

To our customers,

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## Old Company Name in Catalogs and Other Documents

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April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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## 2SJ504

Silicon P Channel MOS FET

REJ03G0871-0400  
(Previous: ADE-208-546B)  
Rev.4.00  
Sep 07, 2005

### Description

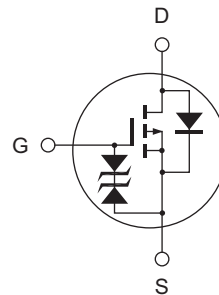
High speed power switching

### Features

- Low on-resistance  
 $R_{DS(on)} = 0.042 \Omega$  typ.
- Low drive current.
- 4 V gate drive devices.
- High speed switching.

### Outline

RENESAS Package code: PRSS0003AD-A  
(Package name: TO-220FM)



1. Gate
2. Drain
3. Source

## Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Value	Unit
Drain to source voltage	V <sub>DSS</sub>	-60	V
Gate to source voltage	V <sub>GSS</sub>	±20	V
Drain current	I <sub>D</sub>	-20	A
Drain peak current	I <sub>D (pulse)</sub> <sup>Note 1</sup>	-80	A
Body to drain diode reverse drain current	I <sub>DR</sub>	-20	A
Avalanche current	I <sub>AP</sub> <sup>Note 3</sup>	-20	A
Avalanche energy	E <sub>AR</sub> <sup>Note 3</sup>	34	mJ
Channel dissipation	P <sub>ch</sub> <sup>Note 2</sup>	30	W
Channel temperature	T <sub>ch</sub>	150	°C
Storage temperature	T <sub>stg</sub>	-55 to +150	°C

- Notes: 1. PW ≤ 10 μs, duty cycle ≤ 1%  
 2. Value at Tc = 25°C  
 3. Value at Ta = 25°C, Rg ≥ 50 Ω

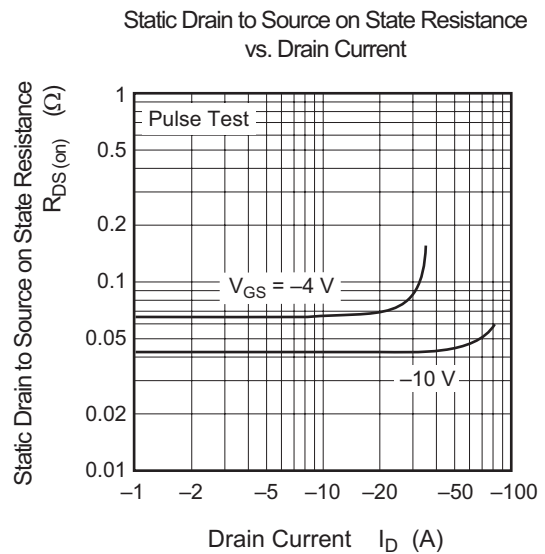
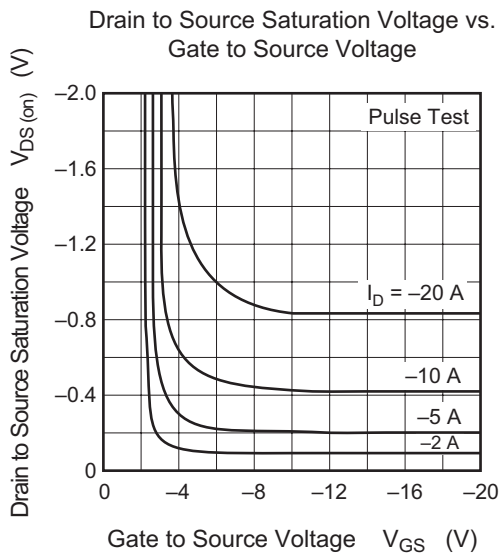
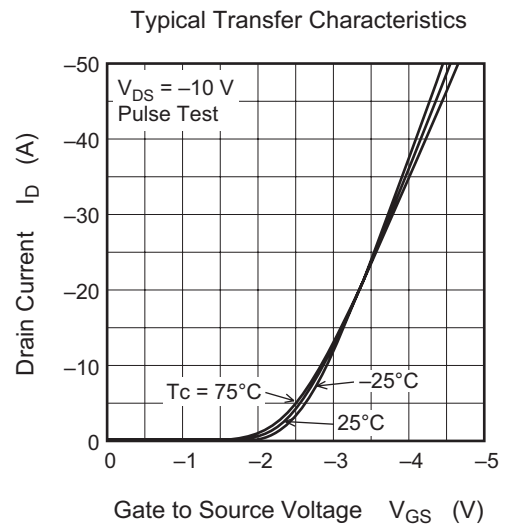
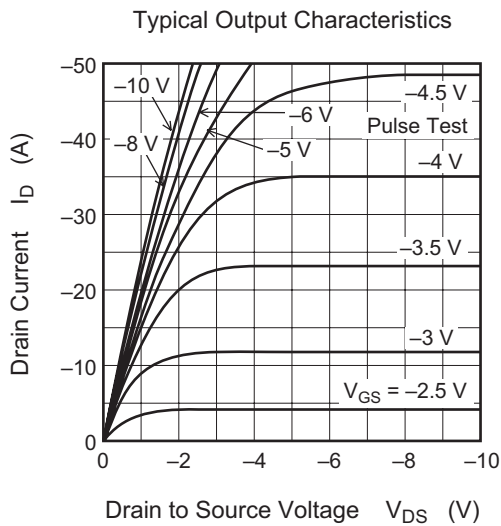
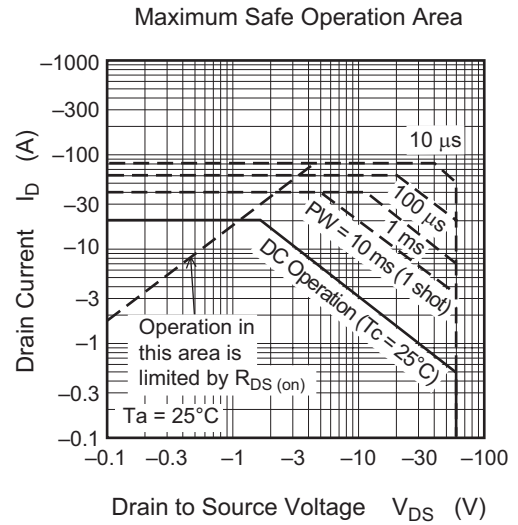
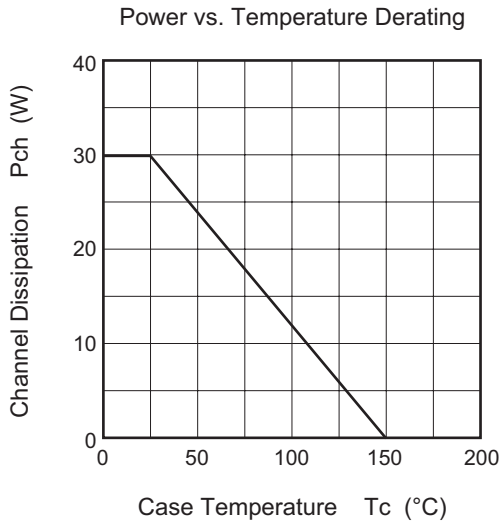
## Electrical Characteristics

(Ta = 25°C)

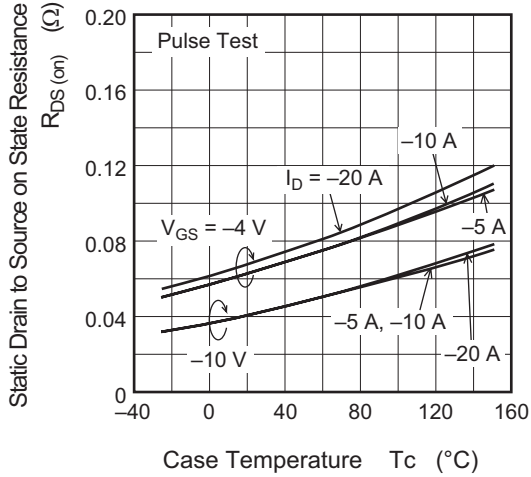
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	V <sub>(BR) DSS</sub>	-60	—	—	V	I <sub>D</sub> = -10 mA, V <sub>GS</sub> = 0
Gate to source breakdown voltage	V <sub>(BR) GSS</sub>	±20	—	—	V	I <sub>G</sub> = ±100 μA, V <sub>DS</sub> = 0
Zero gate voltage drain current	I <sub>DSS</sub>	—	—	-10	μA	V <sub>DS</sub> = -60 V, V <sub>GS</sub> = 0
Gate to source leak current	I <sub>GSS</sub>	—	—	±10	μA	V <sub>GS</sub> = ±16 V, V <sub>DS</sub> = 0
Gate to source cutoff voltage	V <sub>GS (off)</sub>	-1.0	—	-2.0	V	I <sub>D</sub> = -1 mA, V <sub>DS</sub> = -10 V
Static drain to source on state resistance	R <sub>DS (on)</sub>	—	0.042	0.055	Ω	I <sub>D</sub> = -10 A, V <sub>GS</sub> = -10 V <sup>Note 4</sup>
	R <sub>DS (on)</sub>	—	0.065	0.095	Ω	I <sub>D</sub> = -10 A, V <sub>GS</sub> = -4 V <sup>Note 4</sup>
Forward transfer admittance	y <sub>fs</sub>	10	16	—	S	I <sub>D</sub> = -10 A, V <sub>DS</sub> = -10 V <sup>Note 4</sup>
Input capacitance	C <sub>iss</sub>	—	1750	—	pF	V <sub>DS</sub> = -10 V
Output capacitance	C <sub>oss</sub>	—	800	—	pF	V <sub>GS</sub> = 0
Reverse transfer capacitance	C <sub>rss</sub>	—	180	—	pF	f = 1 MHz
Turn-on delay time	t <sub>d (on)</sub>	—	16	—	ns	V <sub>GS</sub> = -10 V
Rise time	t <sub>r</sub>	—	100	—	ns	I <sub>D</sub> = -10 A
Turn-off delay time	t <sub>d (off)</sub>	—	230	—	ns	R <sub>L</sub> = 3 Ω
Fall time	t <sub>f</sub>	—	140	—	ns	
Body to drain diode forward voltage	V <sub>DF</sub>	—	-1.0	—	V	I <sub>F</sub> = -20 A, V <sub>GS</sub> = 0
Body to drain diode reverse recovery time	t <sub>rr</sub>	—	100	—	ns	I <sub>F</sub> = -20 A, V <sub>GS</sub> = 0 di <sub>F</sub> /dt = 50 A/μs

- Note: 4. Pulse test

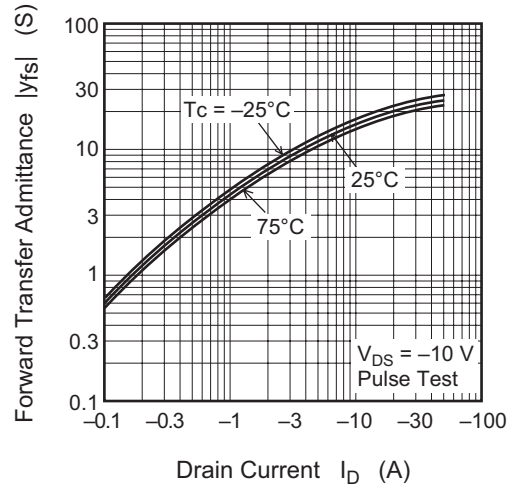
Main Characteristics



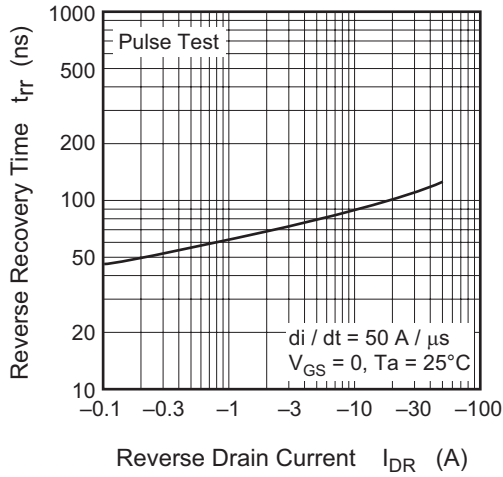
Static Drain to Source on State Resistance vs. Temperature



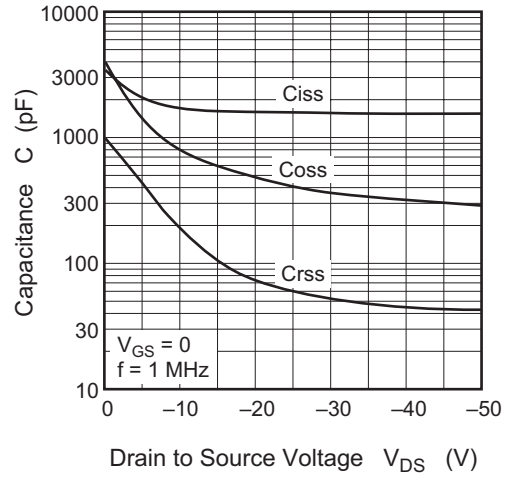
Forward Transfer Admittance vs. Drain Current



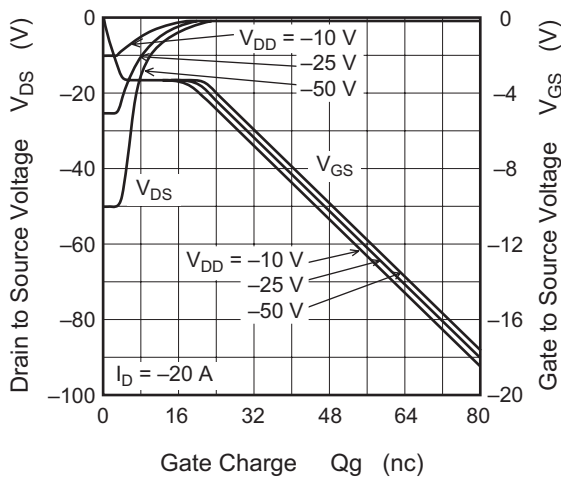
Body-Drain Diode Reverse Recovery Time



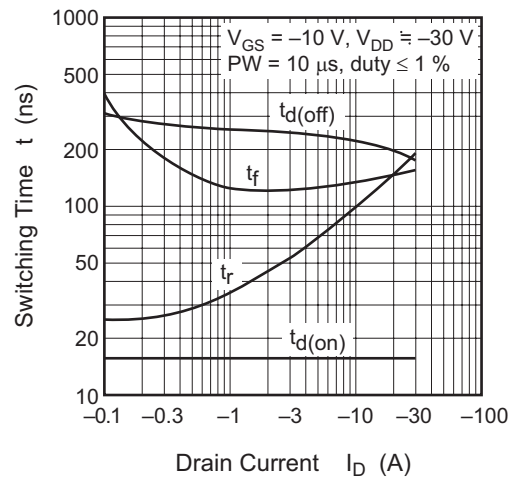
Typical Capacitance vs. Drain to Source Voltage



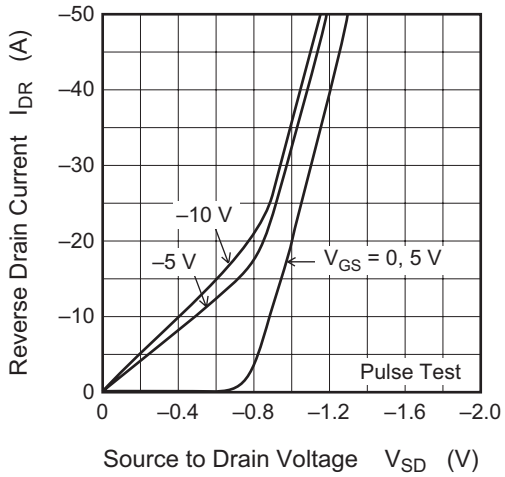
Dynamic Input Characteristics



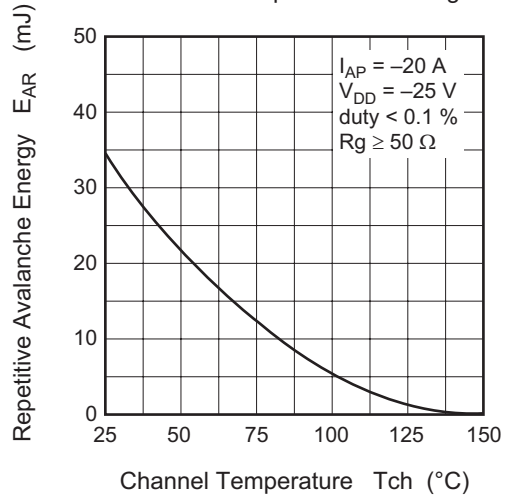
Switching Characteristics



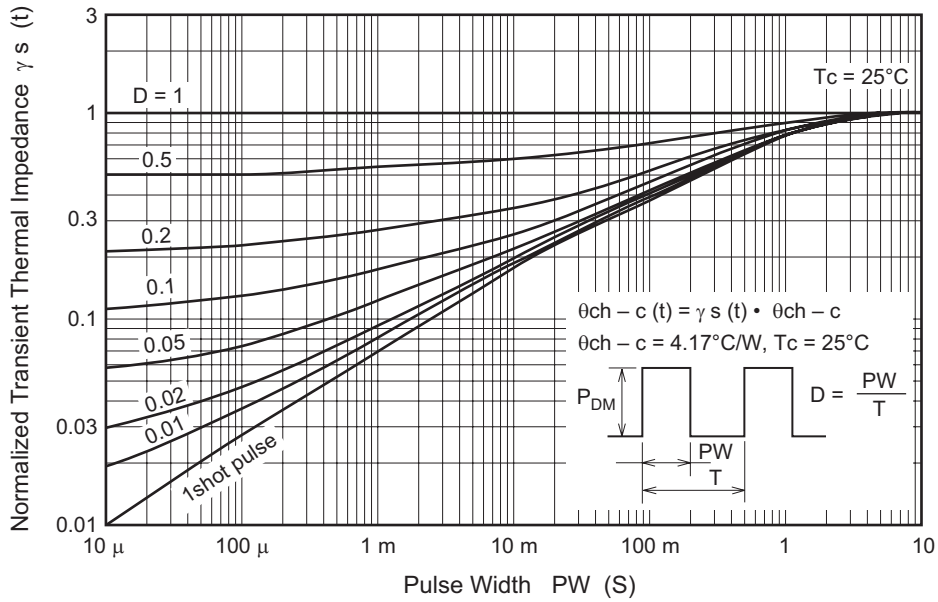
Reverse Drain Current vs. Source to Drain Voltage



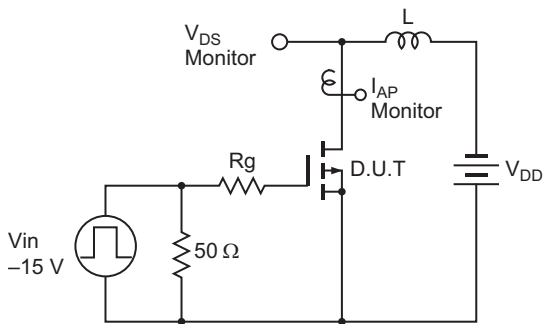
Maximum Avalanche Energy vs. Channel Temperature Derating



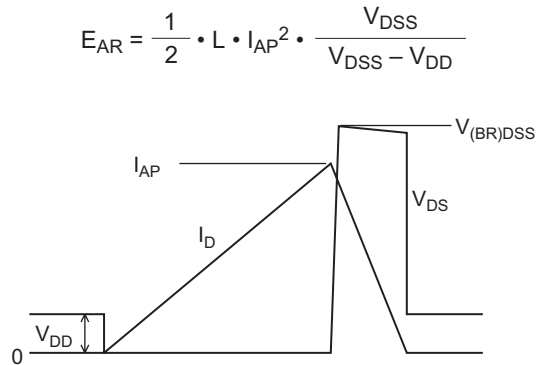
Normalized Transient Thermal Impedance vs. Pulse Width

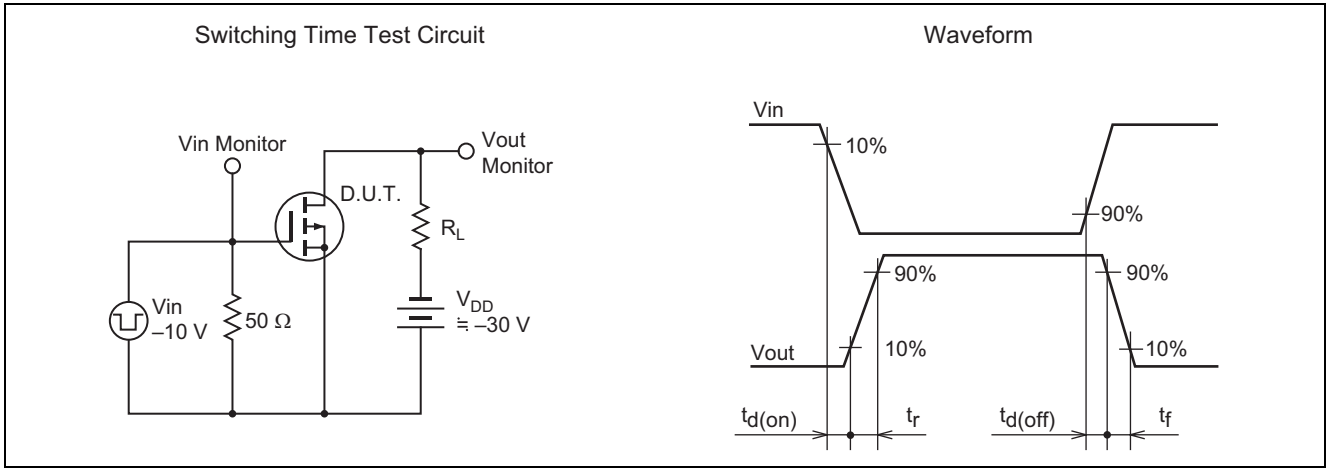


Avalanche Test Circuit



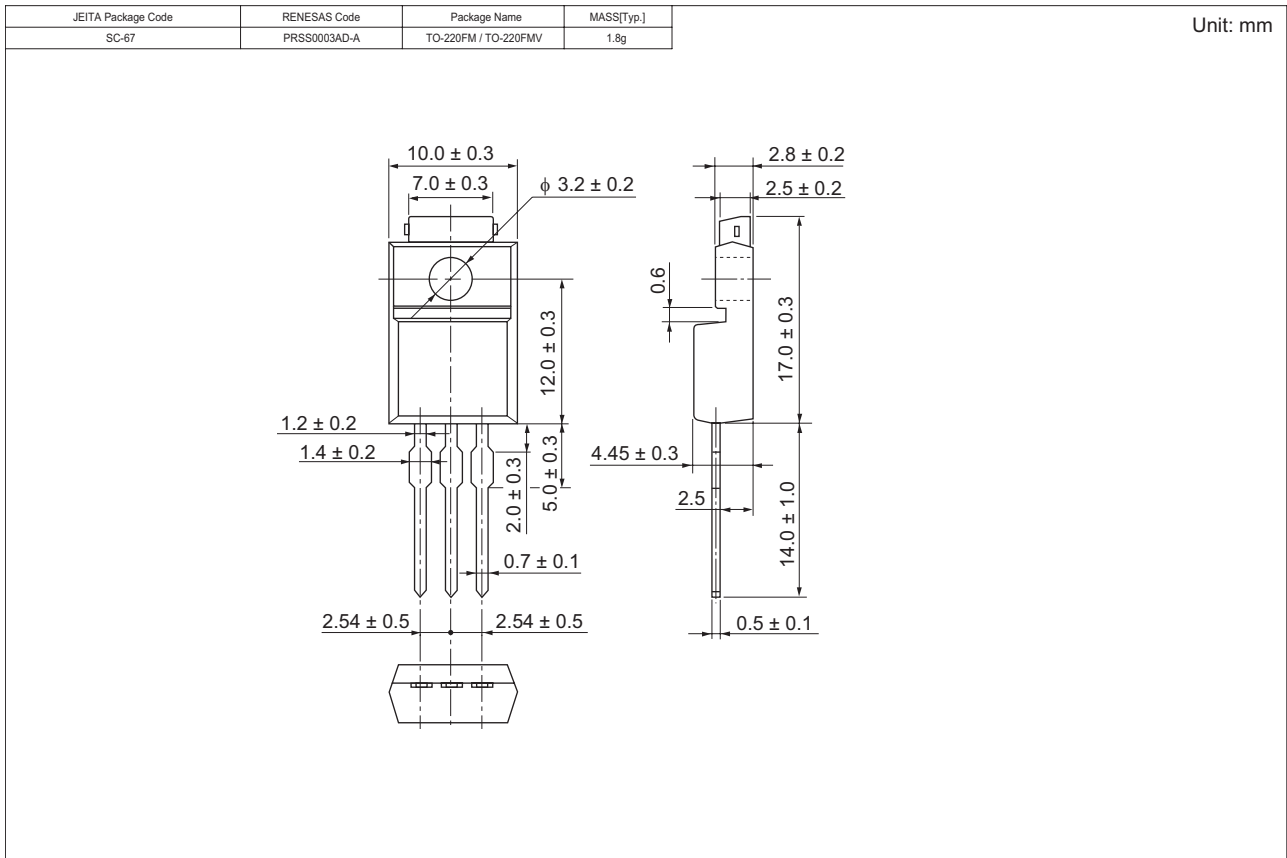
Avalanche Waveform







### Package Dimensions



### Ordering Information

Part Name	Quantity	Shipping Container
2SJ504-E	500 pcs	Box (Sack)

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