MQ7802

Isolated 42~57VDC input, 5~12V output, 30W DC-DC Converter with PoE AT interface

FEATURES

- Wide operating voltage:
  - 42V ~ 57V
- Full features 802.3af/at interface built-in
- Output Current:
  - 12V, 2.5A
  - 5V, 5A
- Output voltage ripple: 200mVPP
- High Efficiency 87% (input 48V, 12V@2.5A)
- Overcurrent /short circuit protection
- Isolation between input and output:1000Vdc
- High reliability: designed to meet 5 million hour MTBF
- Minimal space on PCB:
  - 62.2 mm x 27 mm x 14.5 mm or
  - 2.45 in x 1.06 in x 0.57 in
- No derating to +60℃, natural convection
- UL/IEC/EN60950 compliant
- RoHS Compliant available

APPLICATIONS

- IP Camera
- IP Phone
- Wireless Access Point
- Video Supervisory

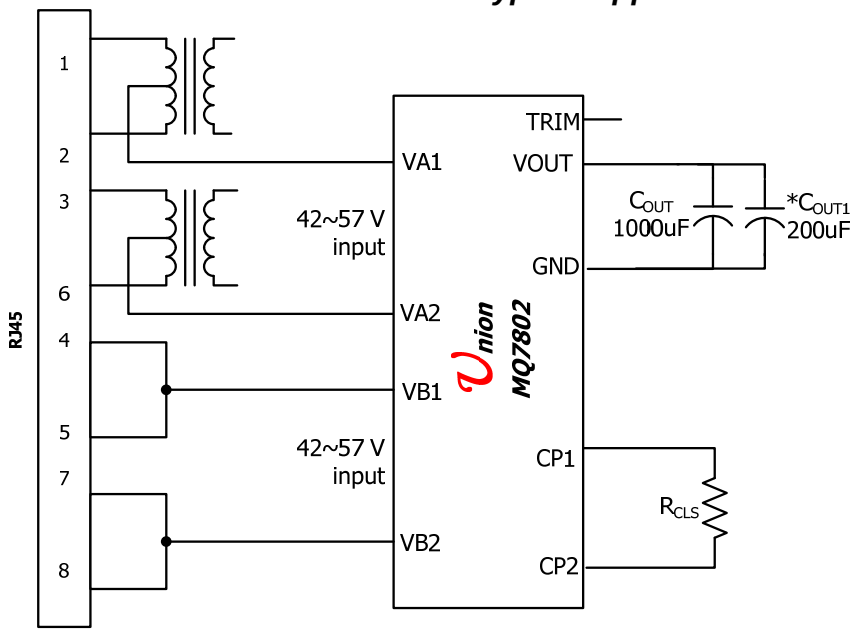
Description

The ***POE MQ7802*** series of modules are designed to extract power from a conventional twisted pair Category 5 Ethernet cable, conforming to the IEEE 802.3af/at Power-over-Ethernet (PoE) standard. IEEE 802.3af/at allows for two power options for Category 5 cables and the MQ7802 have two pairs of power inputs pins: - VA1&2 and VB1&2 to accommodate this.

The MQ7802 signature and control circuit provides the PoE AT compatibility signature and power classification required by the Power Sourcing Equipment (PSE) before applying up to 30W power to the port. The MQ7802 is compatible with Class 0 to Class 4 equipment.

The high efficiency DC/DC converter operates over a wide input voltage range and provides a regulated low ripple and low noise output. The DC/DC converter also has built-in overload and short-circuit output protection.

********** *Typical Application Circuit* **********



CLASS	POWER AT PD		RESISTOR (Ω)
	MINIMUM (W)	MAXIMUM (W)	
0	0.44	12.95	1270
1	0.44	3.84	243
2	3.84	6.49	137
3	6.49	12.95	90.9
4	12.95	25.5	63.4

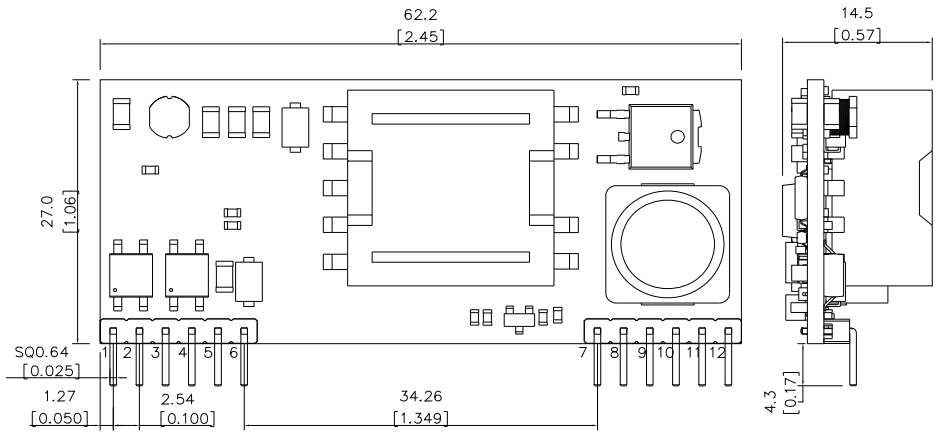
*** For low temperature operation, 200uF Tan Capacitor is necessary.**

*** For keeping part operating normally, 1W minimum load is required.**

Mechanical Specifications

Dimensions are in millimeters (inches)

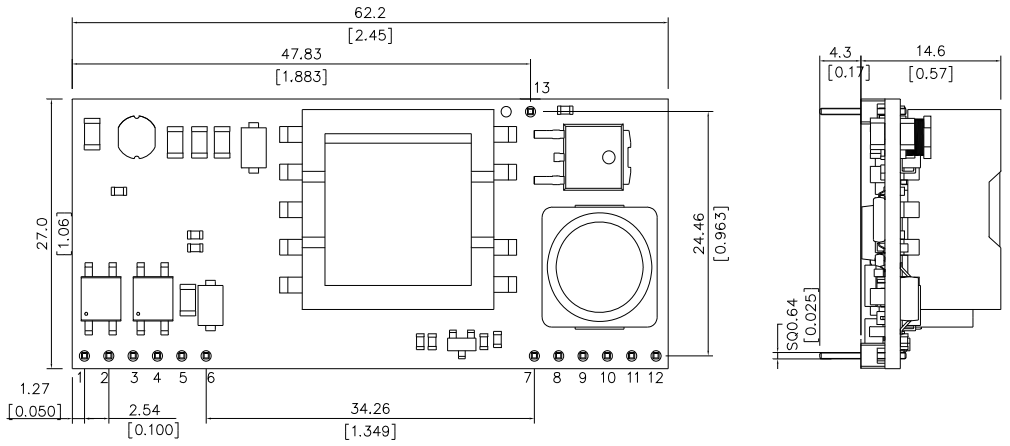
Tolerances: x.x ±0.02in(0.5 mm), x.xx ±0.010in(0.25 mm), unless otherwise noted.



For Through hole

PIN	DESCRIPTION
1	VA1
2	VA2
3	VB1
4	VB2
5	CP1
6	CP2
7/8	GND
9/10	VOUT
11	TRIM
12	NC

Dimensions are in millimeters (inches) with –R option for through hole



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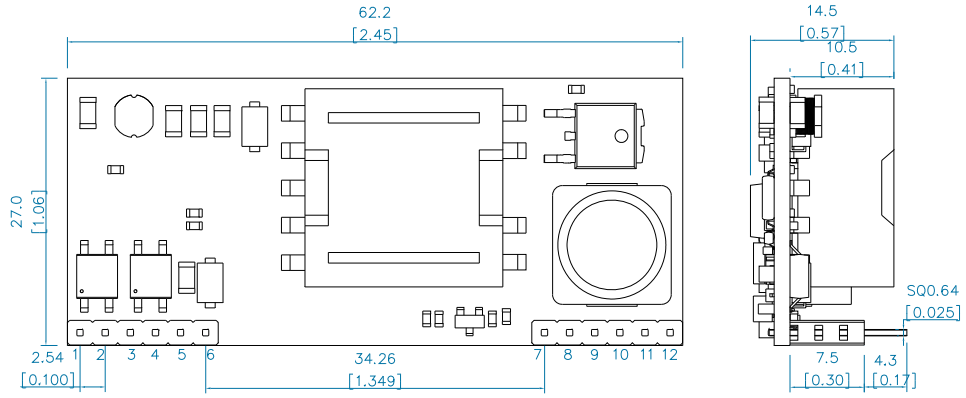
Dimensions are in millimeters (inches) with –RH option for through hole



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7/8	GND
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Dimensions are in millimeters (inches) with –RB option for through hole

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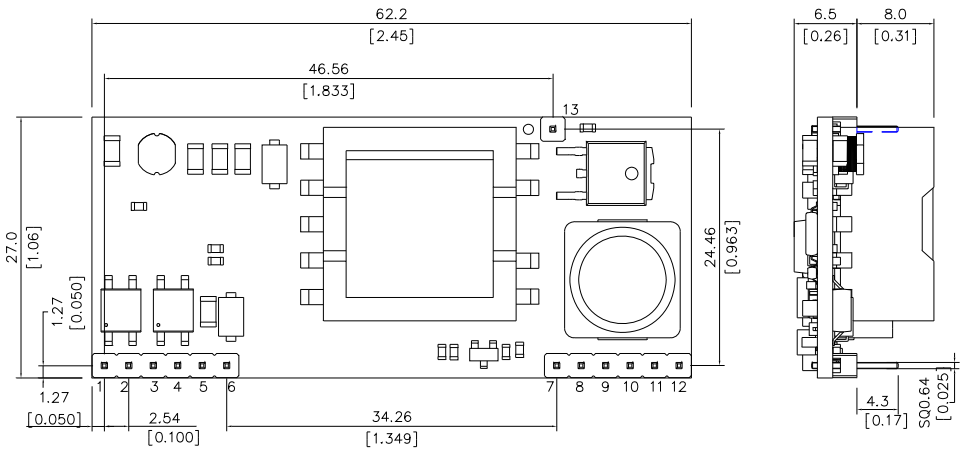

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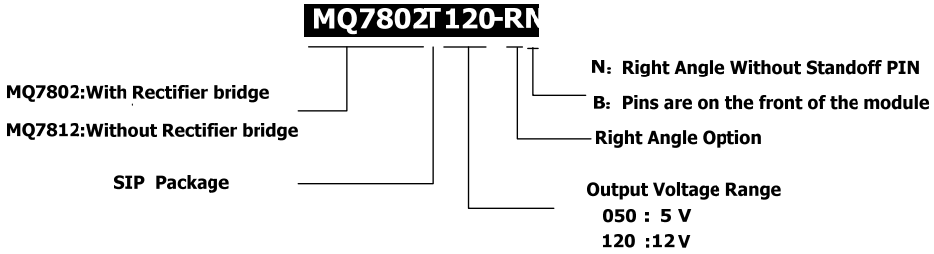
1	VA1
2	VA2
3	VB1
4	VB2
5	CP1
6	CP2
7/8	GND
9/10	VOUT
11	TRIM
12	NC

Performance Specifications (at Ta=+25°C)

Model	Input V_{IN} Range (V)	Output				Efficiency (%)
		I_{OUT} (A)	V_{out} (V)	Regulation		
				Line (%)	Load (%)	
MQ7802T050	42~57	5	5V	0.5	0.5	83%
MQ7802T055		5	5.5V	0.5	0.5	84%
MQ7802T060		5	6 V	0.5	0.5	84%
MQ7802T065		4.5	6.5 V	0.5	0.5	84%
MQ7802T120		2.5	12V	0.5	0.5	87%

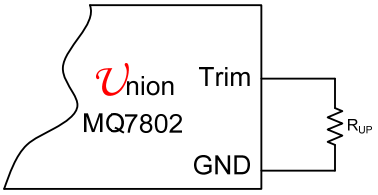
Ordering Information



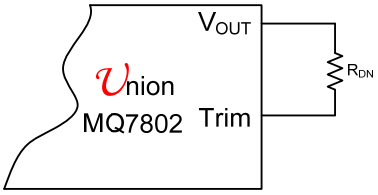
For examples:
MQ7802T120 means MQ7802 in SIP package, output voltage is 12V

Output Trim

MQ7802's output can be trimmed up or down by connecting one resistor to output negative or positive end as following figure.



Output Trim-up



Output Trim-down

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$$R_{UP} = \frac{2.5 * R_{F1}}{V_O - V_{O.DFLT}} - R_S$$

V_O is the desired voltage, $V_{O.DFLT}$ is the module's default output:
For $V_{O.DFLT}$=5.0V, R_{F1}=2.61k, R_S=13k
For $V_{O.DFLT}$=12.0V, R_{F1}=10k, R_S=20.5k

$$R_{DN} = \frac{2.5 * R_{F1}^{\ 2}}{2.61 * (V_{O.DFLT} - V_O)} - R_{F1} - R_S$$

V_O is the desired voltage, $V_{O.DFLT}$ is the module's default output:
For $V_{O.DFLT}$=5.0V, R_{F1}=2.61k, R_S=13k
For $V_{O.DFLT}$=12.0V, R_{F1}=10k, R_S=20.5k

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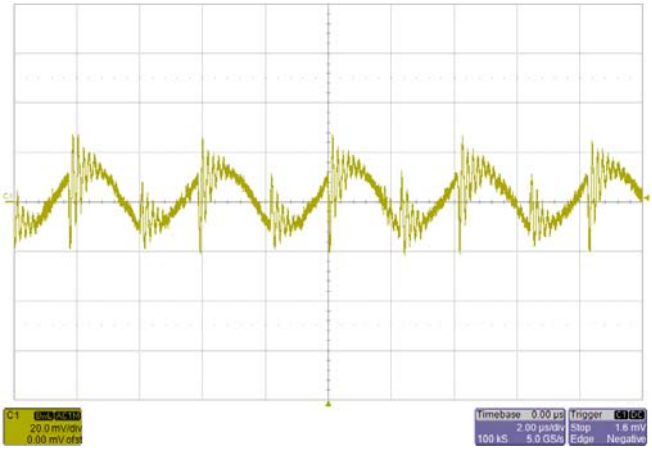
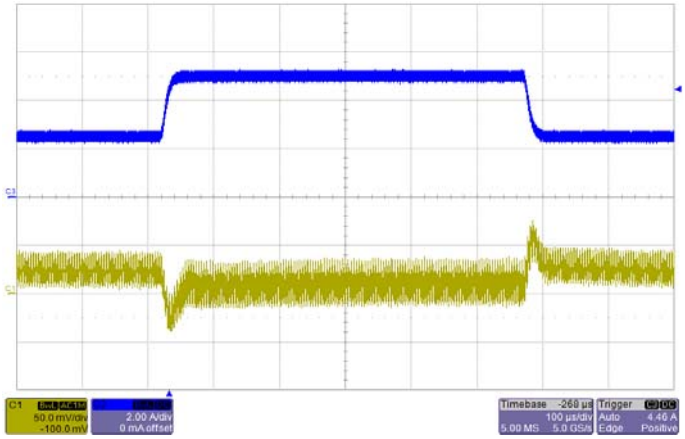
Typical Characteristics

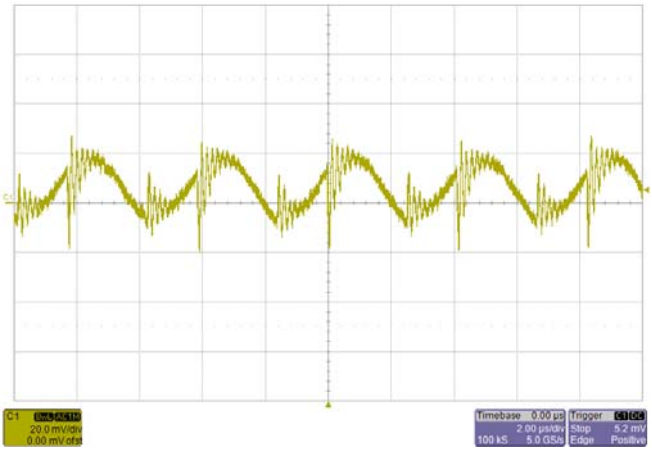
V_{out}=5V (Output Capacitor:470uF AL*2)



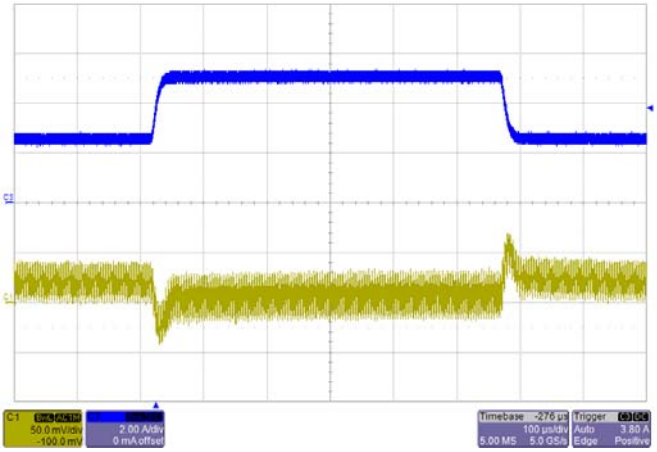
Noise V_{IN}=42V, Io=5A, 5~20MHz Bandwidth



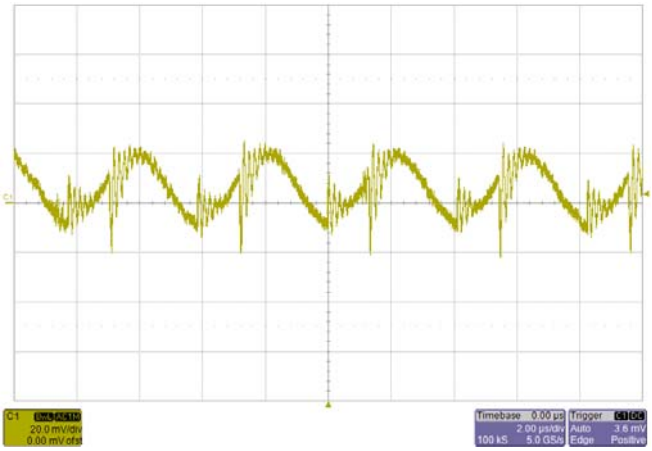
Transient Response, Vin=42V Io=50%~100%~50%



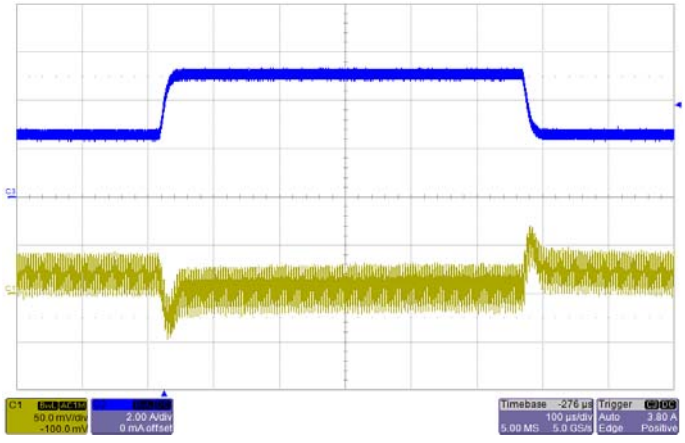
Noise V_{IN}=48V, Io=5A, 5~20MHz Bandwidth



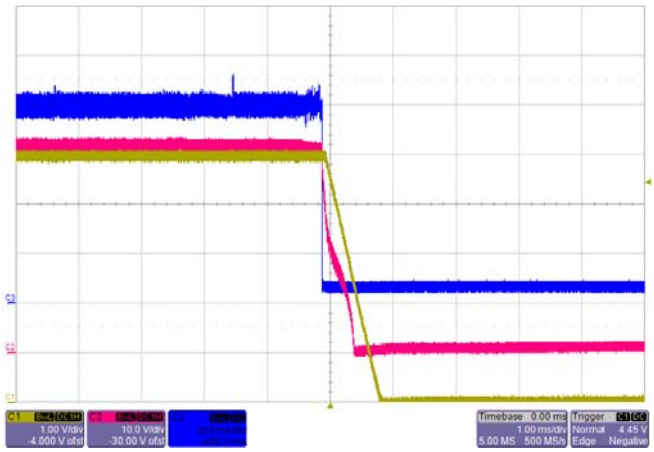
Transient Response, Vin=48V, Io=50%~100%~50%



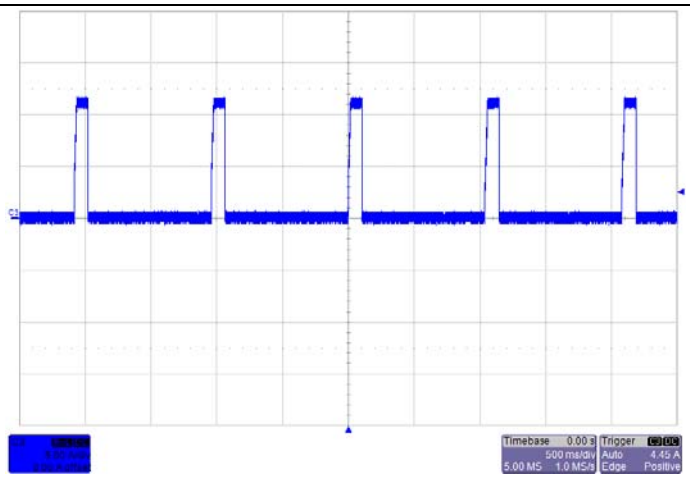
Noise V_{IN}=57V, I_O=5A, 5~20MHz Bandwidth



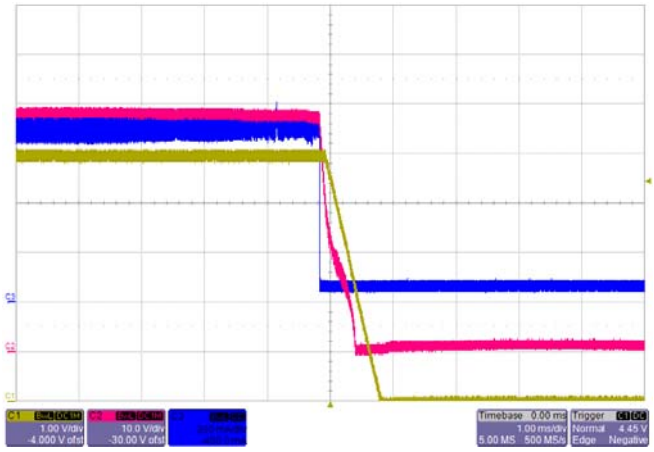
Transient Response V_{IN}=57V, Io=50%~100%~50%



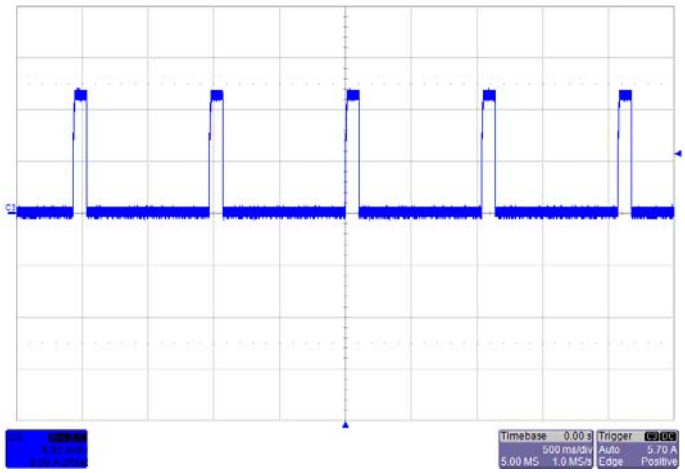
Power Down Vin=42V
C1: Output Voltage, C2: PSE Out, C3: Input Current
ILoad=100%Io.max



Short-Circuit Output, Vin=42V



Power Down Vin=48V
C1: Output Voltage, C2: PSE Out, C3: Input Current
ILoad=100%Io.max



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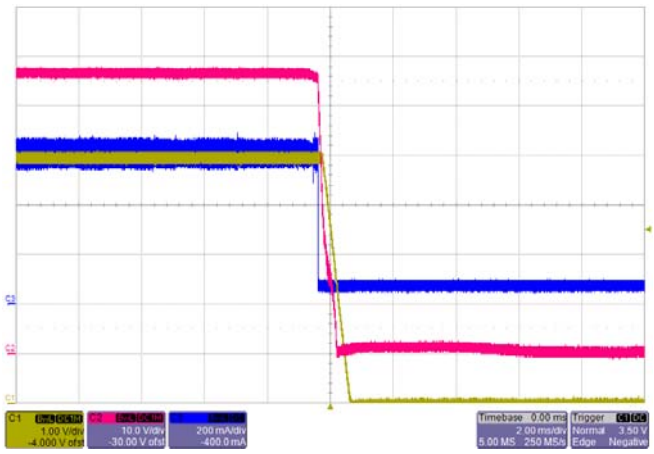
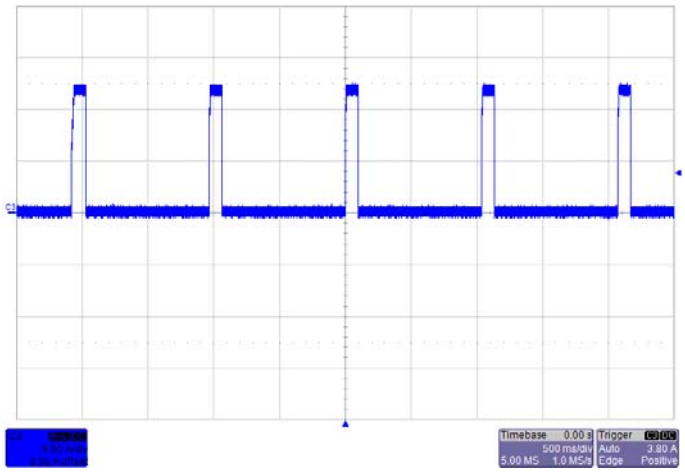


Power Down, Vin=57V
C1: Output Voltage, C2: PSE Out, C3: Input Current
ILoad=100%Io.max



Short-Circuit Output Vin=57V

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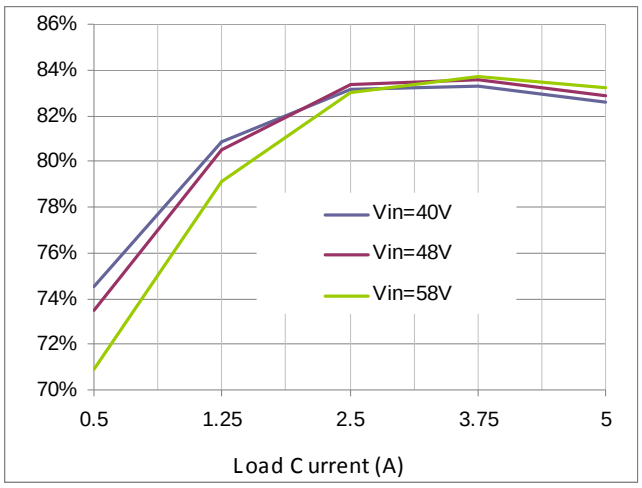
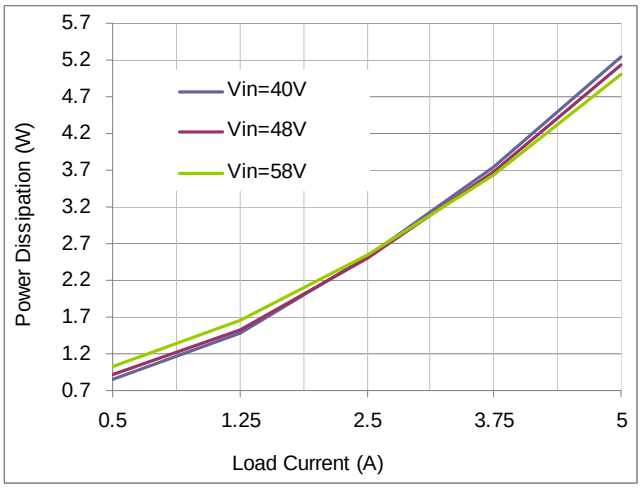
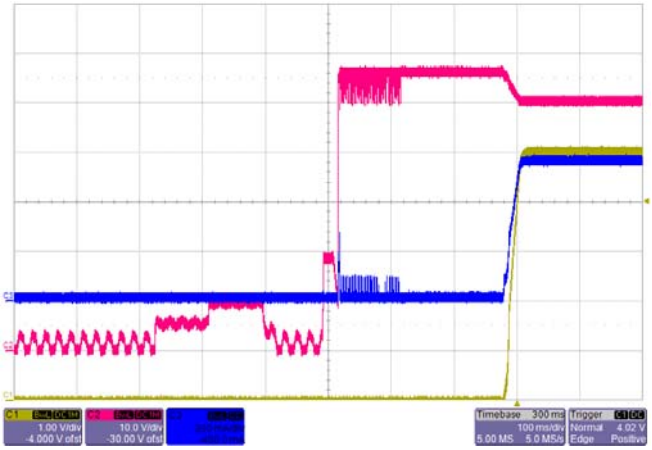


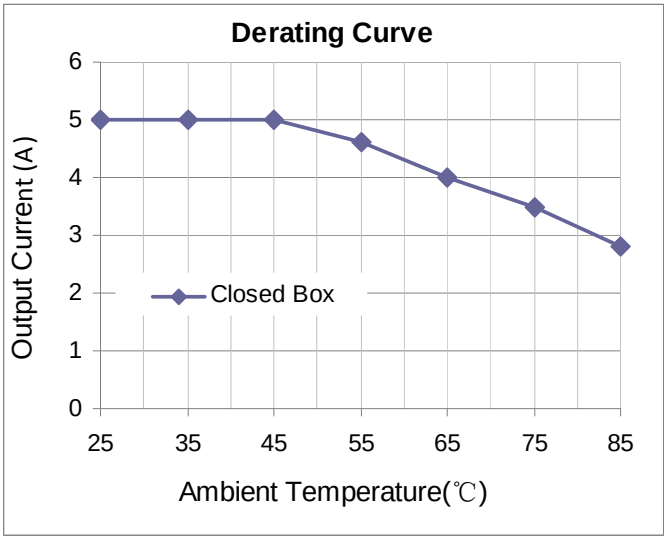
Efficiency



Power Dissipation



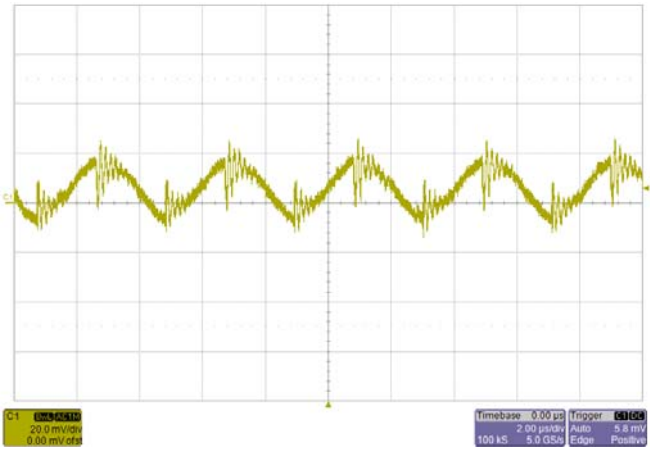
Startup form 56V 802.3at PSE
C1: Output Voltage, C2: PSE Out, C3: Input Current
ILoad=100%Io.max



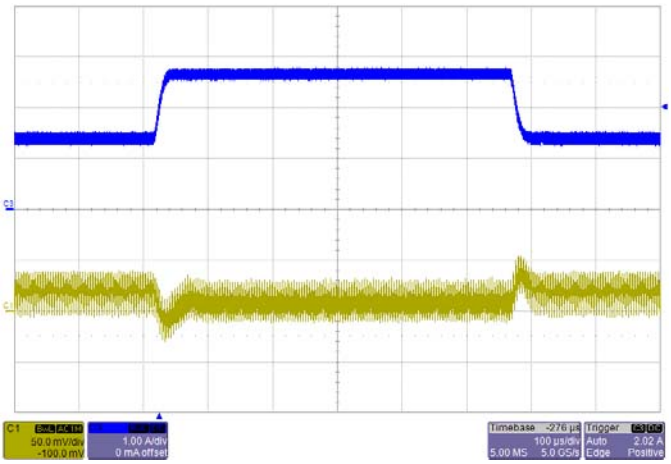
Derating

Typical Characteristics

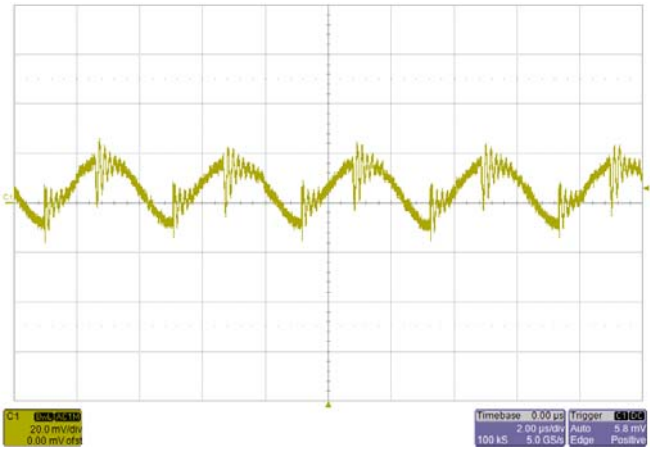
V_{out}=12V (Output Capacitor: 470uF AL*2)



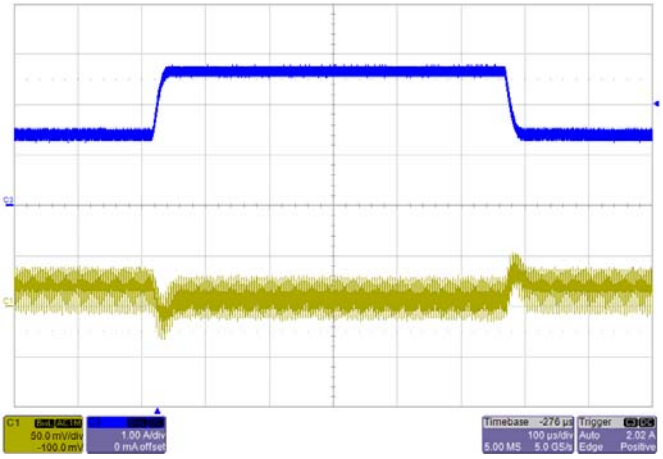
Noise V_{IN}=42V, Io=2.5A, 5~20MHz Bandwidth



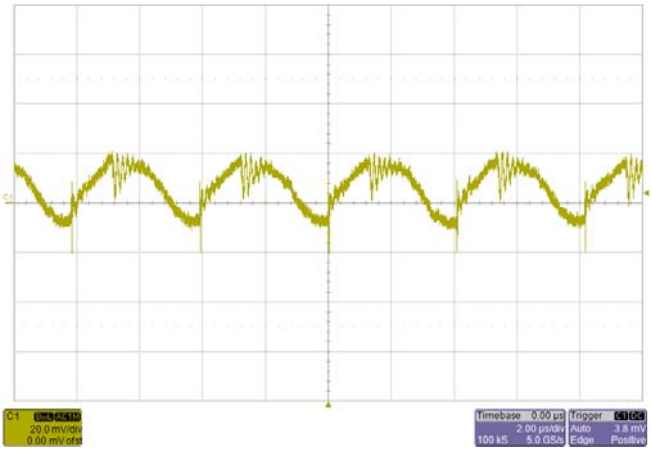
Transient Response, Vin=42V Io=50%~100%~50%



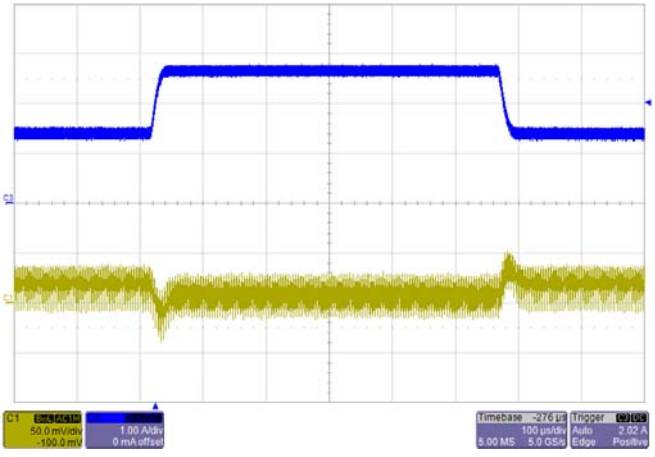
Noise V_{IN}=48V, Io=2.5A, 5~20MHz Bandwidth



Transient Response, Vin=48V, Io=50%~100%~50%



Noise V_{IN}=57V, I_O=2.5A, 5~20MHz Bandwidth



Transient Response V_{IN}=57V, Io=50%~100%~50%

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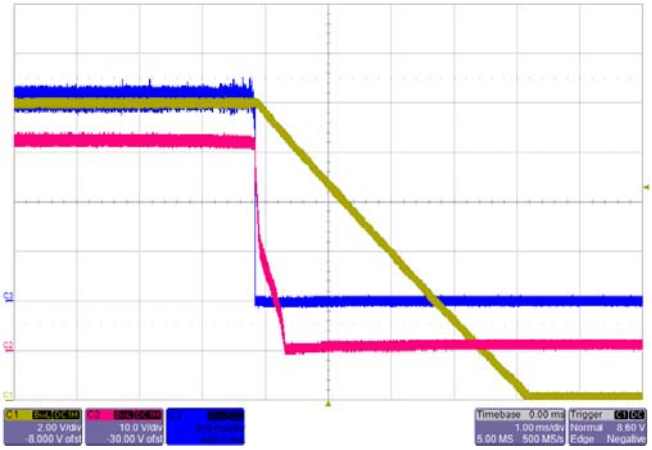
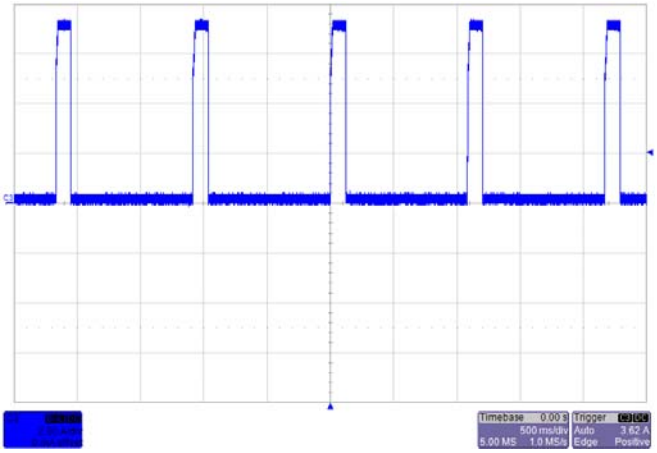
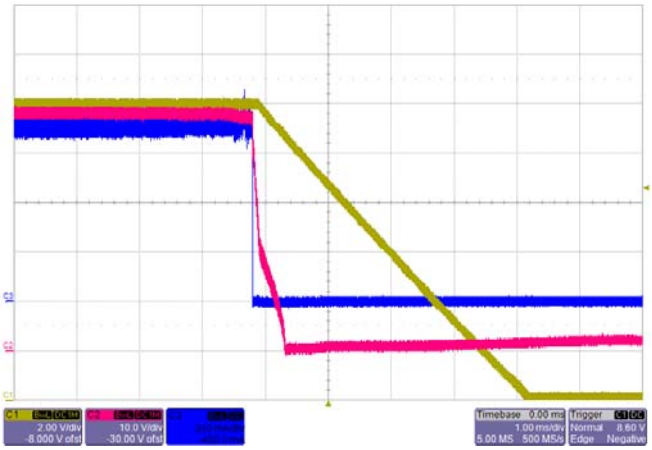


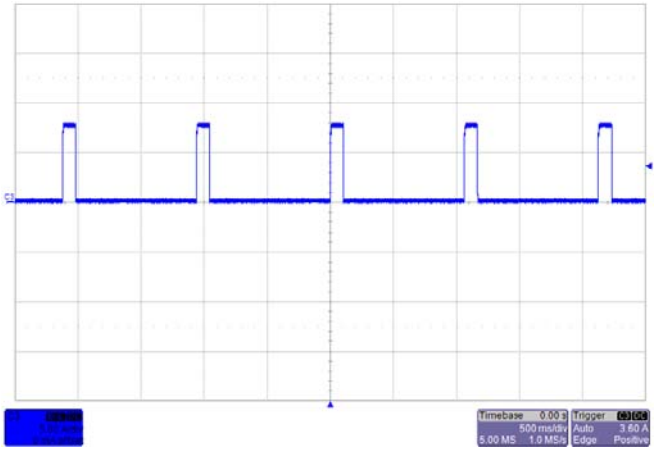
Power Down Vin=42V
C1: Output Voltage, C2: PSE Out, C3: Input Current
ILoad=100%Io.max



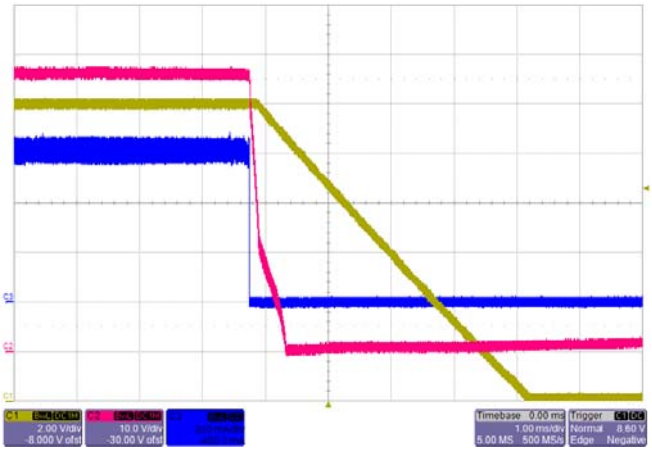
Short-Circuit Output, Vin=42V



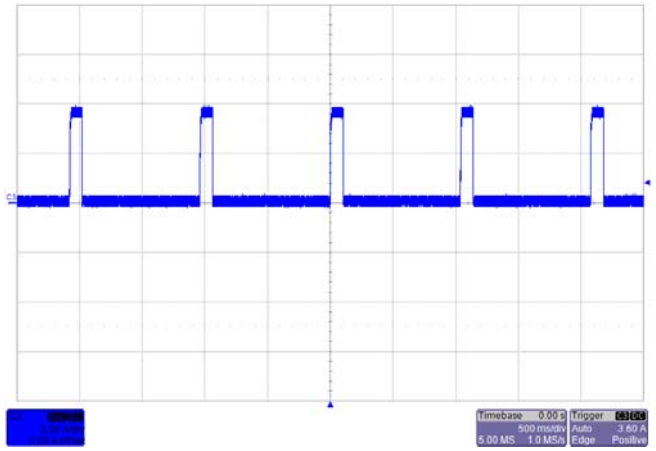
Power Down Vin=48V
C1: Output Voltage, C2: PSE Out, C3: Input Current
ILoad=100%Io.max



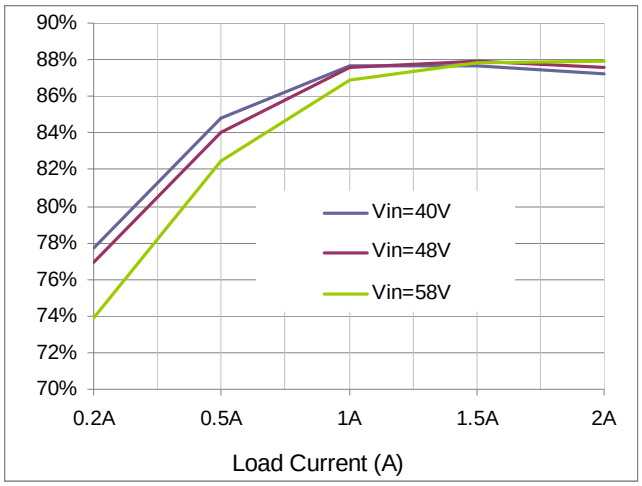
Short-Circuit Output, Vin=48V



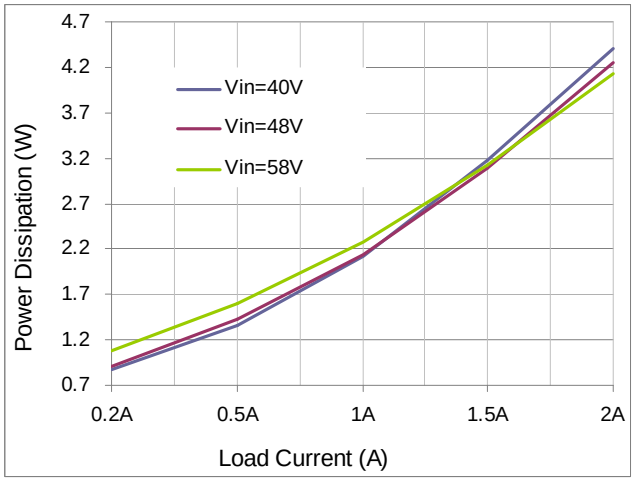
Power Down, Vin=57V
C1: Output Voltage, C2: PSE Out, C3: Input Current
ILoad=100%Io.max



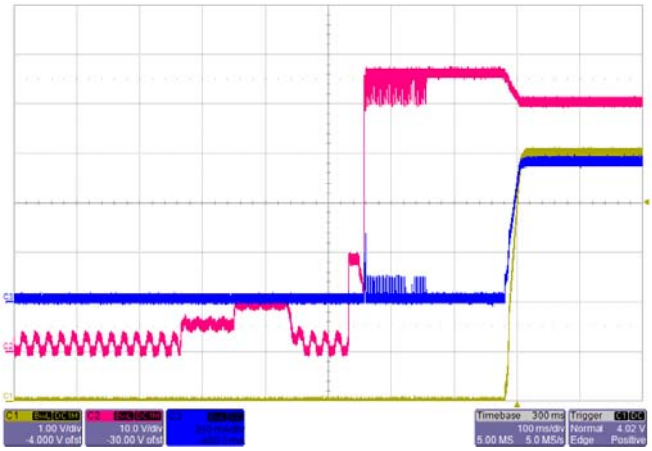
Short-Circuit Output Vin=57V



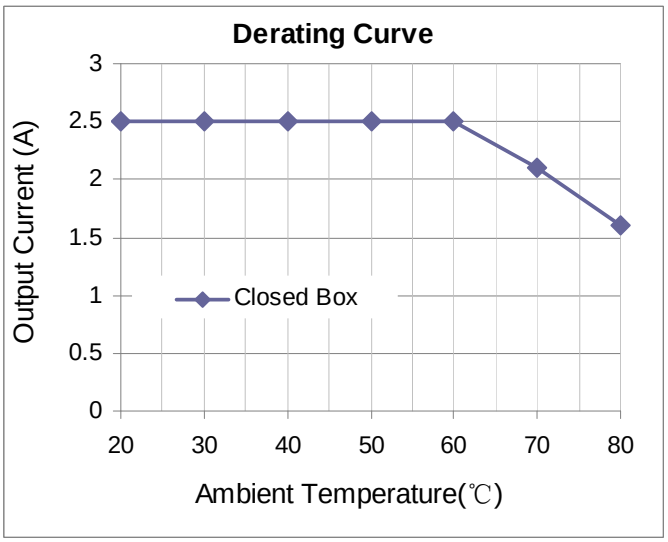
Efficiency



Power Dissipation



Startup form 56V 802.3at PSE
C1: Output Voltage, C2: PSE Out, C3: Input Current
ILoad=100%Io.max



Derating

About Minimum Load

Per 802.3af/at standard, the PSE will not power PD when PD is in idle state, and considering to keep the MQ7802 operating normally, MQ7802 will be active when its load power greater than 1W, for 12V output module means the minimum load current must be great than 80mA, for 5V means 200mA.

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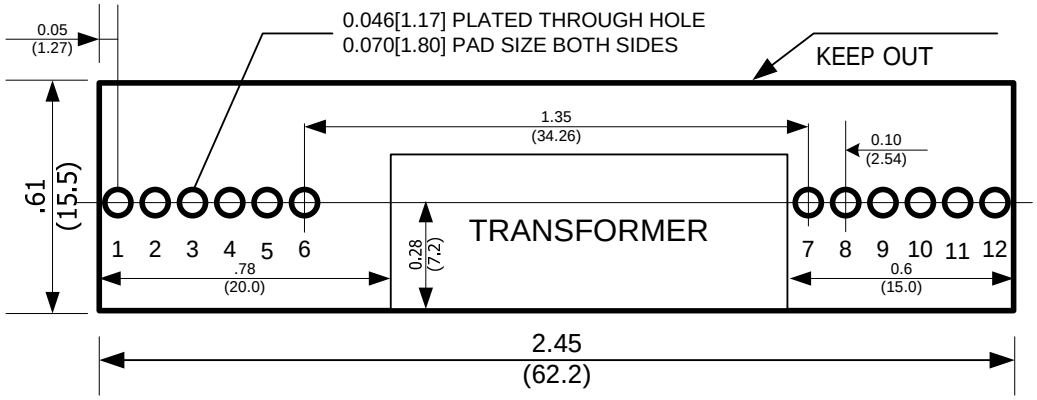
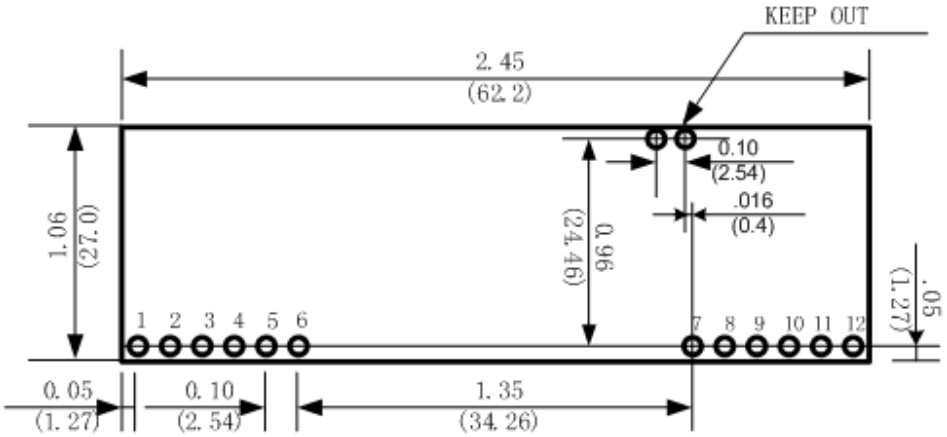
Recommended Hole Pattern

Dimensions are in inches (millimeters)



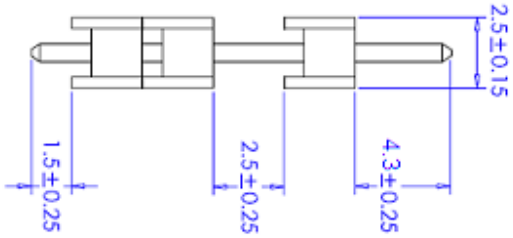
Recommended Hole Pattern for “R” suffix

Dimensions are in inches (millimeters)



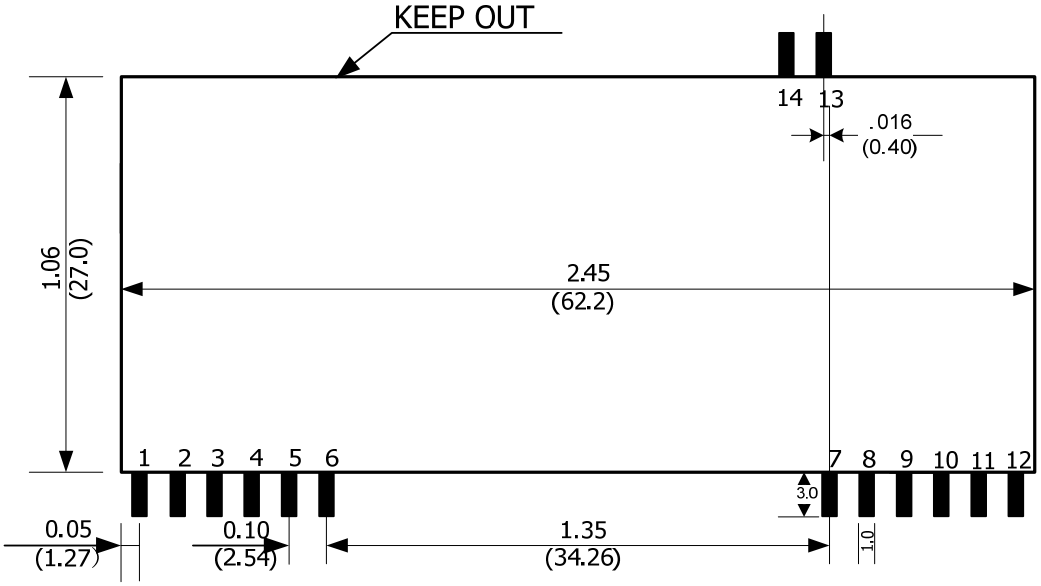
R3 Pin Description

Dimensions are in millimeters



Recommended Hole Pattern for SMT part

Dimensions are in inches (millimeters)



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