

FS70UMJ-06F

High-Speed Switching Use
Nch Power MOS FET

REJ03G0250-0100

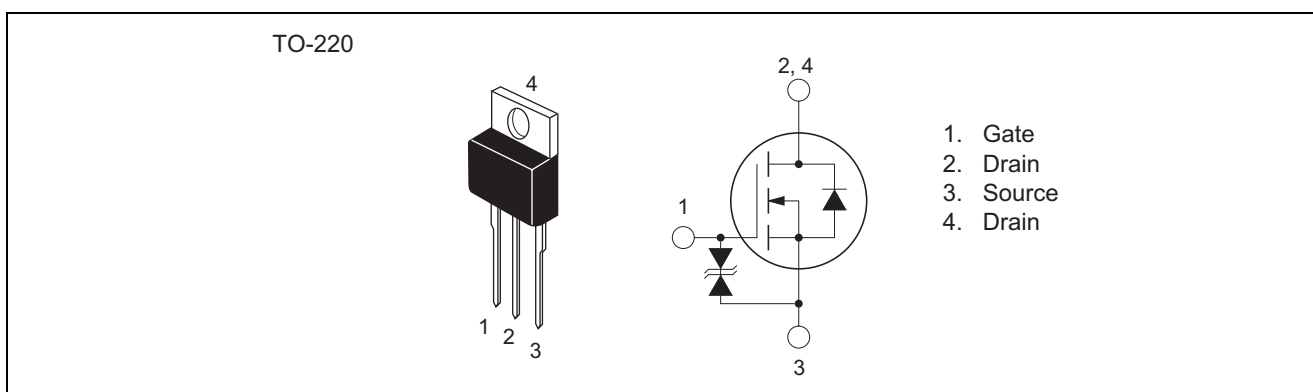
Rev.1.00

Aug.20.2004

Features

- Drive voltage : 4 V
- V_{DSS} : 60 V
- $r_{DS(ON) (max)}$: 7.0 m Ω
- I_D : 70 A
- Recovery Time of the Integrated Fast Recovery Diode (TYP.) : 70 ns

Outline



Applications

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

Maximum Ratings

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

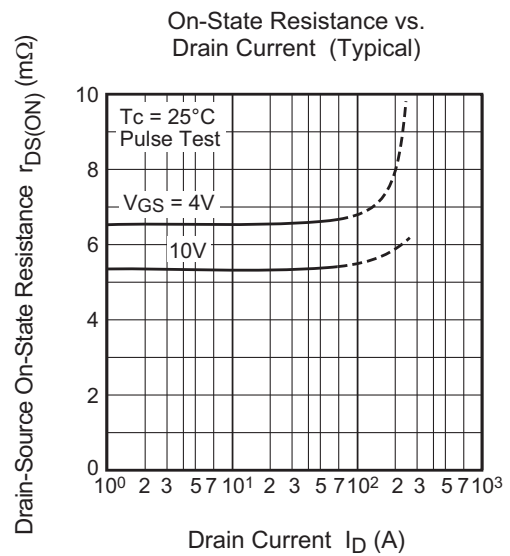
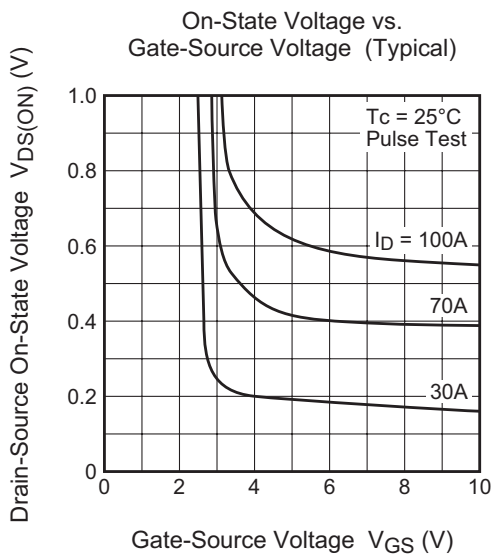
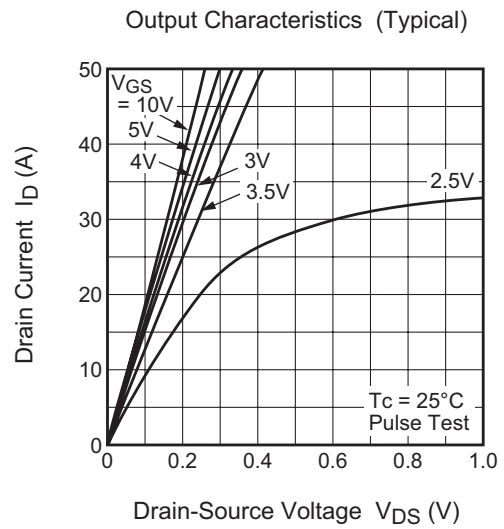
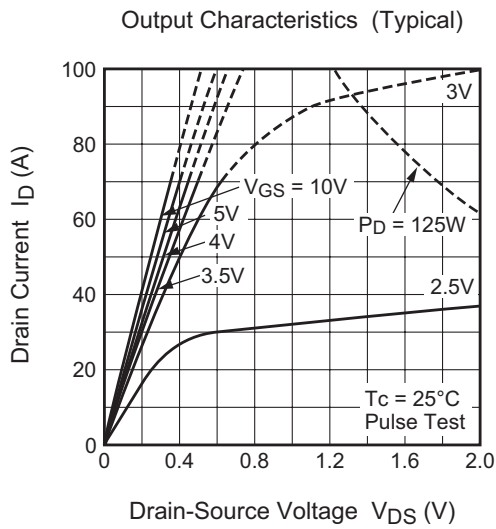
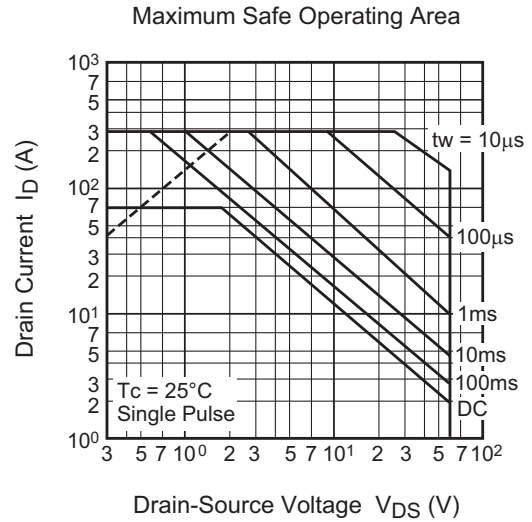
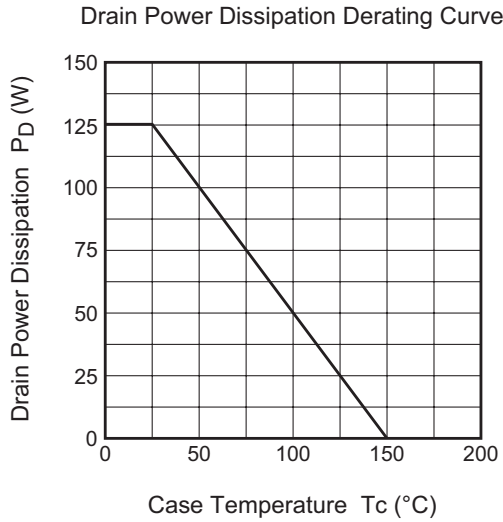
Parameter	Symbol	Ratings	Unit	Conditions
Drain-source voltage	V_{DSS}	60	V	$V_{GS} = 0\text{ V}$
Gate-source voltage	V_{GSS}	± 20	V	$V_{DS} = 0\text{ V}$
Drain current	I_D	70	A	
Drain current (Pulsed)	I_{DM}	280	A	
Avalanche current (Pulsed)	I_{DA}	70	A	$L = 10\ \mu\text{H}$
Source current	I_S	70	A	
Source current (Pulsed)	I_{SM}	280	A	
Maximum power dissipation	P_D	125	W	
Channel temperature	T_{ch}	- 55 to +150	$^\circ\text{C}$	
Storage temperature	T_{stg}	- 55 to +150	$^\circ\text{C}$	
Mass	—	2.0	g	Typical value

Electrical Characteristics

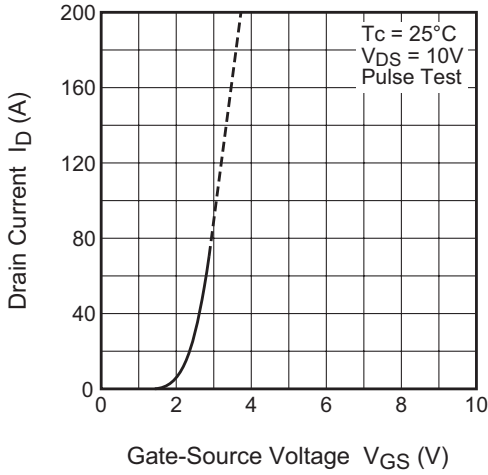
(Tch = 25°C)

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 breakdown voltage	$V_{(BR)GSS}$	± 20	—	—	V	$I_G = \pm 100 \text{ }\mu\text{A}$, $V_{DS} = 0 \text{ V}$
Drain-source leakage current	I_{DSS}	—	—	100	μA	$V_{DS} = 60 \text{ V}$, $V_{GS} = 0 \text{ V}$
Gate-source leakage current	I_{GSS}	—	—	± 10	μA	$V_{GS} = \pm 20 \text{ V}$, $V_{DS} = 0 \text{ V}$
Gate-source threshold voltage	$V_{GS(th)}$	1.0	1.5	2.0	V	$I_D = 1 \text{ mA}$, $V_{DS} = 10 \text{ V}$
Drain-source on-state resistance	$r_{DS(ON)}$	—	5.5	7.0	m Ω	$I_D = 35 \text{ A}$, $V_{GS} = 10 \text{ V}$
Drain-source on-state resistance	$r_{DS(ON)}$	—	6.6	8.3	m Ω	$I_D = 35 \text{ A}$, $V_{GS} = 4 \text{ V}$
Drain-source on-state voltage	$V_{DS(ON)}$	—	0.19	0.25	V	$I_D = 35 \text{ A}$, $V_{GS} = 10 \text{ V}$
Forward transfer admittance	$ y_{fs} $	—	110	—	S	$I_D = 35 \text{ A}$, $V_{DS} = 10 \text{ V}$
Input capacitance	C_{iss}	—	8500	—	pF	$V_{DS} = 10 \text{ V}$, $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$
Output capacitance	C_{oss}	—	1300	—	pF	
Reverse transfer capacitance	C_{rss}	—	720	—	pF	
Turn-on delay time	$t_{d(on)}$	—	42	—	ns	$V_{DD} = 30 \text{ V}$, $I_D = 35 \text{ A}$, $V_{GS} = 10 \text{ V}$, $R_{GEN} = R_{GS} = 50 \text{ }\Omega$
Rise time	t_r	—	130	—	ns	
Turn-off delay time	$t_{d(off)}$	—	800	—	ns	
Fall time	t_f	—	330	—	ns	
Source-drain voltage	V_{SD}	—	1.0	1.5	V	$I_S = 35 \text{ A}$, $V_{GS} = 0 \text{ V}$
Thermal resistance	$R_{th(ch-c)}$	—	—	1.0	$^{\circ}\text{C/W}$	Channel to case
Reverse recovery time	t_{rr}	—	70	—	ns	$I_S = 70 \text{ A}$, $dis/dt = -100 \text{ A}/\mu\text{s}$

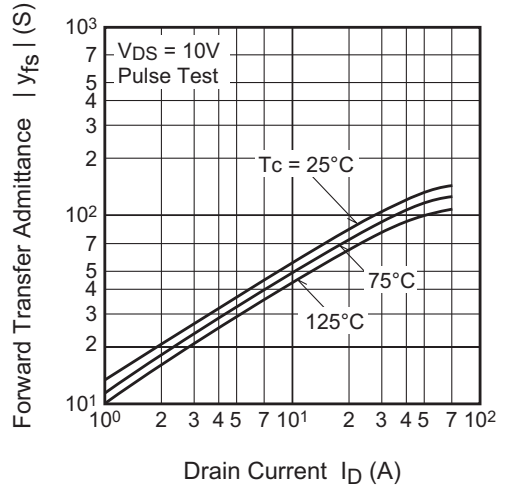
Performance Curves



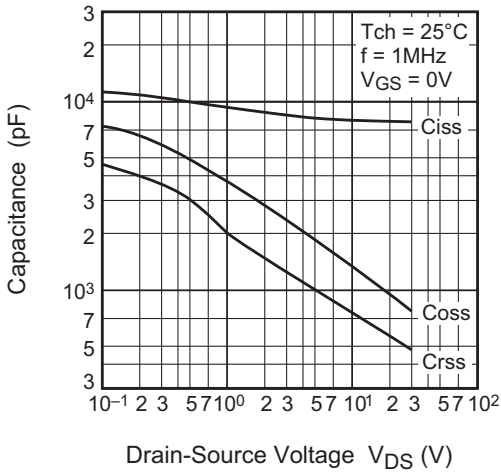
Transfer Characteristics (Typical)



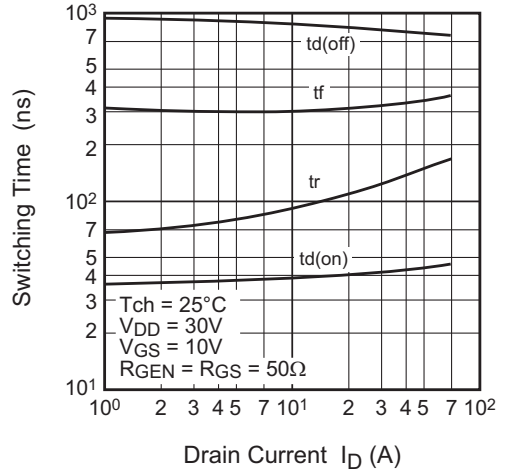
Forward Transfer Admittance vs. Drain Current (Typical)



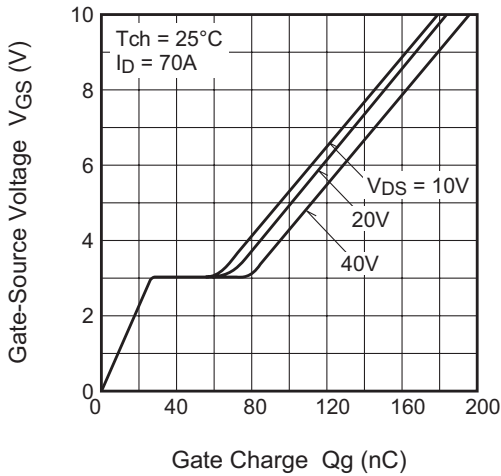
Capacitance vs. Drain-Source Voltage (Typical)



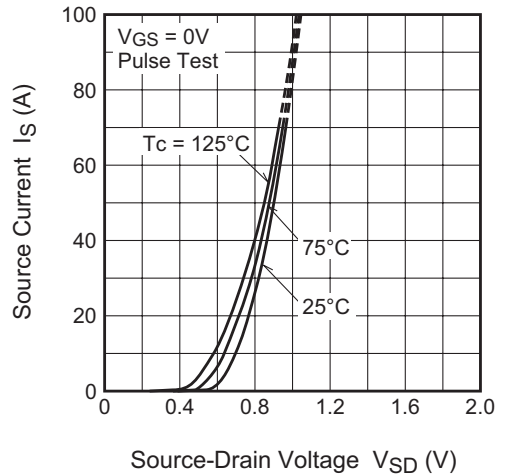
Switching Characteristics (Typical)

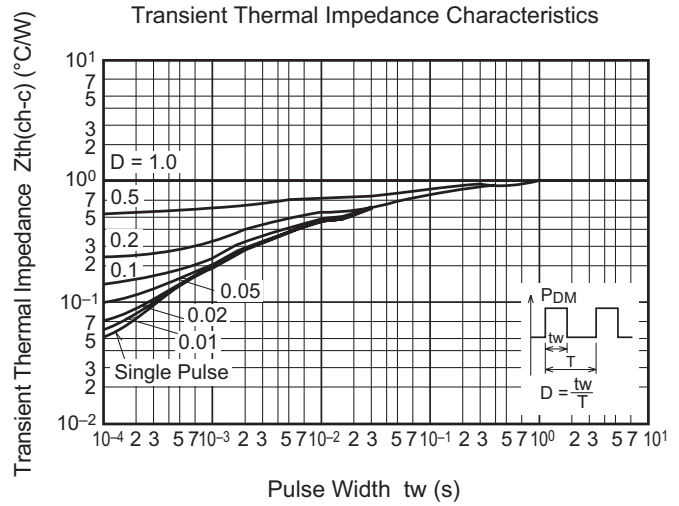
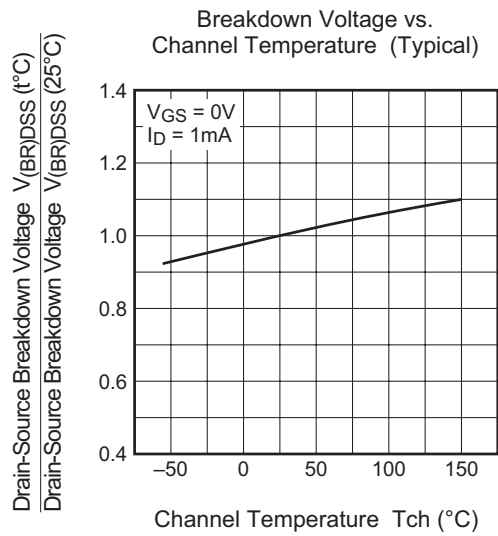
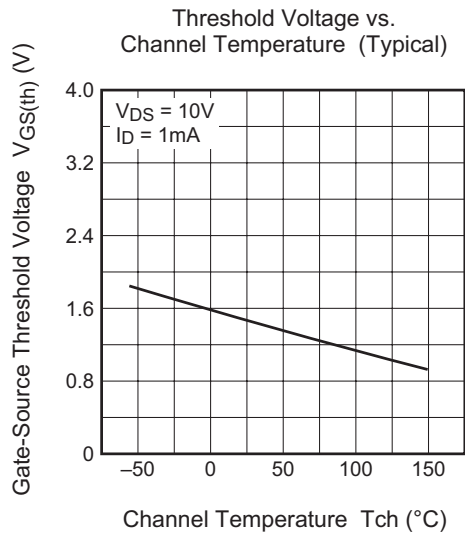
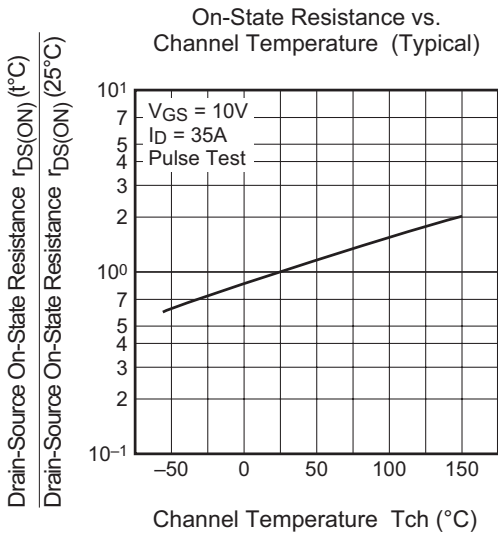


Gate-Source Voltage vs. Gate Charge (Typical)

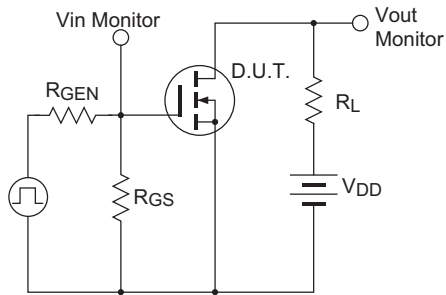


Source-Drain Diode Forward Characteristics (Typical)

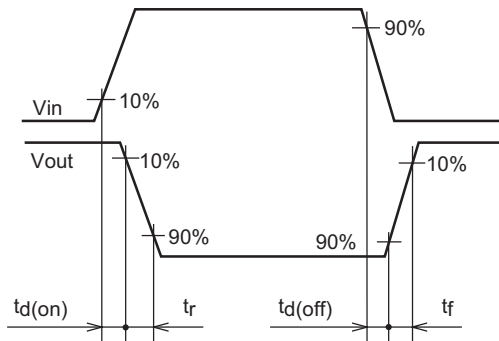




Switching Time Measurement Circuit



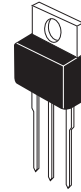
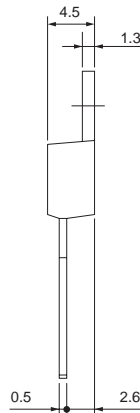
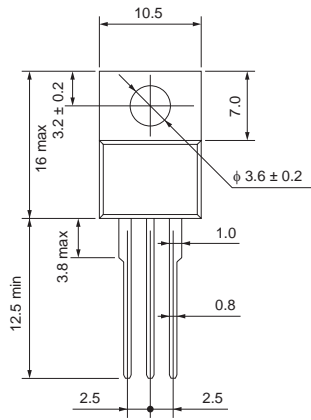
Switching Waveform



Package Dimensions

TO-220

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



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	Static electricity prevention bag	100	Type name	FS70UMJ-06F
Lead form	Plastic Magazine (Tube)	50	Type name – Lead forming code	FS70UMJ-06F-A8

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

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