

RJK60S3DPP-E0

600V - 12A - SJ MOS FET
High Speed Power Switching

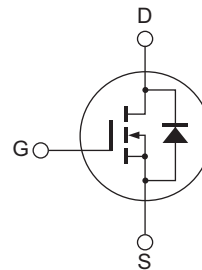
R07DS0637EJ0300
Rev.3.00
Oct 12, 2012

Features

- Superjunction MOSFET
- Low on-resistance
 $R_{DS(on)} = 0.35 \Omega$ typ. (at $I_D = 6 A$, $V_{GS} = 10 V$, $T_a = 25^\circ C$)
- High speed switching
 $t_f = 21 ns$ typ. (at $I_D = 6 A$, $V_{GS} = 10 V$, $R_L = 50 \Omega$, $R_g = 10 \Omega$, $T_a = 25^\circ C$)

Outline

RENESAS Package code: PRSS0003AG-A
(Package name: TO-220FP)



1. Gate
2. Drain
3. Source

Absolute Maximum Ratings

($T_a = 25^\circ C$)

Item	Symbol	Ratings	Unit	
Drain to source voltage	V_{DSS}	600	V	
Gate to source voltage	V_{GSS}	+30, -20	V	
Drain current	$T_C = 25^\circ C$	I_D ^{Note1,2}	12.0	A
	$T_C = 100^\circ C$	I_D ^{Note1,2}	7.6	A
Drain peak current	$I_{D(pulse)}$ ^{Note1}	24	A	
Body-drain diode reverse drain current	I_{DR} ^{Note1}	12	A	
Body-drain diode reverse drain peak current	$I_{DR(pulse)}$ ^{Note1}	24	A	
Avalanche current	I_{AP} ^{Note3}	3	A	
Avalanche energy	E_{AR} ^{Note3}	0.49	mJ	
Channel dissipation	P_{ch} ^{Note4}	27.7	W	
Channel to case thermal impedance	θ_{ch-c}	4.5	$^\circ C/W$	
Channel temperature	T_{ch}	150	$^\circ C$	
Storage temperature	T_{stg}	-55 to +150	$^\circ C$	

- Notes: 1. Limited by T_{ch} max.
2. Maximum duty cycle $D = 0.75$
3. $ST_{ch} = 25^\circ C$, $T_{ch} \leq 150^\circ C$
4. Value at $T_c = 25^\circ C$

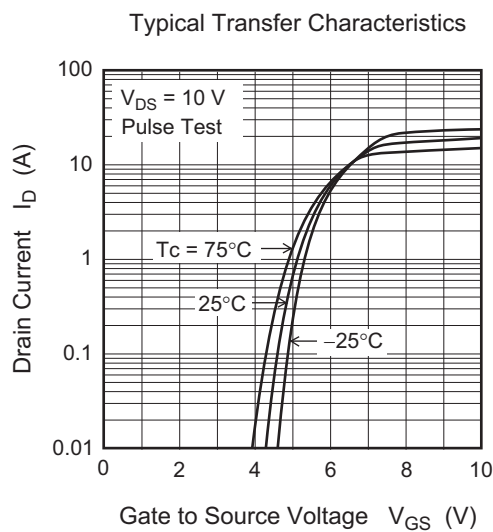
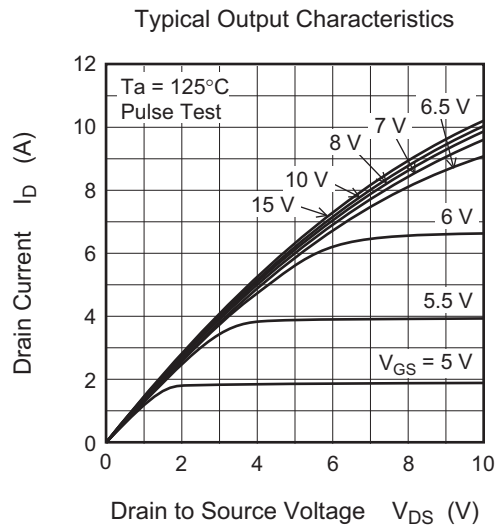
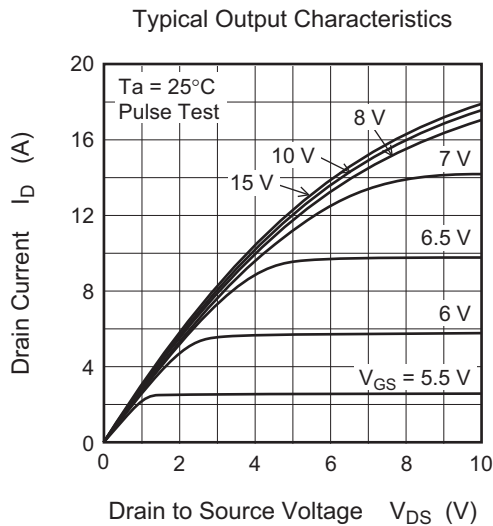
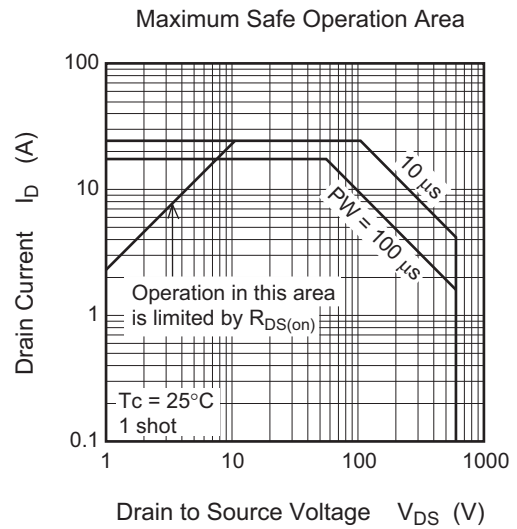
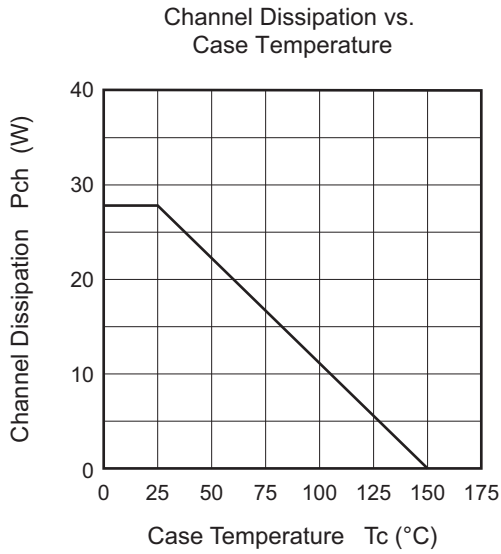
Electrical Characteristics

(Ta = 25°C)

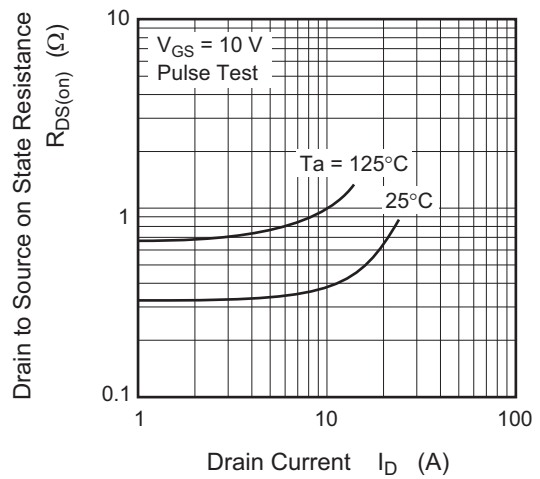
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	600	—	—	V	$I_D = 10 \text{ mA}$, $V_{GS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	1	mA	$V_{DS} = 600 \text{ V}$, $V_{GS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 0.1	μA	$V_{GS} = +30\text{V}$, -20 V , $V_{DS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	3	—	5	V	$V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.35	0.44	Ω	$I_D = 6 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note5}
	$R_{DS(on)}$	—	0.87	—	Ω	Ta = 150°C $I_D = 6 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note5}
Gate resistance	Rg	—	2.5	—	Ω	f = 1 MHz $V_{DS} = 25 \text{ V}$, $V_{GS} = 0$
Input capacitance	Ciss	—	720	—	pF	$V_{DS} = 25 \text{ V}$
Output capacitance	Coss	—	980	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	Crss	—	3.7	—	pF	f = 100 kHz
Turn-on delay time	$t_{d(on)}$	—	13	—	ns	$I_D = 6 \text{ A}$
Rise time	t_r	—	18	—	ns	$V_{GS} = 10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	25	—	ns	$R_L = 50 \Omega$
Fall time	t_f	—	18	—	ns	$R_g = 10 \Omega$ ^{Note5}
Total gate charge	Qg	—	13.6	—	nC	$V_{DD} = 480 \text{ V}$
Gate to source charge	Qgs	—	4.8	—	nC	$V_{GS} = 10 \text{ V}$
Gate to drain charge	Qgd	—	3.9	—	nC	$I_D = 12 \text{ A}$ ^{Note5}
Body-drain diode forward voltage	V_{DF}	—	1.0	1.6	V	$I_F = 12 \text{ A}$, $V_{GS} = 0$ ^{Note5}
Body-drain diode reverse recovery time	t_{rr}	—	320	—	ns	$I_F = 12 \text{ A}$
Body-drain diode reverse recovery current	I_{rr}	—	20	—	A	$V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{s}$ ^{Note5}
Body-drain diode reverse recovery charge	Q _{rr}	—	3.7	—	μC	

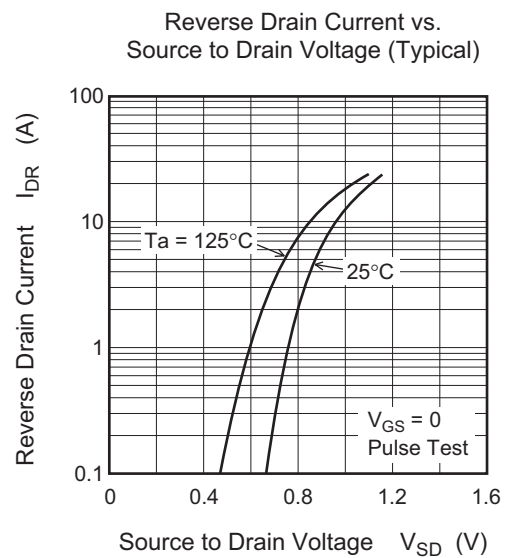
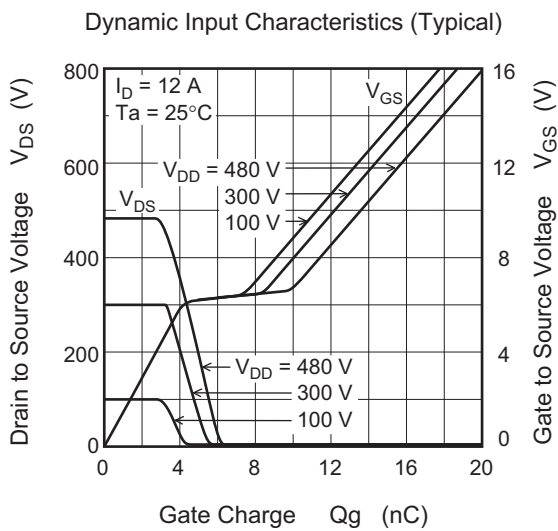
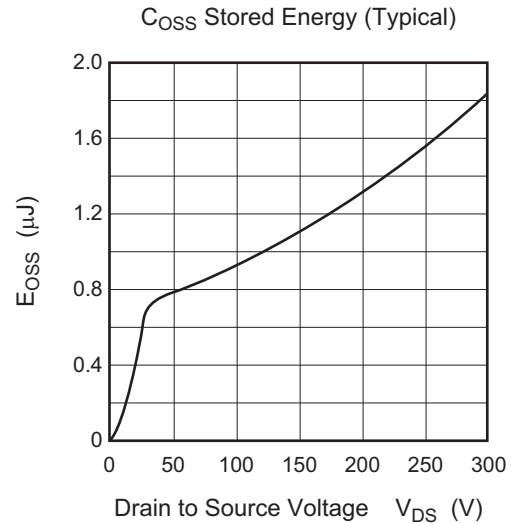
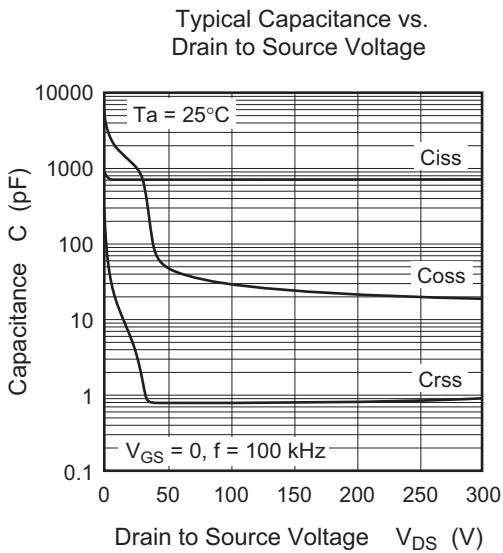
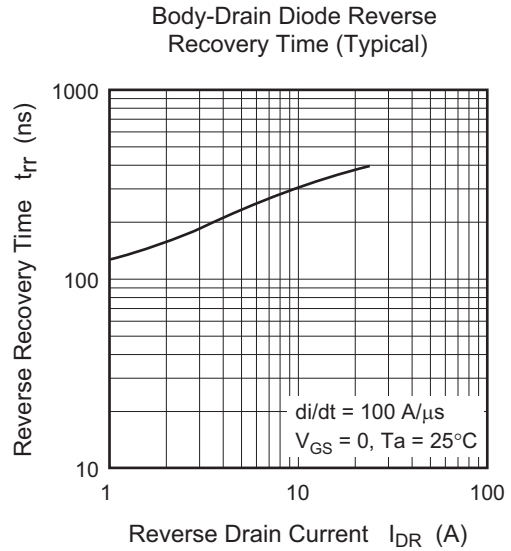
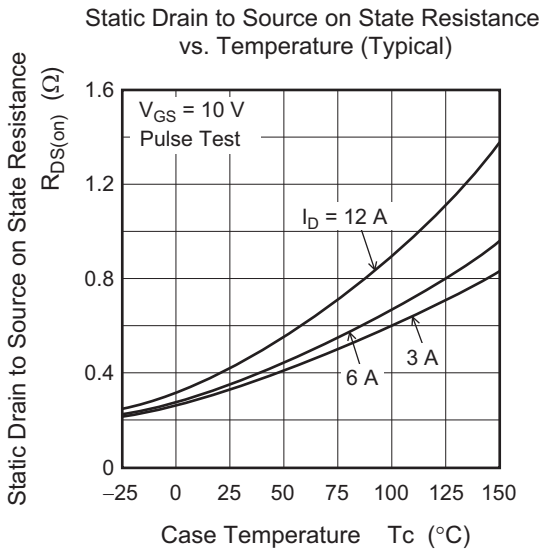
Notes: 5. Pulse test

Main Characteristics

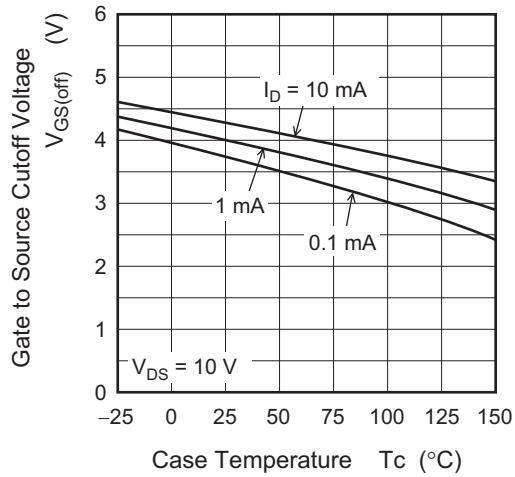


Static Drain to Source on State Resistance vs. Drain Current (Typical)

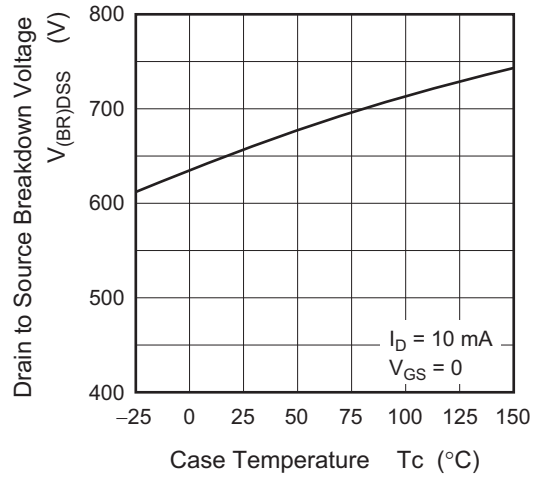




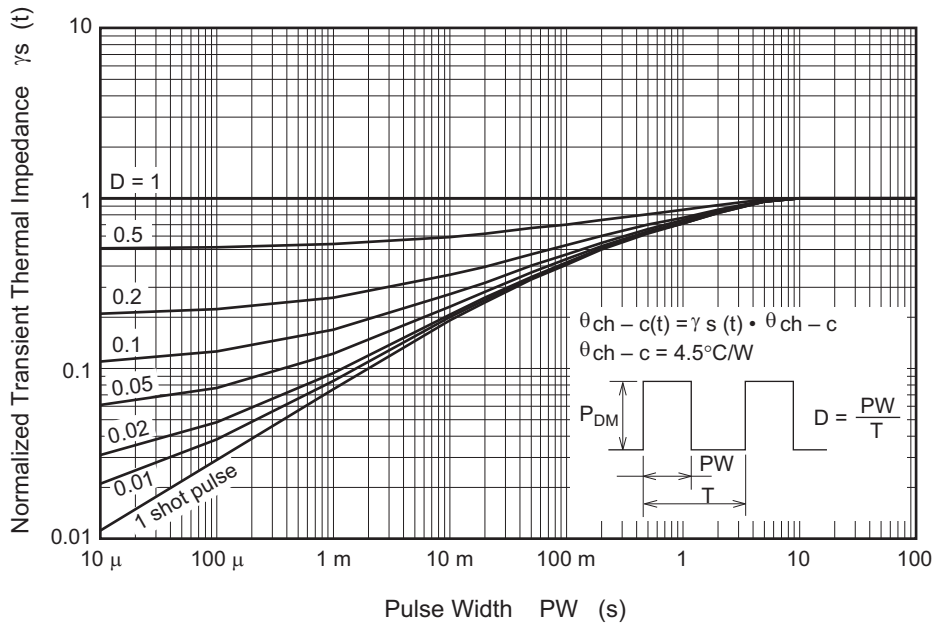
Gate to Source Cutoff Voltage vs. Case Temperature (Typical)



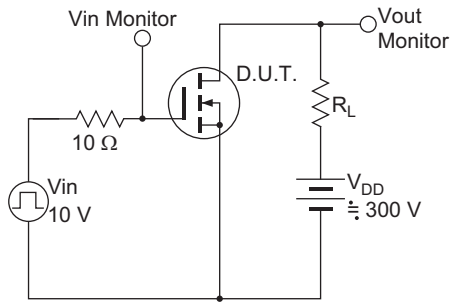
Drain to Source Breakdown Voltage vs. Case Temperature (Typical)



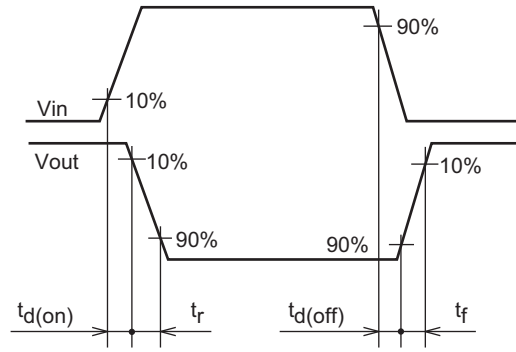
Normalized Transient Thermal Impedance vs. Pulse Width



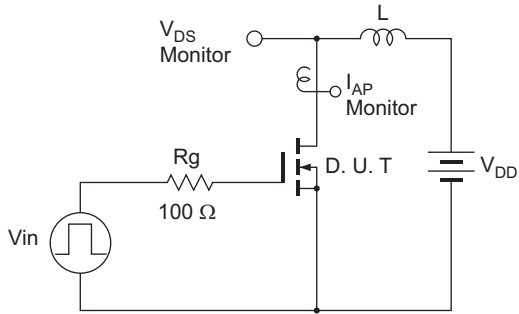
Switching Time Test Circuit



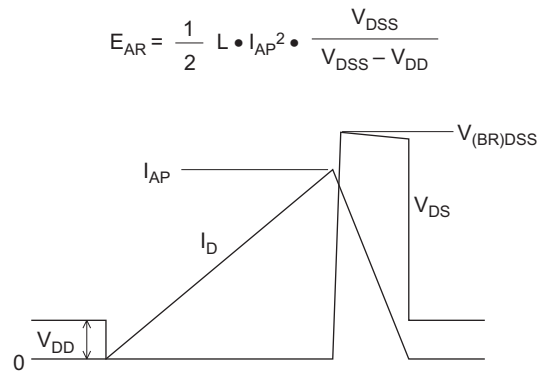
Waveform



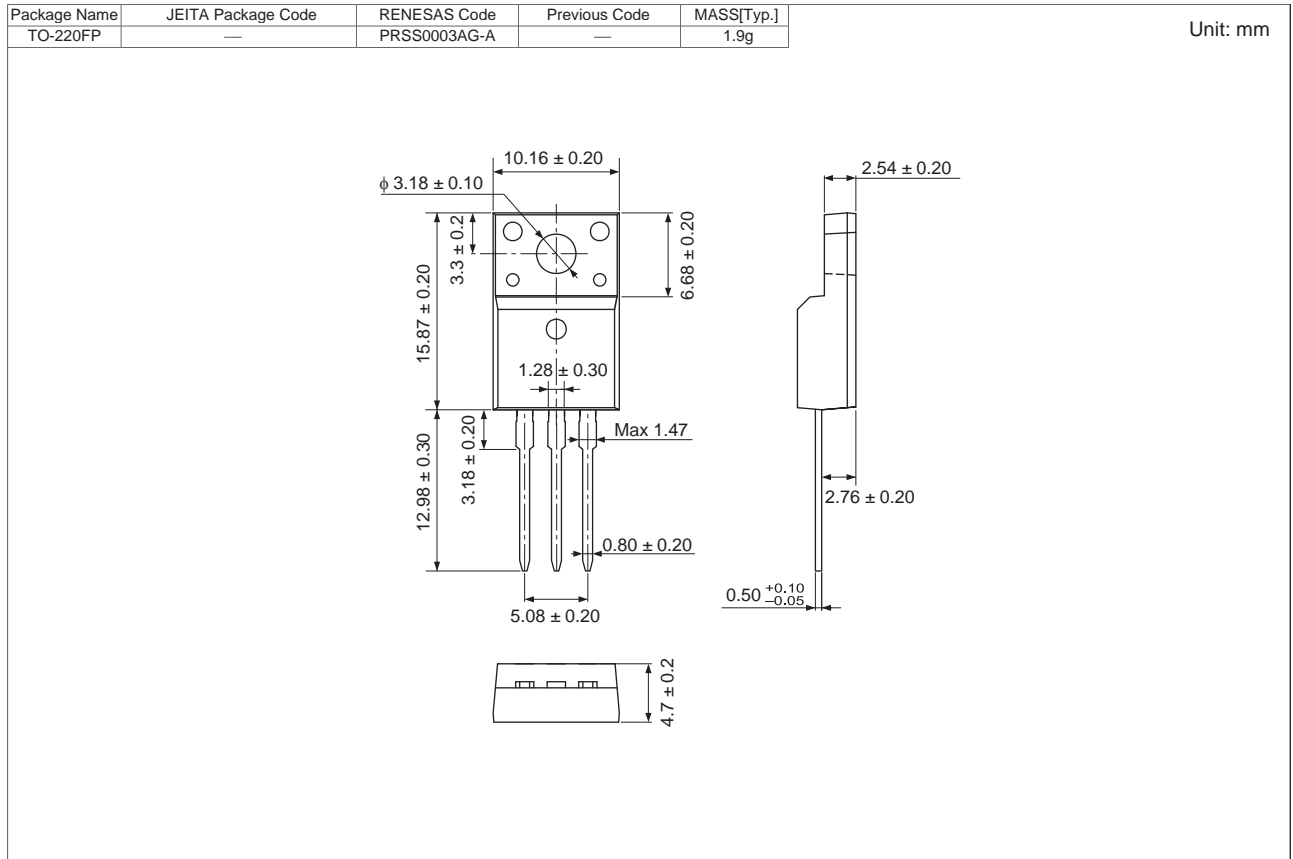
Avalanche Test Circuit



Avalanche Waveform



Package Dimension



Ordering Information

Orderable Part Number	Quantity	Shipping Container
RJK60S3DPP-E0#T2	1000 pcs	Box (Tube)

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Renesas Electronics America Inc.
2880 Scott Boulevard Santa Clara, CA 95050-2554, U.S.A.
Tel: +1-408-588-6000, Fax: +1-408-588-6130

Renesas Electronics Canada Limited
1101 Nicholson Road, Newmarket, Ontario L3Y 9C3, Canada
Tel: +1-905-898-5441, Fax: +1-905-898-3220

Renesas Electronics Europe Limited
Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.
Tel: +44-1628-651-700, Fax: +44-1628-651-804

Renesas Electronics Europe GmbH
Arcadiastrasse 10, 40472 Düsseldorf, Germany
Tel: +49-211-65030, Fax: +49-211-6503-1327

Renesas Electronics (China) Co., Ltd.
7th Floor, Quantum Plaza, No.27 ZhiChunLu Haidian District, Beijing 100083, P.R.China
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

Renesas Electronics (Shanghai) Co., Ltd.
Unit 204, 205, AZIA Center, No.1233 Lujiazui Ring Rd., Pudong District, Shanghai 200120, China
Tel: +86-21-5877-1818, Fax: +86-21-6887-7858 / -7898

Renesas Electronics Hong Kong Limited
Unit 1601-1613, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong
Tel: +852-2886-9318, Fax: +852 2886-9022/9044

Renesas Electronics Taiwan Co., Ltd.
13F, No. 363, Fu Shing North Road, Taipei, Taiwan
Tel: +886-2-8175-9600, Fax: +886 2-8175-9670

Renesas Electronics Singapore Pte. Ltd.
80 Bendemeer Road, Unit #06-02 Hyflux Innovation Centre Singapore 339949
Tel: +65-6213-0200, Fax: +65-6213-0300

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Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: +60-3-7955-3390, Fax: +60-3-7955-9510

Renesas Electronics Korea Co., Ltd.
11F., Samik Laved. or Bldg., 720-2 Yeoksam-Dong, Kangnam-Ku, Seoul 135-080, Korea
Tel: +82-2-558-3737, Fax: +82-2-558-5141