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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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FX6KMJ-3

High-Speed Switching Use
Pch Power MOS FET

REJ03G0263-0100

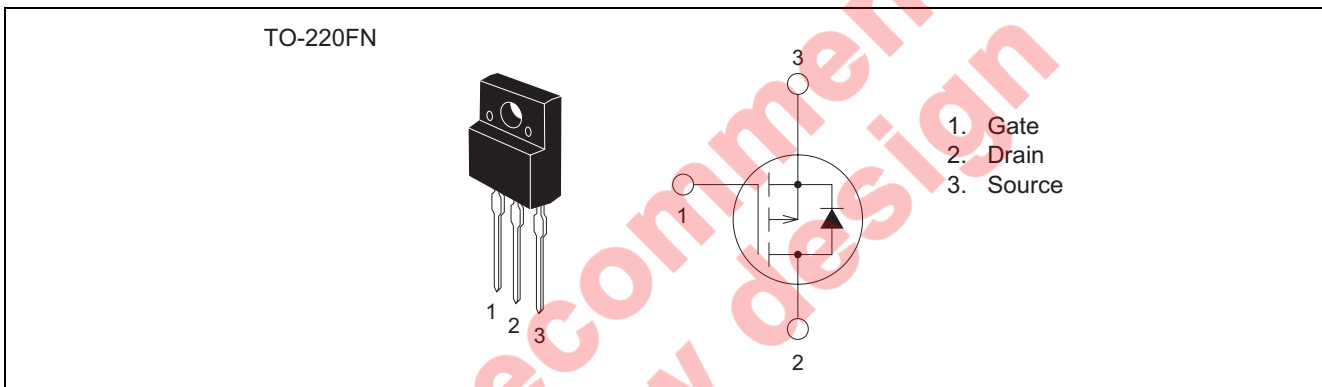
Rev.1.00

Aug.20.2004

Features

- Drive voltage : 4 V
- V_{DSS} : -150 V
- $r_{DS(ON) (max)}$: 0.53 Ω
- I_D : -6 A
- Recovery Time of the Integrated Fast Recovery Diode (TYP.) : 100 ns

Outline



Applications

Motor control, lamp control, solenoid control, DC-DC converters, etc.

Maximum Ratings

($T_c = 25^\circ\text{C}$)

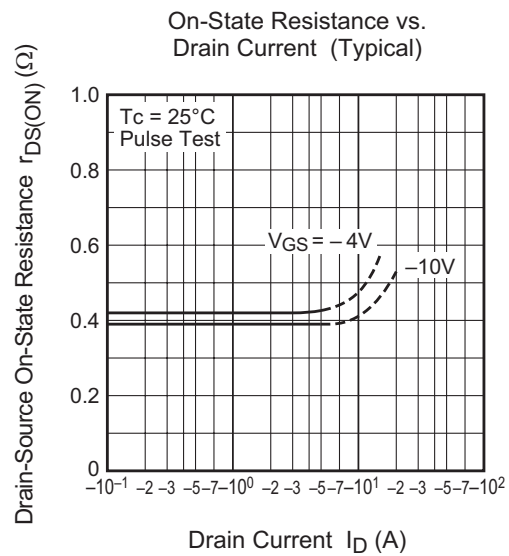
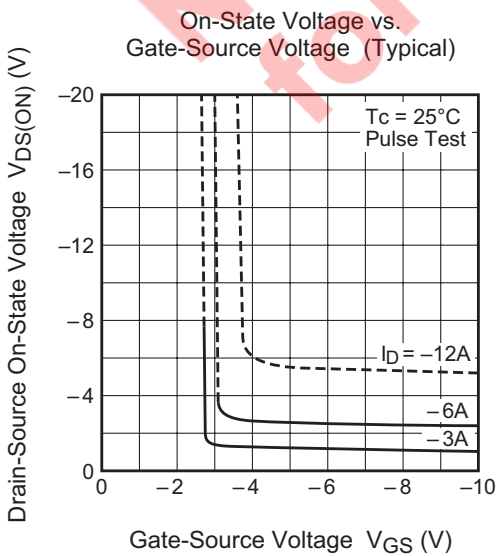
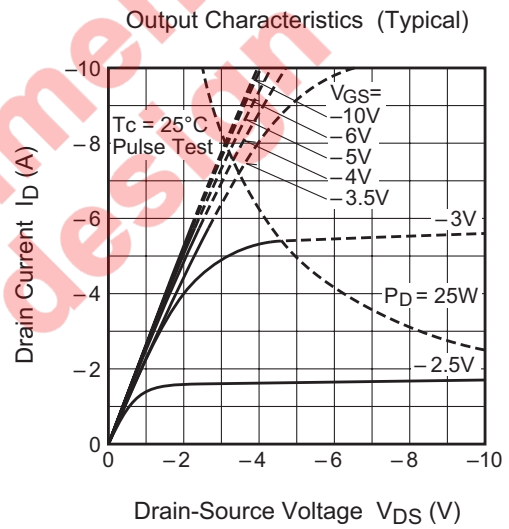
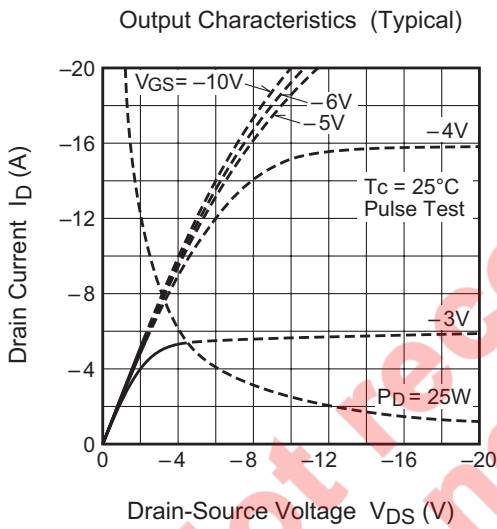
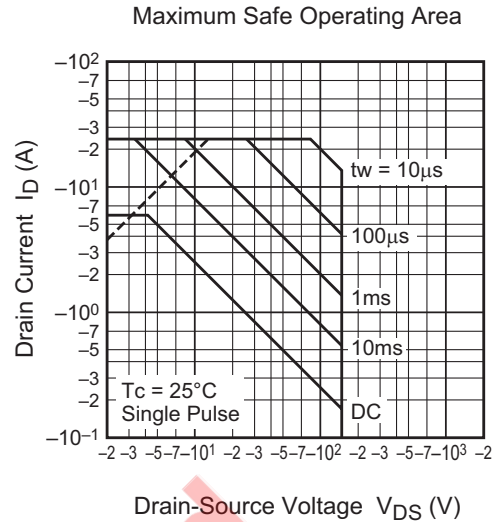
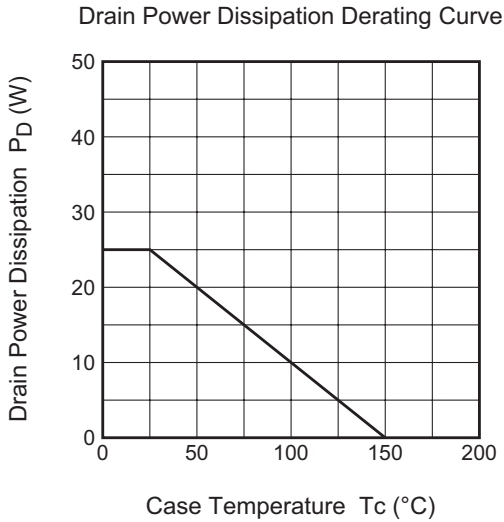
Parameter	Symbol	Rated	Unit	Conditions
Drain-source voltage	V_{DSS}	-150	V	$V_{GS} = 0\text{ V}$
Gate-source voltage	V_{GSS}	± 20	V	$V_{DS} = 0\text{ V}$
Drain current	I_D	-6	A	
Drain current (Pulsed)	I_{DM}	-24	A	
Avalanche current (Pulsed)	I_{DA}	-6	A	$L = 100\ \mu\text{H}$
Source current	I_S	-6	A	
Source current (Pulsed)	I_{SM}	-24	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 1 minute, Terminal to case
Mass	—	2.0	g	Typical value

Electrical Characteristics

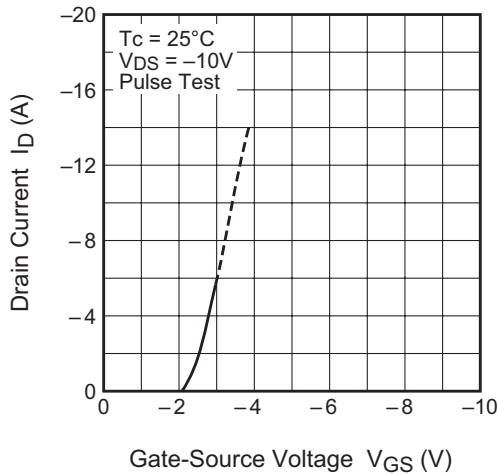
(T_{ch} = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test conditions
Drain-source breakdown voltage	V _{(BR)DSS}	-150	—	—	V	I _D = -1 mA, V _{GS} = 0 V
Gate-source leakage current	I _{GSS}	—	—	±0.1	μA	V _{GS} = ±20 V, V _{DS} = 0 V
Drain-source leakage current	I _{DSS}	—	—	-0.1	mA	V _{DS} = -150 V, V _{GS} = 0 V
Gate-source threshold voltage	V _{GS(th)}	-1.0	-1.5	-2.0	V	I _D = -1 mA, V _{DS} = -10 V
Drain-source on-state resistance	r _{DS(ON)}	—	0.41	0.53	Ω	I _D = -3 A, V _{GS} = -10 V
Drain-source on-state resistance	r _{DS(ON)}	—	0.45	0.59	Ω	I _D = -3 A, V _{GS} = -4 V
Drain-source on-state voltage	V _{DS(ON)}	—	-1.23	-1.59	V	I _D = -3 A, V _{GS} = -10 V
Forward transfer admittance	y _{fs}	—	7.9	—	S	I _D = -3 A, V _{DS} = -10 V
Input capacitance	C _{iss}	—	2420	—	pF	V _{DS} = -10 V, V _{GS} = 0 V, f = 1MHz
Output capacitance	C _{oss}	—	152	—	pF	
Reverse transfer capacitance	C _{rss}	—	69	—	pF	
Turn-on delay time	t _{d(on)}	—	14	—	ns	V _{DD} = -80 V, I _D = -3 A, V _{GS} = -10 V, R _{GEN} = R _{GS} = 50 Ω
Rise time	t _r	—	18	—	ns	
Turn-off delay time	t _{d(off)}	—	156	—	ns	
Fall time	t _f	—	58	—	ns	
Source-drain voltage	V _{SD}	—	-1.0	-1.5	V	I _S = -3 A, V _{GS} = 0 V
Thermal resistance	R _{th(ch-c)}	—	—	5.00	°C/W	Channel to case
Reverse recovery time	t _{rr}	—	100	—	ns	I _S = -6 A, dis/dt = 100 A/μs

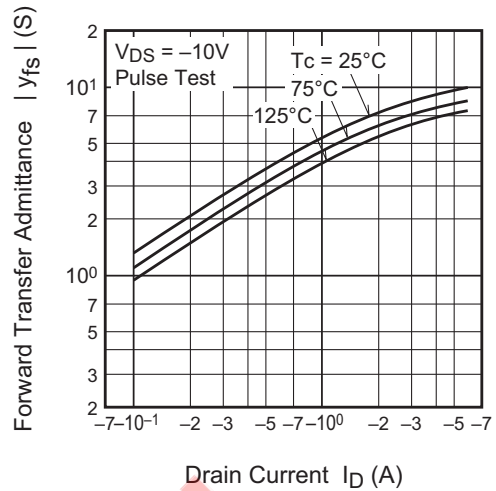
Performance Curves



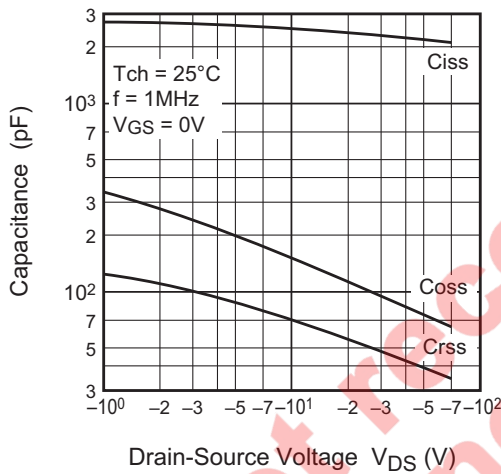
Transfer Characteristics (Typical)



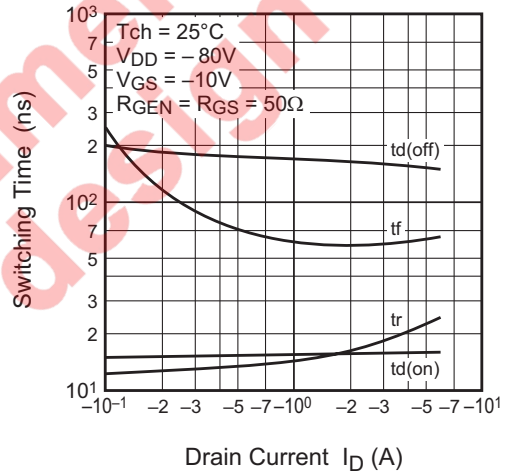
Forward Transfer Admittance vs. Drain Current (Typical)



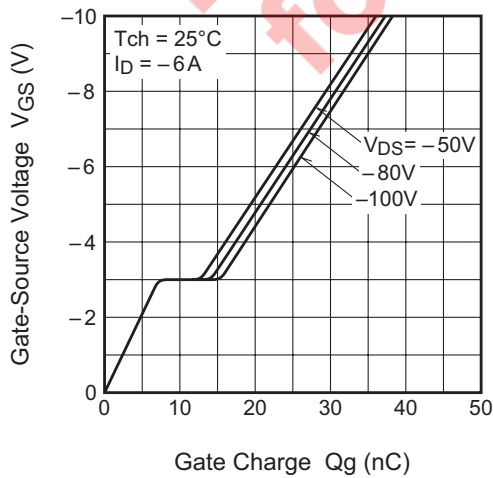
Capacitance vs. Drain-Source Voltage (Typical)



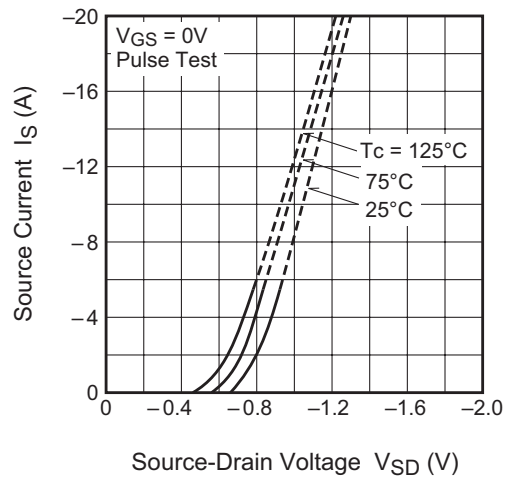
Switching Characteristics (Typical)

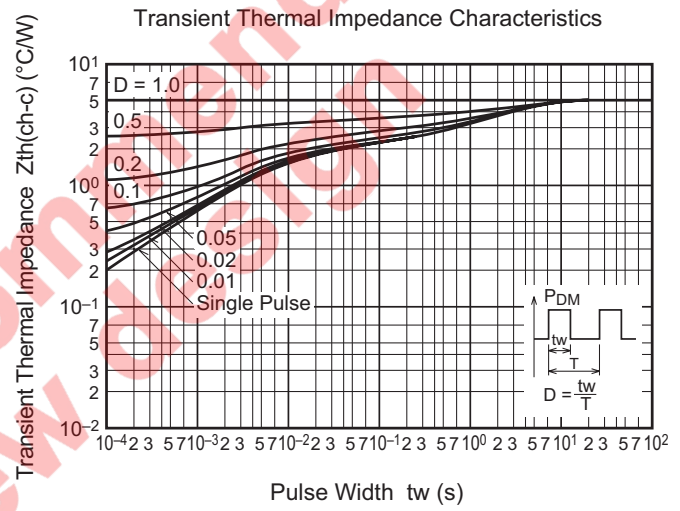
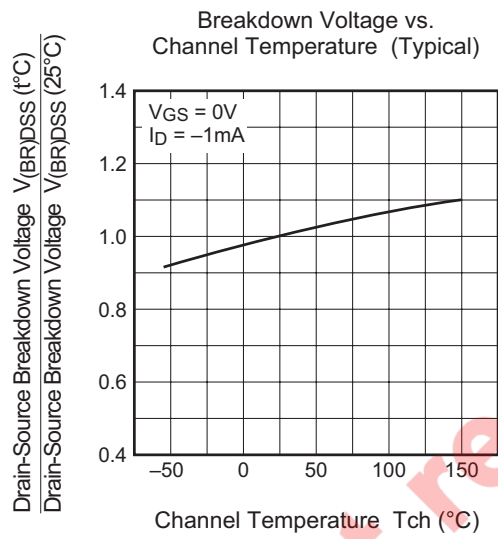
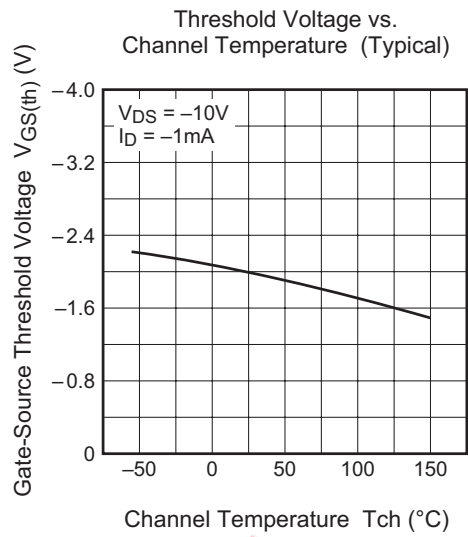
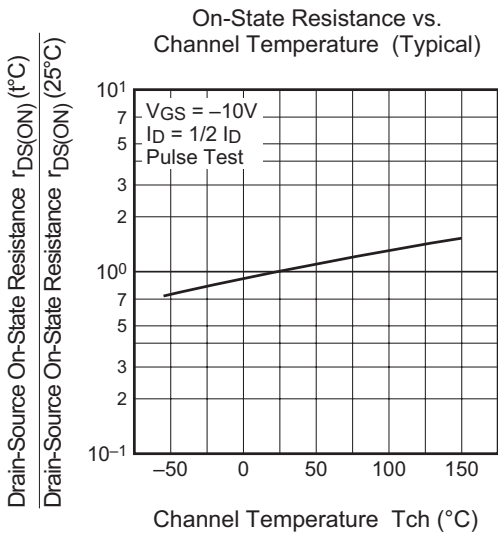


Gate-Source Voltage vs. Gate Charge (Typical)

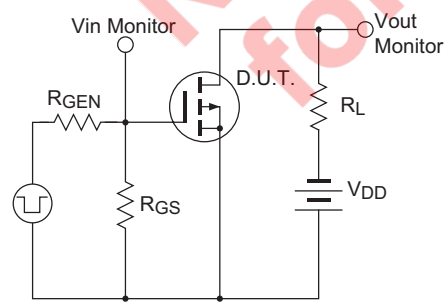


Source-Drain Diode Forward Characteristics (Typical)

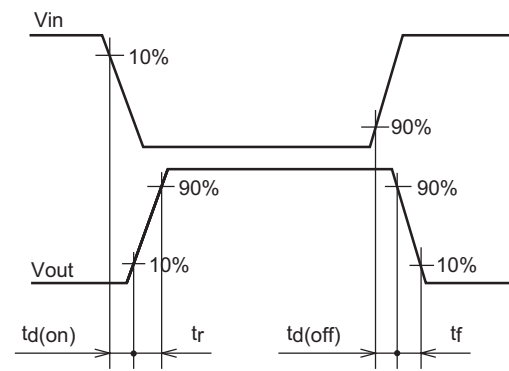




Switching Time Measurement Circuit



Switching Waveform



Package Dimensions

TO-220FN

EIAJ Package Code	JEDEC Code	Mass (g) (reference value)	Lead Material
—	—	2.0	Cu alloy

Technical drawings showing dimensions for the TO-220FN package. Dimensions include: 10 ± 0.3, 15 ± 0.3, 3 ± 0.3, 6.5 ± 0.3, φ 3.2 ± 0.2, 14 ± 0.5, 3.6 ± 0.3, 1.1 ± 0.2, 0.75 ± 0.15, 2.54 ± 0.25, 2.8 ± 0.2, 0.75 ± 0.15, 4.5 ± 0.2, and 2.6 ± 0.2. A 3D perspective view of the package is also shown.

Note 1) The dimensional figures indicate representative values unless otherwise the tolerance is specified.

Symbol	Dimension in Millimeters		
	Min	Typ	Max
A	—	—	—
A ₁	—	—	—
A ₂	—	—	—
b	—	—	—
D	—	—	—
E	—	—	—
e	—	—	—
x	—	—	—
y	—	—	—
y ₁	—	—	—
ZD	—	—	—
ZE	—	—	—

Order Code

Lead form	Standard packing	Quantity	Standard order code	Standard order code example
Straight type	Plastic Magazine (Tube)	50	Type name	FX6KMJ-3
Lead form	Plastic Magazine (Tube)	50	Type name – Lead forming code	FX6KMJ-3-A8

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

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