

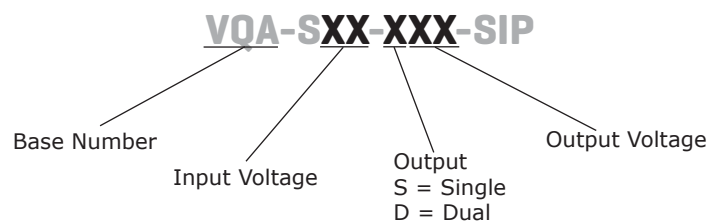
SERIES: VQA | DESCRIPTION: DC-DC CONVERTER
FEATURES

- designed for IGBT driver modules
- small footprint
- 3,000 Vac isolation
- short circuit protection
- temperature range (-40~105°C)
- efficiency up to 80%



MODEL	input voltage		output voltage (Vdc)	output current max (mA)	ripple and noise ¹ max (mVp-p)	efficiency ² typ (%)
	typ (Vdc)	range (Vdc)				
VQA-S9-D15-SIP	12	9~15	15 -8	100 -80	200	80
VQA-S12-D15-SIP	12	11.6~12.4	15 -8.7	80 -40	200	80
VQA-S15-S9-SIP	15	14.5~15.5	9	111	200	80
VQA-S15-D9-SIP	15	14.5~15.5	9 -9	55 -55	200	80
VQA-S15-D15-SIP	15	14.5~15.5	15 -8.7	80 -40	200	80
VQA-S15-D17-SIP	15	14.5~15.5	17 -8.7	80 -40	200	80
VQA-S24-D15-SIP	24	23.3~24.7	15 -8.7	80 -40	200	80

Notes: 1. ripple and noise measured at 20 MHz bandwidth, full load
2. at full load

PART NUMBER KEY


INPUT

parameter	conditions/description	min	typ	max	units
input voltage	VQA-S9-D15-SIP	9	12	15	Vdc
	VQA-S12-D15-SIP	11.6	12	12.4	Vdc
	VQA-S24-D15-SIP	23.3	24	24.7	Vdc
	all other models	14.5	15	15.5	Vdc
surge voltage	VQA-S9-D15-SIP	-0.7		15	Vdc
	VQA-S12-D15-SIP	-0.7		13	Vdc
	VQA-S24-D15-SIP	-0.7		26	Vdc
	all other models	-0.7		16	Vdc
temperature coefficient	at full load			±0.03	%/°C

OUTPUT

parameter	conditions/description	min	typ	max	units
line regulation	for Vin change of ±1%		1.2	1.5	%
switching frequency	at full load, nominal input		100	200	KHz

PROTECTIONS

parameter	conditions/description	min	typ	max	units
short circuit protection	continuous, auto restart				

SAFETY AND COMPLIANCE

parameter	conditions/description	min	typ	max	units
isolation voltage	input to output for 1 minute at 1 mA max. leakage	3,000			Vac
isolation resistance	input to output at 500 Vdc	1,000			MΩ
isolation capacitance	input to output, 100 kHz/0.1 V		6.6		pF
conducted emissions	CISPR22/EN55022, class B, external circuit required (see figure 1)				
radiated emissions	CISPR22/EN55022, class B, external circuit required (see figure 1)				
ESD	IEC/EN61000-4-2, contact ±8kV, class B				
MTBF	MIL-HDBK-217F @ 25°C	3,500,000			hours
RoHS compliant	yes				

ENVIRONMENTAL

parameter	conditions/description	min	typ	max	units
operating temperature	see derating curve	-40		105	°C
storage temperature		-55		125	°C
storage humidity	non-condensing			95	%

SOLDERABILITY

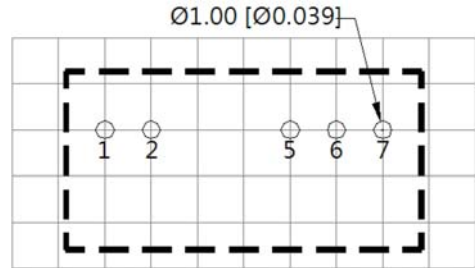
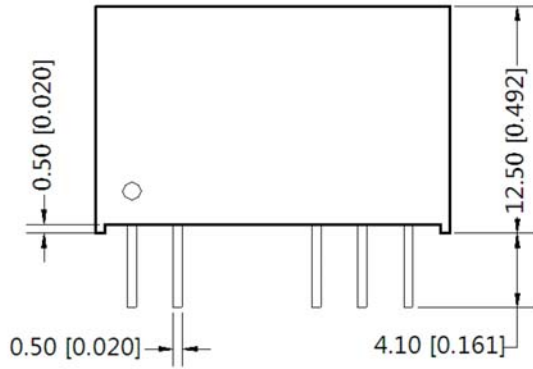
parameter	conditions/description	min	typ	max	units
hand soldering	1.5mm from case for 10 seconds			300	°C

MECHANICAL

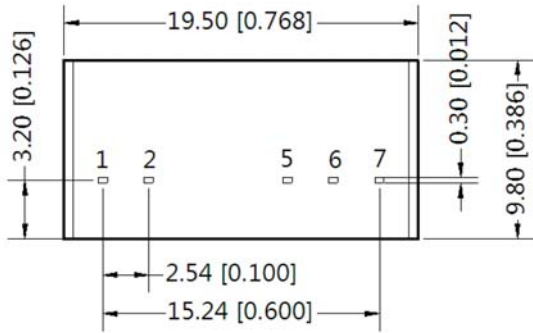
parameter	conditions/description	min	typ	max	units
dimensions	19.50 x 9.80 x 12.5 (0.768 x 0.386 x 0.492 inch)				mm
material	plastic (UL94V-0)				
weight			4.3		g
temperature rise	Ta=25°C		25		°C

MECHANICAL DRAWING

units: mm [inches]
 tolerance: ± 0.50 [± 0.020]
 pin section tolerance: ± 0.10 [± 0.004]



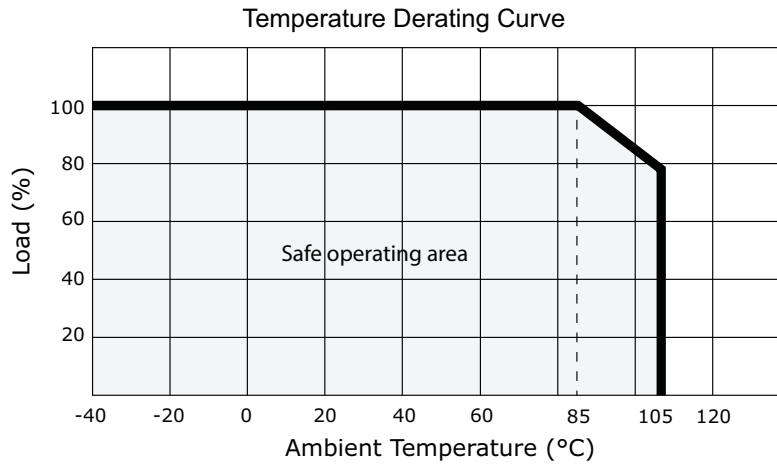
Grid size: 2.54mm x 2.54mm



PIN CONNECTIONS	
PIN	FUNCTION
1	Vin
2	GND
5*	-Vo
6	0 V
7	+Vo

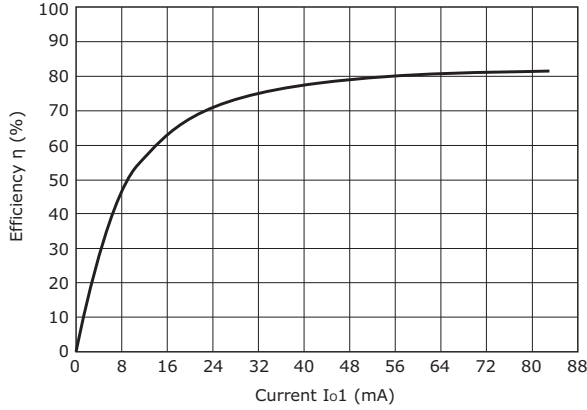
Note: *VQA-S15-S9-SIP has no connection

DERATING CURVES



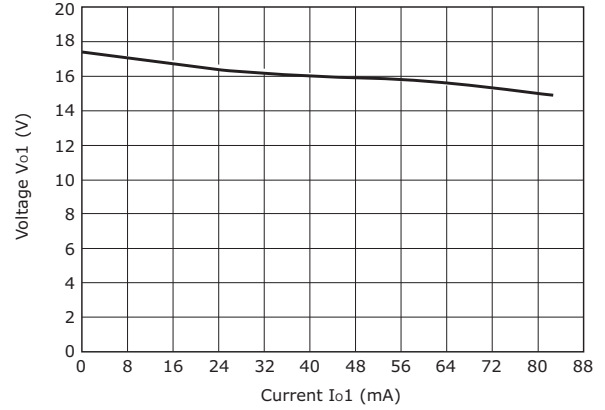
PERFORMANCE CURVES

1. output current vs. efficiency

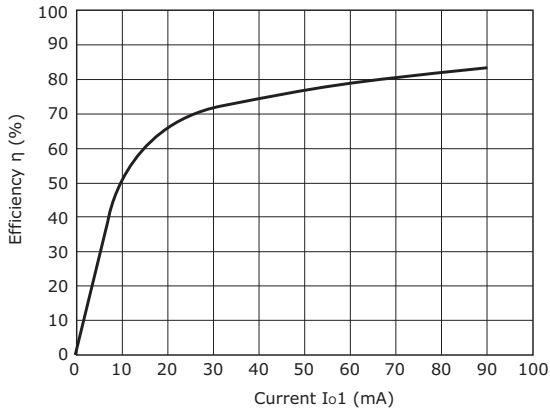


VQA-S12-D15-SIP, VQA-S15-D15-SIP, VQA-S24-D15-SIP

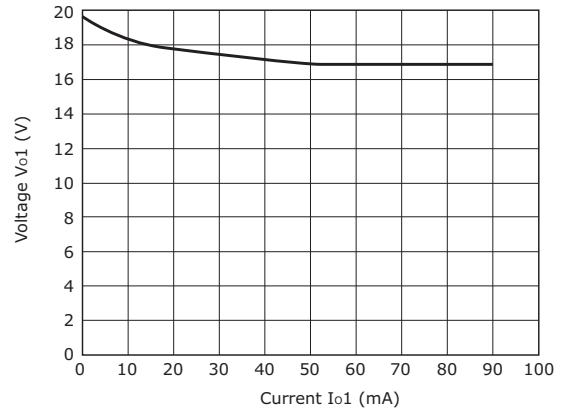
2. output current vs. output voltage



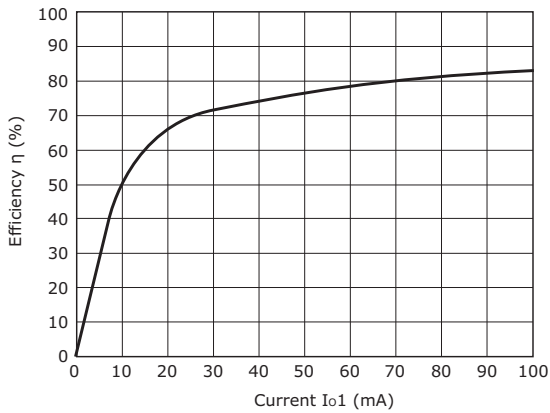
VQA-S12-D15-SIP, VQA-S15-D15-SIP, VQA-S24-D15-SIP



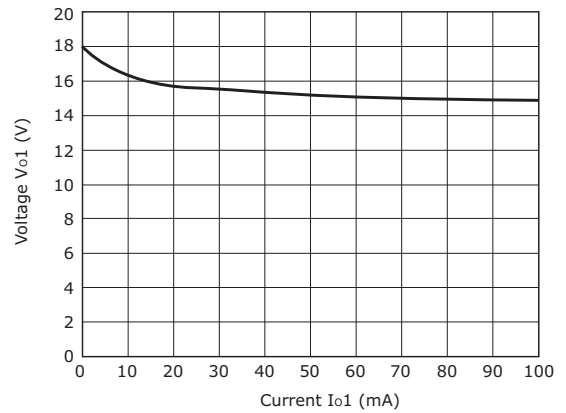
VQA-S15-D17-SIP



VQA-S15-D17-SIP



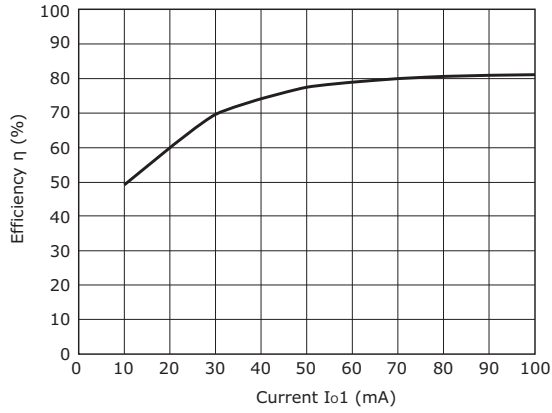
VQA-S9-D15-SIP



VQA-S9-D15-SIP

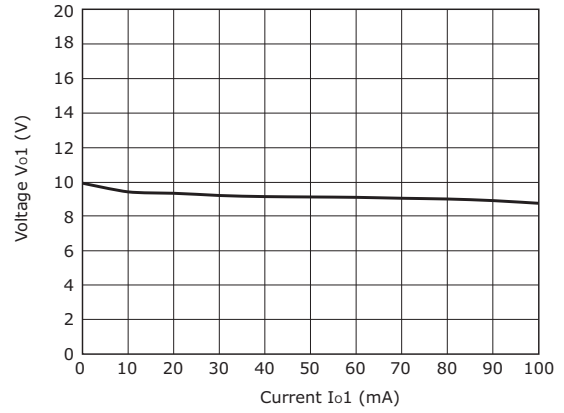
PERFORMANCE CURVES (CONTINUED)

1. output current vs. efficiency

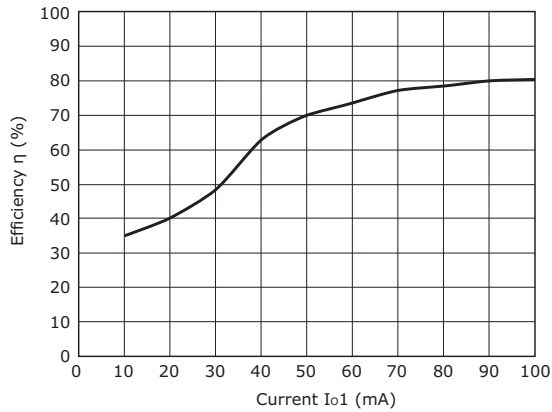


VQA-S15-S9-SIP

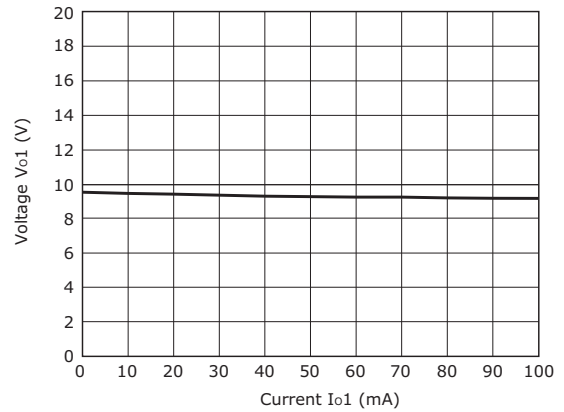
2. output current vs. output voltage



VQA-S15-S9-SIP



VQA-S15-D9-SIP



VQA-S15-D9-SIP

EMC RECOMMENDED CIRCUIT

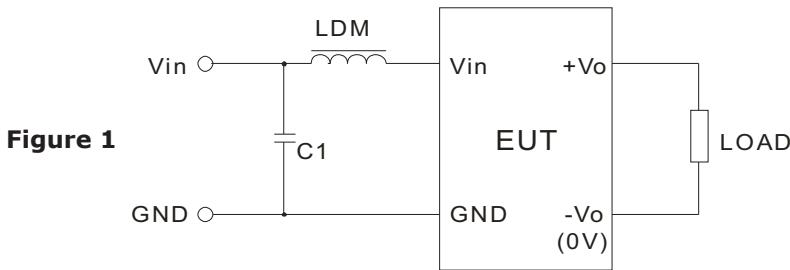


Figure 1

Table 1

Recommended external circuit components		
V_{in} (Vdc)	C1	LDM
12	4.7 μ F/50V	12 μ H
15	4.7 μ F/50V	12 μ H
24	4.7 μ F/50V	12 μ H

TEST CONFIGURATION

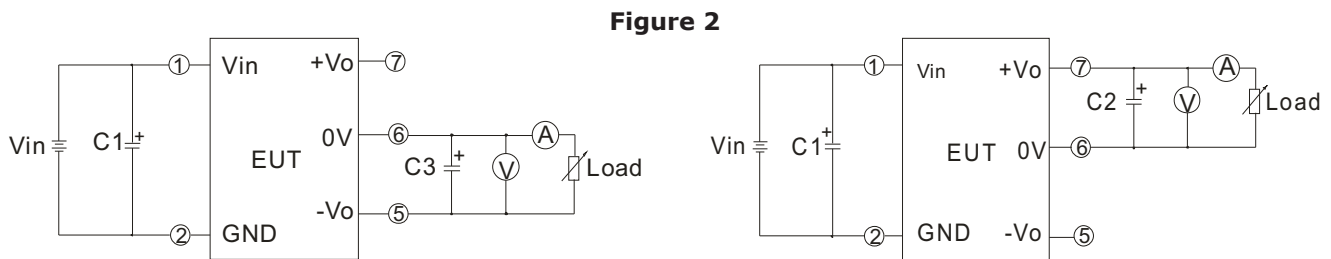
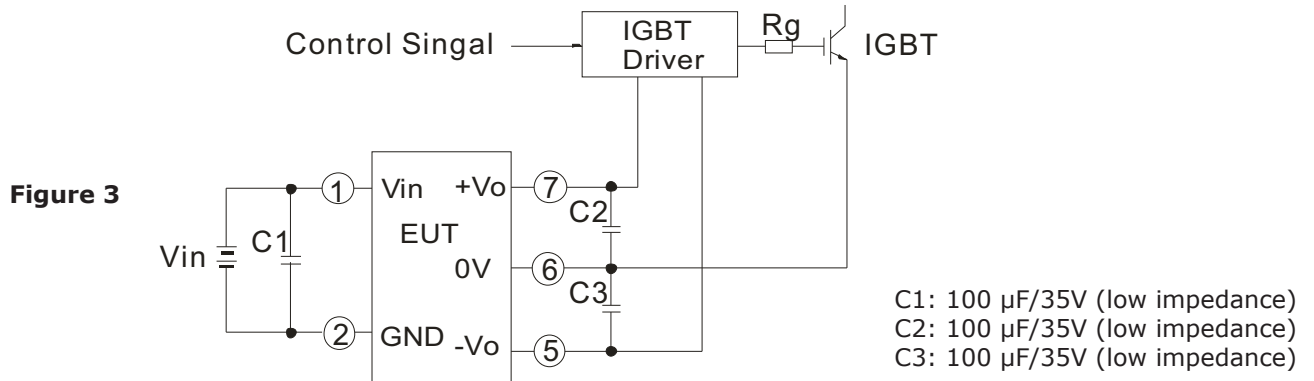


Figure 2

C1, C2, C3: 100 μ F/35V (low impedance)

APPLICATION CIRCUIT



- Notes:
1. The wire between the converter and IGBT driver must be as short as possible.
 2. External filter capacitors should be connected as close as possible to the converter and the IGBT driver.
 3. The output average power of the IGBT driver should be less than the output power of DC-DC module.
 4. Maximum capacitive load is tested at nominal input voltage and full load.

REVISION HISTORY

rev.	description	date
1.0	initial release	08/16/2012
1.01	updated features	09/20/2012
1.02	updated product photograph	11/13/2012
1.03	various updates	02/05/2013
1.04	added switching frequency to spec	07/01/2013
1.05	added models, updated spec	09/23/2013

The revision history provided is for informational purposes only and is believed to be accurate.



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