

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

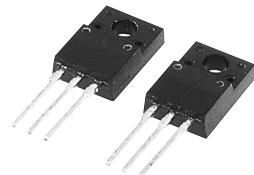
PRELIMINARY
Notice: This is not a final specification.
Some parametric limits are subject to change.

MITSUBISHI Pch POWER MOSFET

FX70K MJ-03

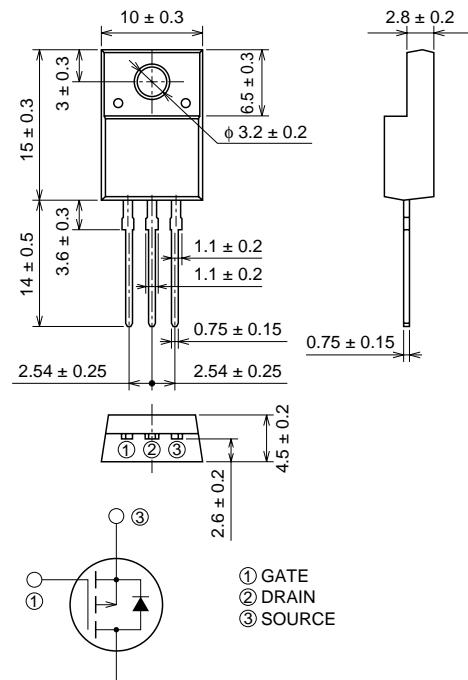
HIGH-SPEED SWITCHING USE

FX70K MJ-03



- 4V DRIVE
- V_{DSS} -30V
- $r_{DS\ (ON)}$ (MAX) 12.3m Ω
- I_D -70A
- Integrated Fast Recovery Diode (TYP.) 70ns
- V_{iso} 2000V

OUTLINE DRAWING



TO-220FN

APPLICATION

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

MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$)

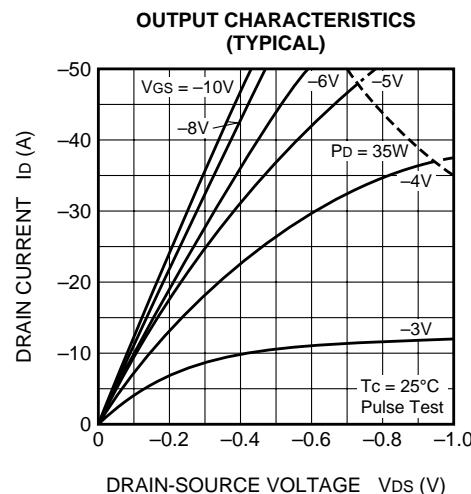
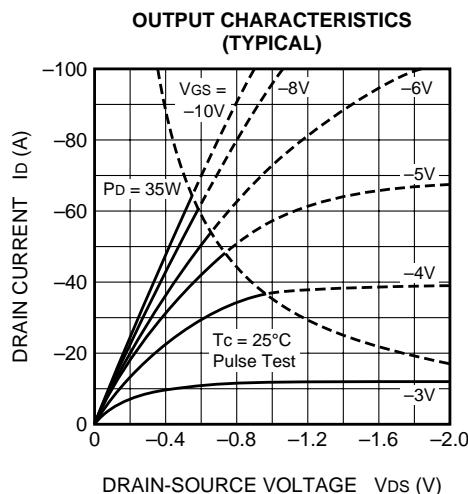
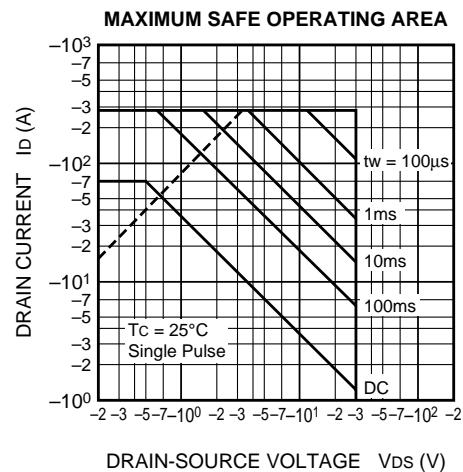
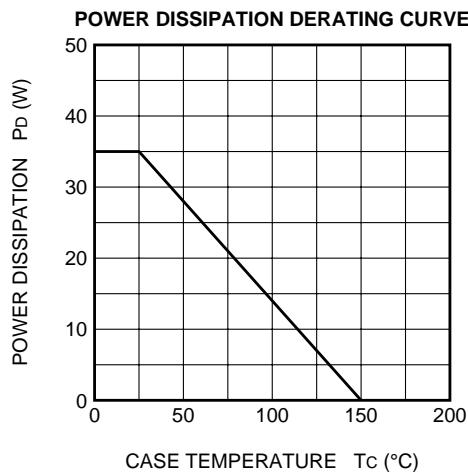
Symbol	Parameter	Conditions	Ratings	Unit
V_{DSS}	Drain-source voltage	$V_{GS} = 0\text{V}$	-30	V
V_{GSS}	Gate-source voltage	$V_{DS} = 0\text{V}$	±20	V
I_D	Drain current		-70	A
I_{DM}	Drain current (Pulsed)		-280	A
I_{DA}	Avalanche drain current (Pulsed)	$L = 10\mu\text{H}$	-70	A
I_S	Source current		-70	A
I_{SM}	Source current (Pulsed)		-280	A
P_D	Maximum power dissipation		35	W
T_{ch}	Channel temperature		-55 ~ +150	°C
T_{stg}	Storage temperature		-55 ~ +150	°C
V_{iso}	Isolation voltage	AC for 1 minute, Terminal to case	2000	V
—	Weight	Typical value	2.0	g

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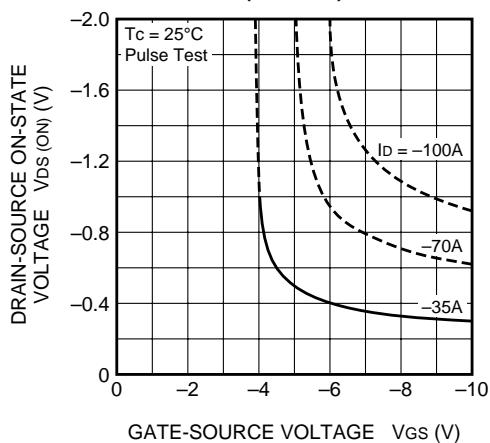
ELECTRICAL CHARACTERISTICS ($T_{ch} = 25^\circ\text{C}$)

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
$V_{(BR)DSS}$	Drain-source breakdown voltage	$Id = -1\text{mA}$, $V_{DS} = 0\text{V}$	-30	—	—	V
IG_{SS}	Gate-source leakage current	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$	—	—	± 0.1	μA
Id_{SS}	Drain-source leakage current	$V_{DS} = -30\text{V}$, $V_{GS} = 0\text{V}$	—	—	-0.1	mA
$V_{GS(\text{th})}$	Gate-source threshold voltage	$Id = -1\text{mA}$, $V_{DS} = -10\text{V}$	-1.3	-1.8	-2.3	V
$r_{DS(\text{ON})}$	Drain-source on-state resistance	$Id = -35\text{A}$, $V_{GS} = -10\text{V}$	—	10.0	12.3	$\text{m}\Omega$
$r_{DS(\text{ON})}$	Drain-source on-state resistance	$Id = -26\text{A}$, $V_{GS} = -4\text{V}$	—	19	25	$\text{m}\Omega$
$V_{DS(\text{ON})}$	Drain-source on-state voltage	$Id = -35\text{A}$, $V_{GS} = -10\text{V}$	—	-0.35	-0.43	V
$ y_{fs} $	Forward transfer admittance	$Id = -35\text{A}$, $V_{DS} = -10\text{V}$	—	55.8	—	S
C_{iss}	Input capacitance	$V_{DS} = -10\text{V}$, $V_{GS} = 0\text{V}$, $f = 1\text{MHz}$	—	11140	—	pF
C_{oss}	Output capacitance		—	2300	—	pF
C_{rss}	Reverse transfer capacitance		—	1000	—	pF
$t_{d(\text{on})}$	Turn-on delay time		—	85	—	ns
t_r	Rise time	$V_{DD} = -15\text{V}$, $Id = -35\text{A}$, $V_{GS} = -10\text{V}$, $R_{GEN} = R_{GS} = 50\Omega$	—	228	—	ns
$t_{d(\text{off})}$	Turn-off delay time		—	751	—	ns
t_f	Fall time		—	360	—	ns
V_{SD}	Source-drain voltage	$Is = -35\text{A}$, $V_{GS} = 0\text{V}$	—	-1.0	-1.5	V
$R_{th(\text{ch-c})}$	Thermal resistance	Channel to case	—	—	3.57	$^\circ\text{C}/\text{W}$
t_{rr}	Reverse recovery time	$Is = -35\text{A}$, $\text{d}i/\text{d}t = 50\text{A}/\mu\text{s}$	—	70	—	ns

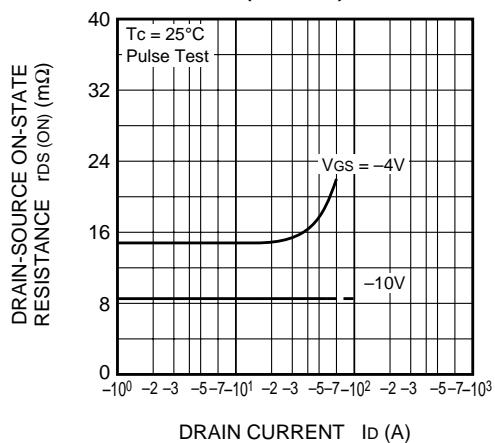
PERFORMANCE CURVES



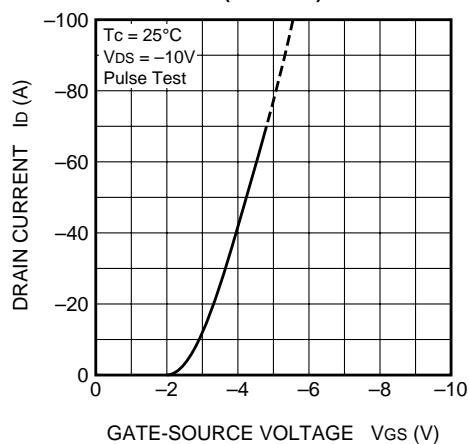
**ON-STATE VOLTAGE VS.
GATE-SOURCE VOLTAGE
(TYPICAL)**



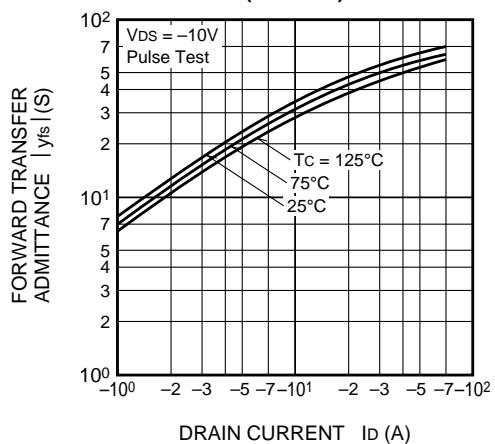
**ON-STATE RESISTANCE VS.
DRAIN CURRENT
(TYPICAL)**



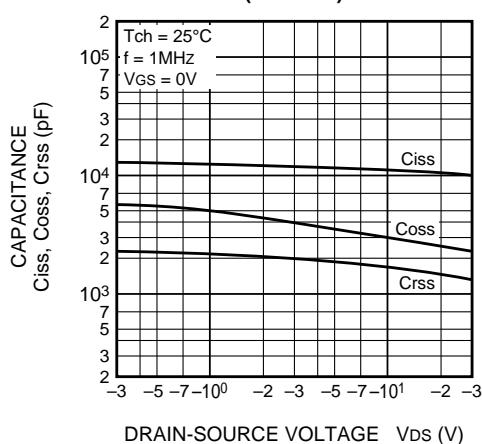
**TRANSFER CHARACTERISTICS
(TYPICAL)**



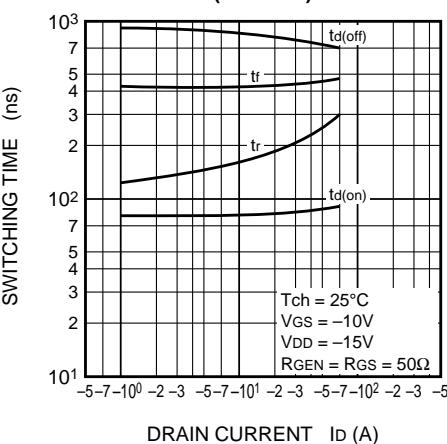
**FORWARD TRANSFER ADMITTANCE
VS.DRAIN CURRENT
(TYPICAL)**



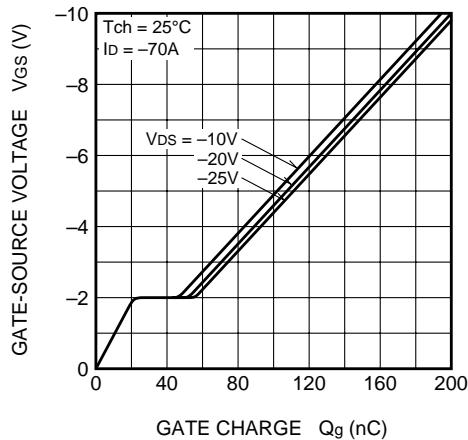
**CAPACITANCE VS.
DRAIN-SOURCE VOLTAGE
(TYPICAL)**



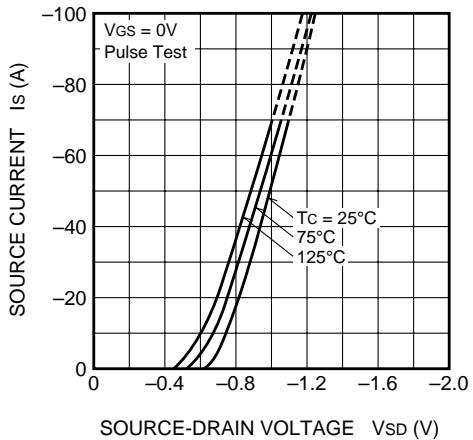
**SWITCHING CHARACTERISTICS
(TYPICAL)**



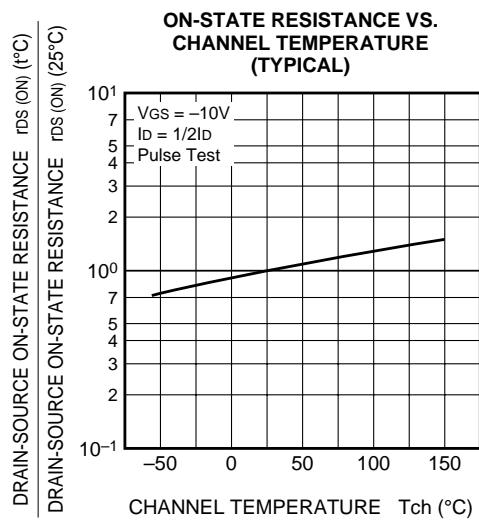
**GATE-SOURCE VOLTAGE
VS.GATE CHARGE
(TYPICAL)**



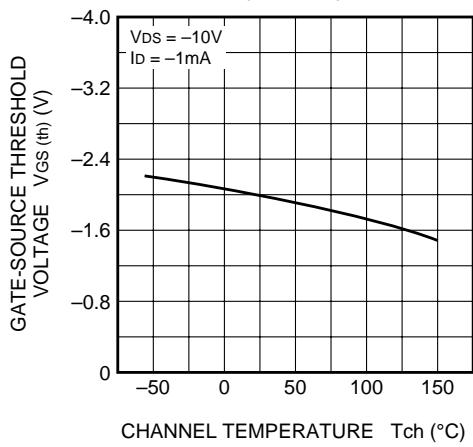
**SOURCE-DRAIN DIODE
FORWARD CHARACTERISTICS
(TYPICAL)**



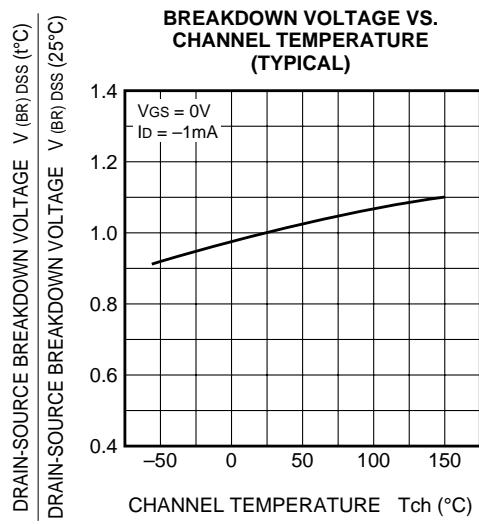
**ON-STATE RESISTANCE VS.
CHANNEL TEMPERATURE
(TYPICAL)**



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



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



**TRANSIENT THERMAL IMPEDANCE
CHARACTERISTICS**

