

To our customers,

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## Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: <http://www.renesas.com>

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

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for new design

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# FS50VSJ-2

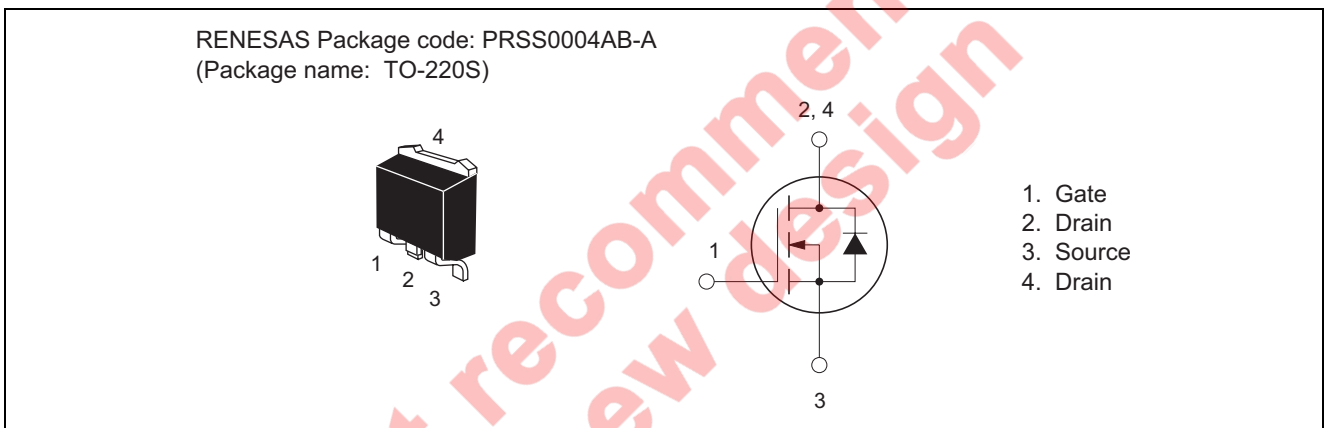
High-Speed Switching Use  
Nch Power MOS FET

REJ03G1426-0200  
(Previous: MEJ02G0069-0101)  
Rev.2.00  
Aug 07, 2006

## Features

- Drive voltage : 4 V
- $V_{DSS}$  : 100 V
- $r_{DS(ON)(max)}$  : 48 m $\Omega$
- $I_D$  : 50 A
- Integrated Fast Recovery Diode (TYP.) : 90 ns

## Outline



## Applications

Motor control, Lamp control, Solenoid control, DC-DC converters, etc.

## Maximum Ratings

( $T_c = 25^\circ\text{C}$ )

Parameter	Symbol	Ratings	Unit	Conditions
Drain-source voltage	$V_{DSS}$	100	V	$V_{GS} = 0\text{ V}$
Gate-source voltage	$V_{GSS}$	$\pm 20$	V	$V_{DS} = 0\text{ V}$
Drain current	$I_D$	50	A	
Drain current (Pulsed)	$I_{DM}$	200	A	
Avalanche drain current (Pulsed)	$I_{DA}$	50	A	$L = 50\ \mu\text{H}$
Source current	$I_S$	50	A	
Source current (Pulsed)	$I_{SM}$	200	A	
Maximum power dissipation	$P_D$	70	W	
Channel temperature	$T_{ch}$	- 55 to +150	$^\circ\text{C}$	
Storage temperature	$T_{stg}$	- 55 to +150	$^\circ\text{C}$	
Mass	—	1.2	g	Typical value

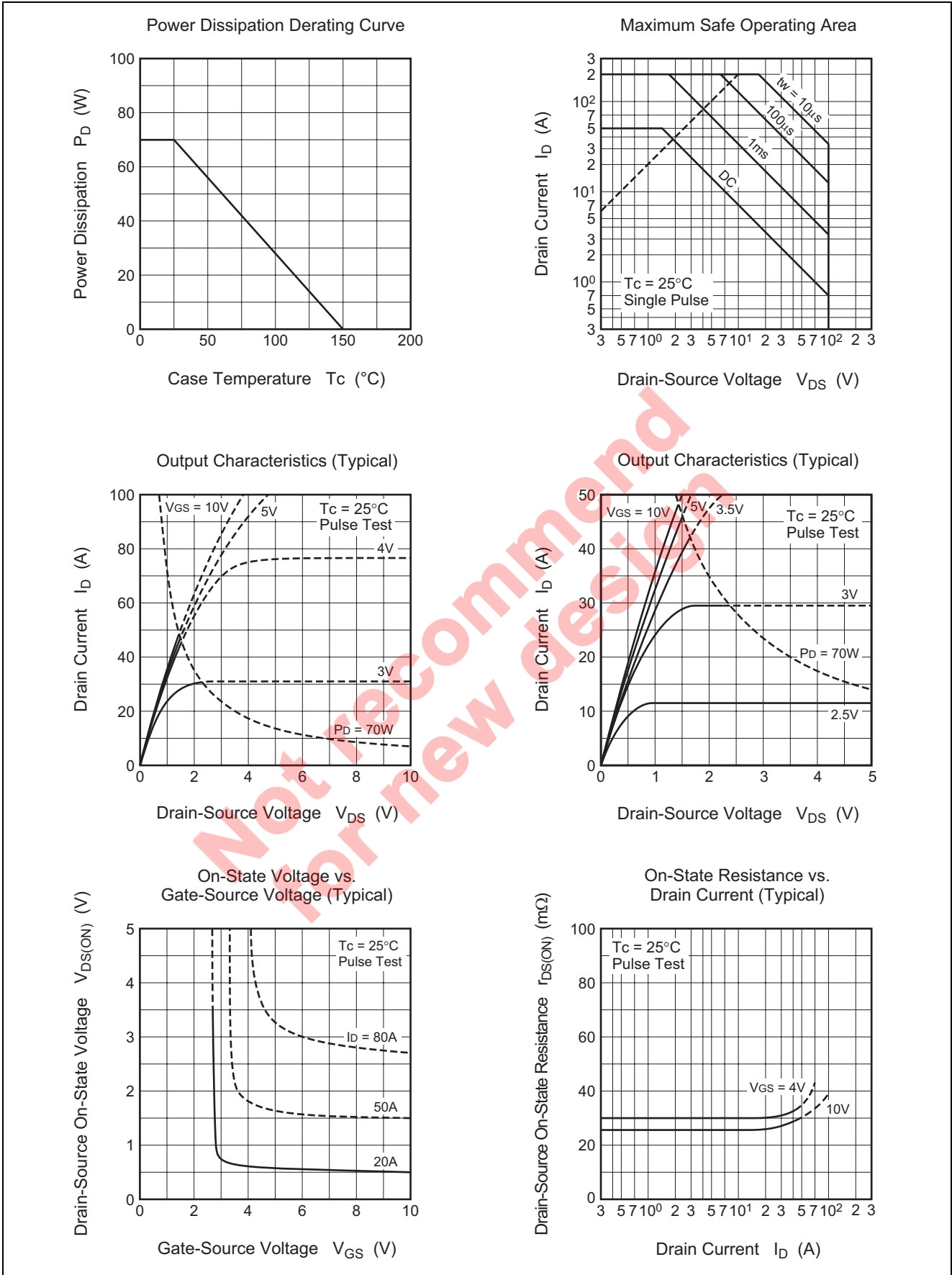
## Electrical Characteristics

(T<sub>ch</sub> = 25°C)

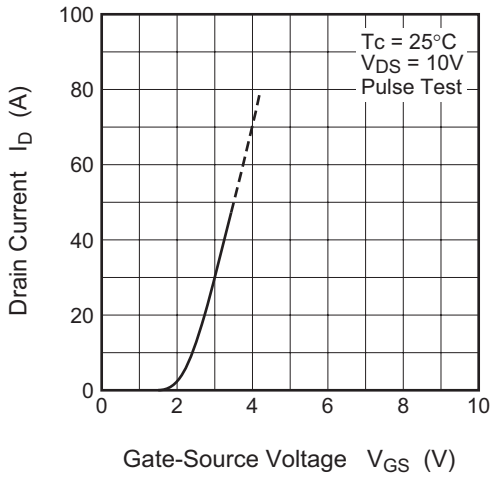
Parameter	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain-source breakdown voltage	$V_{(BR)DSS}$	100	—	—	V	$I_D = 1 \text{ mA}$ , $V_{GS} = 0 \text{ V}$
Gate-source leakage current	$I_{GSS}$	—	—	±0.1	μA	$V_{GS} = \pm 20 \text{ V}$ , $V_{DS} = 0 \text{ V}$
Drain-source leakage current	$I_{DSS}$	—	—	0.1	mA	$V_{DS} = 100 \text{ V}$ , $V_{GS} = 0 \text{ V}$
Gate-source threshold voltage	$V_{GS(th)}$	1.0	1.5	2.0	V	$I_D = 1 \text{ mA}$ , $V_{DS} = 10 \text{ V}$
Drain-source on-state resistance	$r_{DS(ON)}$	—	37	48	mΩ	$I_D = 25 \text{ A}$ , $V_{GS} = 10 \text{ V}$
Drain-source on-state resistance	$r_{DS(ON)}$	—	40	52	mΩ	$I_D = 25 \text{ A}$ , $V_{GS} = 4 \text{ V}$
Drain-source on-state voltage	$V_{DS(ON)}$	—	0.93	1.20	V	$I_D = 25 \text{ A}$ , $V_{GS} = 10 \text{ V}$
Forward transfer admittance	$ y_{fs} $	—	40	—	S	$I_D = 25 \text{ A}$ , $V_{DS} = 10 \text{ V}$
Input capacitance	$C_{iss}$	—	3000	—	pF	$V_{DS} = 10 \text{ V}$ , $V_{GS} = 0 \text{ V}$ , $f = 1 \text{ MHz}$
Output capacitance	$C_{oss}$	—	410	—	pF	
Reverse transfer capacitance	$C_{rss}$	—	210	—	pF	
Turn-on delay time	$t_{d(on)}$	—	22	—	ns	$V_{DD} = 50 \text{ V}$ , $I_D = 25 \text{ A}$ , $V_{GS} = 10 \text{ V}$ , $R_{GEN} = R_{GS} = 50 \Omega$
Rise time	$t_r$	—	65	—	ns	
Turn-off delay time	$t_{d(off)}$	—	270	—	ns	
Fall time	$t_f$	—	160	—	ns	
Source-drain voltage	$V_{SD}$	—	1.0	1.5	V	$I_S = 25 \text{ A}$ , $V_{GS} = 0 \text{ V}$
Thermal resistance	$R_{th(ch-c)}$	—	—	1.78	°C/W	Channel to case
Reverse recovery time	$t_{rr}$	—	90	—	ns	$I_S = 50 \text{ A}$ , $dI_S/dt = -100 \text{ A}/\mu\text{s}$

Not recommended  
for new designs

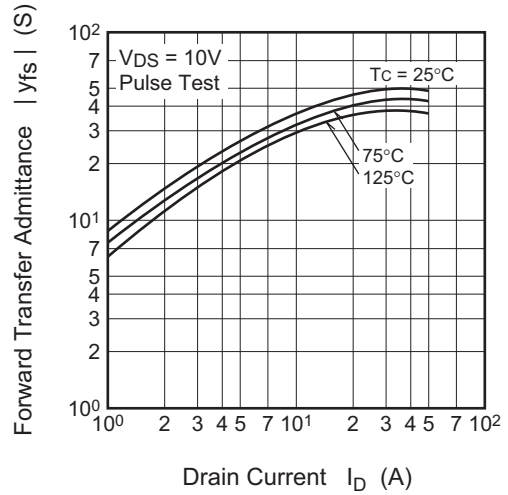
Performance Curves



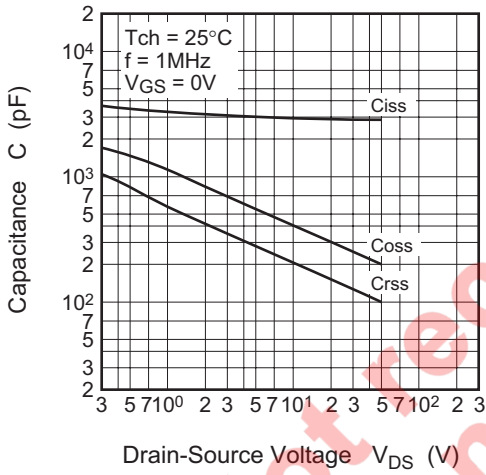
Transfer Characteristics (Typical)



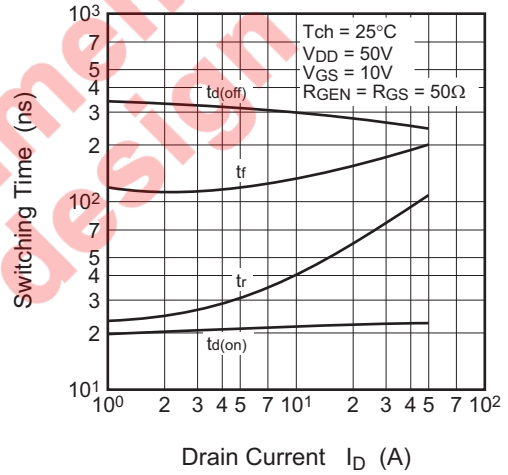
Forward Transfer Admittance vs. Drain Current (Typical)



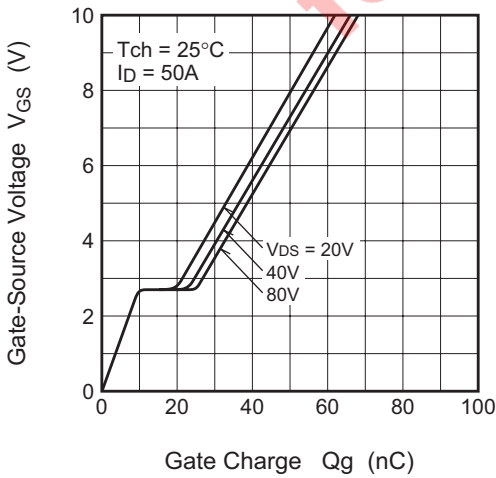
Capacitance vs. Drain-Source Voltage (Typical)



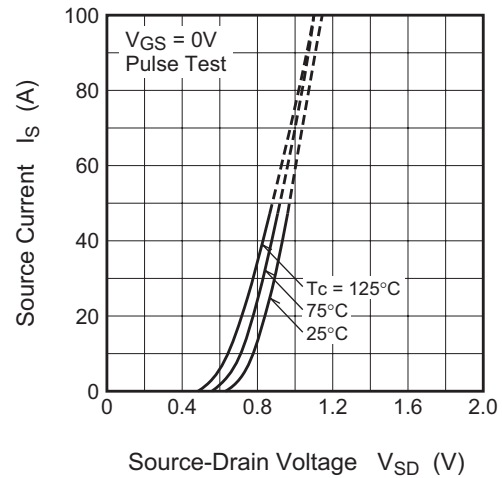
Switching Characteristics (Typical)

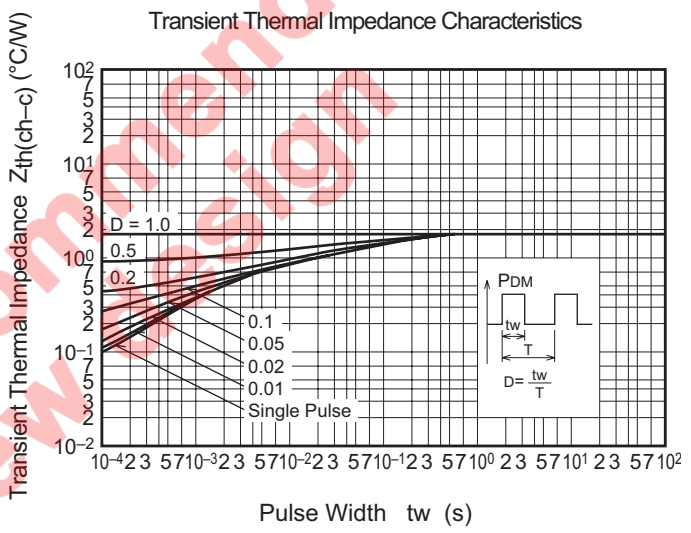
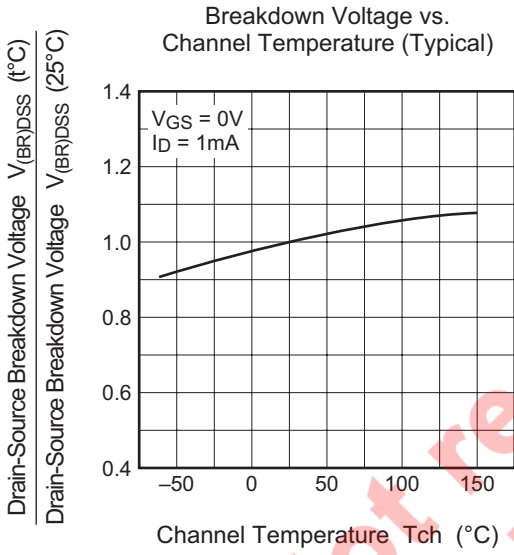
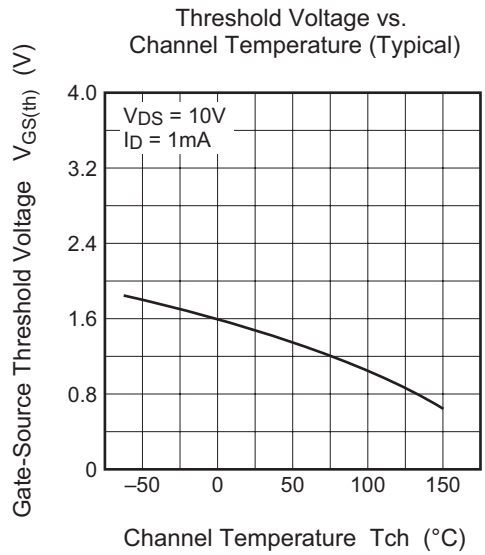
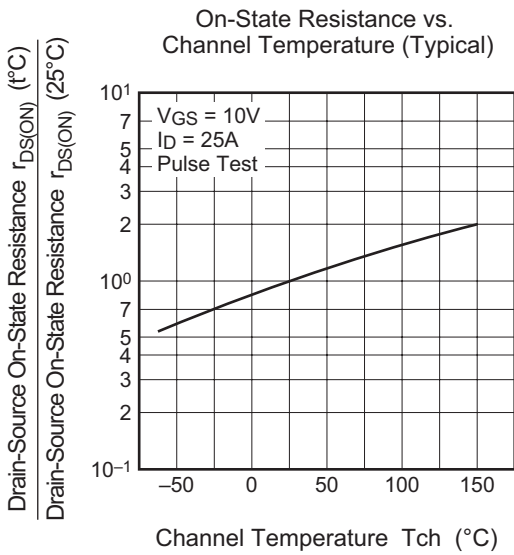


Gate-Source Voltage vs. Gate Charge (Typical)

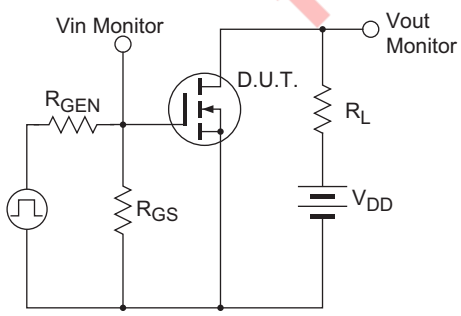


Source-Drain Diode Forward Characteristics (Typical)

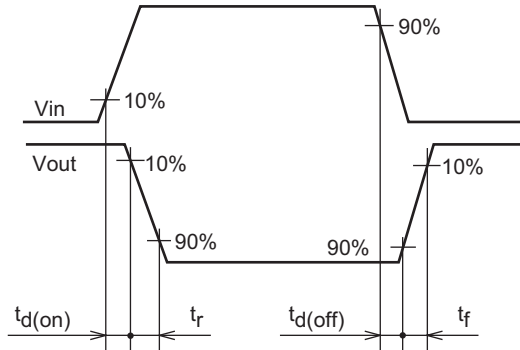




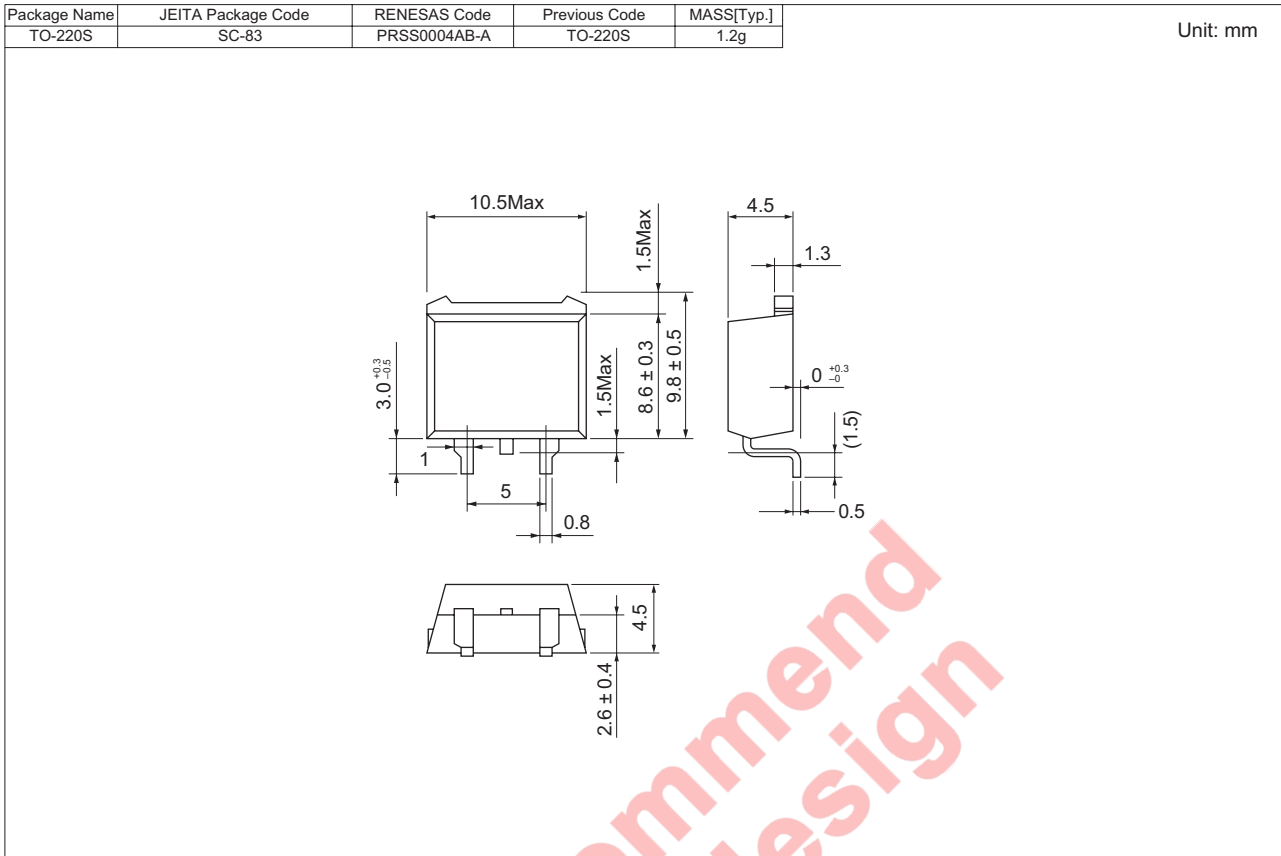
Switching Time Measurement Circuit



Switching Waveform



Package Dimensions



Order Code

Lead form	Standard packing	Quantity	Standard order code	Standard order code example
Surface-mounted type	Taping	1000	Type name – T +Direction (1 or 2) +1	FS50VSJ-2-T11
Surface-mounted type	Plastic Magazine (Tube)	50	Type name	FS50VSJ-2
Straight type	Plastic Magazine (Tube)	50	Type name +A1	FS50VSJ-2-A1

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