

Features

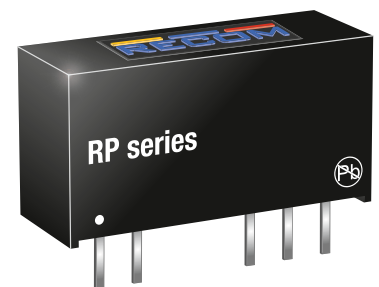
Unregulated Converters

- Pot-core transformer - separated windings
- high 5.2kVDC 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



UL
C_{UL} US
E358085

UL60950-1 certified*
CAN/CSA-C22.2 No 60950-1 certified*
EN60950-1 certified
IEC60950-1 certified
EN55032 compliant

*+15/-9 version excluded

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

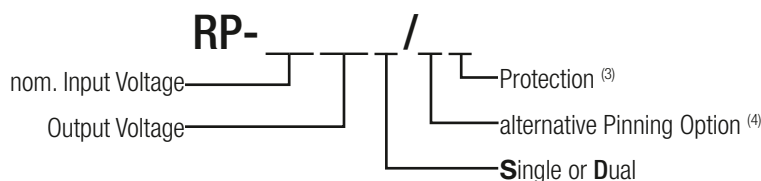
Part Number	nom. Input Voltage [VDC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ. ⁽¹⁾ [%]	max. Capacitive Load ⁽²⁾ [μF]
RP-xx3.3S ^(3,4)	5, 9, 12, 15, 24	3.3	303	70	2200
RP-xx05S ^(3,4)	5, 9, 12, 15, 24	5	200	70-72	1000
RP-xx09S ^(3,4)	5, 9, 12, 15, 24	9	111	75	1000
RP-xx12S ^(3,4)	5, 9, 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 ⁽³⁾	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

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

BASIC CHARACTERISTICS

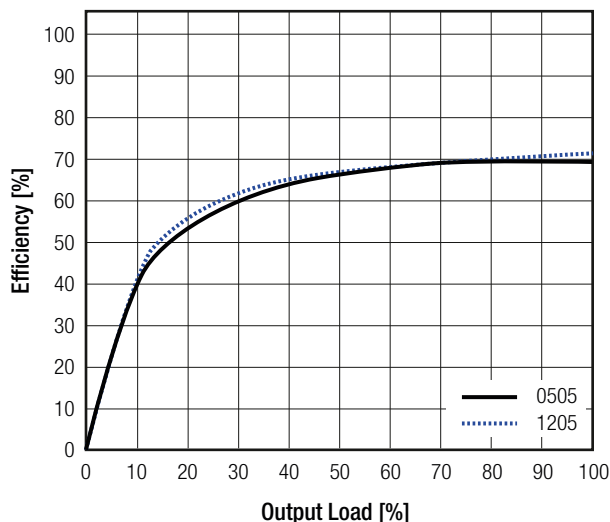
Parameter	Condition	Min.	Typ.	Max.
Internal Input Filter		capacitor		
Input Voltage Range			±10%	
Minimum Load ⁽⁵⁾		0%		
Start-up time				250ms
Internal Operating Frequency		50kHz	100kHz	120kHz
Output Ripple and Noise	20MHz BW			100mVp-p

Notes:

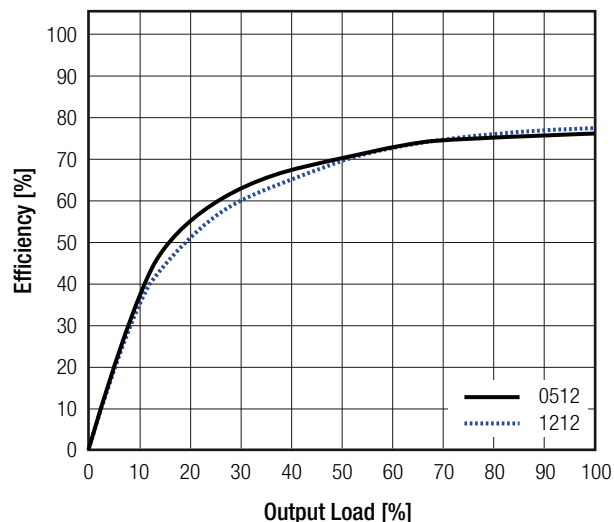
Note5: Operation below 10% load will not harm the converter, but specifications may not be met

Efficiency vs. Load

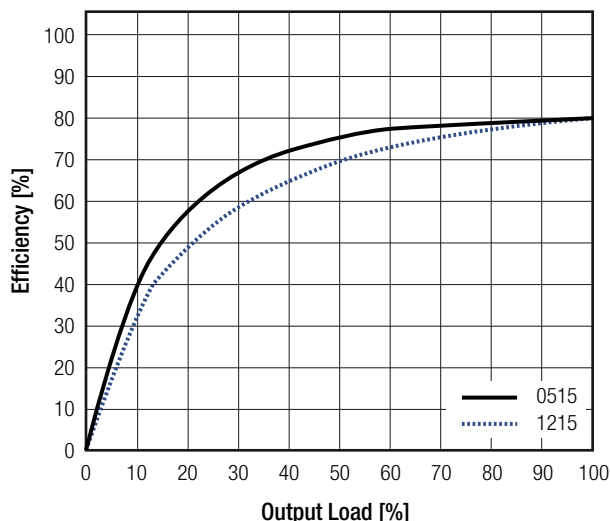
RP-xx05S



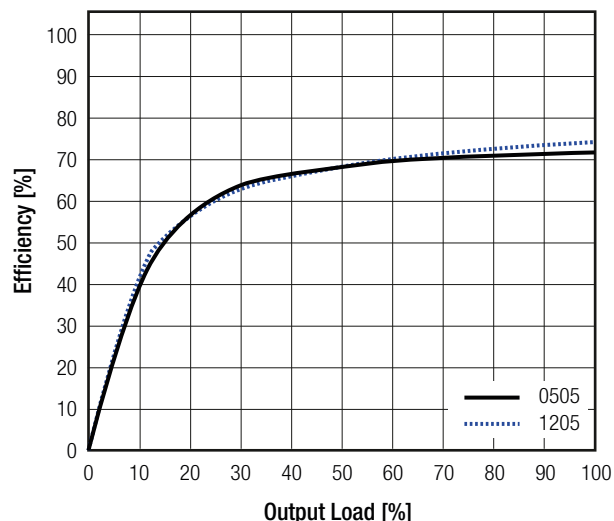
RP-xx12S



RP-xx15S



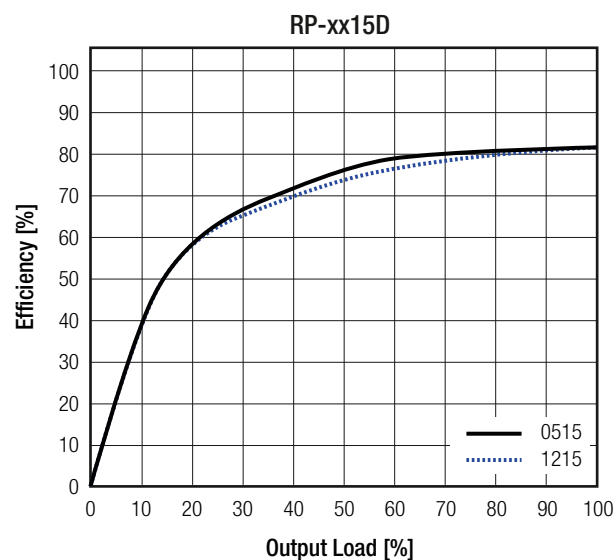
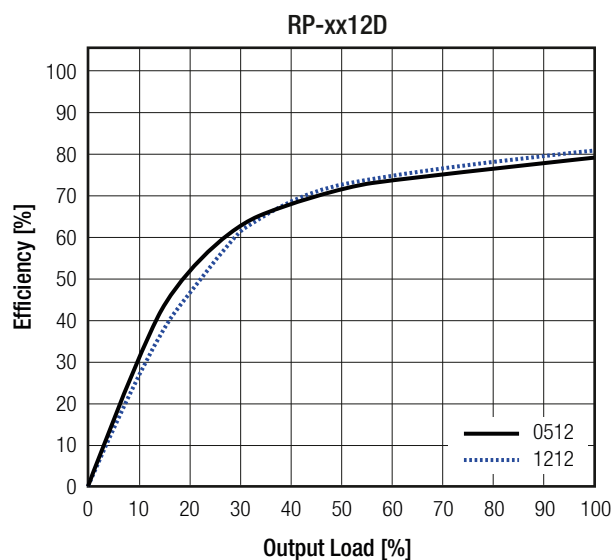
RP-xx05D



continued on next page

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

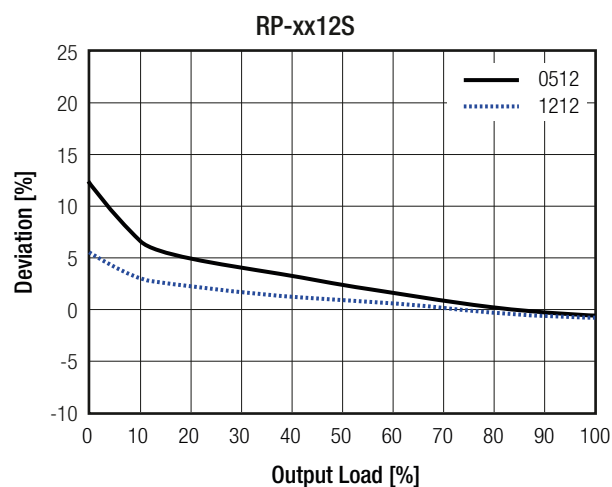
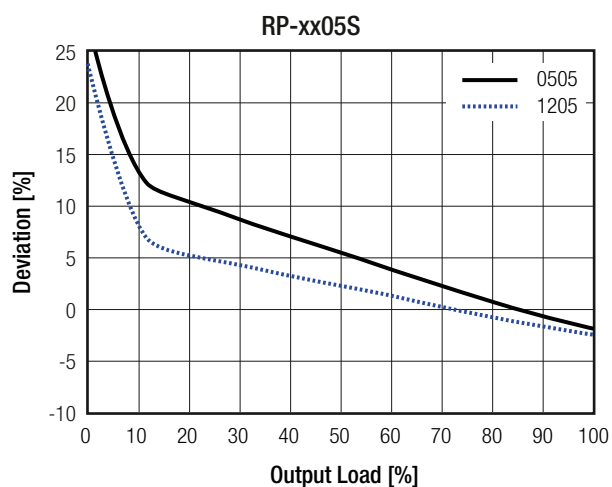
Efficiency vs. Load



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	10% to 100% load	3.3Vout	20.0% max.
		5Vout	15.0% max.
		9, 12, 15, 24Vout and RP-xx1509D	10.0% max.

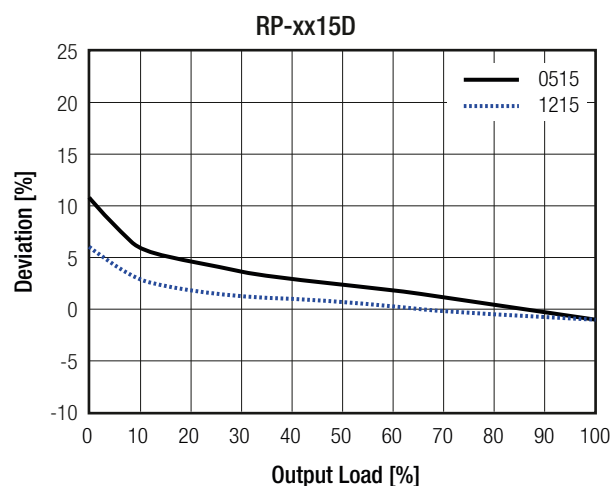
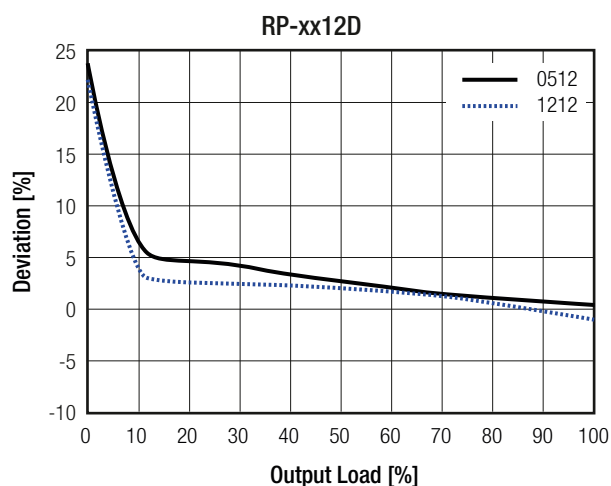
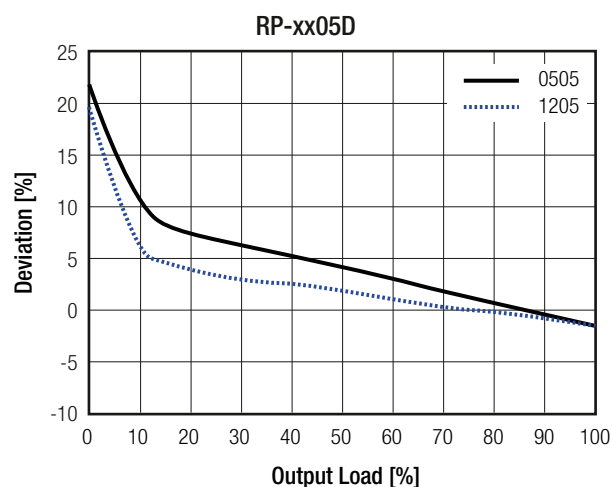
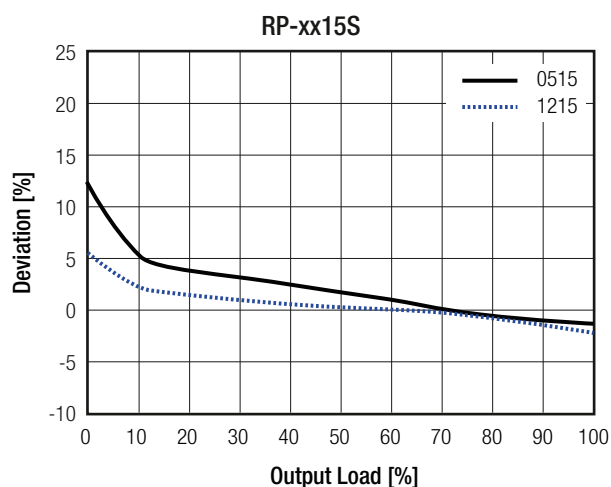
Deviation vs. Load



continued on next page

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 ⁽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

Notes:

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

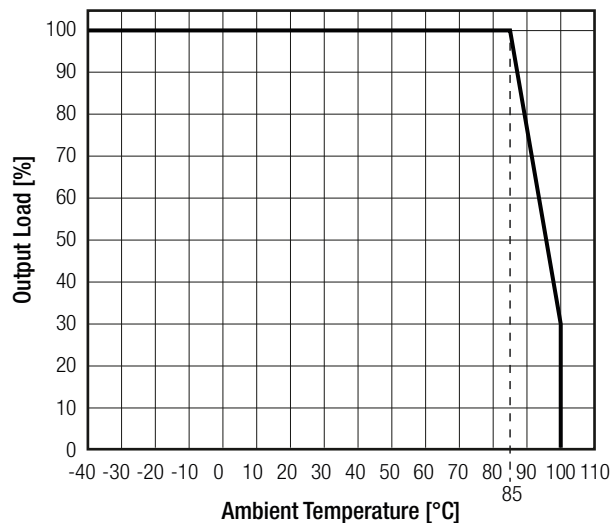
Note7: Refer to local wiring regulations if input over-current protection is also required. Recommended fuse: T1A slow blow type

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			2000m
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 ⁽⁸⁾	1602031	IEC60950-1:2005, 2nd Edition + A2:2013 EN60950-1:2006 + A2:2013
Information Technology Equipment, General Requirements for Safety ⁽⁸⁾	E358085-A6-UL	UL60950-1, 1st Edition:2007 CAN/CSA C22.2 No. 60950-1-03, 1st Edition:2006
EAC	RU-AT.49.09571	TP TC 004/2011
RoHs 2+		RoHS-2011/65/EU + AM-2015/863

EMC Compliance

	Condition	Standard / Criterion
Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement	with external filter	EN55032, Class B EN55032, Class A

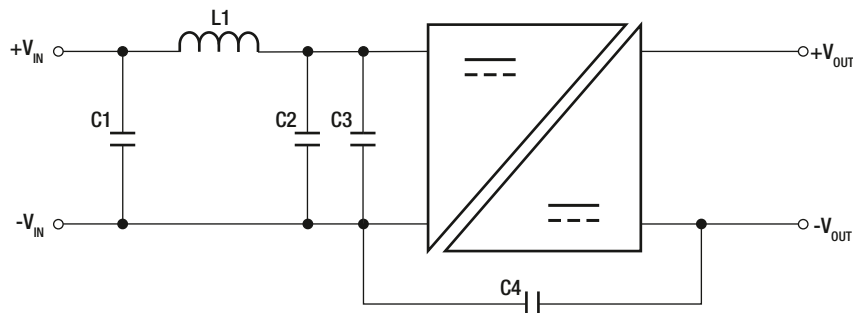
Notes:

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

continued on next page

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

EMC Filtering Suggestions according to EN55032



Component List Class A

C1	L1	C2	C3	C4 (safety)
N/A	N/A	10μF 100V, MLCC	4.7μF 50V, MLCC	N/A

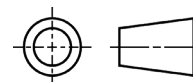
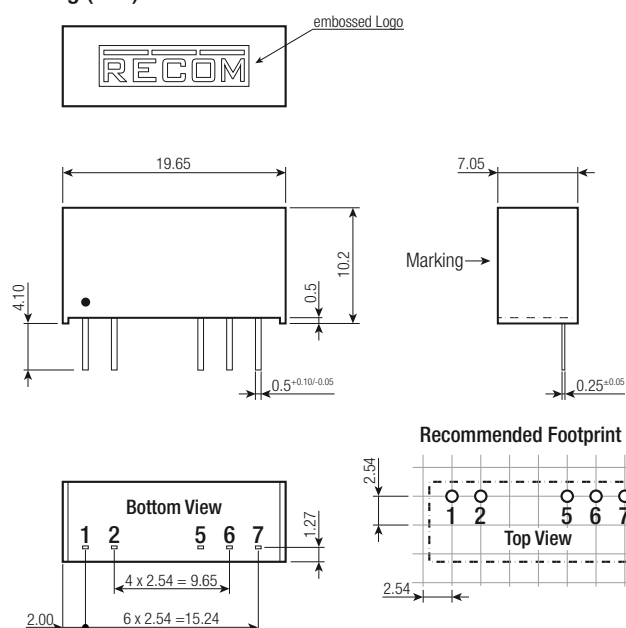
Component List Class B

C1	L1	C2	C3	C4 (safety)
10μF 100V, MLCC	22μH PR4532Z-220K	N/A	N/A	2.2nF 5kV

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)



Pin Connections

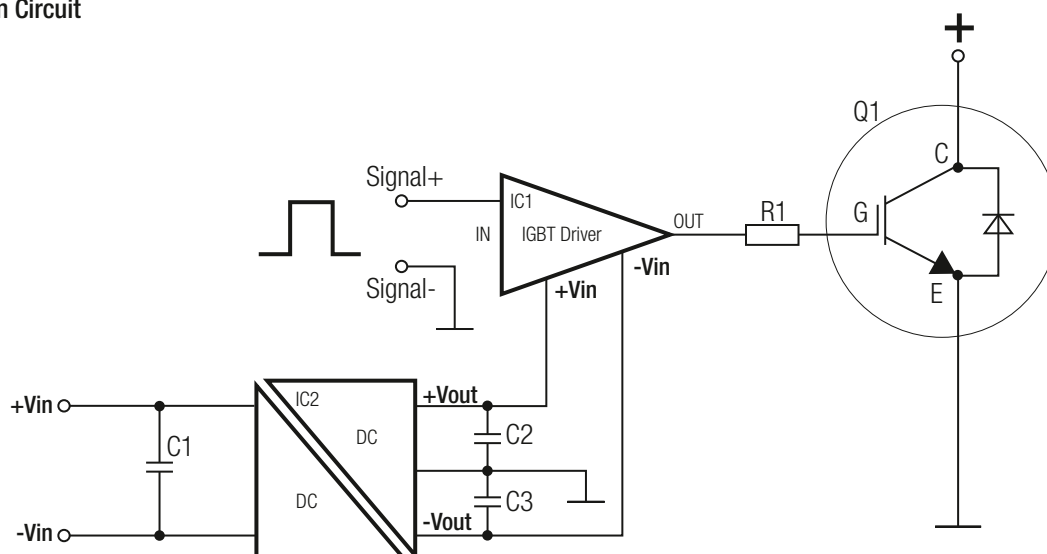
Pin #	Single	Dual	/X2
1	+Vin	+Vin	+Vin
2	-Vin	-Vin	-Vin
5	-Vout	-Vout	No Pin
6	No Pin	Com	-Vout
7	+Vout	+Vout	+Vout

Tolerance: xx.x= ±0.50mm
xx.xx= ±0.25mm

Specifications (measured @ $T_a = 25^\circ\text{C}$, nom. V_{in} 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		95% RH max.

The product information and specifications may be subject to changes even without prior written notice. The product has been designed for various applications; its suitability lies in the responsibility of each customer. The products are not authorized for use in safety-critical applications without RECOM's explicit written consent. A safety-critical application is an application where a failure may reasonably be expected to endanger or cause loss of life, inflict bodily harm or damage property. The applicant shall indemnify and hold harmless RECOM, its affiliated companies and its representatives against any damage claims in connection with the unauthorized use of RECOM products in such safety-critical applications.