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Old Company Name in Catalogs and Other Documents

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

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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Not recommended
for new design

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FX50SMJ-06

High-Speed Switching Use
Pch Power MOS FET

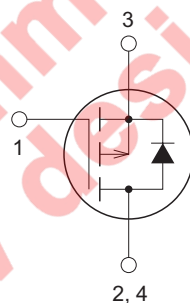
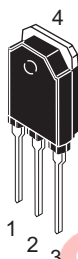
REJ03G1453-0200
(Previous: MEJ02G0278-0101)
Rev.2.00
Aug 07, 2006

Features

- Drive voltage : 4 V
- V_{DSS} : -60 V
- $r_{DS(ON)(max)}$: 18.9 m Ω
- I_D : -50 A
- Integrated Fast Recovery Diode (TYP.) : 70 ns

Outline

RENESAS Package code: PRSS0004ZB-A
(Package name: TO-3P)



1. Gate
2. Drain
3. Source
4. Drain

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}	-60	V	$V_{GS} = 0\text{ V}$
Gate-source voltage	V_{GSS}	± 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	150	W	
Channel temperature	T_{ch}	- 55 to +150	$^\circ\text{C}$	
Storage temperature	T_{stg}	- 55 to +150	$^\circ\text{C}$	
Mass	—	4.8	g	Typical value

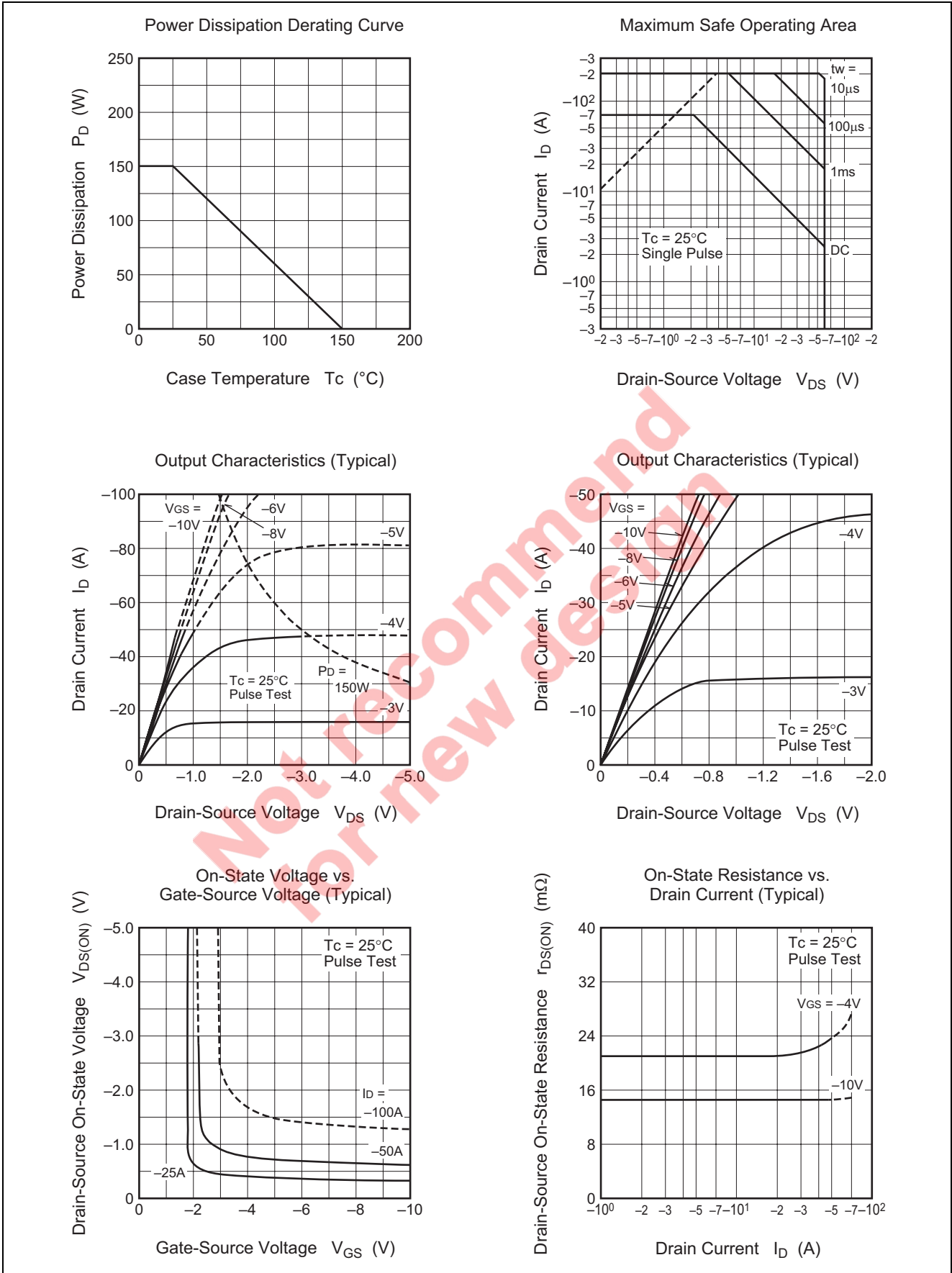
Electrical Characteristics

(T_{ch} = 25°C)

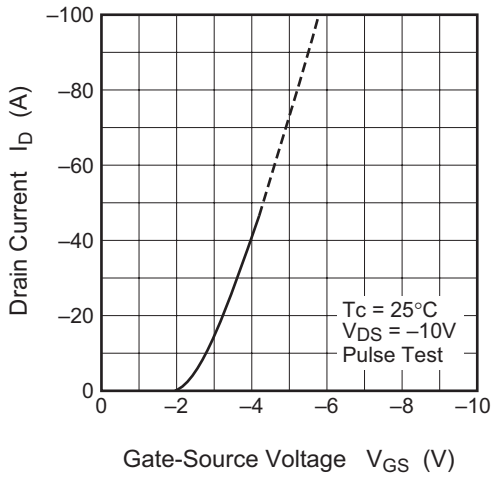
Parameter	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain-source breakdown voltage	$V_{(BR)DSS}$	-60	—	—	V	$I_D = -1 \text{ mA}$, $V_{GS} = 0 \text{ V}$
Gate-source leakage current	I_{GSS}	—	—	±0.1	μA	$V_{GS} = \pm 20 \text{ V}$, $V_{DS} = 0 \text{ V}$
Drain-source leakage current	I_{DSS}	—	—	0.1	mA	$V_{DS} = -60 \text{ V}$, $V_{GS} = 0 \text{ V}$
Gate-source threshold voltage	$V_{GS(th)}$	-1.3	-1.8	-2.3	V	$I_D = -1 \text{ mA}$, $V_{DS} = -10 \text{ V}$
Drain-source on-state resistance	$r_{DS(ON)}$	—	15.0	18.9	mΩ	$I_D = -25 \text{ A}$, $V_{GS} = -10 \text{ V}$
Drain-source on-state resistance	$r_{DS(ON)}$	—	23	32	mΩ	$I_D = -25 \text{ A}$, $V_{GS} = -4 \text{ V}$
Drain-source on-state voltage	$V_{DS(ON)}$	—	-0.38	-0.47	V	$I_D = -25 \text{ A}$, $V_{GS} = -10 \text{ V}$
Forward transfer admittance	$ y_{fs} $	—	49.1	—	S	$I_D = -25 \text{ A}$, $V_{DS} = -10 \text{ V}$
Input capacitance	C_{iss}	—	11610	—	pF	$V_{DS} = -10 \text{ V}$, $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$
Output capacitance	C_{oss}	—	1355	—	pF	
Reverse transfer capacitance	C_{rss}	—	687	—	pF	
Turn-on delay time	$t_{d(on)}$	—	73	—	ns	$V_{DD} = -30 \text{ V}$, $I_D = -25 \text{ A}$, $V_{GS} = -10 \text{ V}$, $R_{GEN} = R_{GS} = 50 \text{ } \Omega$
Rise time	t_r	—	137	—	ns	
Turn-off delay time	$t_{d(off)}$	—	822	—	ns	
Fall time	t_f	—	320	—	ns	
Source-drain voltage	V_{SD}	—	-1.0	-1.5	V	$I_S = -25 \text{ A}$, $V_{GS} = 0 \text{ V}$
Thermal resistance	$R_{th(ch-c)}$	—	—	0.83	°C/W	Channel to case
Reverse recovery time	t_{rr}	—	70	—	ns	$I_S = -50 \text{ A}$, $d_i/d_t = 100 \text{ A}/\mu\text{s}$

Not recommended
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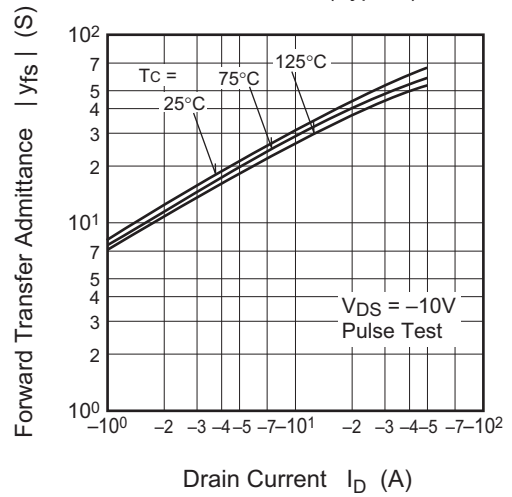
Performance Curves



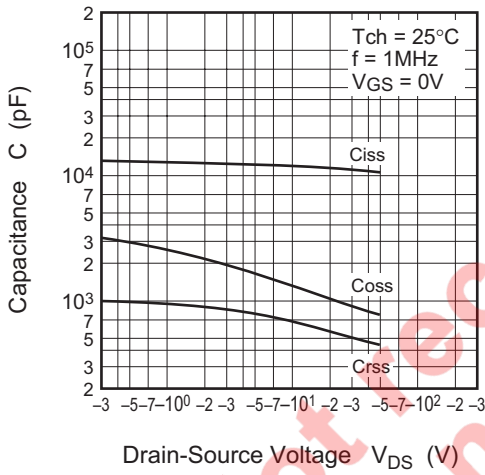
Transfer Characteristics (Typical)



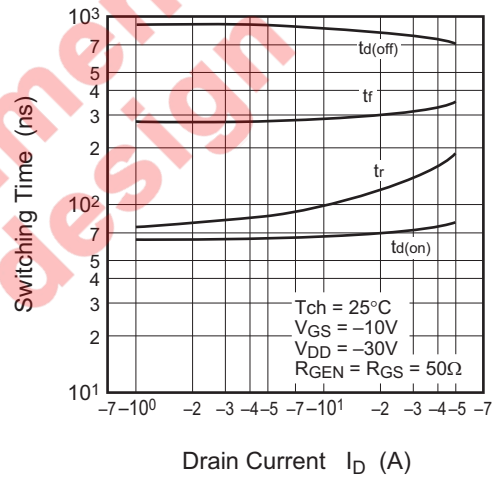
Forward Transfer Admittance vs. Drain Current (Typical)



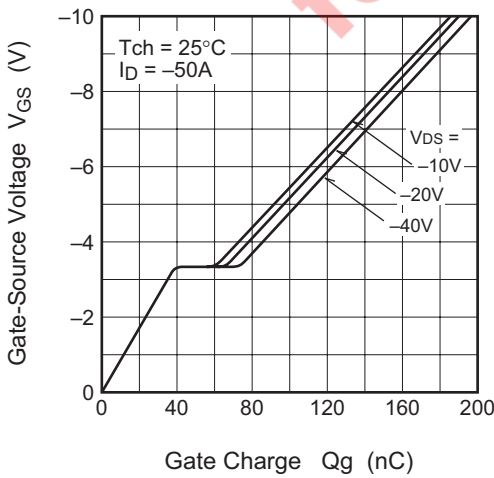
Capacitance vs. Drain-Source Voltage (Typical)



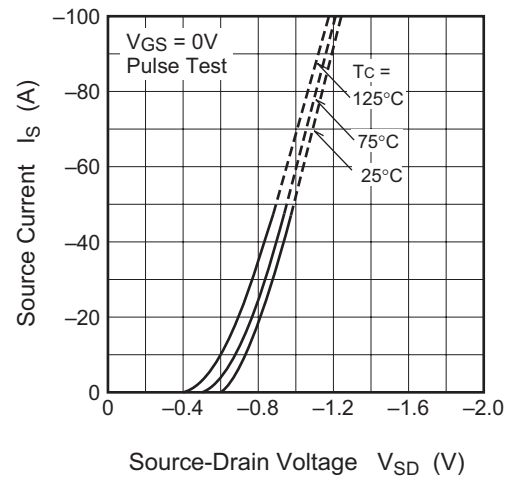
Switching Characteristics (Typical)

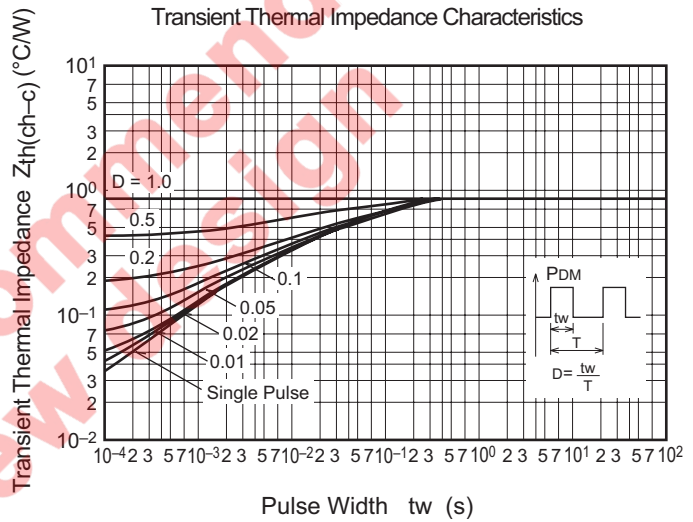
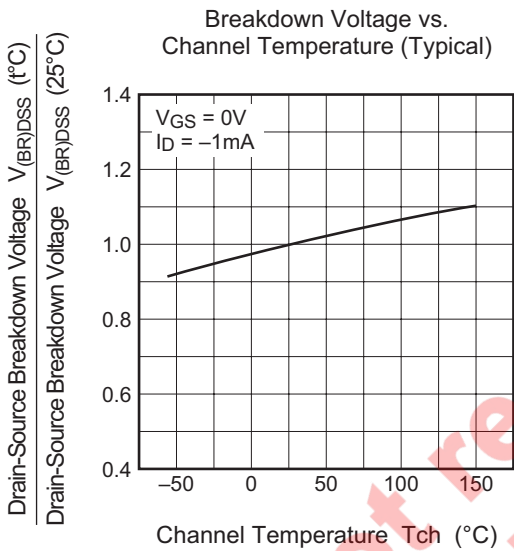
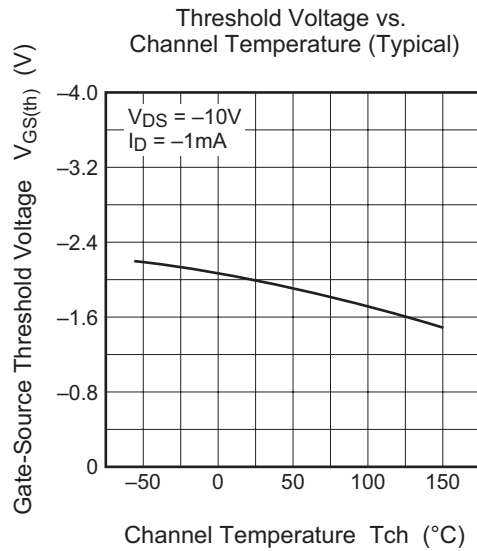
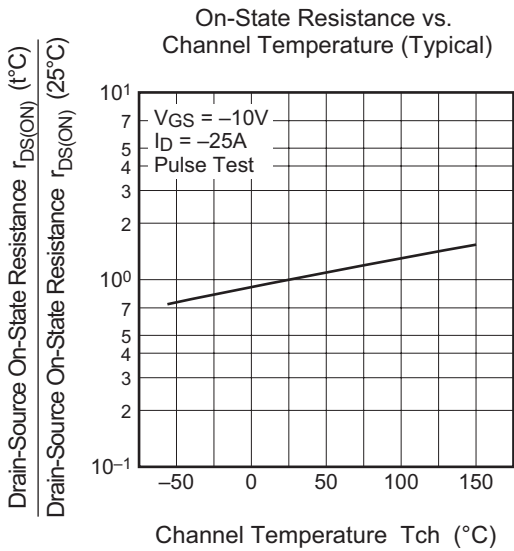


Gate-Source Voltage vs. Gate Charge (Typical)

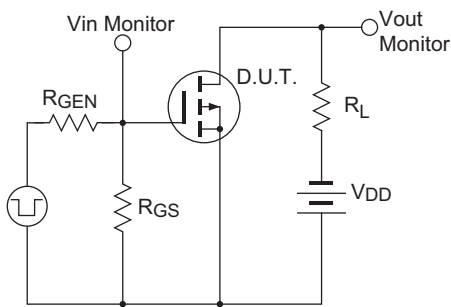


Source-Drain Diode Forward Characteristics (Typical)

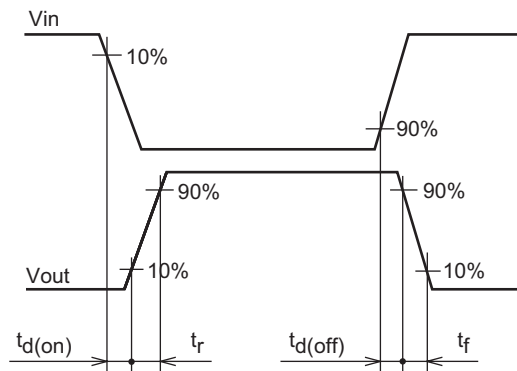




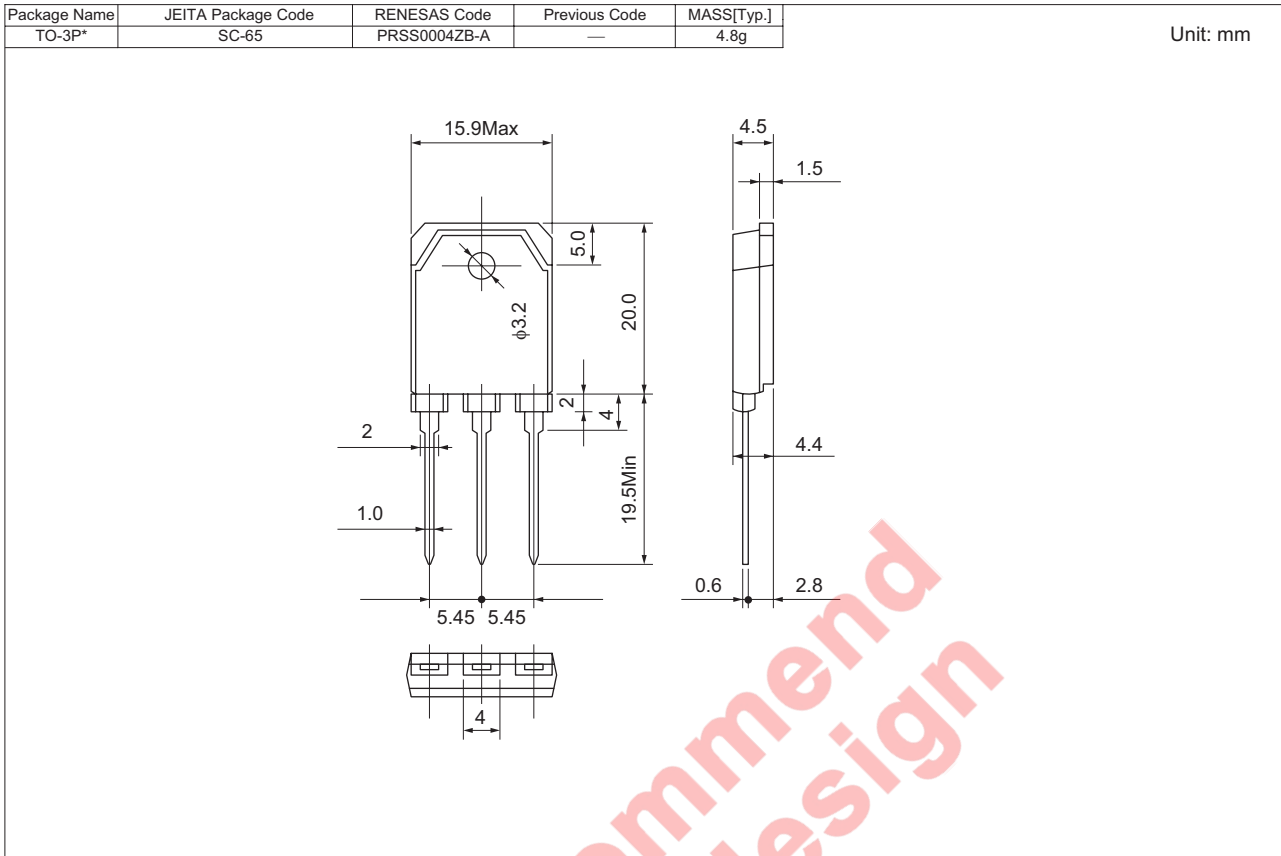
Switching Time Measurement Circuit



Switching Waveform



Package Dimensions



Order Code

Lead form	Standard packing	Quantity	Standard order code	Standard order code example
Straight type	Static electricity prevention bag	20	Type name	FX50SMJ-06
Lead form	Plastic Magazine (Tube)	30	Type name – Lead forming code	FX50SMJ-06-A8

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