

To all our customers

Regarding the change of names mentioned in the document, such as Mitsubishi Electric and Mitsubishi XX, to Renesas Technology Corp.

The semiconductor operations of Hitachi and Mitsubishi Electric were transferred to Renesas Technology Corporation on April 1st 2003. These operations include microcomputer, logic, analog and discrete devices, and memory chips other than DRAMs (flash memory, SRAMs etc.) Accordingly, although Mitsubishi Electric, Mitsubishi Electric Corporation, Mitsubishi Semiconductors, and other Mitsubishi brand names are mentioned in the document, these names have in fact all been changed to Renesas Technology Corp. Thank you for your understanding. Except for our corporate trademark, logo and corporate statement, no changes whatsoever have been made to the contents of the document, and these changes do not constitute any alteration to the contents of the document itself.

Note : Mitsubishi Electric will continue the business operations of high frequency & optical devices and power devices.

Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

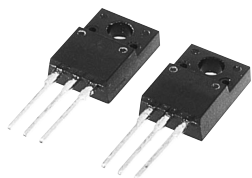
PRELIMINARY
 Notice: This is not a final specification.
 Some parametric limits are subject to change.

MITSUBISHI Pch POWER MOSFET

FX20KMJ-06

HIGH-SPEED SWITCHING USE

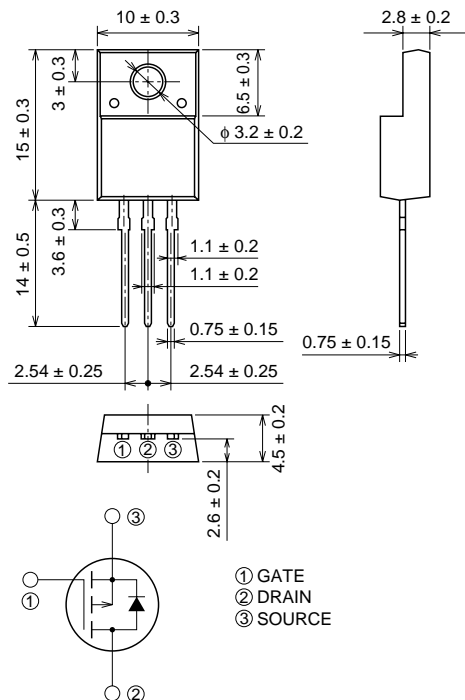
FX20KMJ-06



- 4V DRIVE
- V_{DS} -60V
- $r_{DS(ON)}(MAX)$ 97m Ω
- I_D -20A
- Integrated Fast Recovery Diode (TYP.) 50ns
- V_{iso} 2000V

OUTLINE DRAWING

Dimensions in mm



TO-220FN

APPLICATION

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

MAXIMUM RATINGS (Tc = 25°C)

Symbol	Parameter	Conditions	Ratings	Unit
V_{DS}	Drain-source voltage	$V_{GS} = 0V$	-60	V
V_{GSS}	Gate-source voltage	$V_{DS} = 0V$	±20	V
I_D	Drain current		-20	A
I_{DM}	Drain current (Pulsed)		-80	A
I_{DA}	Avalanche drain current (Pulsed)	$L = 100\mu H$	-20	A
I_S	Source current		-20	A
I_{SM}	Source current (Pulsed)		-80	A
P_D	Maximum power dissipation		25	W
T_{ch}	Channel temperature		-55 ~ +150	°C
T_{stg}	Storage temperature		-55 ~ +150	°C
V_{iso}	Isolation voltage	AC for 1minute, Terminal to case	2000	V
—	Weight	Typical value	2.0	g

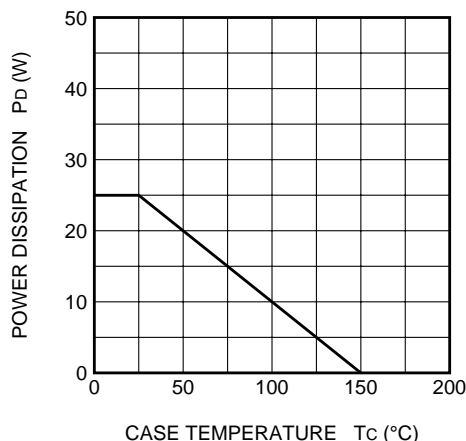
Jan.1999

ELECTRICAL CHARACTERISTICS ($T_{ch} = 25^{\circ}\text{C}$)

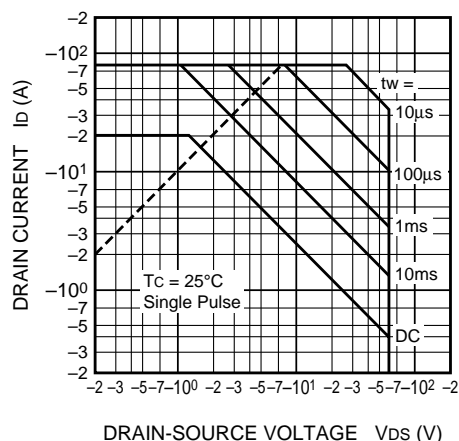
Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
$V_{(BR)DSS}$	Drain-source breakdown voltage	$I_D = -1\text{mA}$, $V_{GS} = 0\text{V}$	-60	—	—	V
I_{GSS}	Gate-source leakage current	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$	—	—	± 0.1	μA
I_{DSS}	Drain-source leakage current	$V_{DS} = -60\text{V}$, $V_{GS} = 0\text{V}$	—	—	-0.1	mA
$V_{GS(th)}$	Gate-source threshold voltage	$I_D = -1\text{mA}$, $V_{DS} = -10\text{V}$	-1.3	-1.8	-2.3	V
$r_{DS(on)}$	Drain-source on-state resistance	$I_D = -10\text{A}$, $V_{GS} = -10\text{V}$	—	73	97	$\text{m}\Omega$
$r_{DS(on)}$	Drain-source on-state resistance	$I_D = -10\text{A}$, $V_{GS} = -4\text{V}$	—	119	166	$\text{m}\Omega$
$V_{DS(on)}$	Drain-source on-state voltage	$I_D = -10\text{A}$, $V_{GS} = -10\text{V}$	—	-0.73	-0.97	V
$ y_{fs} $	Forward transfer admittance	$I_D = -10\text{A}$, $V_{DS} = -10\text{V}$	—	10.9	—	S
C_{iss}	Input capacitance	$V_{DS} = -10\text{V}$, $V_{GS} = 0\text{V}$, $f = 1\text{MHz}$	—	2370	—	pF
C_{oss}	Output capacitance		—	306	—	pF
C_{rss}	Reverse transfer capacitance		—	147	—	pF
$t_d(on)$	Turn-on delay time	$V_{DD} = -30\text{V}$, $I_D = -10\text{A}$, $V_{GS} = -10\text{V}$, $R_{GEN} = R_{GS} = 50\Omega$	—	15	—	ns
t_r	Rise time		—	37	—	ns
$t_d(off)$	Turn-off delay time		—	131	—	ns
t_f	Fall time		—	72	—	ns
V_{SD}	Source-drain voltage	$I_S = -10\text{A}$, $V_{GS} = 0\text{V}$	—	-1.0	-1.5	V
$R_{th(ch-c)}$	Thermal resistance	Channel to case	—	—	5.00	$^{\circ}\text{C/W}$
t_{rr}	Reverse recovery time	$I_S = -20\text{A}$, $dis/dt = 100\text{A}/\mu\text{s}$	—	50	—	ns

PERFORMANCE CURVES

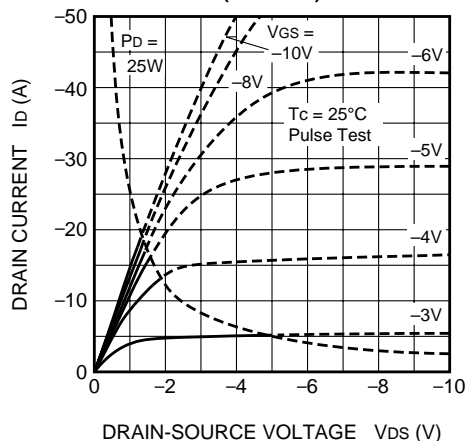
POWER DISSIPATION DERATING CURVE



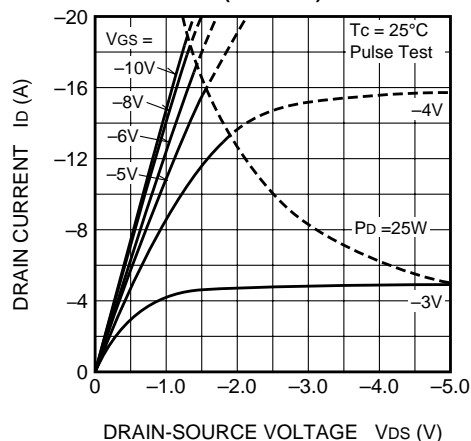
MAXIMUM SAFE OPERATING AREA



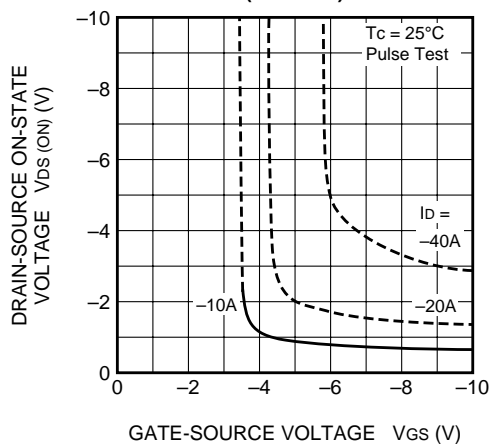
OUTPUT CHARACTERISTICS (TYPICAL)



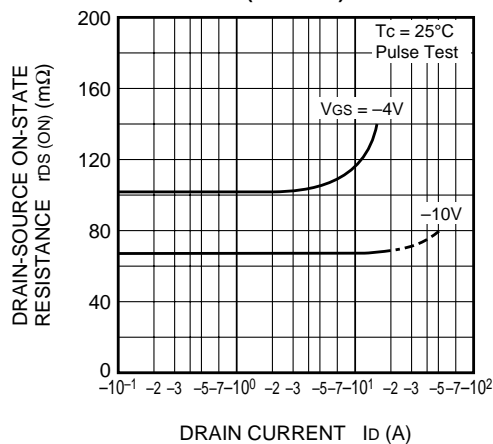
OUTPUT CHARACTERISTICS (TYPICAL)



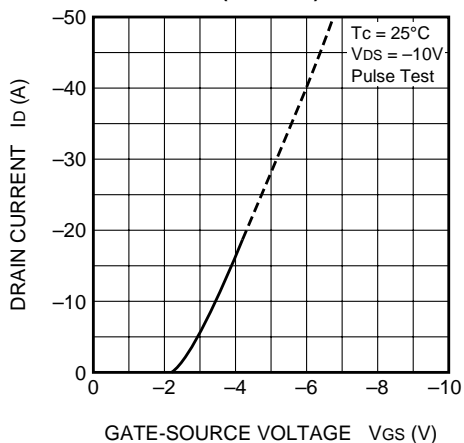
**ON-STATE VOLTAGE VS.
GATE-SOURCE VOLTAGE
(TYPICAL)**



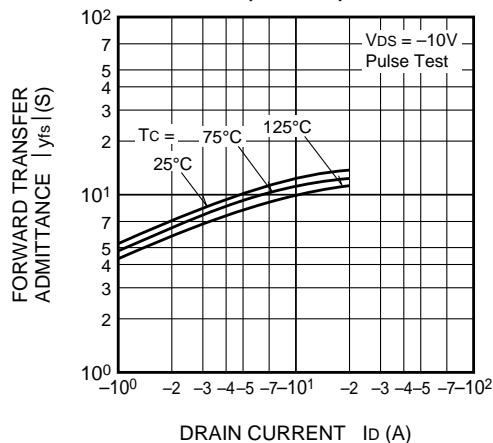
**ON-STATE RESISTANCE VS.
DRAIN CURRENT
(TYPICAL)**



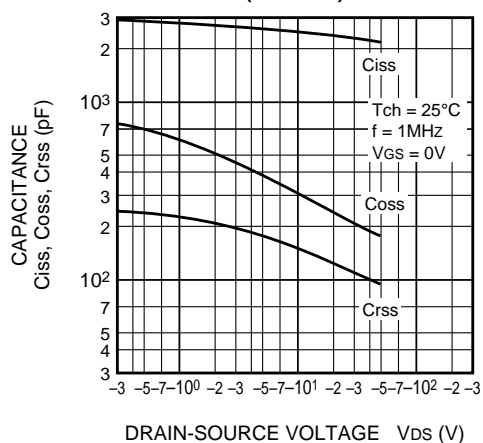
**TRANSFER CHARACTERISTICS
(TYPICAL)**



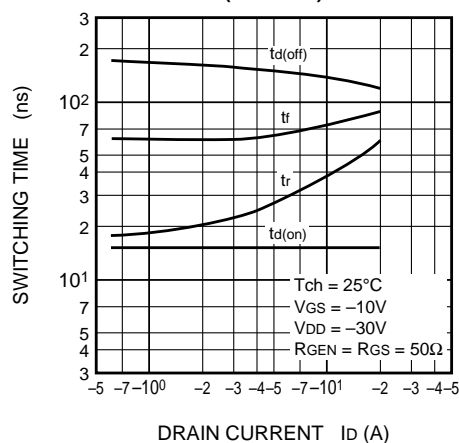
**FORWARD TRANSFER ADMITTANCE
VS.DRAIN CURRENT
(TYPICAL)**



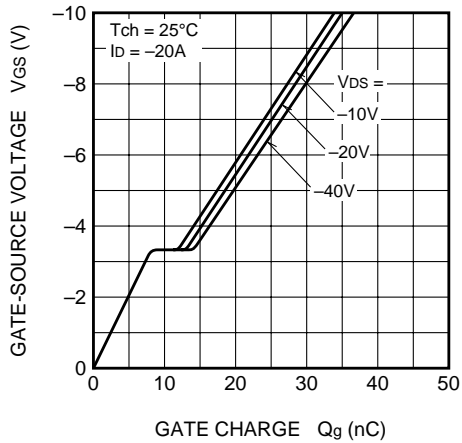
**CAPACITANCE VS.
DRAIN-SOURCE VOLTAGE
(TYPICAL)**



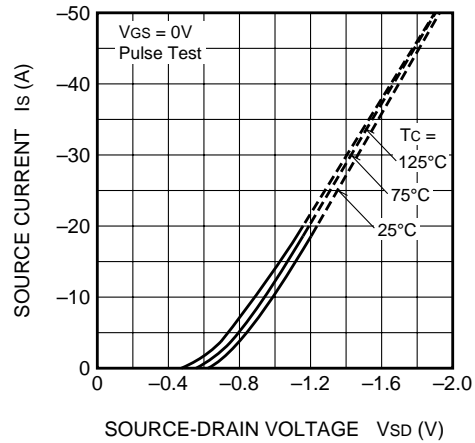
**SWITCHING CHARACTERISTICS
(TYPICAL)**



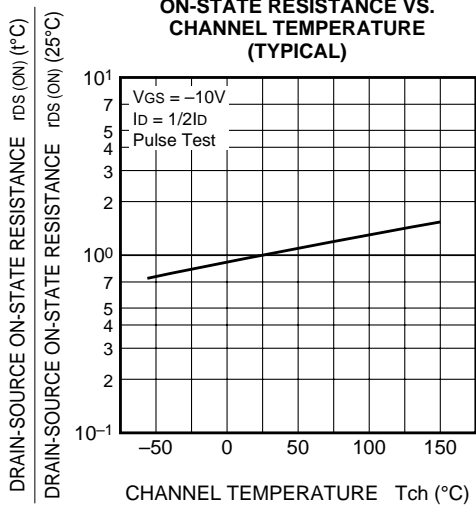
**GATE-SOURCE VOLTAGE
 VS. GATE CHARGE
 (TYPICAL)**



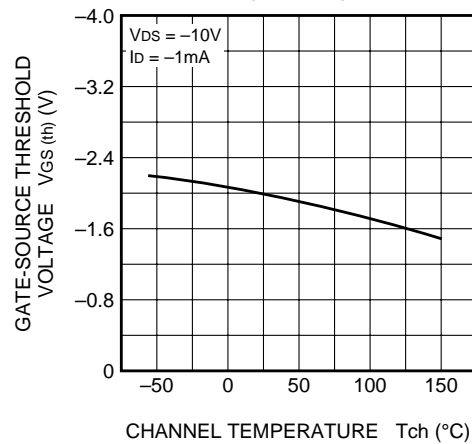
**SOURCE-DRAIN DIODE
 FORWARD CHARACTERISTICS
 (TYPICAL)**



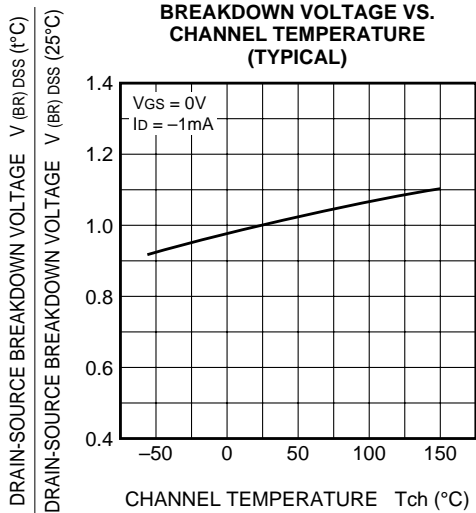
**ON-STATE RESISTANCE VS.
 CHANNEL TEMPERATURE
 (TYPICAL)**



**THRESHOLD VOLTAGE VS.
 CHANNEL TEMPERATURE
 (TYPICAL)**



**BREAKDOWN VOLTAGE VS.
 CHANNEL TEMPERATURE
 (TYPICAL)**



**TRANSIENT THERMAL IMPEDANCE
 CHARACTERISTICS**

