THE DATASHEET OF

RP-0509S

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

RECOM
DC/DC Converter

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.

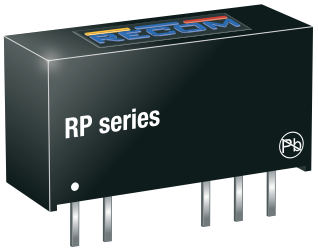
Selection Guide

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



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

Model Numbering

RP- ___ ___ / ___ ___

- nom. Input Voltage
- Output Voltage
- Protection (3)
- alternative Pinning Option (4)
- **S**ingle or **D**ual

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:

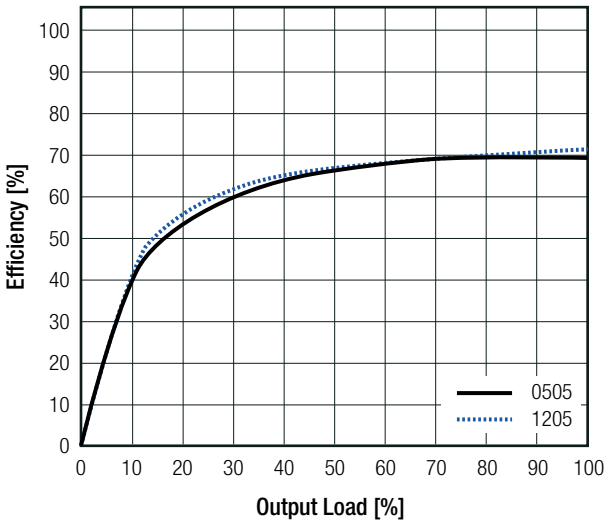
RP-123.3S/P: 12V Input Voltage, 3.3V Output Voltage, Single Output with continuous short circuit protection
RP-0509S/X2: 5V Input Voltage, ±9V Output Voltage, Single Output with alternative pinning
RP-0505S/P/X2: 5V Input Voltage, 5V Output Voltage, Single Output with continuous short circuit protection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

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

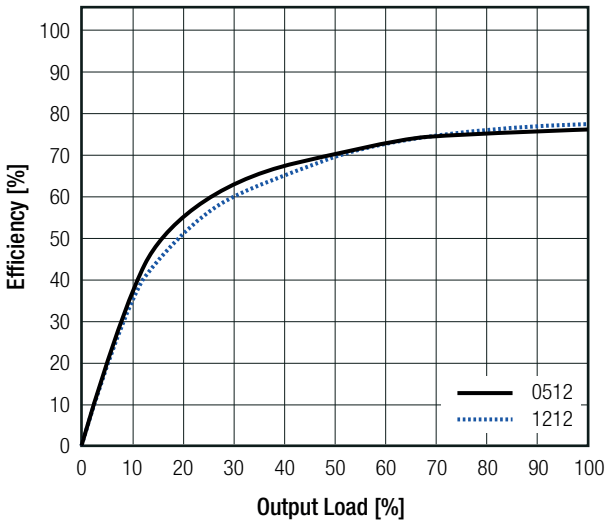
BASIC CHARACTERISTICS				
Parameter	**Condition**	**Min.**	**Typ.**	**Max.**
Internal Input Filter				capacitor
Input Voltage Range			±10%	
Minimum Load		0%		
Start-up time				250ms
Internal Operating Frequency		50kHz	100kHz	120kHz
Output Ripple and Noise	20MHz BW			100mVp-p

Efficiency vs. Load

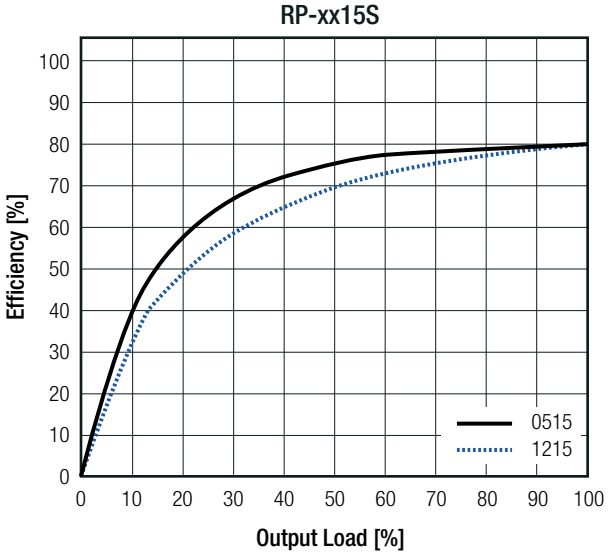
RP-xx05S



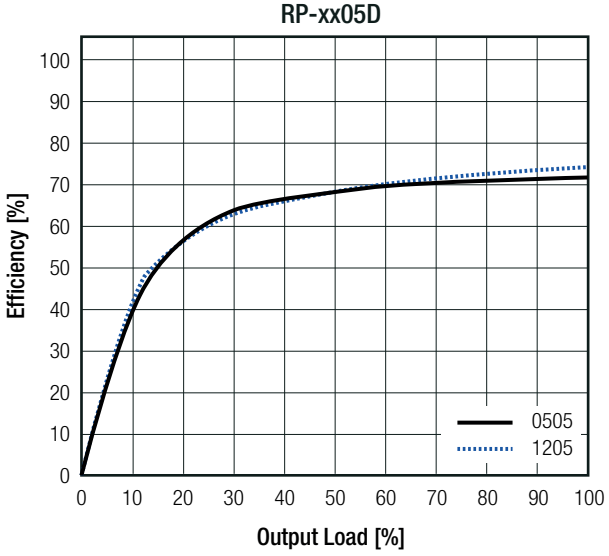
RP-xx12S



RP-xx15S



RP-xx05D



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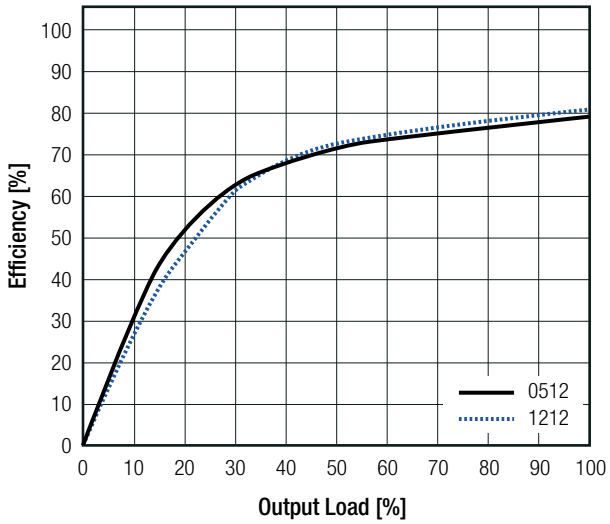
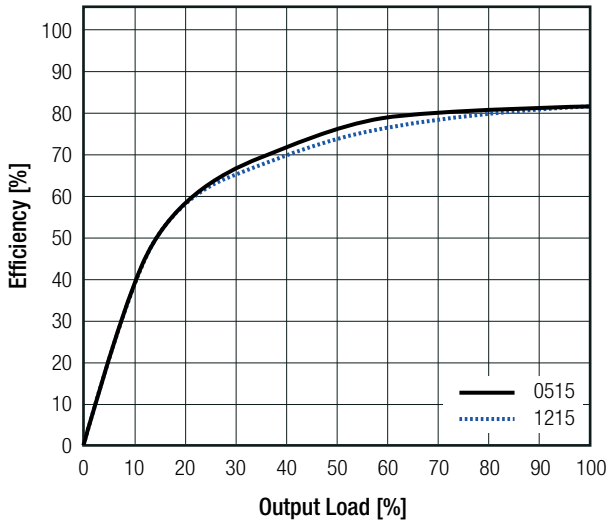
Specifications (measured @ Ta= 25°C, nom. Vin and full load unless otherwise stated)

Efficiency vs. Load

RP-xx12D



RP-xx15D



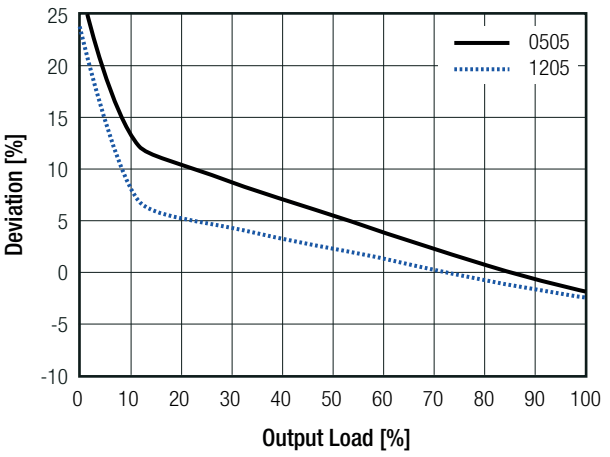
REGULATIONS			
Parameter	**Condition**		**Value**
Output Accuracy			±5.0% max.
Line Regulation	low line to high line		±1.2% of 1.0% Vin typ.
Load Regulation [5]	10% to 100% load	3.3Vout	20.0% max.
		5Vout	15.0% max.
		9, 12, 15, 24Vout and RP-xx1509D	10.0% max.

Notes:

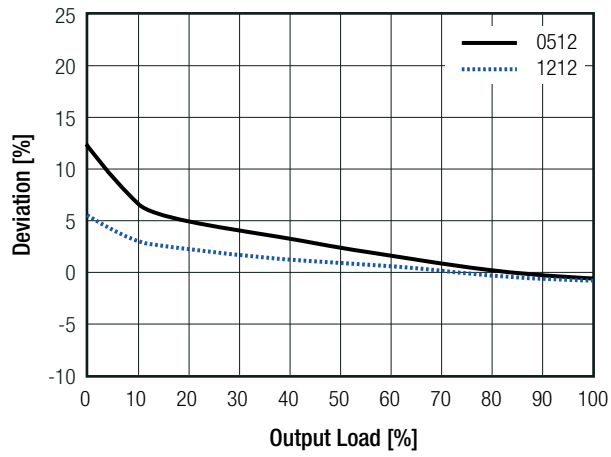
Note5: Operation below 10% load will not harm the converter, but specifications may not be met

Deviation vs. Load

RP-xx05S



RP-xx12S



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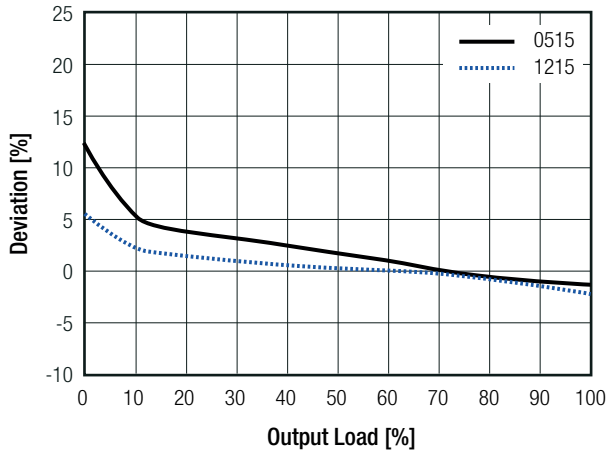
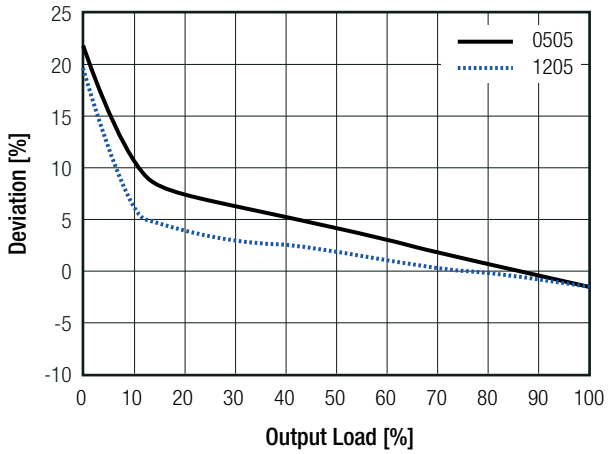
Specifications (measured @ Ta= 25°C, nom. Vin and full load unless otherwise stated)

Deviation vs. Load

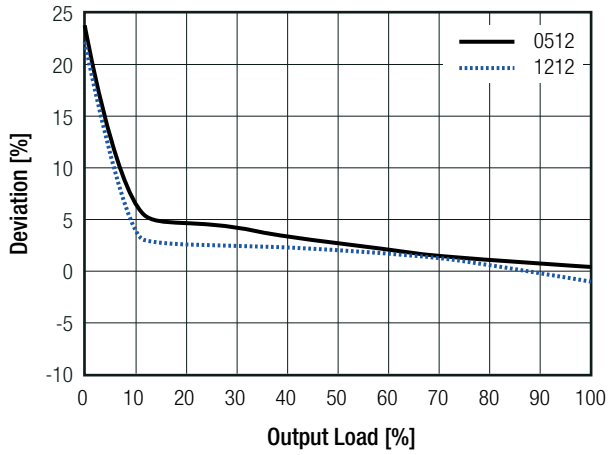
RP-xx15S



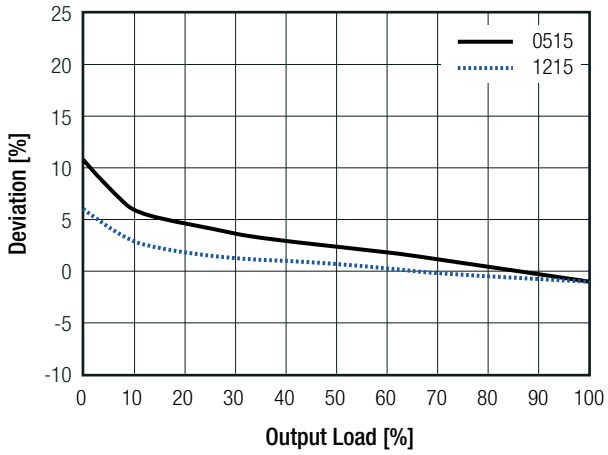
RP-xx05D



RP-xx12D



RP-xx15D



PROTECTIONS

Parameter	Type		Value
Short Circuit Protection (SCP)	without suffix with suffix "/P"		1 second continuous
Isolation Voltage [6]	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

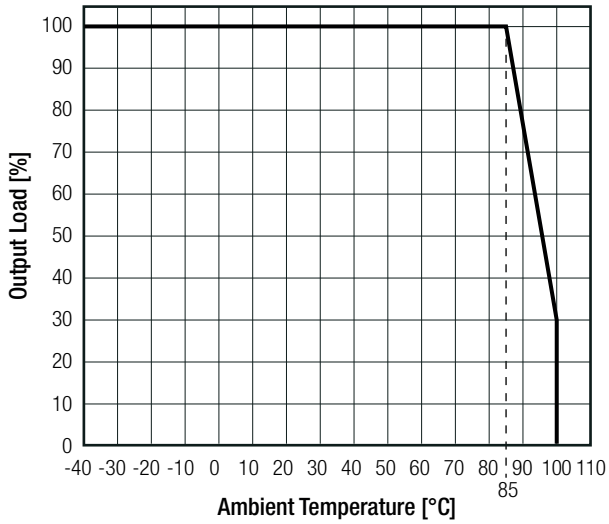
Note7: Refer to local wiring regulations if input over-current protection is also required. Recommended fuse: T1A slow blow type

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 +85°C	18400 x 10^3 hours 6900 x 10^3 hours

Derating Graph



SAFETY AND CERTIFICATIONS

Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety	E358085-A6-UL (8, 9)	UL60950-1, 2nd Edition:2007 CAN/CSA C22.2 No. 60950-1-03, 2nd Edition:2007
Information Technology Equipment, General Requirements for Safety	SPCLVD1602031 (9)	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 (8)	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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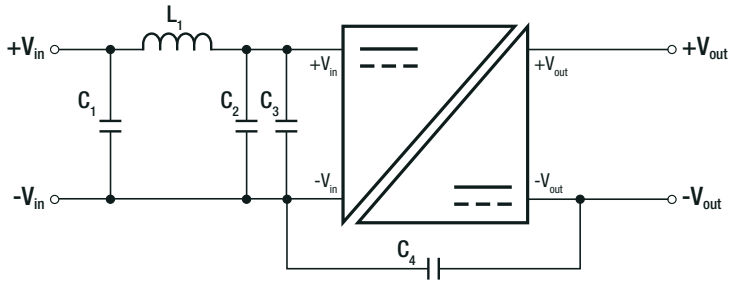
Specifications (measured @ Ta= 25°C, nom. Vin and full load unless otherwise stated)

EMC Filter Suggestion according to EN55032



Component List Class A

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

Component List Class B

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

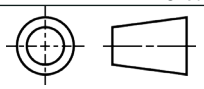
Notes:

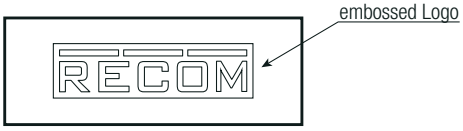
Note10: Filter suggestions are valid for indicated part numbers only. For other part numbers, please contact RECOM tech support for advice

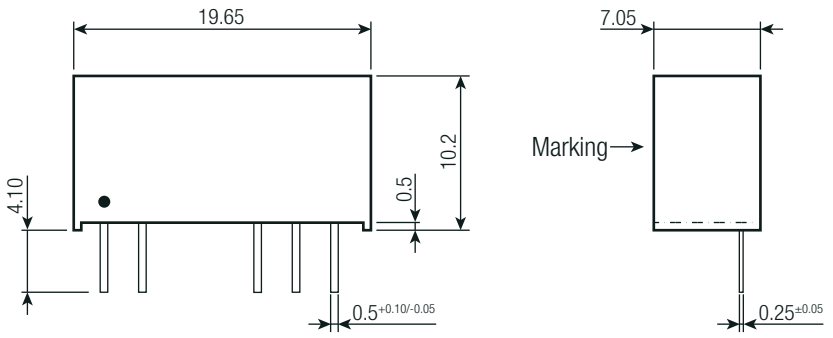
DIMENSION AND PHYSICAL CHARACTERISTICS

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

Dimension Drawing (mm)



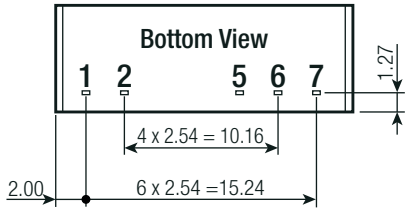




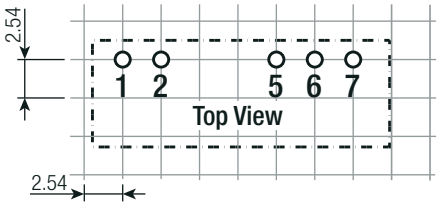
Pinning information

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



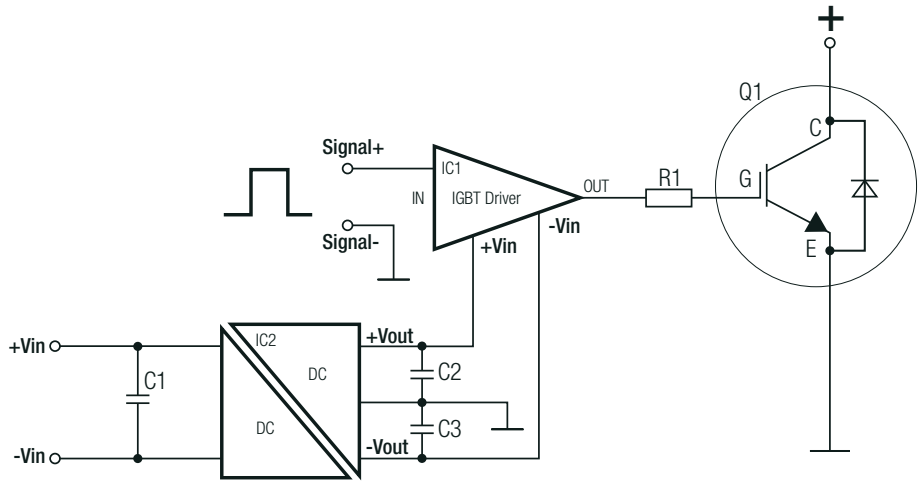
Recommended Footprint Details



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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