocity at most. It is better that the middle one is at the center of minimum and maximum. For example, 0-200-400, 0-100-200, 100-200-300.

2. If the minimum air velocity is 0LFM or 50LFM, do not mark on the curve, just record as "Natural Convection".

Maximum junction temperature of semiconductors derated to 125 degree C.



Bottom View



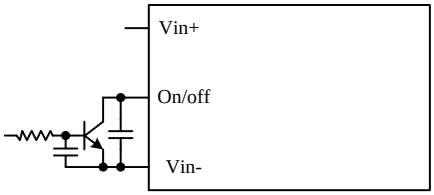
Vin = 48V

Derating curve for the base plate

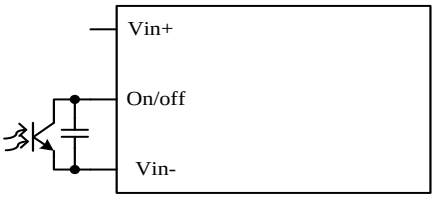
9. REMOTE ON/OFF

PARAMETER		DESCRIPTION	MIN	TYP	MAX	UNIT
Signal Low (Unit On)	Active Low	Remote On/Off pin is open, the module is off	-0.3	-	0.8	V
Signal High (Unit Off)			2.4	-	18	V
Current Sink			0	-	1	mA

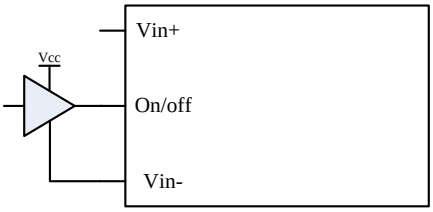
Recommended remote on/off circuit for active low



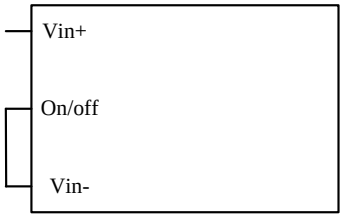
Control with open collector/drain circuit



Control with photocoupler circuit



Control with logic circuit

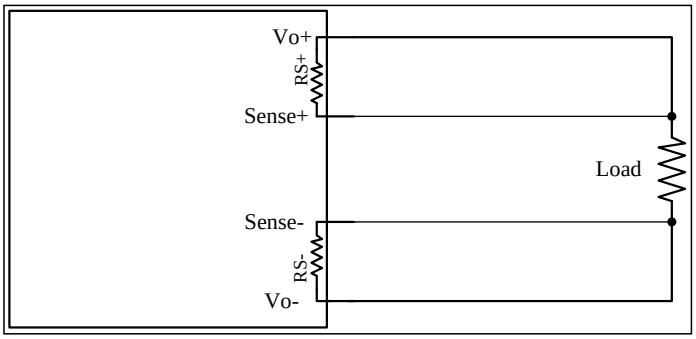


Permanently on

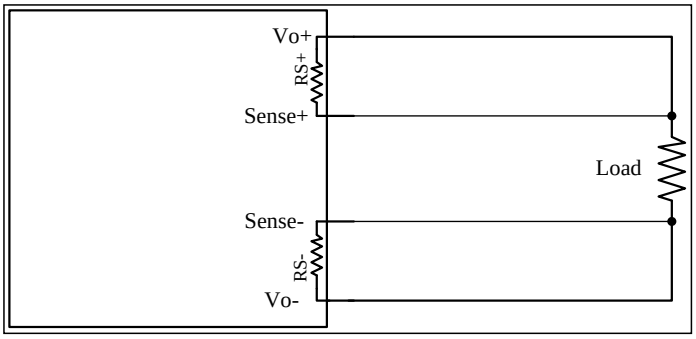
10. REMOTE SENSE

This module has remote sense compensation feature. It can minimizes the effects of resistance between module's output and load in system layout and facilitates accurate voltage regulation at load terminals or other selected point.

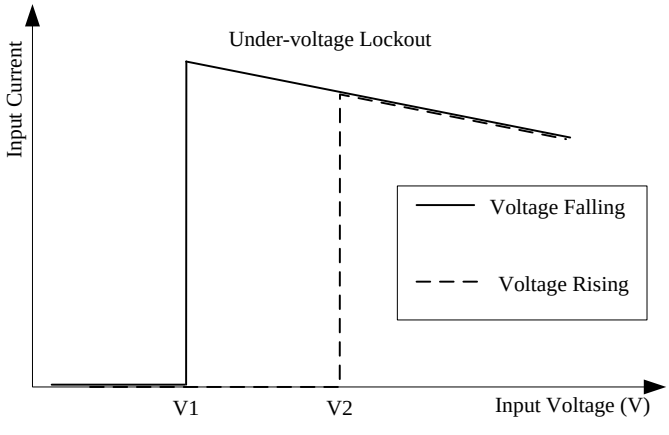
1. Recommend the connection of remote sense compensation as below figure. There are a resistor RS+ (100 ohm) from Vo+ to Sense+ and a resistor RS- (100 ohm) from Vo- to Sense- inside of this module.



2. If not using remote sense compensation, please connect sense directly to output at module's pin, that is, connect sense+ to Vo+ and sense- to Vo- at module's pin, the shorter the better. See below figure.

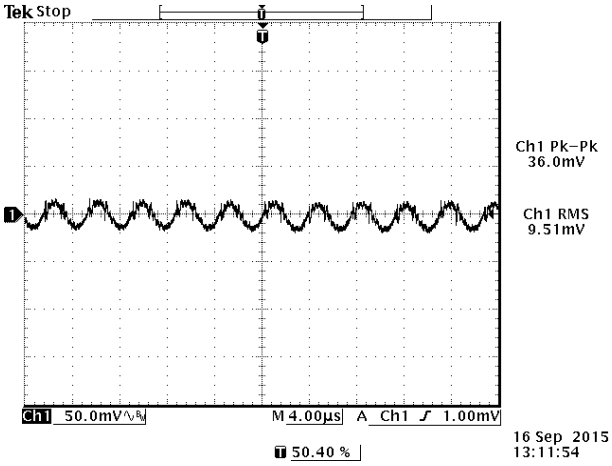


11. UNDER VOLTAGE LOCKOUT



V1 = 33V
V2 = 34.5V

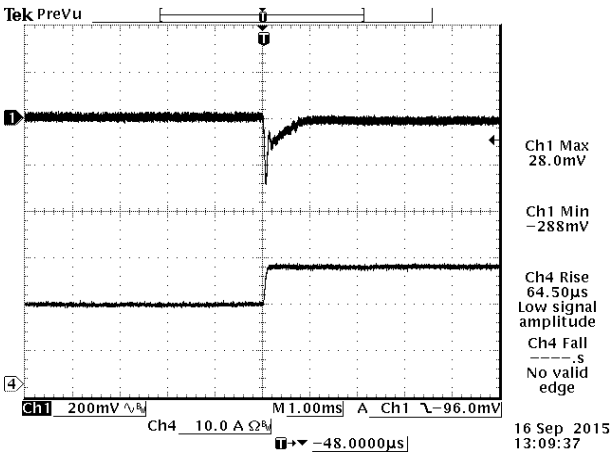
12. RIPPLE AND NOISE WAVEFORM



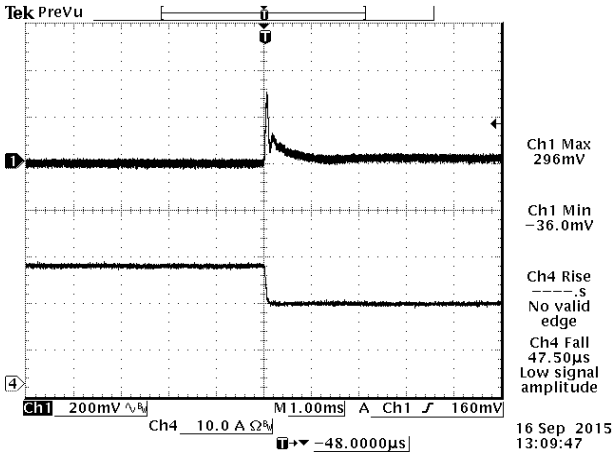
Note: 48Vdc input, 12Vdc/35A output and Ta=25 deg C, and with a 1uF ceramic cap and 270uF electrolytic cap at output.

13. TRANSIENT RESPONSE WAVEFORMS

Transient Response: di/dt=0.1A/us, 1uF ceramic cap and 270uF electrolytic cap at output



Vout= 12V 50%-75% Load Transients at Vin=48V, Ta=25 deg C

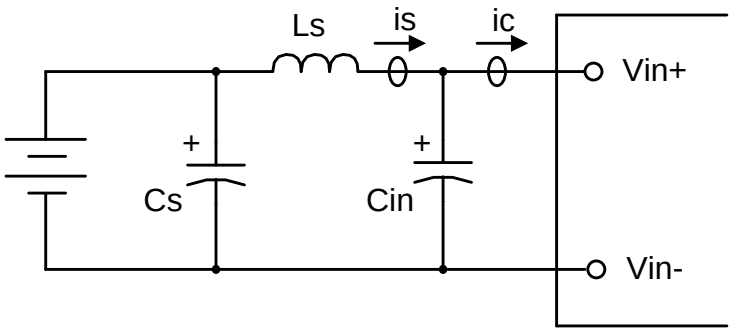


Vout= 12V 75%-50% Load Transients at Vin=48V, Ta=25 deg C

14. INPUT NOISE

Input reflected ripple current

Testing setup



Notes and values in testing.

i is: Input Reflected Ripple Current

ic: Input Terminal Ripple Current

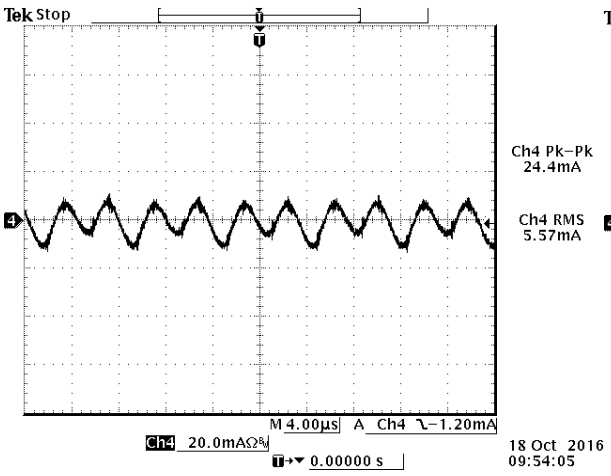
Ls: Simulated Source Impedance (10µH)

Cs: Offset possible source Impedance (100µF, ESR<0.12Ω @ 100kHz, 20C)

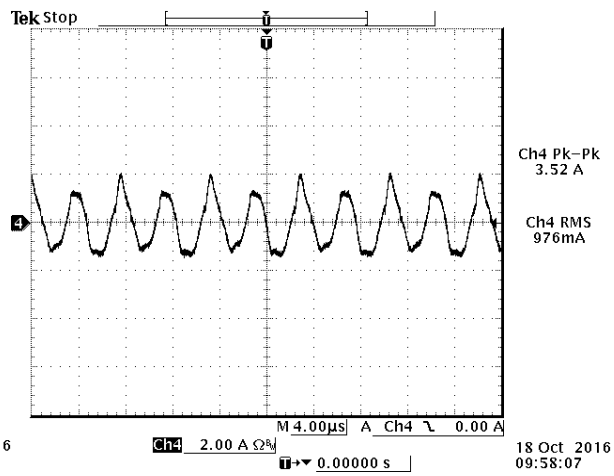
Cin: Electrolytic capacitor, should be as closed as possible to the power module to swallow ic ripple current and help with stability.

Recommendation: 100µF, ESR<0.12Ω @ 100kHz, 20C.

Below measured waveforms are based on above simulated and recommended inductance and capacitance.



is (input reflected ripple current), AC component

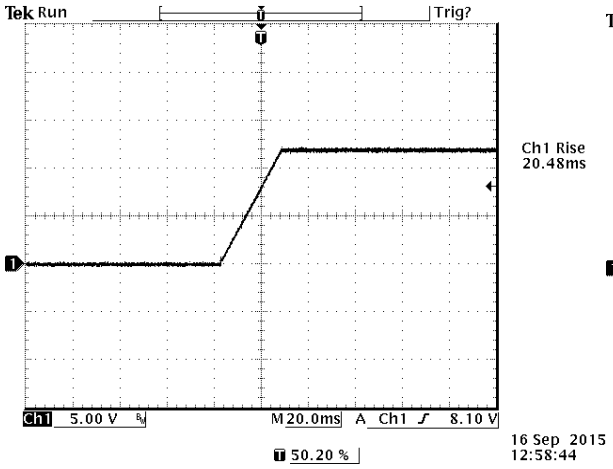


ic (input terminal ripple current), AC component

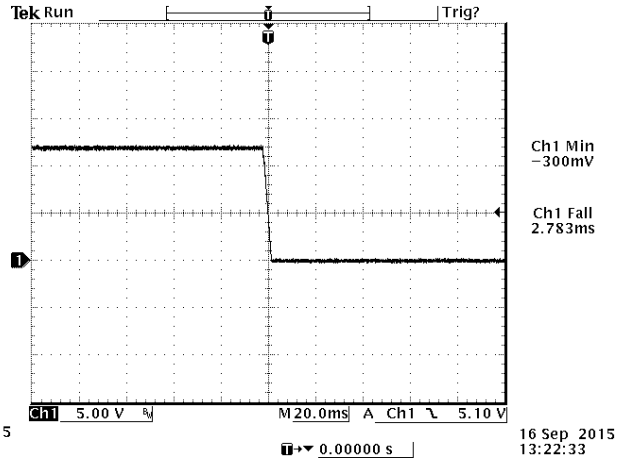
Test condition: *48Vdc input, 12Vdc/35A output and Ta=25 deg C, with a 1µF ceramic and 270µf Tan. Cap at output.*

15. STARTUP & SHUTDOWN

Startup



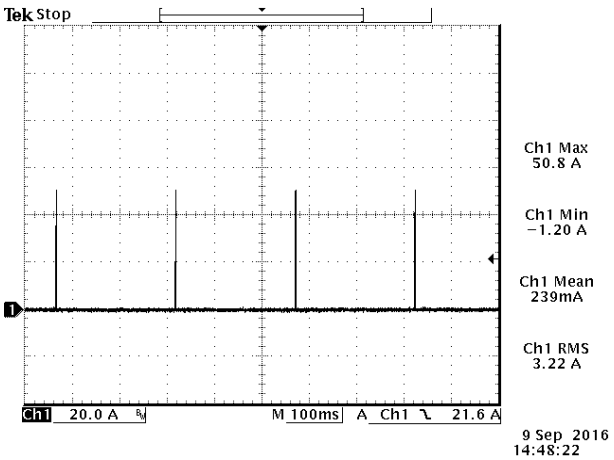
48Vdc input, 12Vdc/35A output and Ta=25 deg C,
and with a 1uF ceramic cap and 270uF electrolytic cap at output.



48Vdc input, 12Vdc/35A output and Ta=25 deg C,
and with a 1uF ceramic cap and 270uF electrolytic cap at output.

16. OCP

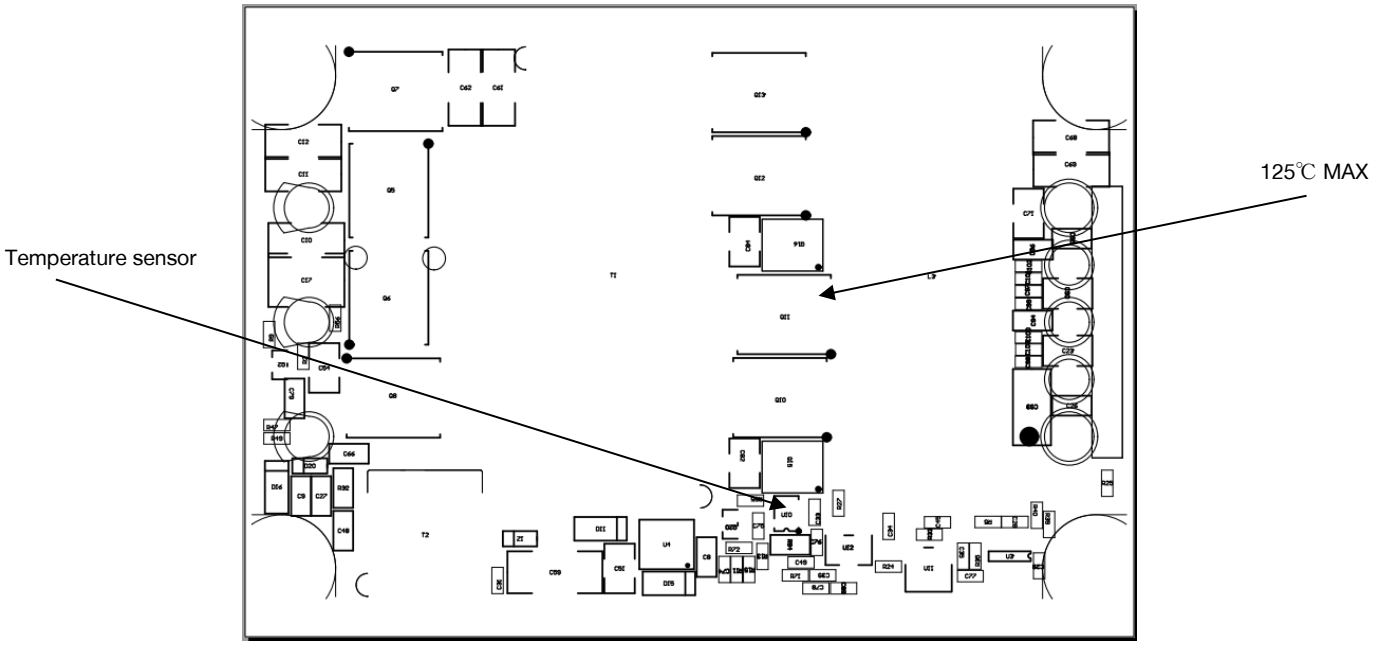
To provide protection in a fault output overload condition, the module is equipped with internal current-limiting circuitry and can endure current limiting for a few mili-seconds. If the overcurrent condition persists beyond a few milliseconds, the module will shut down into hiccup mode and restart once every 400mS. The module operates normally when the output current goes into specified range. The typical average output current is 0.239A during hiccup.



Expansion of on time portion of above figure

17. OTP

Requirement: Mark the location of thermal sense component and hottest component on silkscreen.

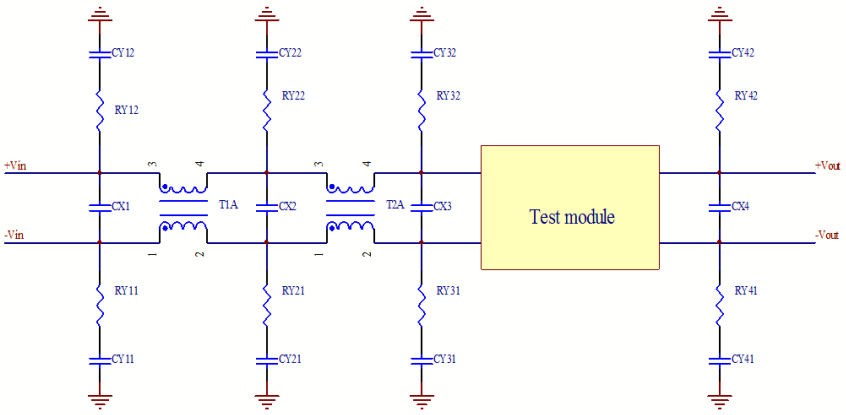


18. SAFETY & EMC

Safety:

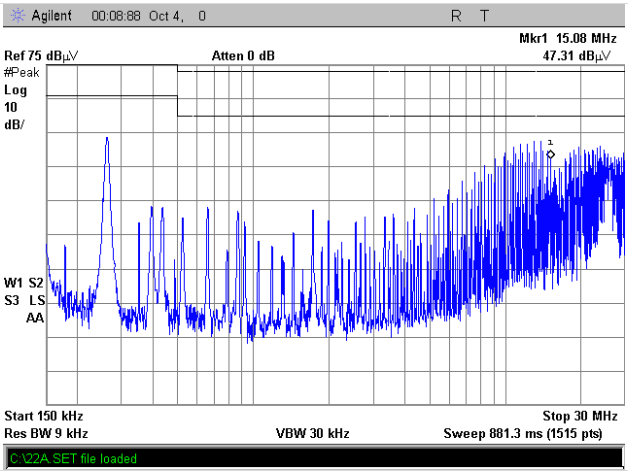
1. UL Certification UL60950-1
2. TUV Certification EN60950-1

Setup:

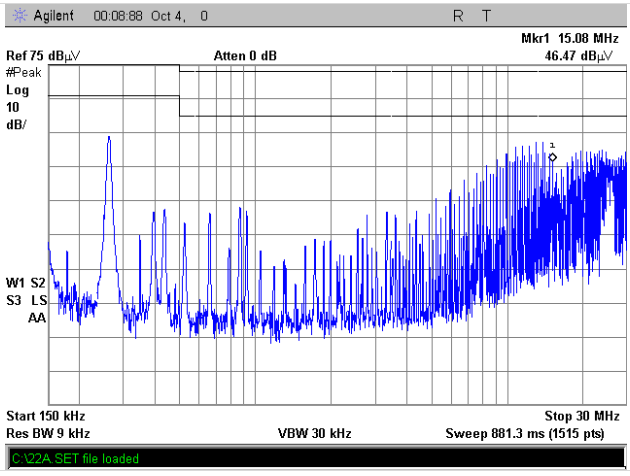


T1A	CX1	RY11	RY12	CY11	CY12
-	-	-	-	-	-
T2A	CX2	RY21	RY22	CY21	CY22
1mH	10uF	-	-	-	-
-	CX3	RY31	RY32	CY31	CY32
-	100uF+10uF	0R	0R	10uF+0.1uF+10nF	10uF+0.1uF+10nF
-	CX4	RY41	RY42	CY41	CY42
-	100uF	-	-	-	-

Positive:



Negative:



19. POWER MANAGEMENT BUS

Digital Feature Descriptions

The module supports Power Management Bus to allow to be monitored, controlled and configured by the system. More detailed Power Management Bus information can be found in the Power Management Bus Protocol Specification, Part I and part II, revision 1.3, which is shown in the System Management Interface Forum Web site: www.powerSIG.org. The supported Power Management Bus commands of the module are listed below in the supported Power Management Bus Commands section. The module supports four Power Management Bus signal lines: Data, Clock, SMBALERT (optional), Control (C2 pin, optional), and two Address lines: Addr0 and Addr1. 100 kHz communication bus speed is preferred.

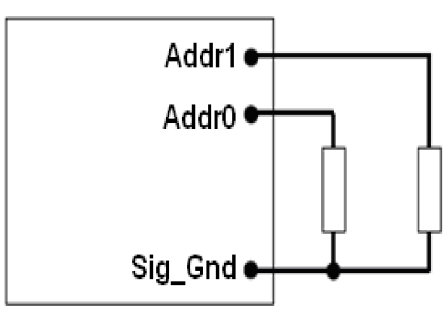
SMBALERT protocol is also supported by the module. SMBALERT line is also a wired-AND signal, by which the module can alert the Power Management Bus master via pulling the SMBALERT pin to an active low. There is only one way that the master and the module response to the alert of SMBALERT line. The master will communicate with the slave module using the programmed address, and using the various READ_STATUS commands to find the cause for the SMBALERT. The CLEAR_FAULTS command will clear the SMBALERT.

The module contains a data flash used to store configuration settings, which will not be programmed into the device data flash automatically. The STORE_DEFAULT_ALL can be used to store the current settings to the non-volatile memory. The RESTORE_DEFAULT_ALL can be used to restore the factory settings to the non-volatile memory.

Power Management Bus Addressing

The Module has flexible Power Management Bus addressing capability. When connect different resistor from Addr0 and Addr1 pin to GND pin, 64 possible addresses can be acquired. The address is in the form of octal digits; Each pin offers one octal digit, and then combine together to form the decimal address as shown in below.

Address = 8 * ADDR1 + ADDR0

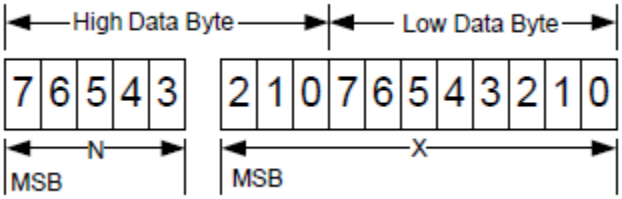


Corresponded to each octal digit, the requested resistor values are shown in below, and +/-1% resistors accuracy can be accepted. If there are any resistances exceeding the requested range, address 16 will be return. 0-12 and 40, 44, 45, and 55 in decimal address cannot be used, since they are reserved according to the SMBus specifications, and which will also return address 16. The final returned address is TBD.

OCTAL DIGIT	RESISTOR(KOHM)
0	10
1	15.4
2	23.7
3	36.5
4	54.9
5	84.5
6	130
7	200

Power Management Bus Data Format

For commands which is except to the output voltage, including input voltage, output current, temperature, PWM frequency, duty cycle, the controller will use the 2-byte linear format as defined by the Power Management Bus system management protocol. The linear data format contains 2 bytes which include a 5-bit two's complement exponent and an 11-bit two's complement mantissa. The communicated value Y is received and reported as $Y = X*2^N$

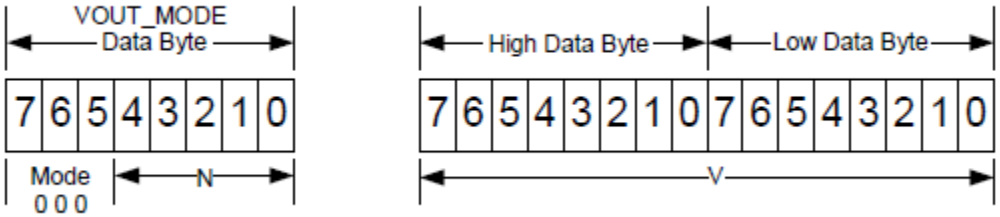


For example, to set the over temperature fault threshold 135 deg C by OT_FAULT_LIMIT command, the read/write data can be calculated refer to below:

The binary number of N is 0, whose decimal is 0.

$X = OT\_FAULT\_LIMIT /2^{(0)} = 135$, whose binary is 0b00010000111.

Combine X and N, the binary is 0b0000000010000111. The hexadecimal of OT_FAULT_LIMIT is 0x0087.



The controller will receive output voltage parameters and report output voltage values using the Power Management Bus Vout linear format. The voltage will be in the form $Voltage = V*2^N$. The Mantissa and exponent in this equation will be read and reported using 3 bytes. The first byte is the VOUT_MODE byte which will always contain 000 in the 3 MSB's. The 5 LSB's are the exponent. The exponent N is fixed and equals -10. The other 2 bytes N will contain the Mantissa. In the above format N is a 5-bit two's complement binary integer and V is a 16-bit unsigned binary integer. All 16 bits are reported to be compatible with the Power Management Bus protocol.

For example, to set Vout to 12V by VOUT_COMMAND, the read/write data can be calculated refer to below process:

$V = Vout/2^{(-10)} = 12/2^{(-10)} = 12288$

Convert the decimal to hexadecimal 0x3000. So the VOUT_COMMAND is 0x3000.

Supported Power Management Bus Commands

The main Power Management Bus commands described in the Power Management Bus 1.3 specification are supported by the module. Partial Power Management Bus commands are fully supported; Partial Power Management Bus commands have difference with the definition in Power Management Bus 1.3 specification. All the supported Power Management Bus commands are detailed summarized in the below table.

Command	Command code	Command Description	Type	Standard or not	Data format	Default value	Range Limit	Data units	Exponent	Note
OPERATION	0x01	Configures the operational state of the module	R/W byte	Refer to below description	Bit field	0x80	/	/	/	/
ON_OFF_CONFIG	0x02	Configures the combination of CONTROL pin input and serial bus commands needed to turn the module on and off	Read byte	Refer to below description	Bit field	0x18	/	/	/	OPERATION command controls module on/off
STORE_DEFAULT_ALL	0x11	Store the current settings to the non-volatile memory	Write and no data bytes	Standard	/	/	/	/	/	/
RESTORE_DEFAULT_ALL	0x12	Restore the factory settings to the non-volatile memory	Write and no data bytes	Standard	/	/	/	/	/	/
VOUT_MODE	0x20	Read Vo data format	Read byte	Standard and refer to Power Management Bus data format section	mode + exponent	0x16	/	/	/	/
VOUT_COMMAND	0x21	Set the output voltage normal value	R/W word	Standard and refer to Power Management Bus data format section	Vout linear	12	9-12.6	Volts	-10	/
VOUT_MAX	0x24	Set a upper limit on the output voltage the module can command	Read word	Standard and refer to Power Management Bus data format section	Vout linear	12.6	/	Volts	-10	/
VOUT_MARGIN_HIGH	0x25	Set the output voltage margin high value	R/W word	Standard and refer to Power Management Bus data format section	Vout linear	12.5	9-12.6	Volts	-10	/
VOUT_MARGIN_LOW	0x26	Set the output voltage margin low value	R/W word	Standard and refer to Power Management Bus data format section	Vout linear	10	9-12.6	Volts	-10	/
VOUT_MIN	0x2B	Set a lower limit on the output voltage the module can command	Read word	Standard and refer to Power Management Bus data format section	Vout linear	9	/	Volts	-10	/
MAX_DUTY	0x32	Set the maximum duty cycle	R/W word	Standard and refer to Power Management Bus data format section	Linear	50	50	%	0	/
FREQUNCY_SWITCH	0x33	Set the switching frequency	R/W word	Standard and refer to Power Management Bus data format section	Linear	260	240-320	kHz	0	The switching frequency updated at the next Vin power on
VOUT_OV_FAULT_LIMIT	0x40	Set the output over voltage fault threshold	R/W word	Standard and refer to Power Management Bus data format section	Vout linear	13.5	11-16	Volts	-10	/
VOUT_OV_FAULT_RESPONSE	0x41	Instructs what action to take in response to an output overvoltage fault	R/W byte	Refer to below description	Bit field	0xB8	/	/	/	/
IOUT_OC_FAULT_LIMIT	0x46	Set the output overcurrent fault threshold	R/W word	Standard and refer to Power Management Bus data format section	Linear	45	23-45	A	0	/
IOUT_OC_FAULT_RESPONSE	0x47	Instructs what action to take in response to an output overcurrent fault	R/W byte	Refer to below description	Bit field	0xF8	/	/	/	/

IOUT_OC_WARN_LIMIT	0x4A	Set a threshold causing an output current high warning	R/W word	Standard and refer to Power Management Bus data format section	Linear	40	23-45	A	0	Must less than IOUT_OC_FAULT_LIMIT value
OT_FAULT_LIMIT	0x4F	Set the over temperature fault threshold	R/W word	Standard and refer to Power Management Bus data format section	Linear	135	25-140	Dec C	0	/
OT_FAULT_RESPONSE	0x50	Instructs what action to take in response to an over temperature fault	R/W byte	Refer to below description	Bit field	0xB8	/	/	/	/
OT_WARN_LIMIT	0x51	Set a threshold causing a temperature high warning	R/W word	Standard and refer to Power Management Bus data format section	Linear	125	25-140	Dec C	0	Must less than OT_FAULT_LIMIT value
STATUS_WORD	0x79	Returns the information with a summary of the unit's fault/warn condition	Read word	Refer to below description	Bit field	/	/	/	/	/
STATUS_VOUT	0x7A	Returns the information with a summary of the unit's output voltage condition	Read byte	Refer to below description	Bit field	/	/	/	/	/
STATUS_IOUT	0x7B	Returns the information with a summary of the unit's output current condition	Read byte	Refer to below description	Bit field	/	/	/	/	/
STATUS_INPUT	0x7C	Returns the information with a summary of the unit's input condition	Read byte	Refer to below description	Bit field	/	/	/	/	/
STATUS_TEMPERATURE	0x7D	Returns the information with a summary of the unit's temperature condition	Read byte	Refer to below description	Bit field	/	/	/	/	/
STATUS_CML	0x7E	Returns the information with a summary of the unit's communication condition	Read byte	Refer to below description	Bit field	/	/	/	/	/
READ_VIN	0x88	Returns the input voltage of the module	Read word	Standard and refer to Power Management Bus data format section	Linear	/	/	/	0	/
READ_VOUT	0x8B	Returns the output voltage of the module	Read word	Standard and refer to Power Management Bus data format section	Vout Linear	/	/	/	-10	/
READ_IOUT	0x8C	Returns the output current of the module	Read word	Standard and refer to Power Management Bus data format section	Linear	/	/	/	0	/
READ_TEMPERATURE_1	0x8D	Returns the temperature of the module	Read word	Standard and refer to Power Management Bus data format section	Linear	/	/	/	0	/
READ_DUTY_CYCLE	0x94	Returns the duty cycle of PWM	Read word	Standard and refer to Power Management Bus data format section	Linear	/	/	/	0	/
READ_FREQUENCY	0x95	Returns the frequency of PWM	Read word	Standard and refer to Power Management Bus data format section	Linear	/	/	/	0	/
Power Management Bus_REVISION	0x98	Returns the revision of Power Management Bus	Read byte	Refer to below description	Bit field	0x33	/	/	/	Power Management Bus V1.3
MFR_C1_C2_CONFIG	0x6C	Configure C2 pin function	R/W byte	Refer to below description	Bit field	0x00	/	/	/	Default C2 function: PGOOD
MFR_C2_CONFIG	0x6D	Configure C2 pin logic	R/W byte	Refer to below description	Bit field	0x00	/	/	/	Default Secondary on/off function: Secondary on/off signal ignored, and Negative logic enabled
MFR_PGOOD_POLARITY	0x6E	Configure power good logic	R/W byte	Refer to below description	Bit field	0x00	/	/	/	Negative PGOOD logic

OPERATION				
Bit number	**Purpose**	**Bit value**	**Meaning**	**Default settings**
7	Turn the module on/off	1	on	1
		0	off	
6	Not supported	/	/	0
5:4	Control the source of the output voltage command	00	VOUT_COMMAND	00
		01	VOUT_MARGIN_LOW	
		10	VOUT_MARGIN_HIGH	
		11	Not supported	
3:0	Reserved or Not supported	/	/	0000

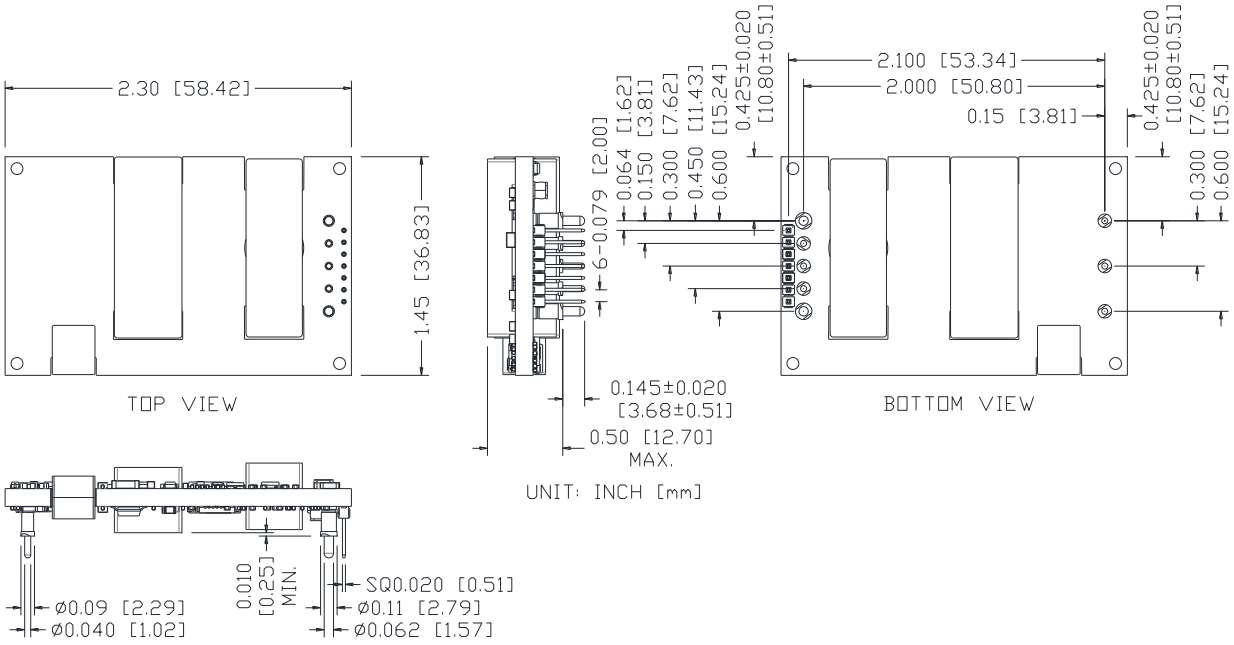
ON_OFF_CONFIG				
Bit number	**Purpose**	**Bit value**	**Meaning**	**Default settings**
7:5	Reserved	/	/	000
4	Module powers up regardless of the state of the CONTROL pin and OPERATION command or not	0	Not supported	1
		1	Wait CONTROL and OPERATION	
3	Module powers up regardless of the state of the OPERATION command or not	0	Not supported	1
		1	Wait OPERATION command	
2	Module powers up regardless of the state of the CONTROL pin or not (Not supported)	0	Not supported	0
		1	Wait CONTROL pin	
1:0	Not supported	/	/	00

VOUT_OV_FAULT_RESPONSE				
Bit number	**Purpose**	**Bit value**	**Meaning**	**Default settings**
7:6	Response when fault happens	00	Not supported	10
		01	Not supported	
		10	The module shuts down and response according to the retry setting in bits [5:3]	
		11	Not supported	
5:3	Retry setting	000	Module does not attempt to restart until a RESET signal or OPERATION command or Bias power is removed	111
		001-110	Not supported	
		111	Attempts to restart continuously until it is commanded off	
2:0	Delay time	/	Not supported	000

IOUT_OC_FAULT_RESPONSE				
Bit number	**Purpose**	**Bit value**	**Meaning**	**Default settings**
7:6	Response when fault happens	00	Not supported	11
		01	Not supported	
		10	Not supported	
		11	The module shuts down and response according to the retry setting in bits [5:3]	
5:3	Retry setting	000	Module does not attempt to restart until a RESET signal or OPERATION command or Bias power is removed	111
		001-110	Not supported	
		111	Attempts to restart continuously until it is commanded off	
2:0	Delay time	/	Not supported	000

20. MECHANICAL DIMENSIONS

OUTLINE



Note: This module is recommended and compatible with Pb-Free Wave Soldering and must be soldered using a peak solder temperature of no more than 260 ºC for less than 5 seconds.

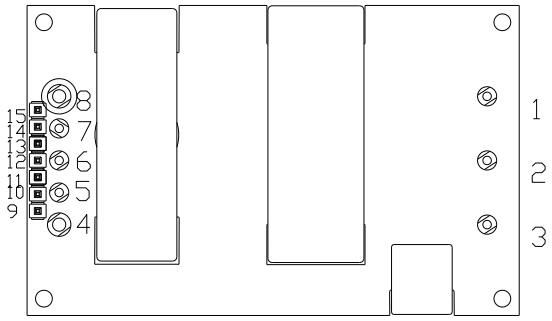
NOTES:

All Pins: Material - Copper Alloy;
Finish - Tin plated.

1) Undimensioned components are shown for visual reference only.

2) All dimensions in inches; Tolerances: x.xx +/-0.02 in [0.5 mm]. x.xxx +/-0.010 in [0.25 mm]. Unless otherwise stated.

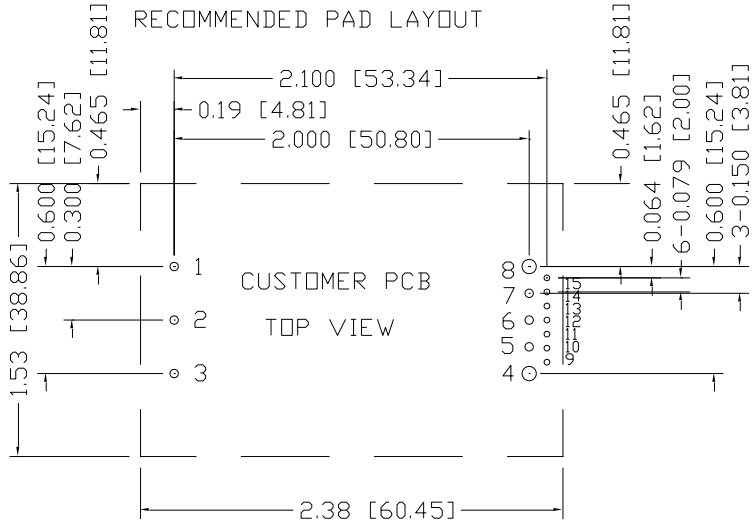
PIN DEFINITIONS



BOTTOM VIEW

PIN	FUNCTION	PIN	FUNCTION
1	Vin (+)	9	C2
2	ON/OFF	10	DGND
3	Vin (-)	11	PMBDATA
4	Vout (-)	12	SMBALERT
5	Sense (-)	13	PMBCLK
6	Trim	14	Addr1
7	Sense(+)	15	Addr0
8	Vout (+)		

RECOMMENDED PAD LAYOUT



1,2,3,5,6,7 Ø0.050 HOLE SIZE, Ø0.10 min PAD SIZE
4,8 Ø0.074 HOLE SIZE, Ø0.12 min PAD SIZE
9,10,11,12,13,14,15 Ø0.035 HOLE SIZE, Ø0.065 min PAD SIZE

21. REVISION HISTORY

DATE	REVISION	CHANGES DETAIL	APPROVAL
2016-09-19	AA	First release	S.Wang
2016-10-31	AB	Update input noise test	S.Wang
2017-03-02	AC	Add trim and sense	S.Wang
2018-06-20	AD	Update Part Number Explanation, Output Trim Equations and MD	S.Wang
2018-08-02	AE	Update the description for operating temperature	S.Wang

For more information on these products consult: tech.support@psbel.com

NUCLEAR AND MEDICAL APPLICATIONS - Products are not designed or intended for use as critical components in life support systems, equipment used in hazardous environments, or nuclear control systems.
TECHNICAL REVISIONS - The appearance of products, including safety agency certifications pictured on labels, may change depending on the date manufactured. Specifications are subject to change without notice.

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