



**THE DATASHEET OF  
RP-2415D**



# Features

# Unregulated Converters

- Pot-core transformer - separated windings
- high 5.2kVDC/1s basic isolation in compact size
- Optional continuous short circuit protection
- Efficiency up to 82%
- Pin compatible with RH and RK series
- Suitable for IGBT applications
- IEC/EN/UL/CSA 60950-1 certified



## RP

**1 Watt**  
**SIP7**  
**Single and Dual Output**



### Description

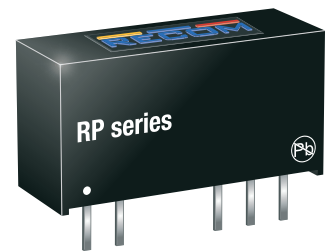
The RP series has very high isolation of 5.2kVDC in a compact size. The converters are suitable for IGBT driver applications. The /X2 version has rearranged pins to permit an input output separation of more than 9mm.

### Selection Guide

Part Number	nom. Input Voltage [VDC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ. <sup>(1)</sup> [%]	max. Capacitive Load <sup>(2)</sup> [µF]
RP-xx3.3S <sup>(3,4)</sup>	5, 9, 12, 15, 24	3.3	303	70	2200
RP-xx05S <sup>(3,4)</sup>	5, 9, 12, 15, 24	5	200	70-72	1000
RP-xx09S <sup>(3,4)</sup>	5, 9, 12, 15, 24	9	111	75	1000
RP-xx12S <sup>(3,4)</sup>	5, 9, 12, 15, 24	12	84	75-78	470
RP-xx15S <sup>(3,4)</sup>	5, 9, 12, 15, 24	15	66	80	470
RP-xx24S <sup>(3,4)</sup>	5, 9, 12, 15, 24	24	42	80	220
RP-xx3.3D <sup>(3)</sup>	5, 9, 12, 15, 24	±3.3	±152	70	±1000
RP-xx05D <sup>(3)</sup>	5, 9, 12, 15, 24	±5	±100	74-76	±470
RP-xx09D <sup>(3)</sup>	5, 9, 12, 15, 24	±9	±56	75	±470
RP-xx12D <sup>(3)</sup>	5, 9, 12, 15, 24	±12	±42	79-82	±220
RP-xx15D <sup>(3)</sup>	5, 9, 12, 15, 24	±15	±33	80-82	±220
RP-xx24D <sup>(3)</sup>	5, 9, 12, 15, 24	±24	±21	80	±100
RP-xx1509D	5,12,24	+15/-9	±42	70-85	±220

#### Notes:

- Note1: Efficiency is tested at nominal input and full load at +25°C ambient  
 Note2: Max Cap Load is tested at nominal input and full resistive load



### Model Numbering



#### Notes:

- Note3: standard part is without continuous short circuit protection  
 add suffix „/P“ for continuous short circuit protection  
 Note4: add suffix „/X2“ for alternative pinning (only available for single outputs)  
 or add suffix „/P/X2“ for continuous short circuit protection and alternative pinning

#### Ordering Examples:

- RP-123.3S/P: 12V Input Voltage, 3.3V Output Voltage, Single Output with continuous short circuit protection  
 RP-0509S/X2: 5V Input Voltage, ±9V Output Voltage, Single Output with alternative pinning  
 RP-0505S/P/X2: 5V Input Voltage, 5V Output Voltage, Single Output with continuous short circuit protection and alternative pinning

UL60950-1 certified\*  
 CSA/CAN C22.2 No. 60950-1-07 certified\*  
 IEC/EN60950-1 certified  
 IEC/EN60601-1 certified\*  
 EN55032 compliant

\*+15/-9 version excluded

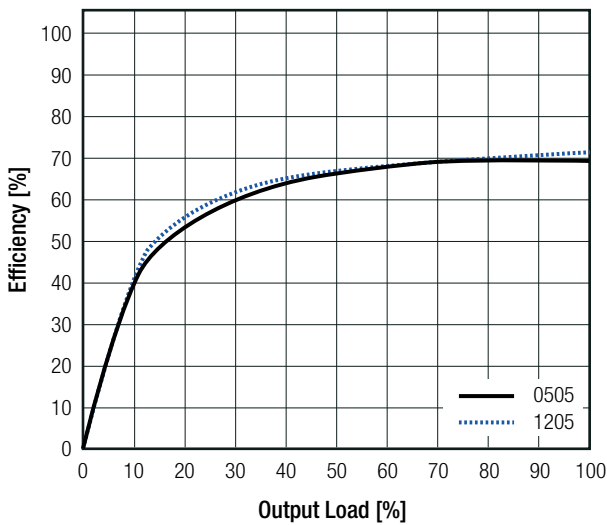
**Specifications** (measured @ Ta= 25°C, nom. Vin and full load unless otherwise stated)

### BASIC CHARACTERISTICS

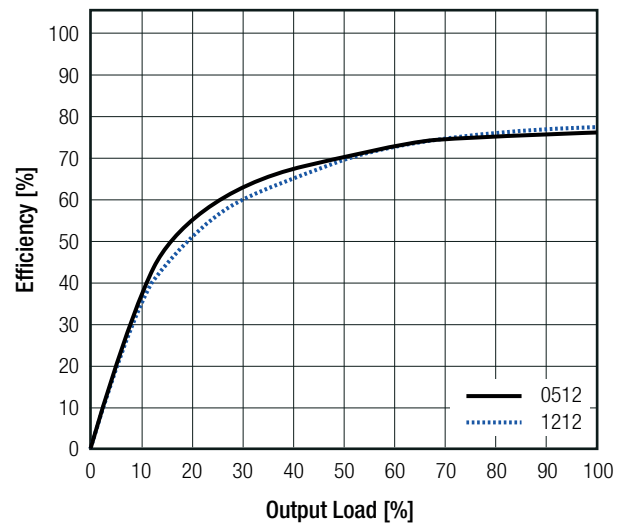
Parameter	Condition	Min.	Typ.	Max.
Internal Input Filter				capacitor
Input Voltage Range			±10%	
Minimum Load		0%		
Start-up time				250ms
Internal Operating Frequency		50kHz	100kHz	120kHz
Output Ripple and Noise	20MHz BW			100mVp-p

### Efficiency vs. Load

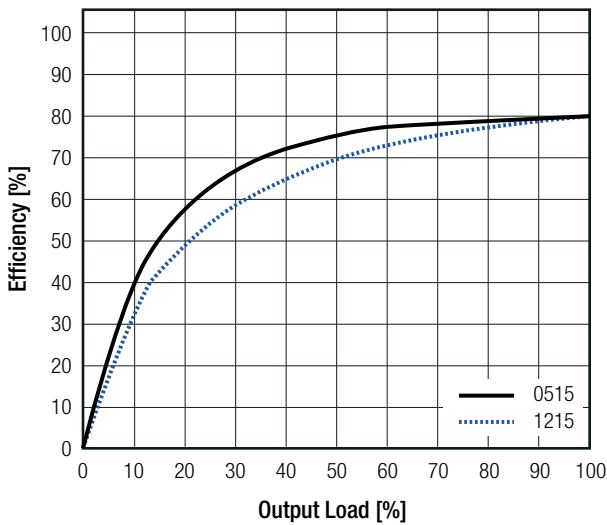
RP-xx05S



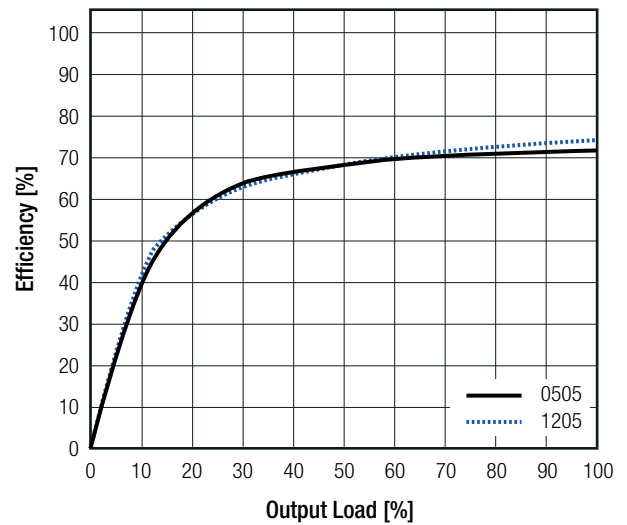
RP-xx12S



RP-xx15S



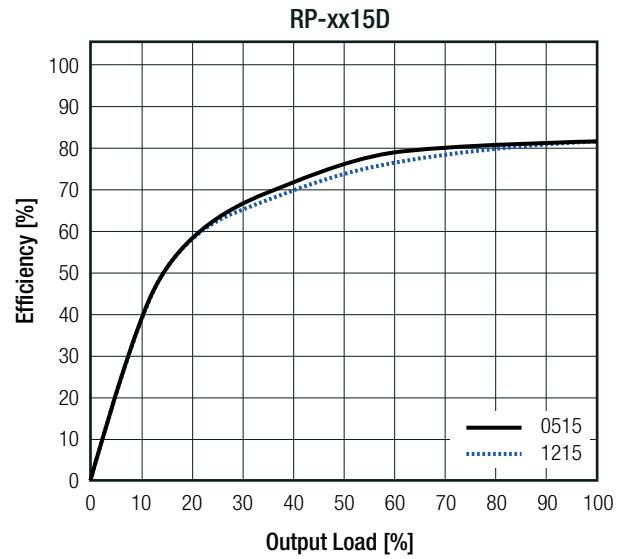
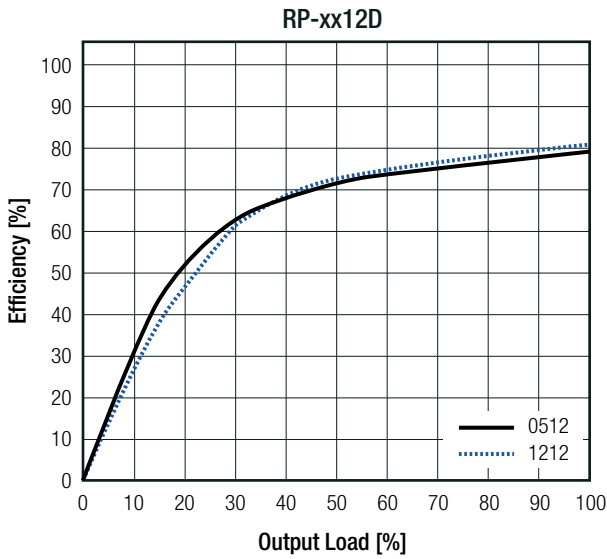
RP-xx05D



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Specifications (measured @ Ta= 25°C, nom. Vin and full load unless otherwise stated)

### Efficiency vs. Load



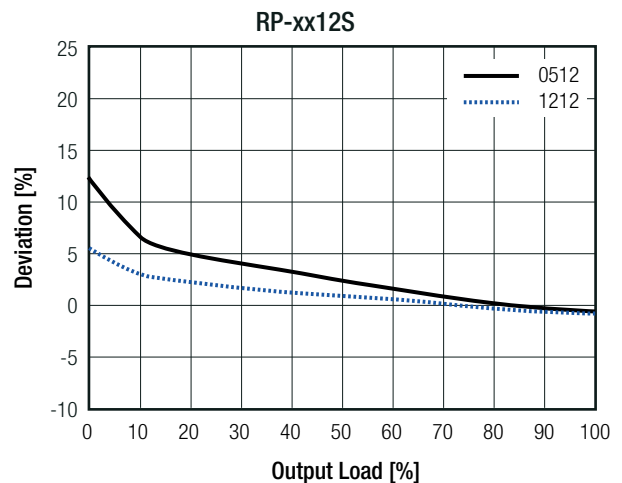
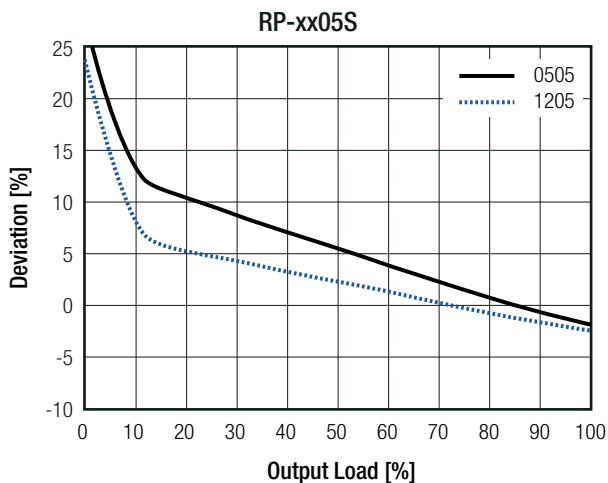
### REGULATIONS

Parameter	Condition		Value
Output Accuracy			±5.0% max.
Line Regulation	low line to high line		±1.2% of 1.0% Vin typ.
Load Regulation <sup>(5)</sup>	10% to 100% load	3.3Vout	20.0% max.
		5Vout	15.0% max.
		9, 12, 15, 24Vout and RP-xx1509D	10.0% max.

#### Notes:

Note5: Operation below 10% load will not harm the converter, but specifications may not be met

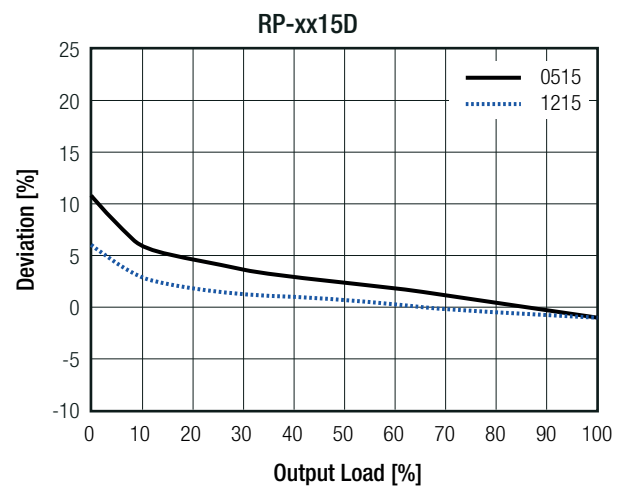
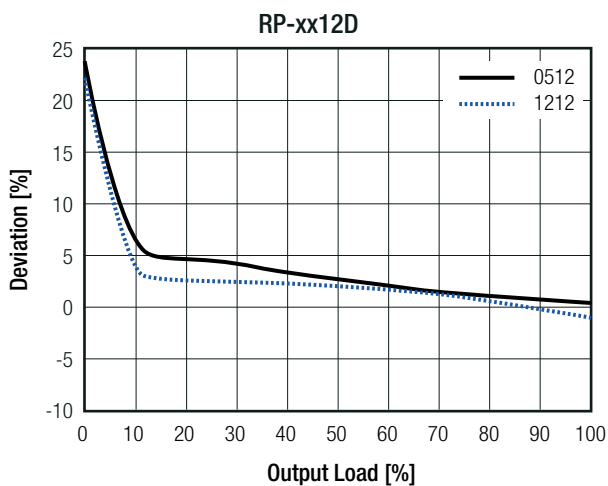
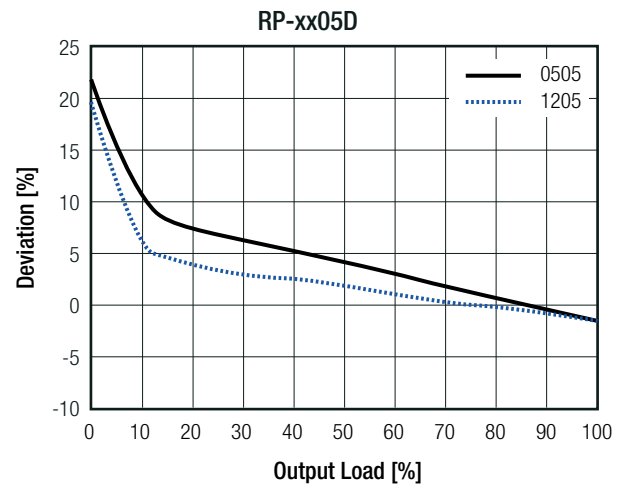
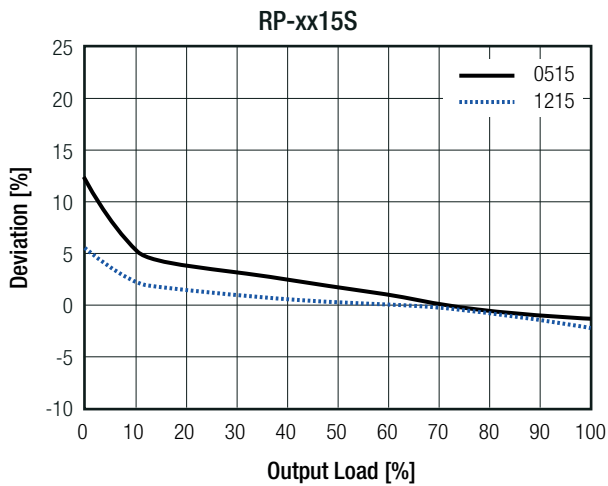
### Deviation vs. Load



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Specifications (measured @ Ta= 25°C, nom. Vin and full load unless otherwise stated)

### Deviation vs. Load



PROTECTIONS			
Parameter	Type		Value
Short Circuit Protection (SCP)	without suffix with suffix "/P"		1 second continuous
Isolation Voltage <sup>(6)</sup>	I/P to O/P	tested for 1 second rated for 1 minute	5.2kVDC 2kVAC/60Hz
Isolation Resistance			20GΩ min.
Isolation Capacitance			4pF min. / 10pF max.
Insulation Grade			basic (IEC/EN60950-1) functional (IEC/EN60601-1)

**Notes:**

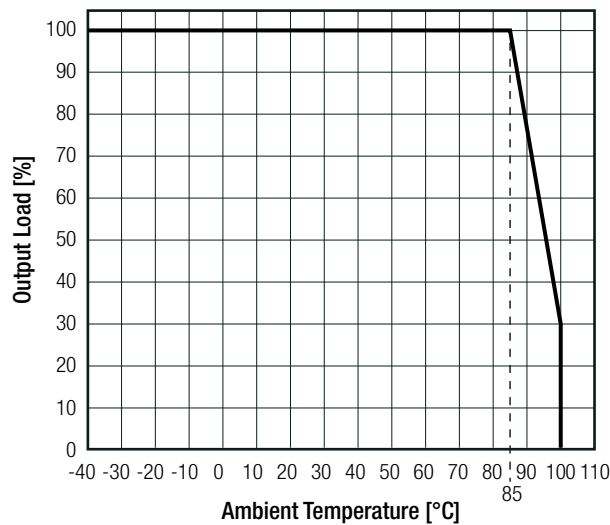
Note6: For repeat Hi-Pot testing, reduce the time and/or the test voltage

Note7: Refer to local wiring regulations if input over-current protection is also required. Recommended fuse: T1A slow blow type

**Specifications** (measured @ Ta= 25°C, nom. Vin and full load unless otherwise stated)

ENVIRONMENTAL			
Parameter	Condition		Value
Operating Temperature Range	full load (see graph)		-40°C to +85°C
Maximum Case Temperature			+105°C
Operating Altitude			3000m
Operating Humidity	non-condensing		95% RH max.
Pollution Degree			PD2
MTBF	according to MIL-HDBK-217F, G.B.	+25°C	18400 x 10 <sup>3</sup> hours
		+85°C	6900 x 10 <sup>3</sup> hours

**Derating Graph**



**SAFETY AND CERTIFICATIONS**

Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety	E358085-A6-UL <sup>(8,9)</sup>	UL60950-1, 2nd Edition:2007 CAN/CSA C22.2 No. 60950-1-03, 2nd Edition:2007
Information Technology Equipment, General Requirements for Safety	SPCLVD1602031 <sup>(9)</sup>	IEC60950-1:2005, 2nd Edition + A2:2013 EN60950-1:2006 + A2:2013
Medical electrical equipment Part 1: General requirements for basic safety and essential performance	WD-SE-R-180676-A0 <sup>(8)</sup>	IEC60601-1:2005 + A1:2012, 3rd Edition EN60601-1:2006 + A1:2013 + A12:2014
EAC	RU-AT.49.09571	TP TC 004/2011
RoHS 2+		RoHS-2011/65/EU + AM-2015/863

EMC Compliance	Condition	Standard / Criterion
Electromagnetic compatibility of multimedia equipment - Emission requirements	with external filter (see filter suggestion below)	EN55032, Class B EN55032, Class A

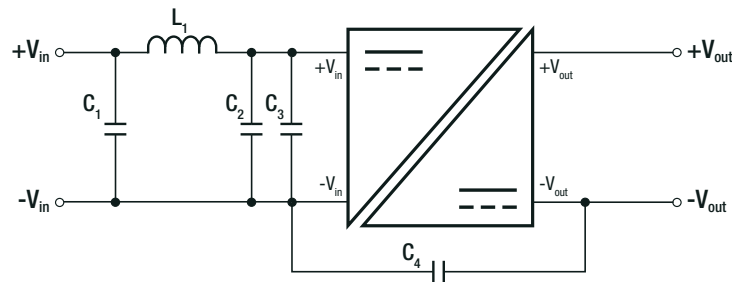
**Notes:**

- Note8: excluded +15/-9 version
- Note9: excluded suffix „/X2“

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### Specifications (measured @ Ta= 25°C, nom. Vin and full load unless otherwise stated)

#### EMC Filter Suggestion according to EN55032



#### Component List Class A

MODEL	C2	C3
RP-0505S	10µF	4.7µF
RP-0515S		
RP-2405S	100V MLCC	50V MLCC
RP-2424S		

#### Component List Class B

MODEL	C1	L1	C4 (safety)
RP-0505S	10µF	22µH choke RLS-226	2.2nF
RP-0515S			
RP-2405S	100V MLCC		
RP-2424S			

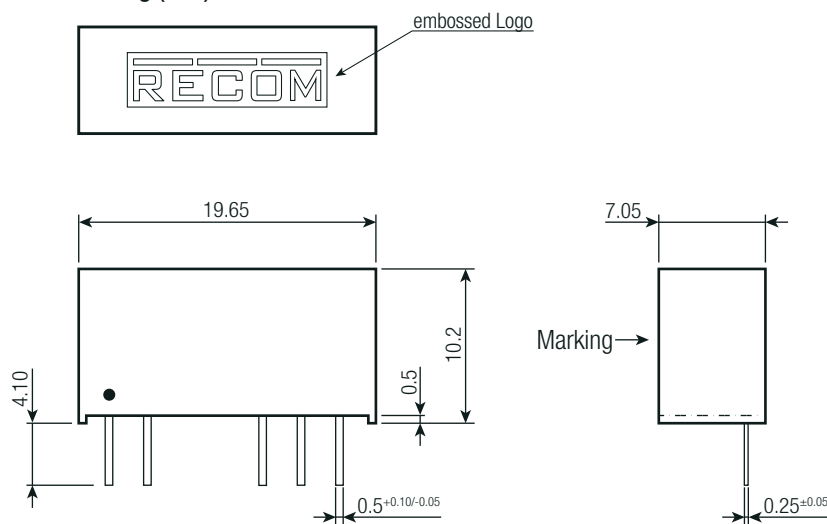
#### Notes:

Note10: Filter suggestions are valid for indicated part numbers only. For other part numbers, please contact RECOM tech support for advice

#### DIMENSION AND PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	case potting PCB	non-conductive black plastic (UL94 V-0) epoxy, (UL94 V-0) FR4, (UL94 V-0)
Dimension (LxWxH)		19.65 x 7.05 x 10.2mm
Weight		2.4g typ.

#### Dimension Drawing (mm)

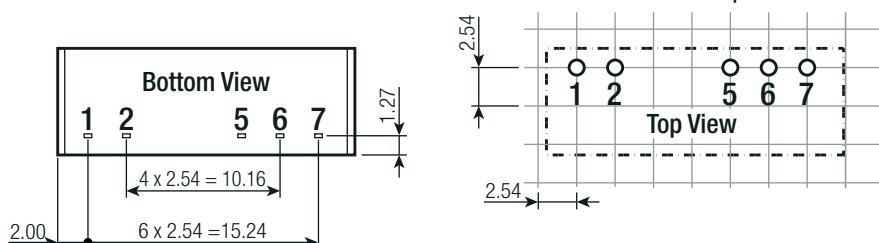


#### Pinning information

Pin #	Single	Dual	/X2
1	+Vin	+Vin	+Vin
2	-Vin	-Vin	-Vin
5	-Vout	-Vout	no Pin
6	no pin	Com	-Vout
7	+Vout	+Vout	+Vout

Tolerance: xx.x= ±0.5mm  
xx.xx= ±0.25mm

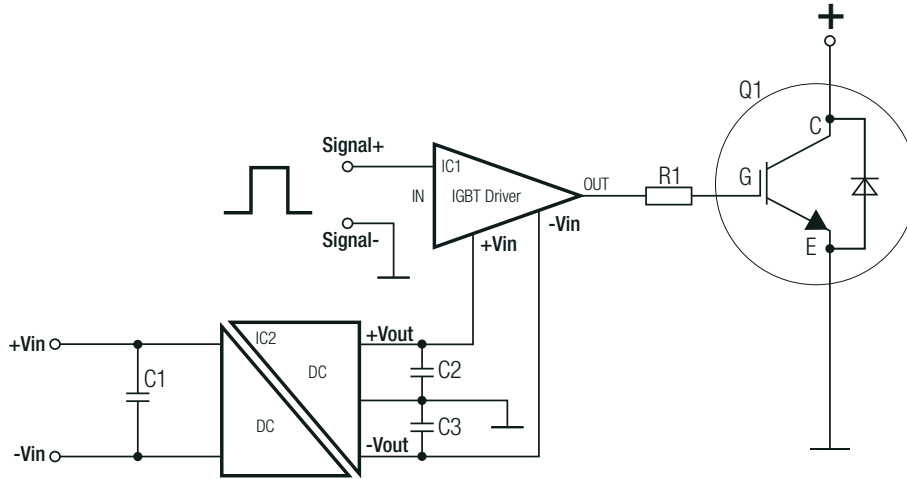
#### Recommended Footprint Details



**Specifications** (measured @ Ta= 25°C, nom. Vin and full load unless otherwise stated)

**INSTALLATION AND APPLICATION**

**IGBT Application Circuit**





**PACKAGING INFORMATION**

Parameter	Type	Value
Packaging Dimension (LxWxH)	tube	520.0 x 16.0 x 9.0mm
Packaging Quantity	tube	25pcs
Storage Temperature Range		-55°C to + 125°C
Storage Humidity	non-condensing	95% RH max.

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