

FX20KMJ-3

High-Speed Switching Use
Pch Power MOS FET

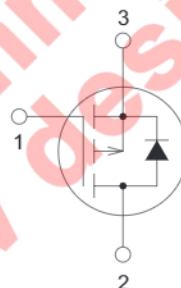
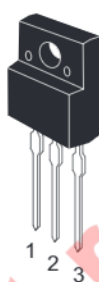
REJ03G1444-0200
(Previous: MEJ02G0289-0101)
Rev.2.00
Aug 07, 2006

Features

- Drive voltage : 4 V
- $V_{DSS} : -150 \text{ V}$
- $r_{DS(ON) (max)} : 0.29 \Omega$
- $I_D : -20 \text{ A}$
- Integrated Fast Recovery Diode (TYP.) : 100 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}	-150	V	$V_{GS} = 0 \text{ V}$
Gate-source voltage	V_{GSS}	± 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	$L = 30 \mu\text{H}$
Source current	I_S	-20	A	
Source current (Pulsed)	I_{SM}	-80	A	
Maximum power dissipation	P_D	30	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

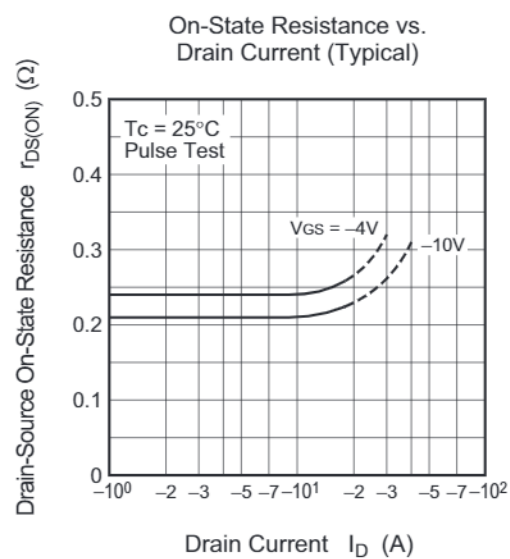
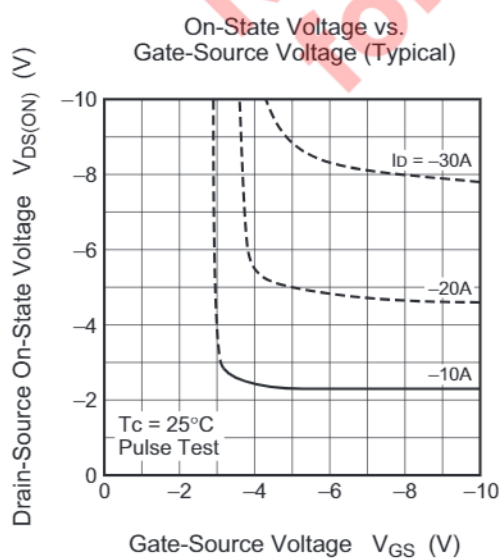
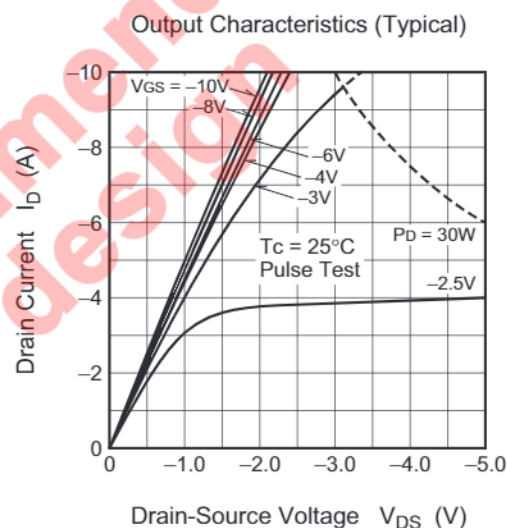
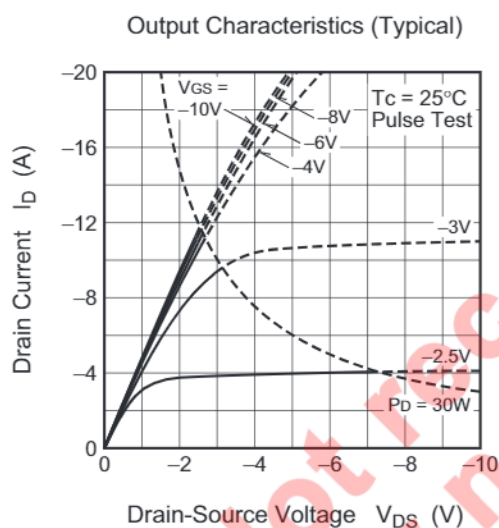
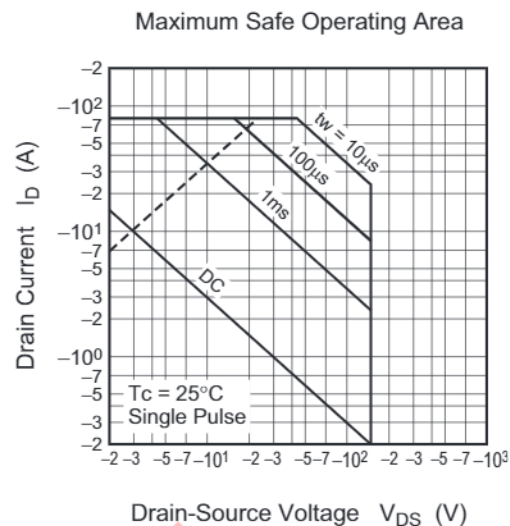
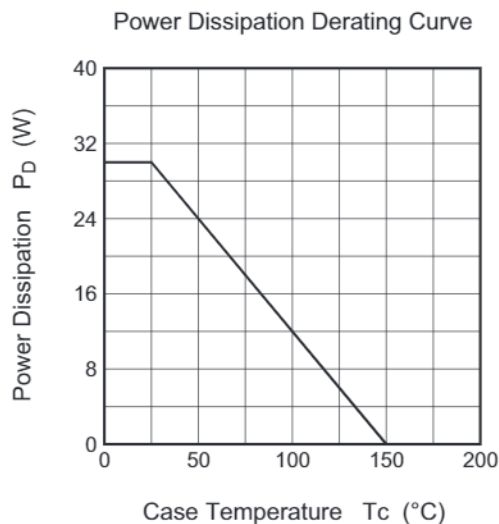
Electrical Characteristics

(T_{ch} = 25°C)

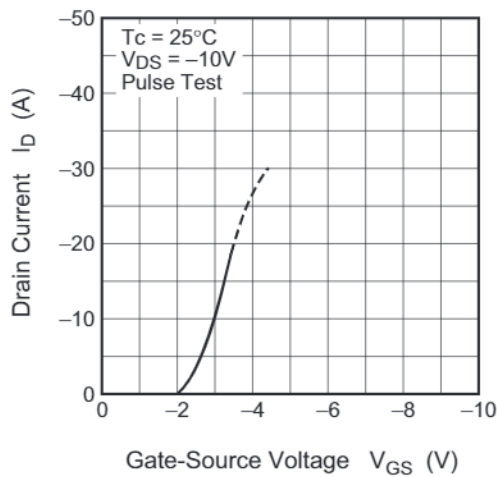
Parameter	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain-source breakdown voltage	$V_{(BR)DSS}$	-150	—	—	V	$I_D = -1 \text{ mA}$, $V_{GS} = 0 \text{ V}$
Gate-source leakage current	I_{GSS}	—	—	± 0.1	μA	$V_{GS} = \pm 20 \text{ V}$, $V_{DS} = 0 \text{ V}$
Drain-source leakage current	I_{DSS}	—	—	-0.1	mA	$V_{DS} = -150 \text{ V}$, $V_{GS} = 0 \text{ V}$
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	$r_{DS(on)}$	—	0.23	0.29	Ω	$I_D = -10 \text{ A}$, $V_{GS} = -10 \text{ V}$
Drain-source on-state resistance	$r_{DS(on)}$	—	0.25	0.32	Ω	$I_D = -10 \text{ A}$, $V_{GS} = -4 \text{ V}$
Drain-source on-state voltage	$V_{DS(on)}$	—	-2.3	-2.9	V	$I_D = -10 \text{ A}$, $V_{GS} = -10 \text{ V}$
Forward transfer admittance	$ y_{fs} $	—	17.5	—	S	$I_D = -10 \text{ A}$, $V_{DS} = -10 \text{ V}$
Input capacitance	C_{iss}	—	4470	—	pF	$V_{DS} = -10 \text{ V}$, $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$
Output capacitance	C_{oss}	—	248	—	pF	
Reverse transfer capacitance	C_{rss}	—	115	—	pF	
Turn-on delay time	$t_{d(on)}$	—	15	—	ns	$V_{DD} = -80 \text{ V}$, $I_D = -10 \text{ A}$, $V_{GS} = -10 \text{ V}$, $R_{GEN} = R_{GS} = 50 \Omega$
Rise time	t_r	—	42	—	ns	
Turn-off delay time	$t_{d(off)}$	—	273	—	ns	
Fall time	t_f	—	114	—	ns	
Source-drain voltage	V_{SD}	—	-1.0	-1.5	V	$I_S = -10 \text{ A}$, $V_{GS} = 0 \text{ V}$
Thermal resistance	$R_{th(ch-c)}$	—	—	4.17	$^{\circ}\text{C/W}$	Channel to case
Reverse recovery time	t_{rr}	—	100	—	ns	$I_S = -20 \text{ A}$, $dI_S/dt = 100 \text{ A}/\mu\text{s}$

Not recommended
for new design

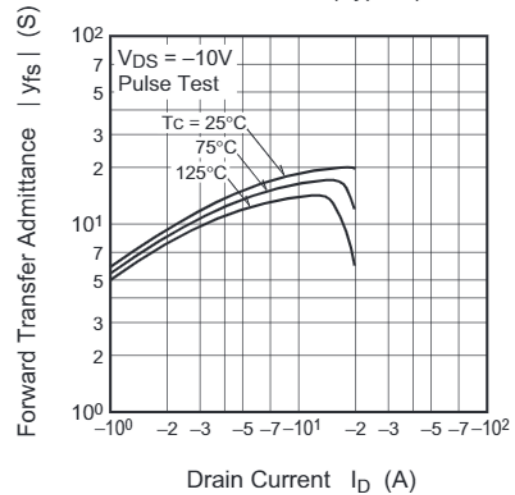
Performance Curves



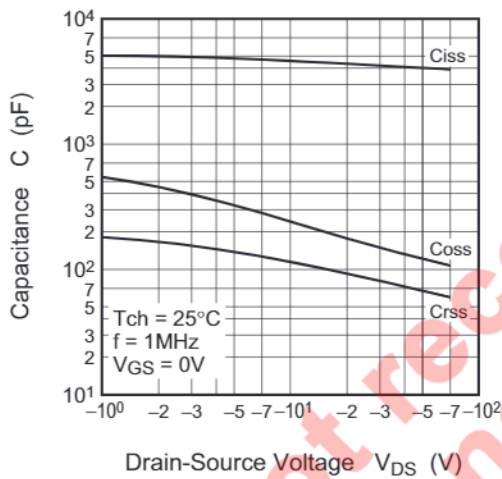
Transfer Characteristics (Typical)



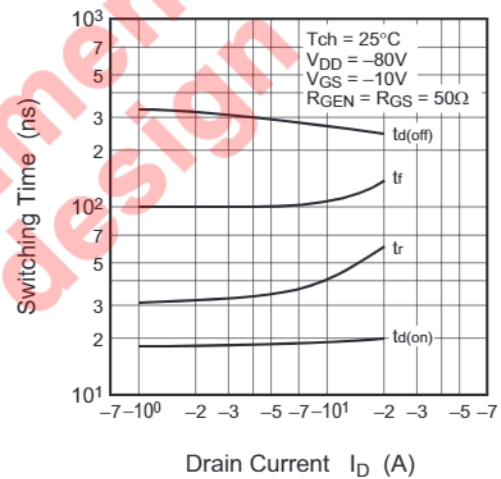
Forward Transfer Admittance vs. Drain Current (Typical)



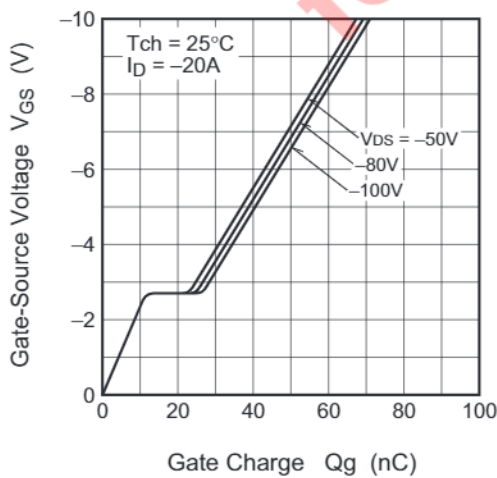
Capacitance vs. Drain-Source Voltage (Typical)



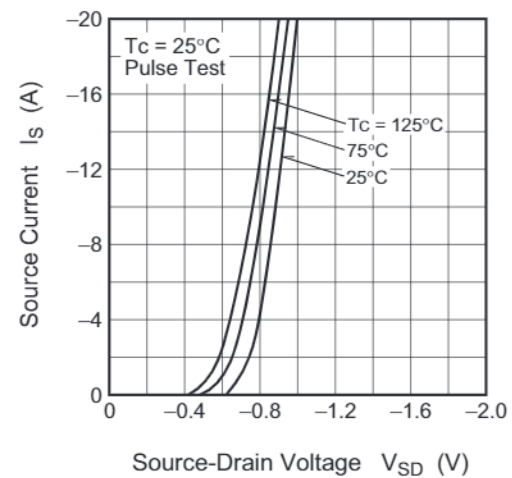
Switching Characteristics (Typical)

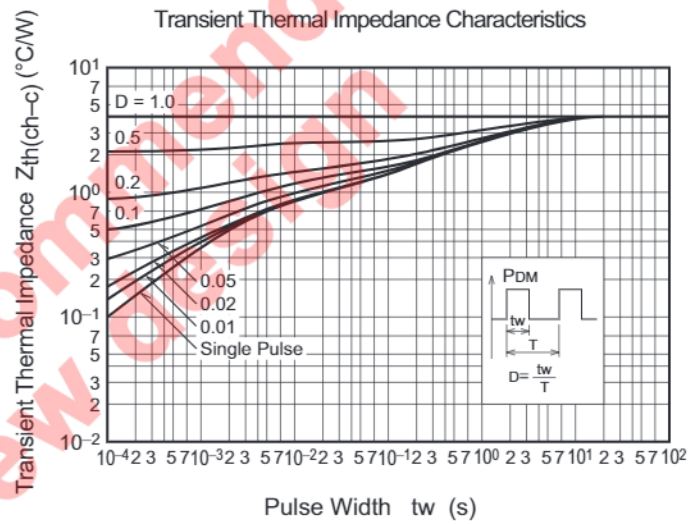
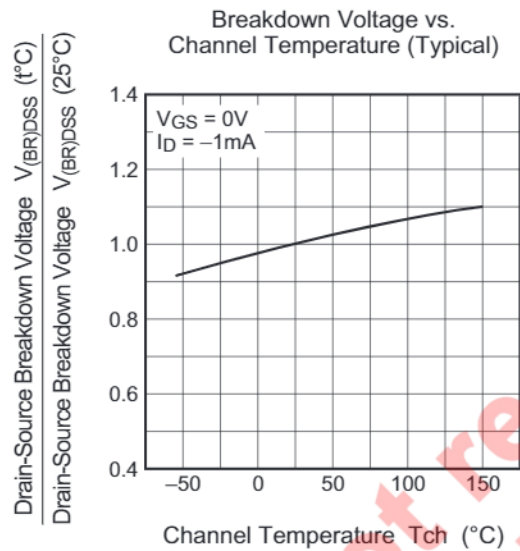
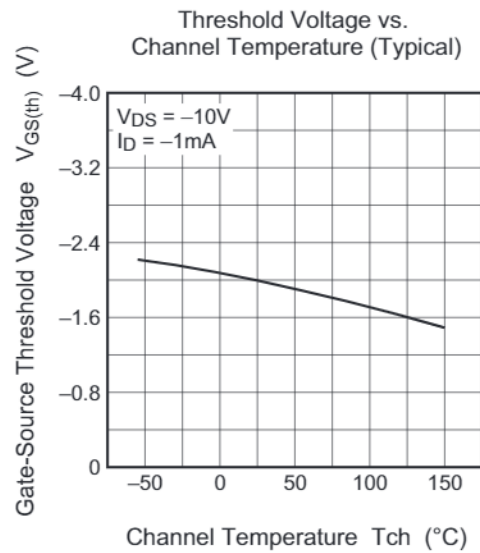
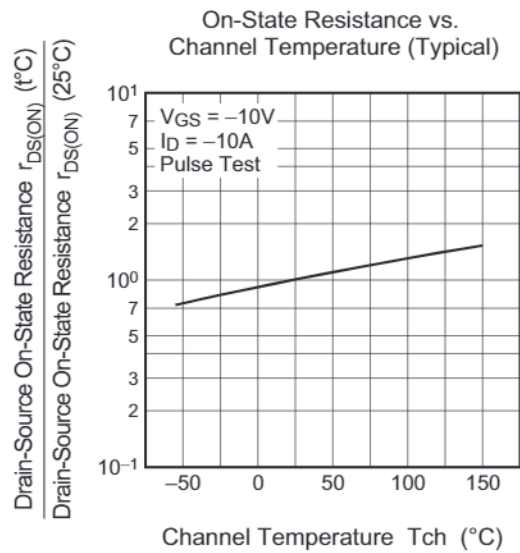


Gate-Source Voltage vs. Gate Charge (Typical)

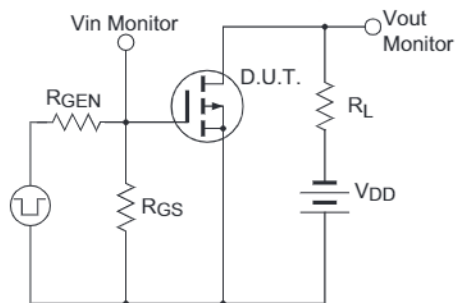


Source-Drain Diode Forward Characteristics (Typical)

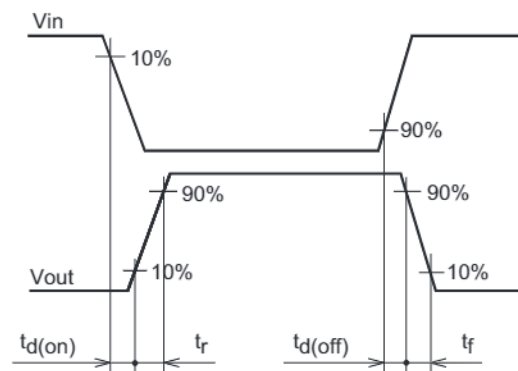




Switching Time Measurement Circuit



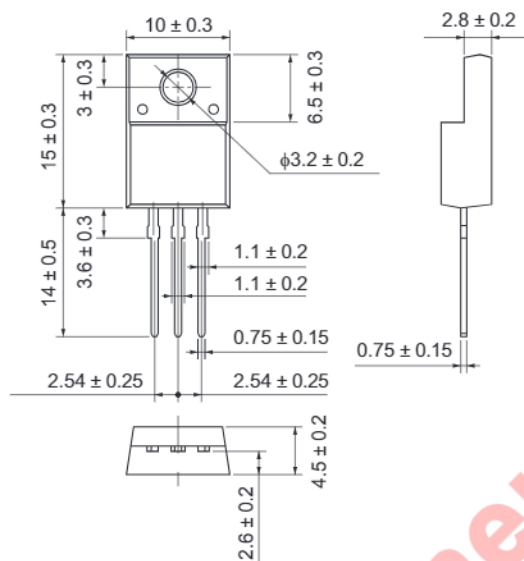
Switching Waveform



Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
TO-220FN	—	PRSS0003AB-A	—	2.0g

Unit: mm



Order Code

Lead form	Standard packing	Quantity	Standard order code	Standard order code example
Straight type	Plastic Magazine (Tube)	50	Type name	FX20KMJ-3
Lead form	Plastic Magazine (Tube)	50	Type name – Lead forming code	FX20KMJ-3-A8

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

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