

# 2SJ542

## Silicon P Channel MOS FET

REJ03G0889-0400  
(Previous: ADE-208-591B)  
Rev.4.00  
Sep 07, 2005

### Description

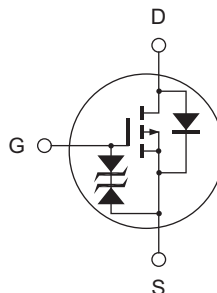
High speed power switching

### Features

- Low on-resistance  
 $R_{DS(on)} = 0.050 \Omega$  typ.
- Low drive current.
- 4 V gate drive devices.
- High speed switching.

### Outline

RENESAS Package code: PRSS0004AC-A  
(Package name: TO-220AB)



1. Gate
2. Drain (Flange)
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>	-18	A
Drain peak current	I <sub>D (pulse)</sub> <sup>Note 1</sup>	-72	A
Body to drain diode reverse drain current	I <sub>DR</sub>	-18	A
Avalanche current	I <sub>AP</sub> <sup>Note 3</sup>	-18	A
Avalanche energy	E <sub>AR</sub> <sup>Note 3</sup>	27	mJ
Channel dissipation	P <sub>ch</sub> <sup>Note 2</sup>	60	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 T<sub>c</sub> = 25°C3. Value at T<sub>ch</sub> = 25°C, R<sub>g</sub> ≥ 50 Ω

## Electrical Characteristics

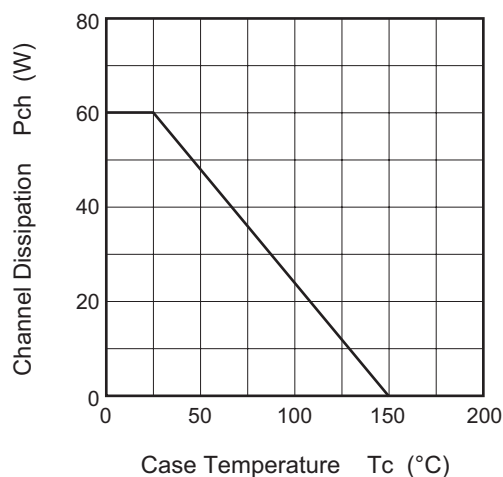
(Ta = 25°C)

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>	—	0.050	0.065	Ω	I <sub>D</sub> = -9 A, V <sub>GS</sub> = -10 V <sup>Note 4</sup>
	R <sub>DS (on)</sub>	—	0.070	0.110	Ω	I <sub>D</sub> = -9 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> = -9 A, V <sub>DS</sub> = -10 V <sup>Note 4</sup>
Input capacitance	C <sub>iss</sub>	—	1300	—	pF	V <sub>DS</sub> = -10 V
Output capacitance	C <sub>oss</sub>	—	650	—	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>	—	14	—	ns	V <sub>GS</sub> = -10 V
Rise time	t <sub>r</sub>	—	95	—	ns	I <sub>D</sub> = -9 A
Turn-off delay time	t <sub>d (off)</sub>	—	190	—	ns	R <sub>L</sub> = 3.33 Ω
Fall time	t <sub>f</sub>	—	135	—	ns	
Body to drain diode forward voltage	V <sub>DF</sub>	—	-1.0	—	V	I <sub>F</sub> = -18 A, V <sub>GS</sub> = 0
Body to drain diode reverse recovery time	t <sub>rr</sub>	—	70	—	ns	I <sub>F</sub> = -18 A, V <sub>GS</sub> = 0 di <sub>F</sub> /dt = 50 A/μs

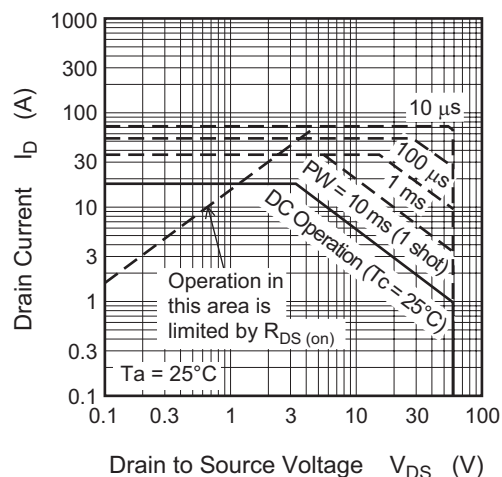
Note: 4. Pulse test

## Main Characteristics

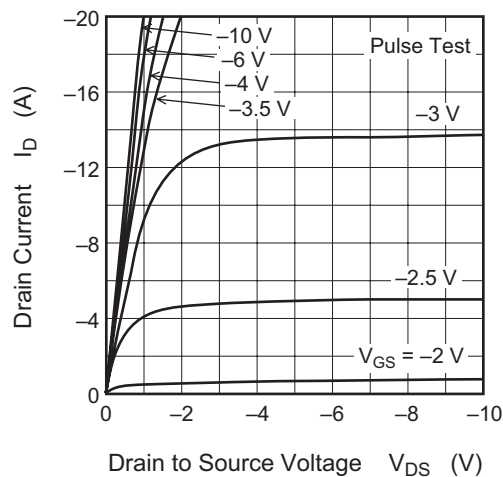
Power vs. Temperature Derating



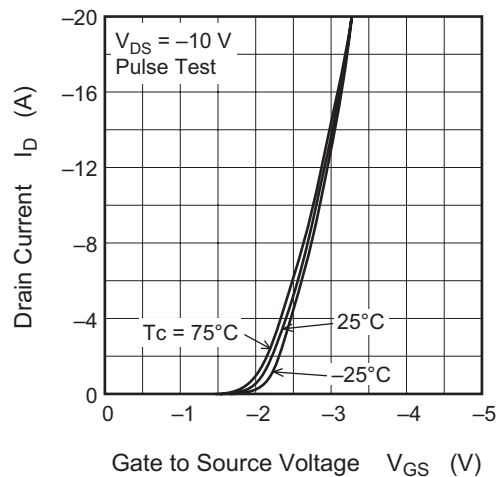
Maximum Safe Operation Area



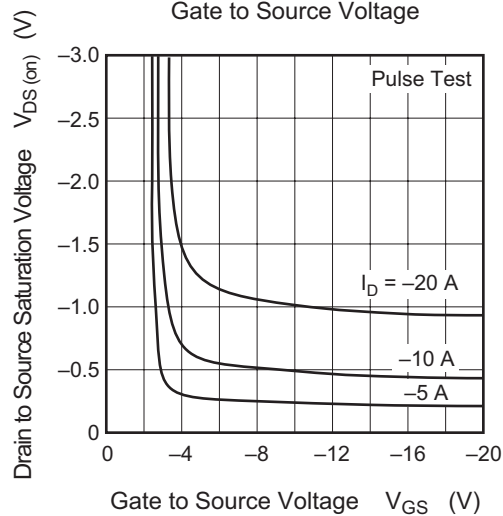
Typical Output Characteristics



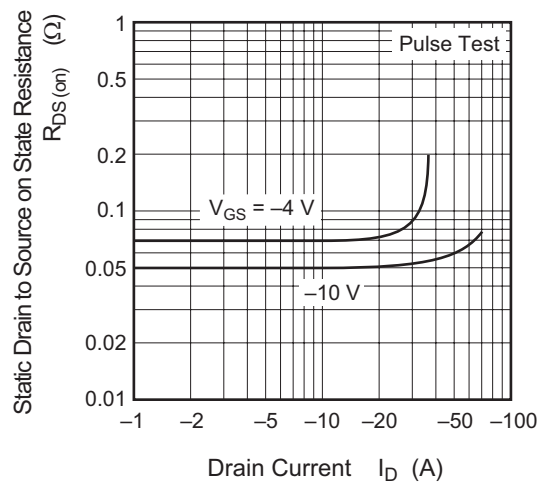
Typical Transfer Characteristics

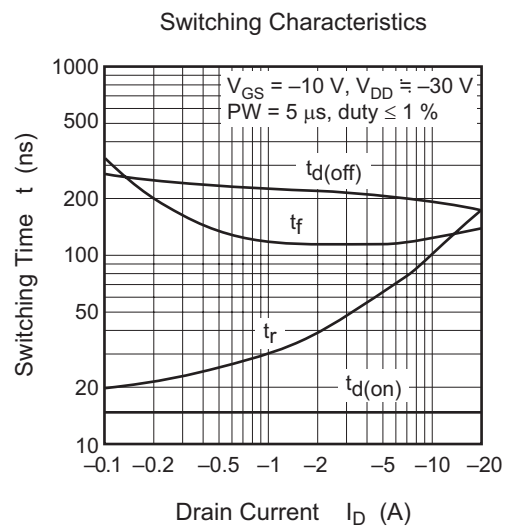
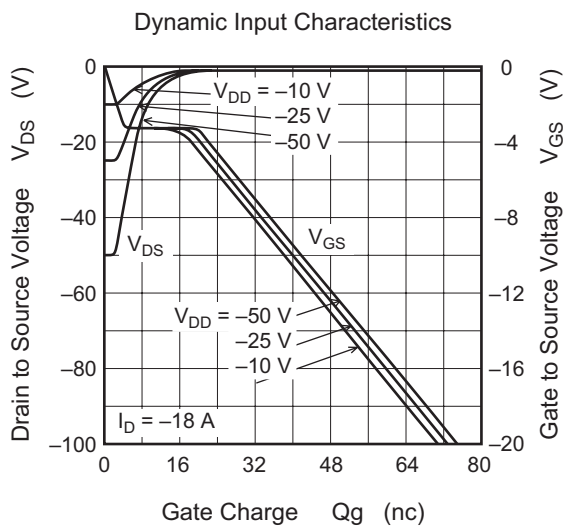
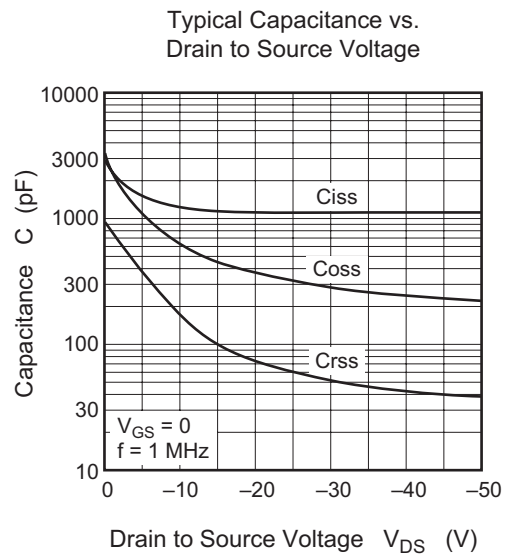
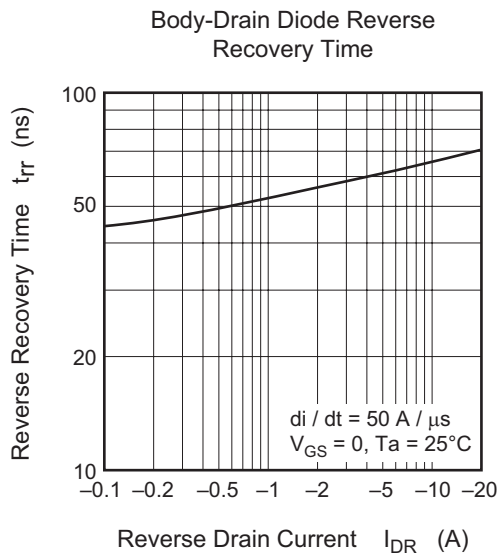
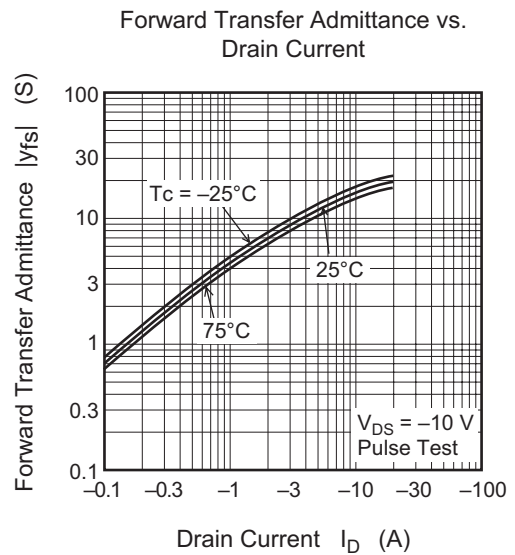
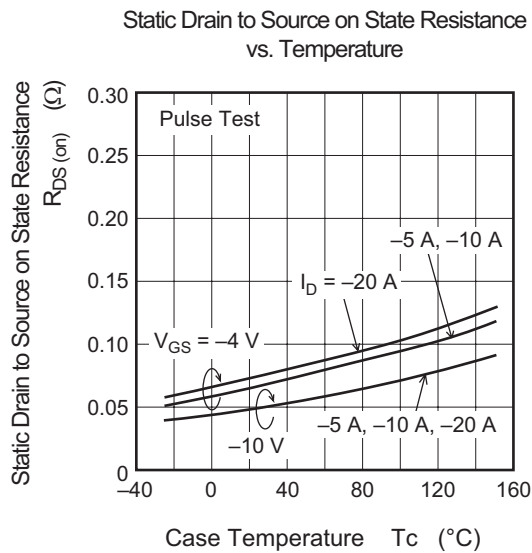


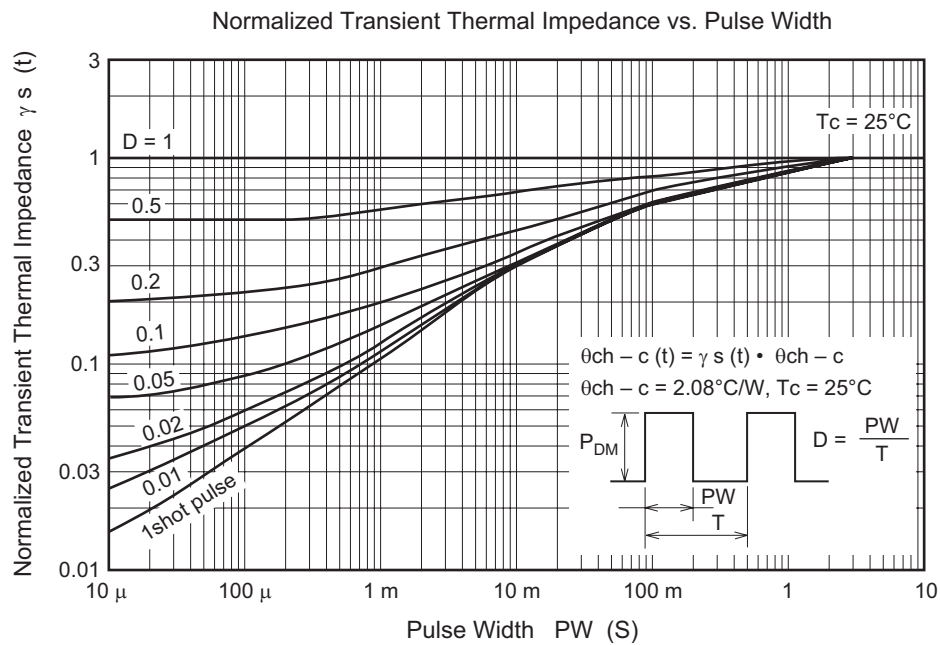
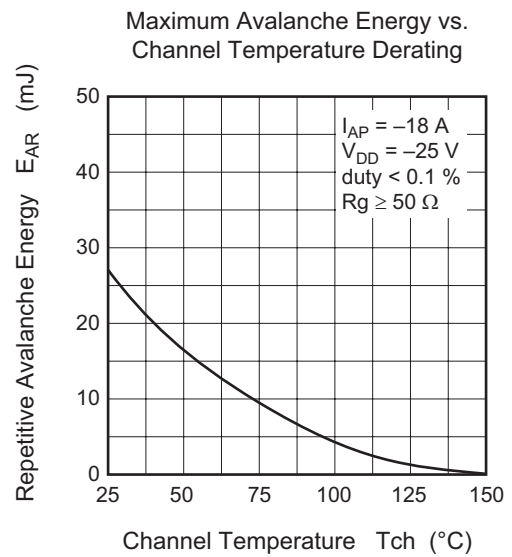
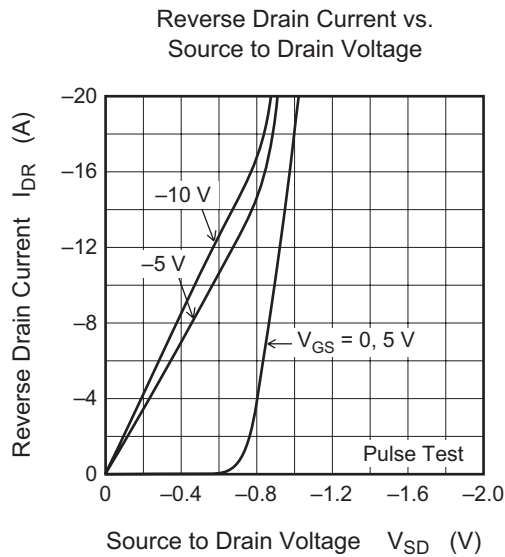
Drain to Source Saturation Voltage vs. Gate to Source Voltage



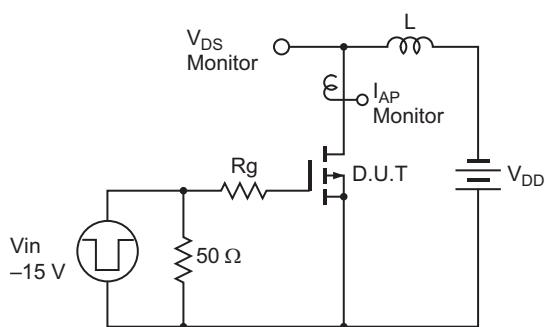
Static Drain to Source on State Resistance vs. Drain Current





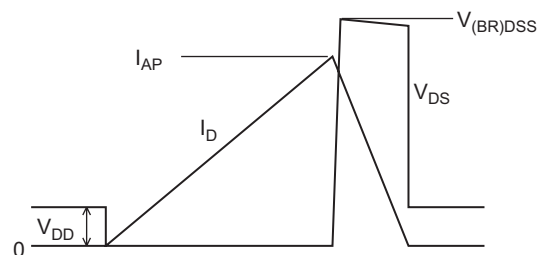


Avalanche Test Circuit

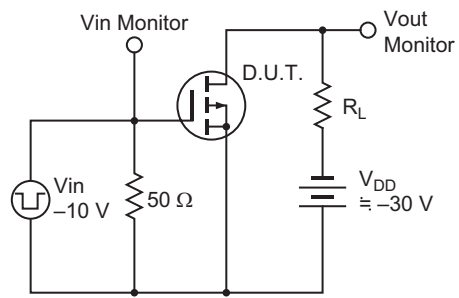


Avalanche Waveform

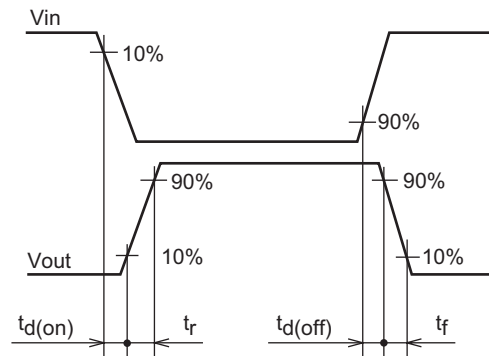
$$E_{AR} = \frac{1}{2} \cdot L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



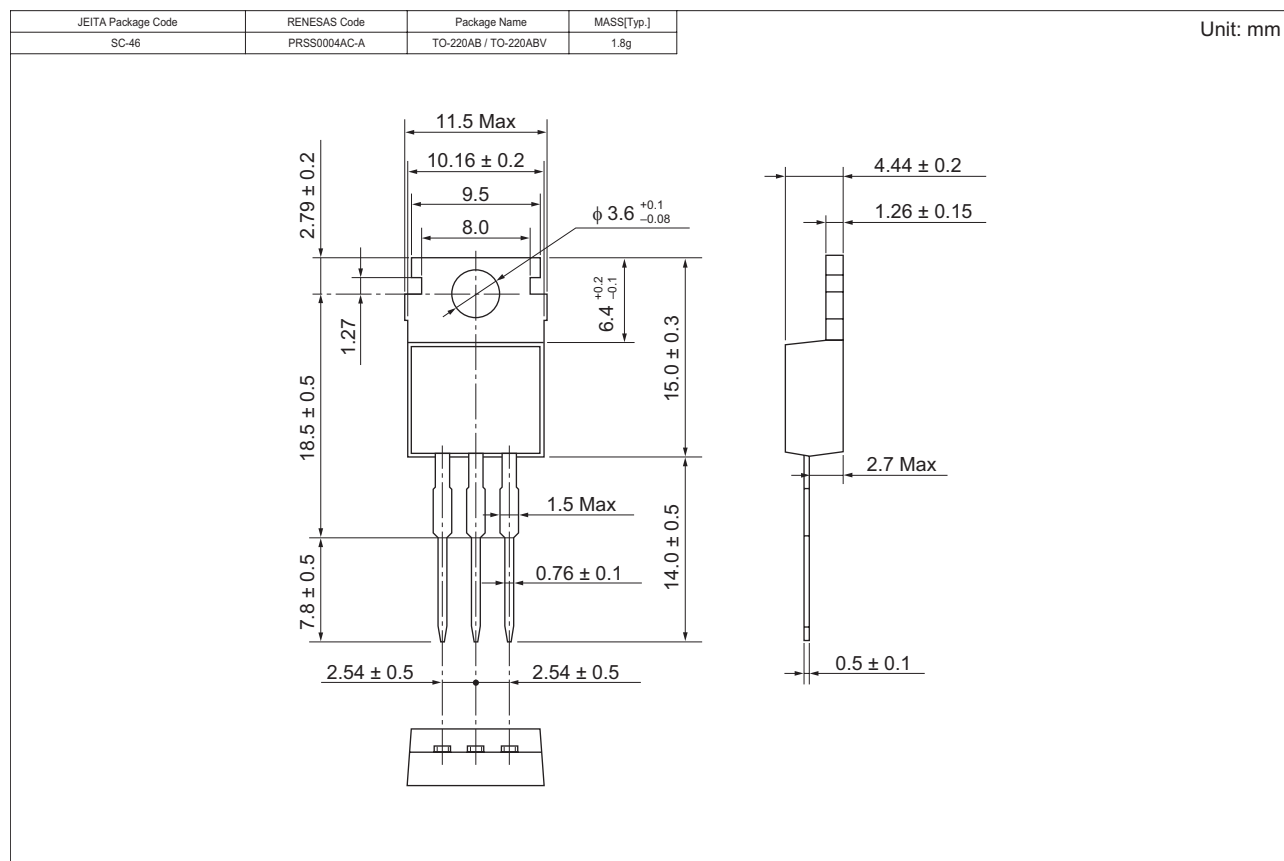
Switching Time Test Circuit



Waveform



## Package Dimensions



## Ordering Information

Part Name	Quantity	Shipping Container
2SJ542-E	500 pcs	Box (Sack)

Note: For some grades, production may be terminated. Please contact the Renesas sales office to check the state of production before ordering the product.

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