FX20VSJ-3

High-Speed Switching Use
Pch Power MOS FET

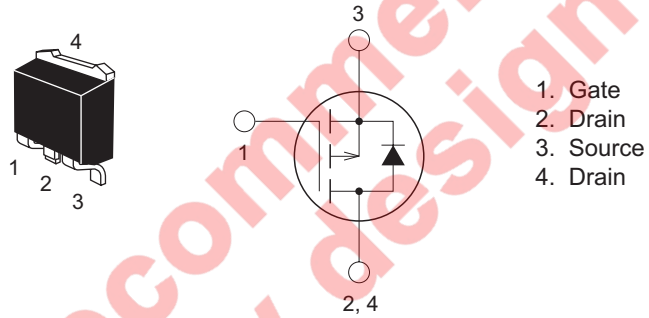
REJ03G0273-0100
Rev.1.00
Aug.20.2004

Features

- Drive voltage : 4 V
- V_{DSS} : – 150 V
- $r_{DS(ON)\ (max)}$: 0.29 Ω
- I_D : – 20 A
- Recovery Time of the Integrated Fast Recovery Diode (TYP.) : 100 ns

Outline

TO-220S



Applications

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

Maximum Ratings

(Tc = 25°C)

Parameter	Symbol	Ratings	Unit	Conditions
Drain-source voltage	V_{DSS}	–150	V	V_{GS} = 0 V
Gate-source voltage	V_{GSS}	±20	V	V_{DS} = 0 V
Drain current	I_D	–20	A	
Drain current (Pulsed)	I_{DM}	–80	A	
Avalanche current (Pulsed)	I_{DA}	–20	A	L = 30 µH
Source current	I_S	–20	A	
Source current (Pulsed)	I_{SM}	–80	A	
Maximum power dissipation	P_D	70	W	
Channel temperature	Tch	– 55 to +150	°C	
Storage temperature	Tstg	– 55 to +150	°C	
Mass	—	1.2	g	Typical value

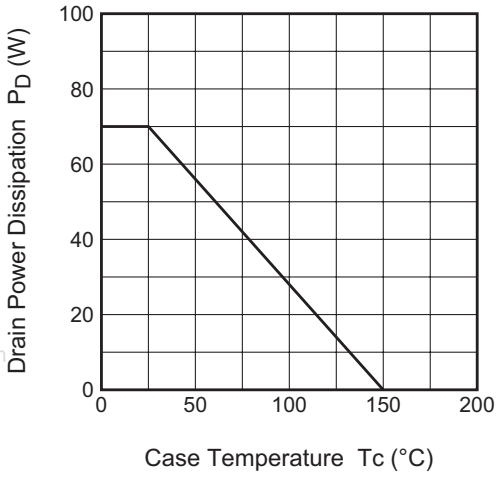
Electrical Characteristics

(Tch = 25°C)

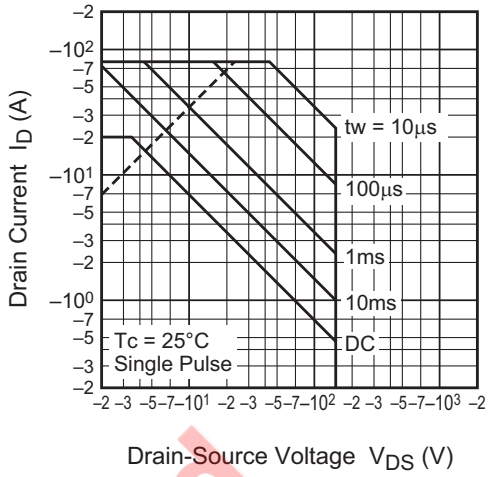
Parameter	Symbol	Min.	Typ.	Max.	Unit	Test conditions
Drain-source breakdown voltage	$V_{(BR)DSS}$	–150	—	—	V	I_D = –1 mA, V_{GS} = 0 V
Gate-source leakage current	I_{GSS}	—	—	±0.1	µA	V_{GS} = ±20 V, V_{DS} = 0 V
Drain-source leakage current	I_{DSS}	—	—	–0.1	mA	V_{DS} = –150 V, V_{GS} = 0 V
Gate-source 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	$r_{DS(ON)}$	—	0.23	0.29	Ω	I_D = –10 A, V_{GS} = –10 V
Drain-source on-state resistance	$r_{DS(ON)}$	—	0.25	0.32	Ω	I_D = –10 A, V_{GS} = – 4 V
Drain-source on-state voltage	$V_{DS(ON)}$	—	–2.3	–2.9	V	I_D = –10 A, V_{GS} = –10 V
Forward transfer admittance	$\lvert y_{fs} \rvert$	—	17.5	—	S	I_D = –10 A, V_{DS} = –10 V
Input capacitance	Ciss	—	4470	—	pF	V_{DS} = –10 V, V_{GS} = 0 V, f = 1MHz
Output capacitance	Coss	—	248	—	pF	
Reverse transfer capacitance	Crss	—	115	—	pF	
Turn-on delay time	$t_{d(on)}$	—	15	—	ns	V_{DD} = – 80 V, I_D = –10 A, V_{GS} = –10 V, R_{GEN} = R_{GS} = 50 Ω
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 A, V_{GS} = 0 V
Thermal resistance	Rth(ch-c)	—	—	1.79	°C/W	Channel to case
Reverse recovery time	t_{rr}	—	100	—	ns	I_S = – 20 A, dis/dt = 100 A/µs

Performance Curves

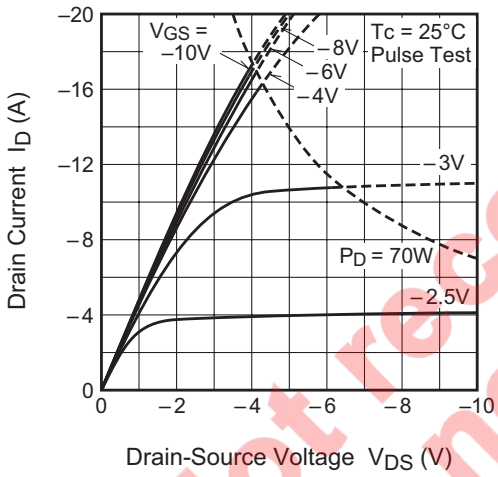
Drain Power Dissipation Derating Curve



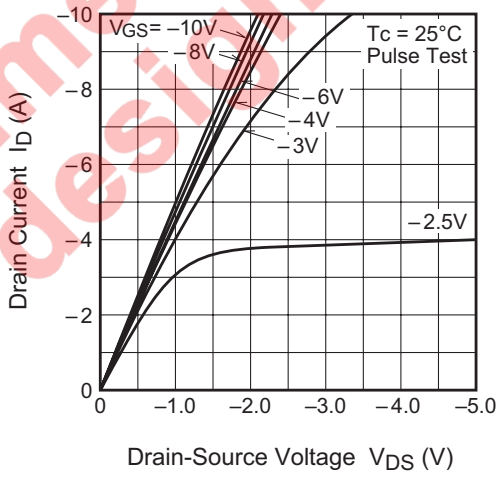
Maximum Safe Operating Area



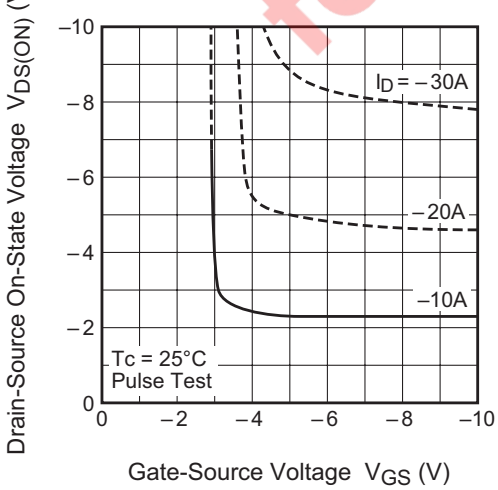
Output Characteristics (Typical)



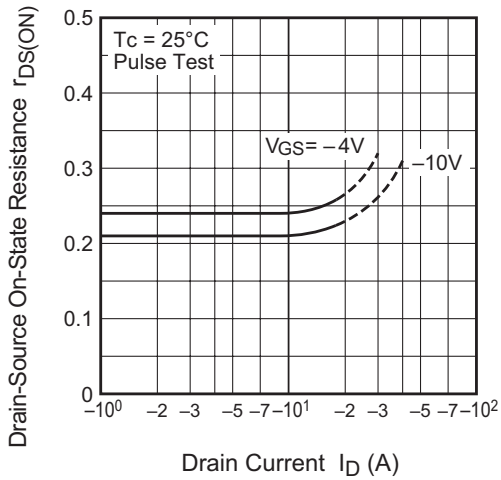
Output Characteristics (Typical)



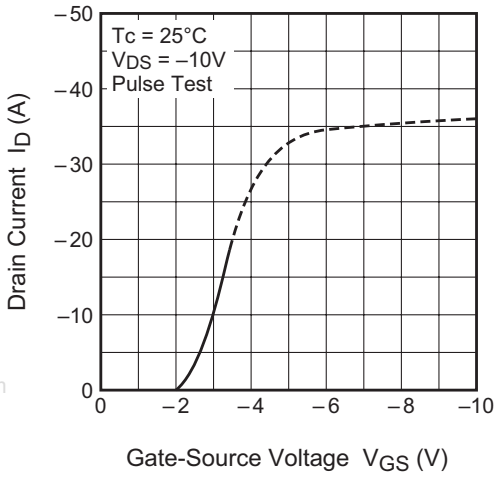
On-State Voltage vs. Gate-Source Voltage (Typical)



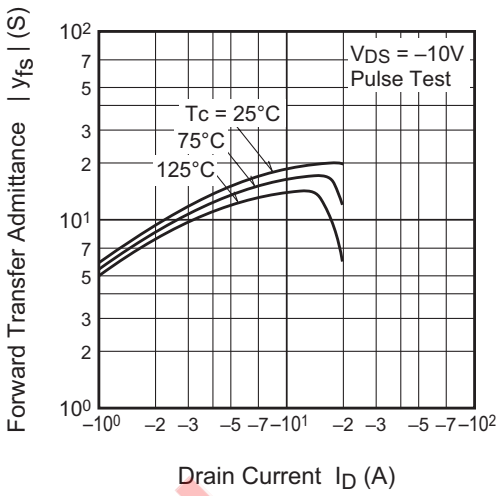
On-State Resistance vs. Drain Current (Typical)



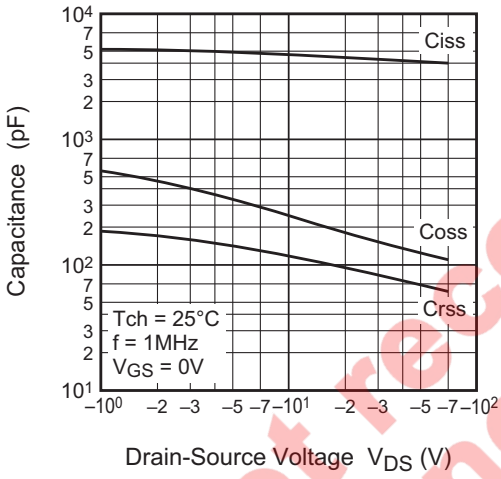
Transfer Characteristics (Typical)



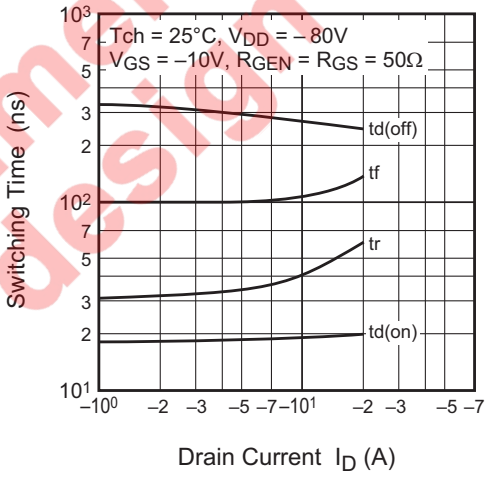
Forward Transfer Admittance vs. Drain Current (Typical)



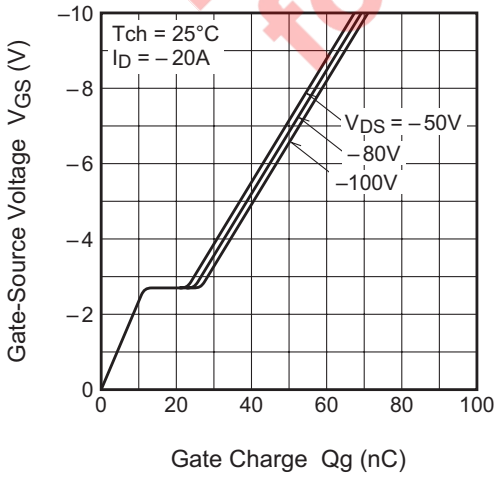
Capacitance vs. Drain-Source Voltage (Typical)



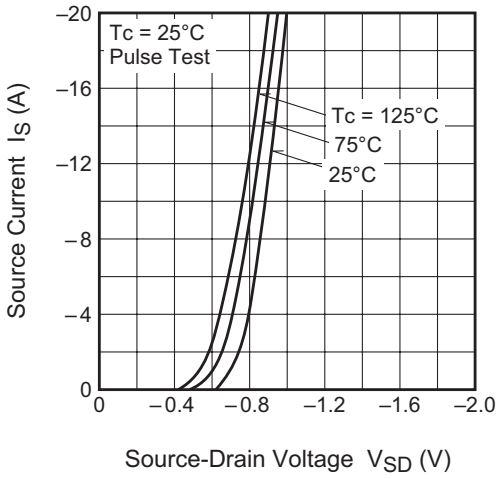
Switching Characteristics (Typical)



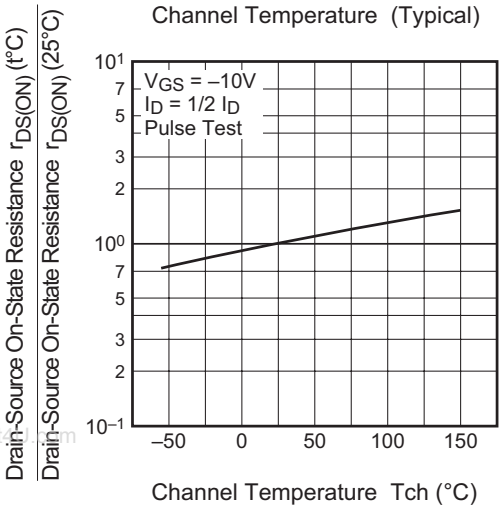
Gate-Source Voltage vs. Gate Charge (Typical)



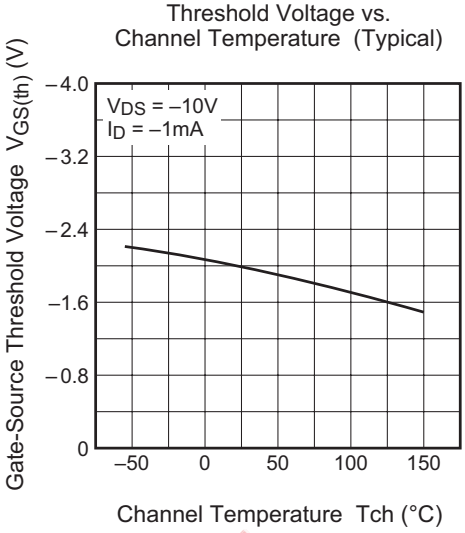
Source-Drain Diode Forward Characteristics (Typical)



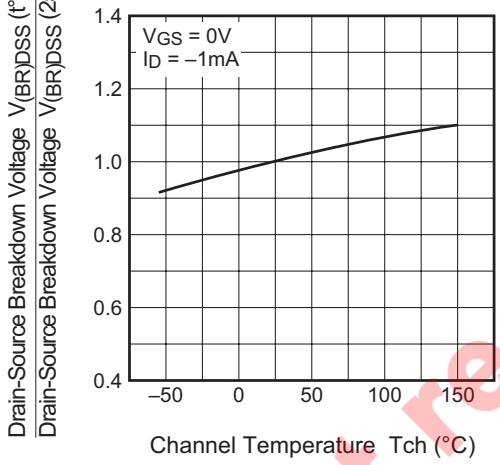
On-State Resistance vs. Channel Temperature (Typical)



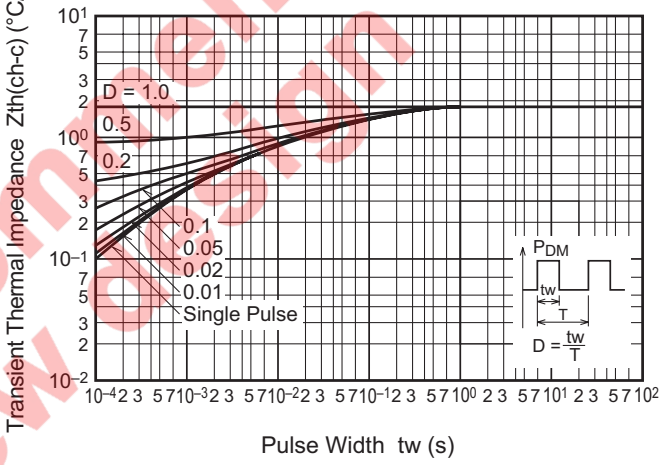
Threshold Voltage vs. Channel Temperature (Typical)



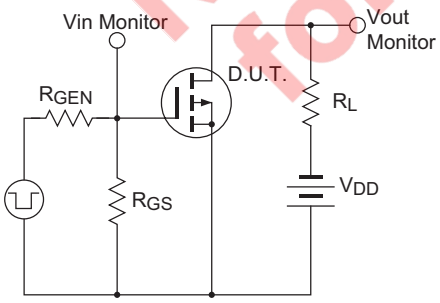
Breakdown Voltage vs. Channel Temperature (Typical)



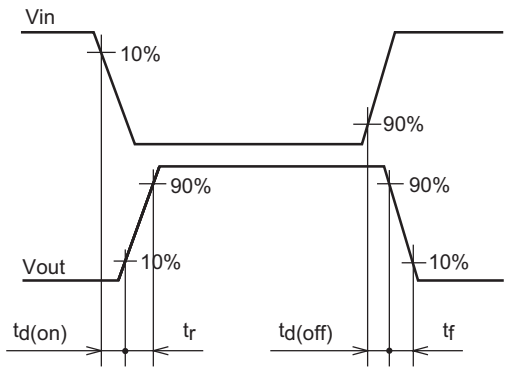
Transient Thermal Impedance Characteristics



Switching Time Measurement Circuit



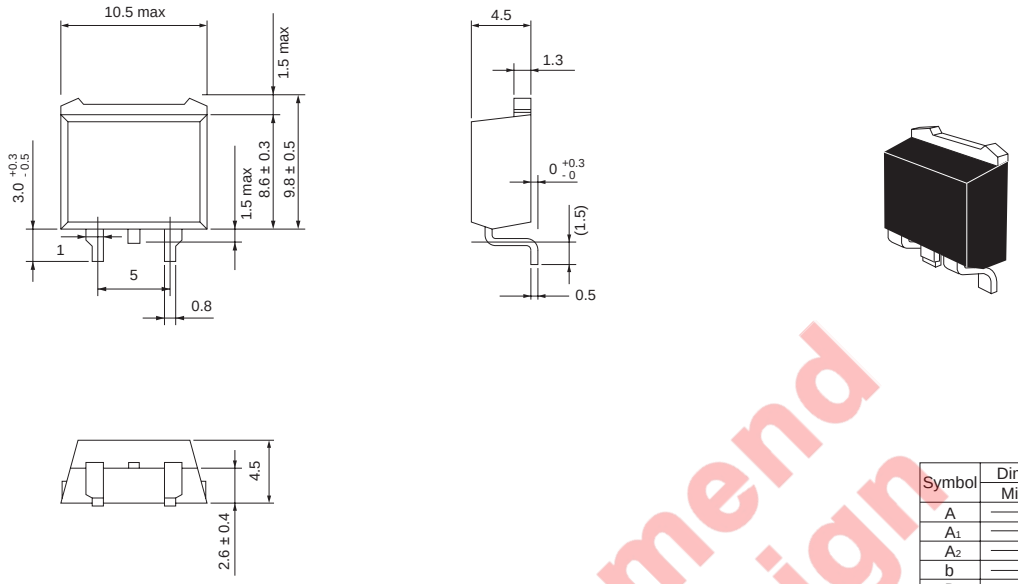
Switching Waveform



Package Dimensions

TO-220S

EIAJ Package Code	JEDEC Code	Mass (g) (reference value)	Lead Material
—	—	1.2	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
Surface-mounted type	Taping	1000	Type name – T +Direction (1 or 2) +1	FS20VSJ-3-T11
Surface-mounted type	Plastic Magazine (Tube)	50	Type name	FS20VSJ-3
Straight type	Plastic Magazine (Tube)	50	Type name +A1	FS20VSJ-3-A1

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

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