

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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# FX20KMJ-06

## High-Speed Switching Use Pch Power MOS FET

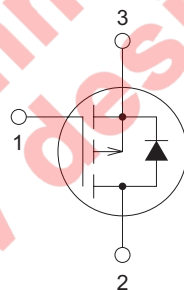
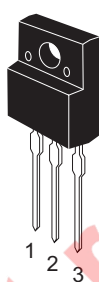
REJ03G1442-0200  
(Previous: MEJ02G0275-0101)  
Rev.2.00  
Aug 07, 2006

### Features

- Drive voltage : 4 V
- $V_{DSS}$  : - 60 V
- $r_{DS(ON) (max)}$  : 97 m $\Omega$
- $I_D$  : - 20 A
- Integrated Fast Recovery Diode (TYP.) : 50 ns
- Viso : 2000 V

### Outline

RENESAS Package code: PRSS0003AB-A  
(Package name: TO-220FN)



1. Gate
2. Drain
3. Source

### 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	$V_{GSS}$	$\pm 20$	V	$V_{DS} = 0\text{ V}$
Drain current	$I_D$	-20	A	
Drain current (Pulsed)	$I_{DM}$	-80	A	
Avalanche drain current (Pulsed)	$I_{DA}$	-20	A	$L = 100\ \mu\text{H}$
Source current	$I_S$	-20	A	
Source current (Pulsed)	$I_{SM}$	-80	A	
Maximum power dissipation	$P_D$	25	W	
Channel temperature	$T_{ch}$	- 55 to +150	$^\circ\text{C}$	
Storage temperature	$T_{stg}$	- 55 to +150	$^\circ\text{C}$	
Isolation voltage	Viso	2000	V	AC for 1 minute, Terminal to case
Mass	—	2.0	g	Typical value

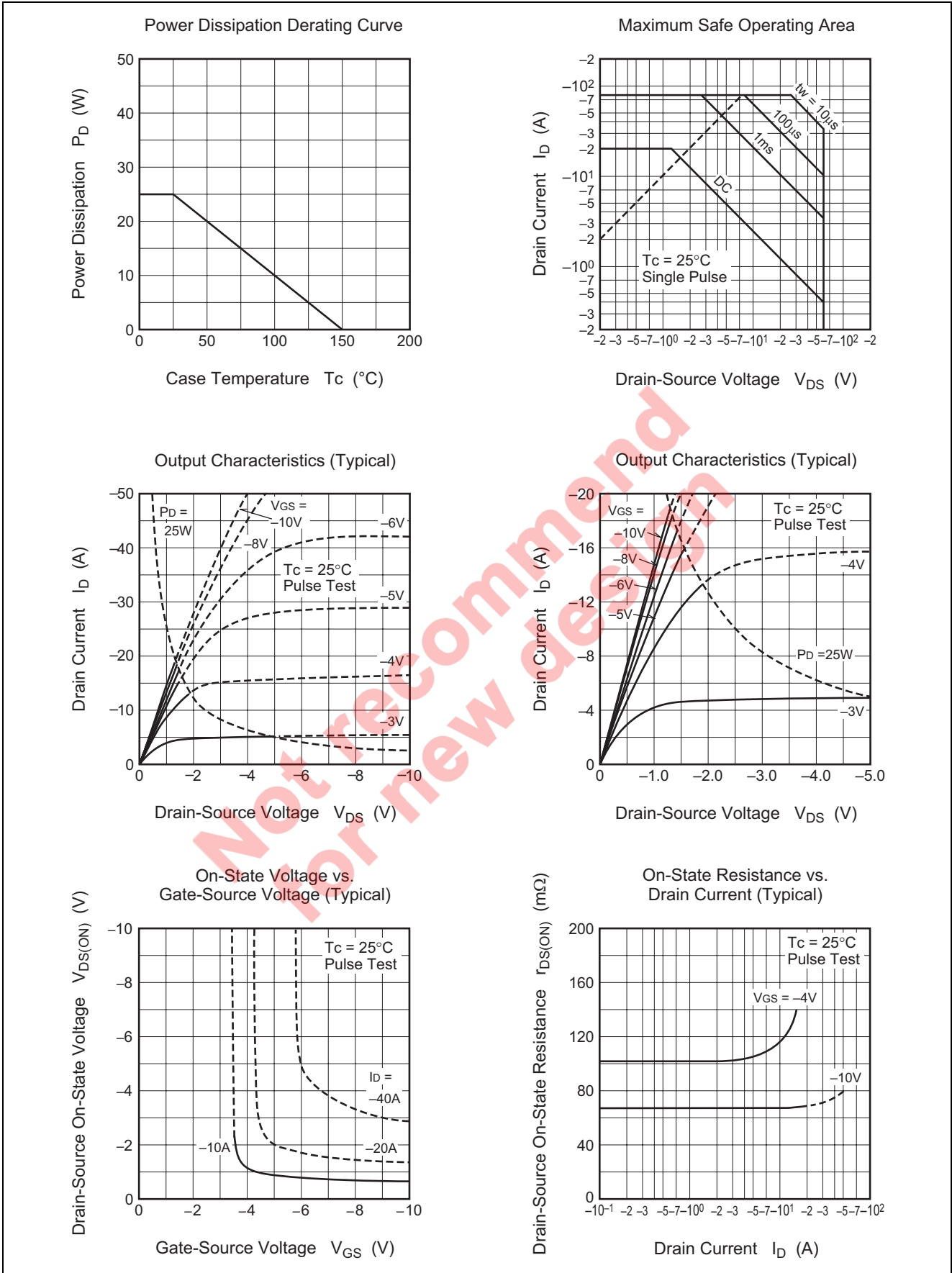
## Electrical Characteristics

(T<sub>ch</sub> = 25°C)

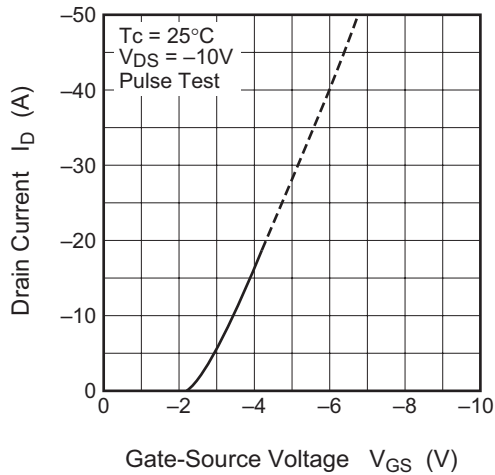
Parameter	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain-source breakdown voltage	$V_{(BR)DSS}$	-60	—	—	V	$I_D = -1 \text{ mA}$ , $V_{GS} = 0 \text{ V}$
Gate-source leakage current	$I_{GSS}$	—	—	$\pm 0.1$	$\mu\text{A}$	$V_{GS} = \pm 20 \text{ V}$ , $V_{DS} = 0 \text{ V}$
Drain-source leakage current	$I_{DSS}$	—	—	-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	$r_{DS(ON)}$	—	73	97	m $\Omega$	$I_D = -10 \text{ A}$ , $V_{GS} = -10 \text{ V}$
Drain-source on-state resistance	$r_{DS(ON)}$	—	119	166	m $\Omega$	$I_D = -10 \text{ A}$ , $V_{GS} = -4 \text{ V}$
Drain-source on-state voltage	$V_{DS(ON)}$	—	-0.73	-0.97	V	$I_D = -10 \text{ A}$ , $V_{GS} = -10 \text{ V}$
Forward transfer admittance	$ y_{fs} $	—	10.9	—	S	$I_D = -10 \text{ A}$ , $V_{DS} = -10 \text{ V}$
Input capacitance	$C_{iss}$	—	2370	—	pF	$V_{DS} = -10 \text{ V}$ , $V_{GS} = 0 \text{ V}$ , $f = 1 \text{ MHz}$
Output capacitance	$C_{oss}$	—	306	—	pF	
Reverse transfer capacitance	$C_{rss}$	—	147	—	pF	
Turn-on delay time	$t_{d(on)}$	—	15	—	ns	$V_{DD} = -30 \text{ V}$ , $I_D = -10 \text{ A}$ , $V_{GS} = -10 \text{ V}$ , $R_{GEN} = R_{GS} = 50 \Omega$
Rise time	$t_r$	—	37	—	ns	
Turn-off delay time	$t_{d(off)}$	—	131	—	ns	
Fall time	$t_f$	—	72	—	ns	
Source-drain voltage	$V_{SD}$	—	-1.0	-1.5	V	$I_S = -10 \text{ A}$ , $V_{GS} = 0 \text{ V}$
Thermal resistance	$R_{th(ch-c)}$	—	—	5.00	$^{\circ}\text{C/W}$	Channel to case
Reverse recovery time	$t_{rr}$	—	50	—	ns	$I_S = -20 \text{ A}$ , $d_i/d_t = 100 \text{ A}/\mu\text{s}$

Not recommended  
for new designs

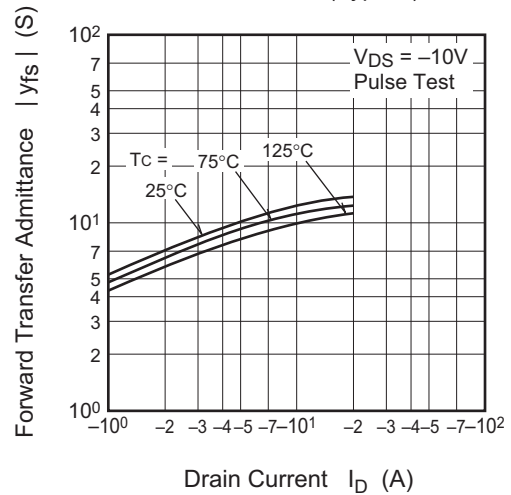
Performance Curves



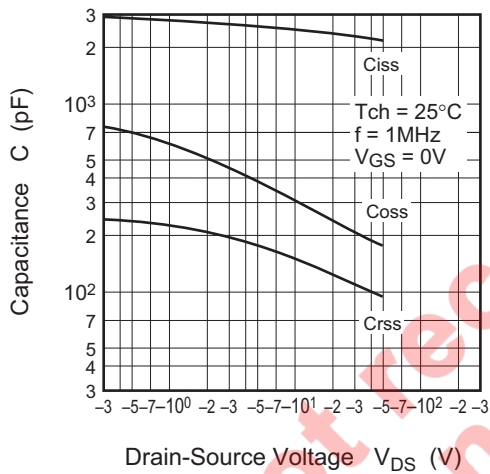
Transfer Characteristics (Typical)



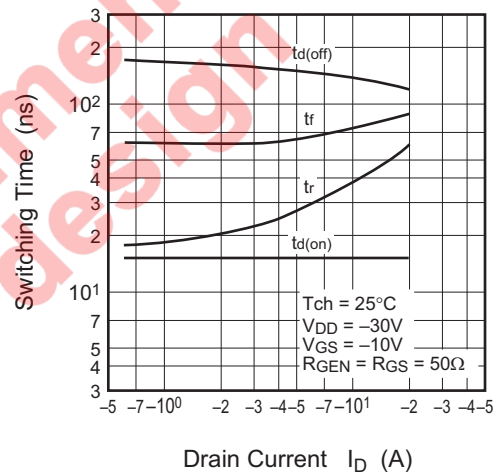
Forward Transfer Admittance vs. Drain Current (Typical)



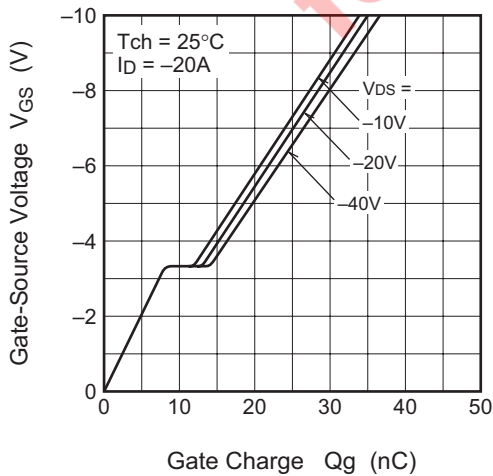
Capacitance vs. Drain-Source Voltage (Typical)



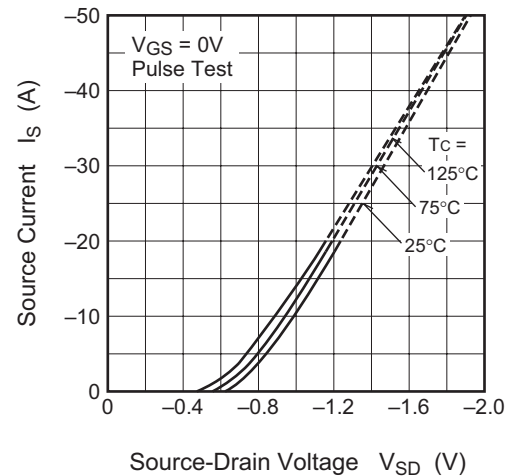
Switching Characteristics (Typical)

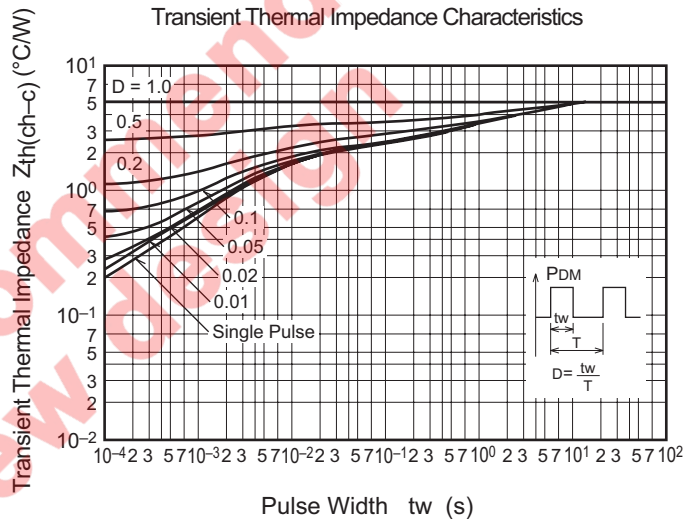
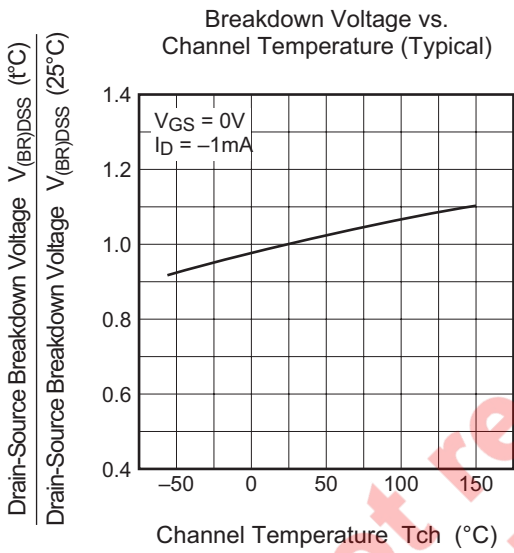
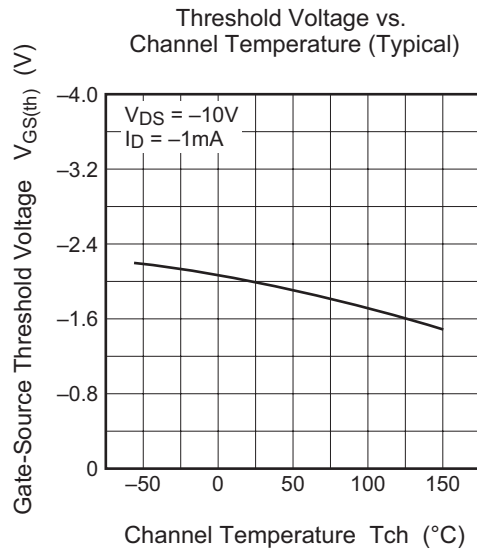
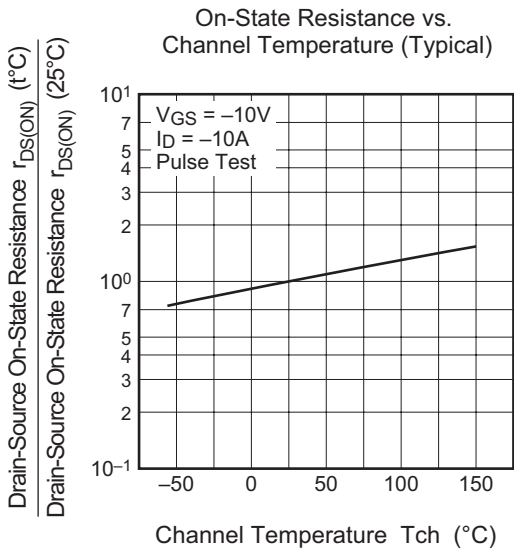


Gate-Source Voltage vs. Gate Charge (Typical)

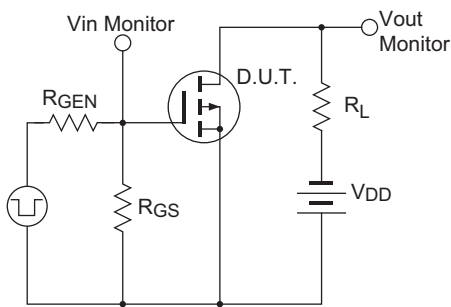


Source-Drain Diode Forward Characteristics (Typical)

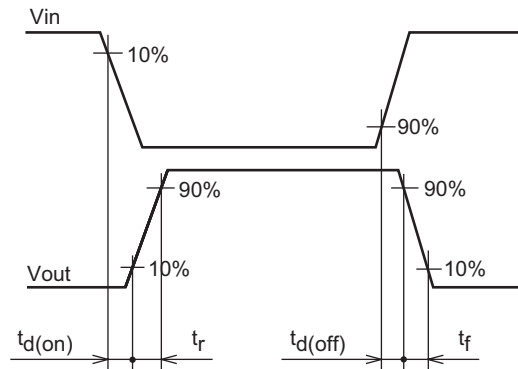




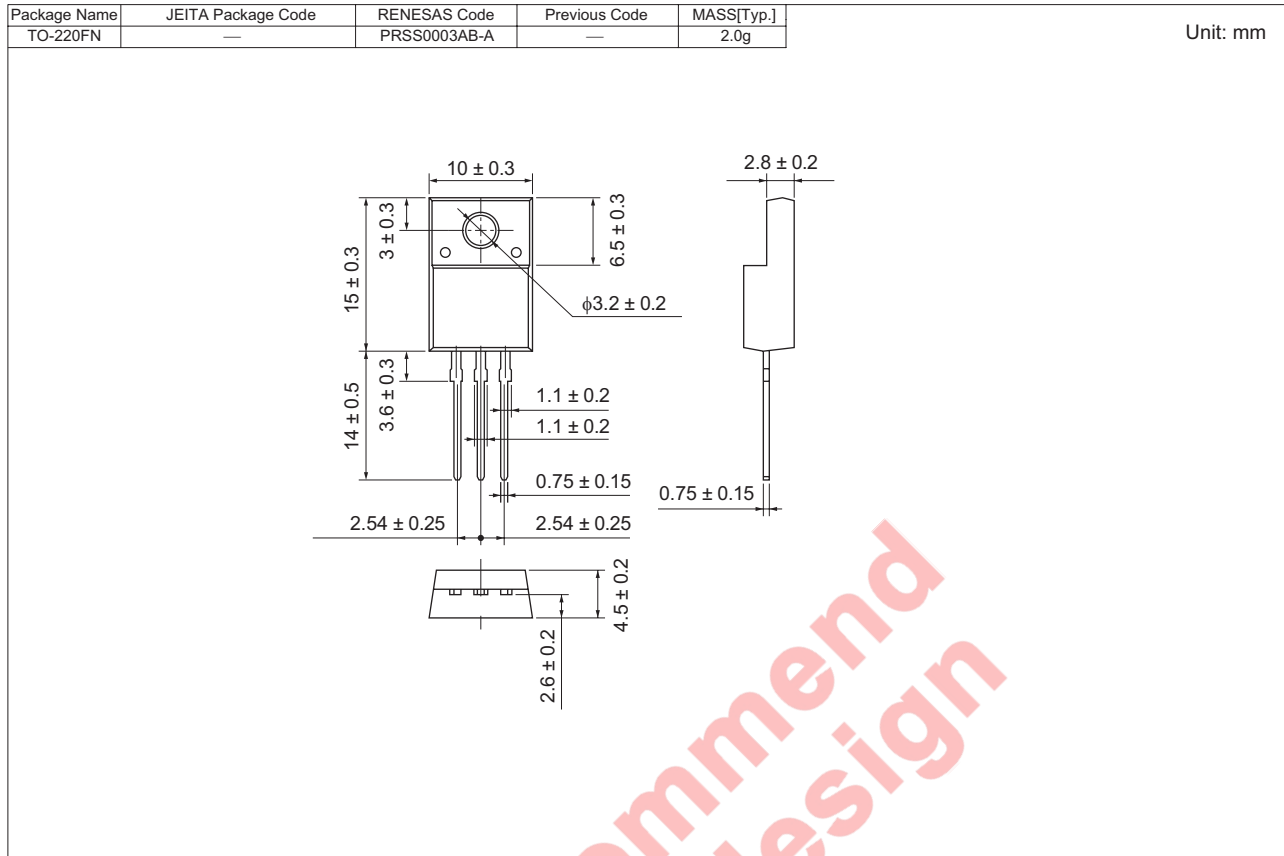
Switching Time Measurement Circuit



Switching Waveform



### Package Dimensions



### Order Code

Lead form	Standard packing	Quantity	Standard order code	Standard order code example
Straight type	Plastic Magazine (Tube)	50	Type name	FX20KMJ-06
Lead form	Plastic Magazine (Tube)	50	Type name – Lead forming code	FX20KMJ-06-A8

Note: Please confirm the specification about the shipping in detail.



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