

FX50SMJ-06

High-Speed Switching Use
Pch Power MOS FET

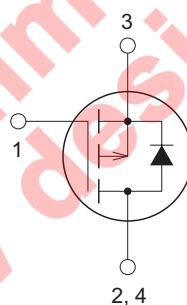
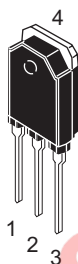
REJ03G1453-0200
(Previous: MEJ02G0278-0101)
Rev.2.00
Aug 07, 2006

Features

- Drive voltage : 4 V
- V_{DSS} : -60 V
- $r_{DS(ON)(max)}$: 18.9 m Ω
- I_D : -50 A
- Integrated Fast Recovery Diode (TYP.) : 70 ns

Outline

RENESAS Package code: PRSS0004ZB-A
(Package name: TO-3P)



1. Gate
2. Drain
3. Source
4. Drain

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}	-60	V	$V_{GS} = 0$ V
Gate-source voltage	V_{GSS}	± 20	V	$V_{DS} = 0$ V
Drain current	I_D	-50	A	
Drain current (Pulsed)	I_{DM}	-200	A	
Avalanche drain current (Pulsed)	I_{DA}	-50	A	L = 50 μ H
Source current	I_S	-50	A	
Source current (Pulsed)	I_{SM}	-200	A	
Maximum power dissipation	P_D	150	W	
Channel temperature	Tch	- 55 to +150	°C	
Storage temperature	Tstg	- 55 to +150	°C	
Mass	—	4.8	g	Typical value

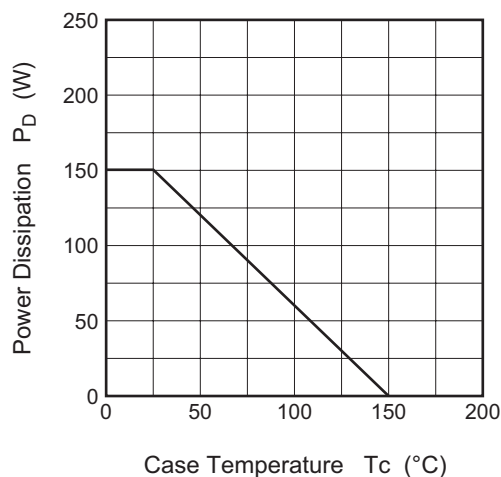
Electrical Characteristics

(T_{ch} = 25°C)

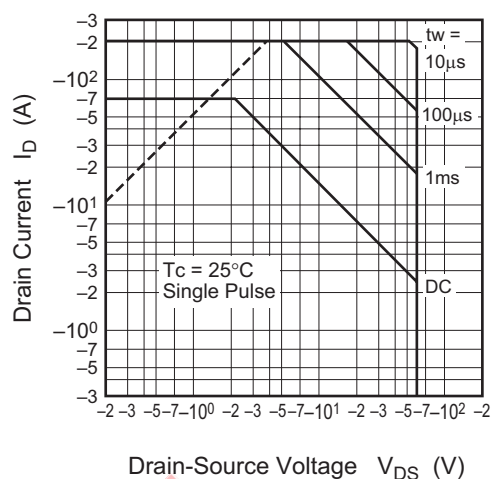
Parameter	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain-source breakdown voltage	$V_{(BR)DSS}$	-60	—	—	V	$I_D = -1 \text{ mA}$, $V_{GS} = 0 \text{ V}$
Gate-source leakage current	I_{GSS}	—	—	±0.1	μA	$V_{GS} = \pm 20 \text{ V}$, $V_{DS} = 0 \text{ V}$
Drain-source leakage current	I_{DSS}	—	—	0.1	mA	$V_{DS} = -60 \text{ V}$, $V_{GS} = 0 \text{ V}$
Gate-source threshold voltage	$V_{GS(th)}$	-1.3	-1.8	-2.3	V	$I_D = -1 \text{ mA}$, $V_{DS} = -10 \text{ V}$
Drain-source on-state resistance	$r_{DS(ON)}$	—	15.0	18.9	mΩ	$I_D = -25 \text{ A}$, $V_{GS} = -10 \text{ V}$
Drain-source on-state resistance	$r_{DS(ON)}$	—	23	32	mΩ	$I_D = -25 \text{ A}$, $V_{GS} = -4 \text{ V}$
Drain-source on-state voltage	$V_{DS(ON)}$	—	-0.38	-0.47	V	$I_D = -25 \text{ A}$, $V_{GS} = -10 \text{ V}$
Forward transfer admittance	$ y_{fs} $	—	49.1	—	S	$I_D = -25 \text{ A}$, $V_{DS} = -10 \text{ V}$
Input capacitance	C_{iss}	—	11610	—	pF	$V_{DS} = -10 \text{ V}$, $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$
Output capacitance	C_{oss}	—	1355	—	pF	
Reverse transfer capacitance	C_{rss}	—	687	—	pF	
Turn-on delay time	$t_{d(on)}$	—	73	—	ns	$V_{DD} = -30 \text{ V}$, $I_D = -25 \text{ A}$, $V_{GS} = -10 \text{ V}$, $R_{GEN} = R_{GS} = 50 \Omega$
Rise time	t_r	—	137	—	ns	
Turn-off delay time	$t_{d(off)}$	—	822	—	ns	
Fall time	t_f	—	320	—	ns	
Source-drain voltage	V_{SD}	—	-1.0	-1.5	V	$I_S = -25 \text{ A}$, $V_{GS} = 0 \text{ V}$
Thermal resistance	$R_{th(ch-c)}$	—	—	0.83	°C/W	Channel to case
Reverse recovery time	t_{rr}	—	70	—	ns	$I_S = -50 \text{ A}$, $dI_S/dt = 100 \text{ A}/\mu\text{s}$

Performance Curves

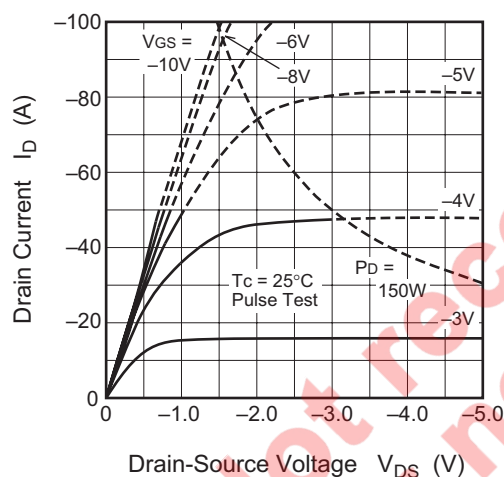
Power Dissipation Derating Curve



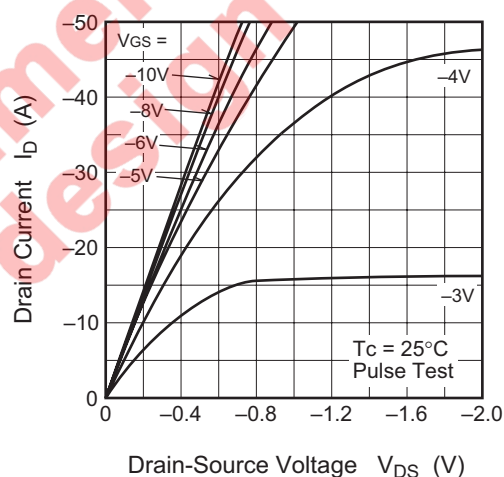
Maximum Safe Operating Area



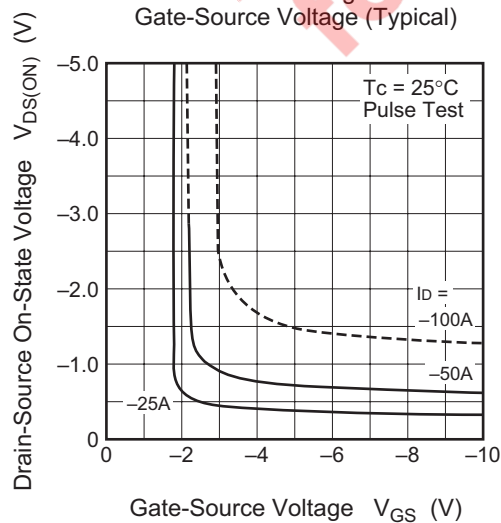
Output Characteristics (Typical)



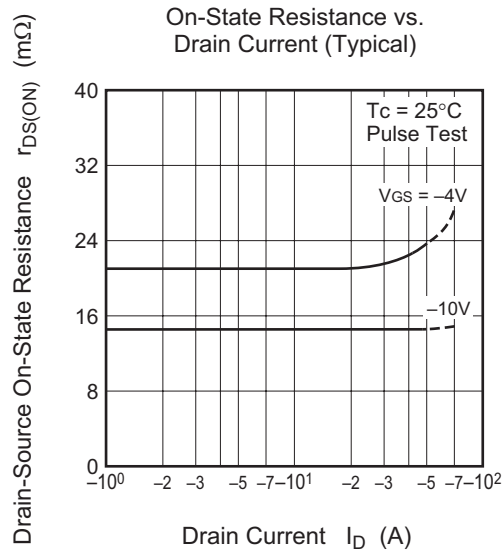
Output Characteristics (Typical)



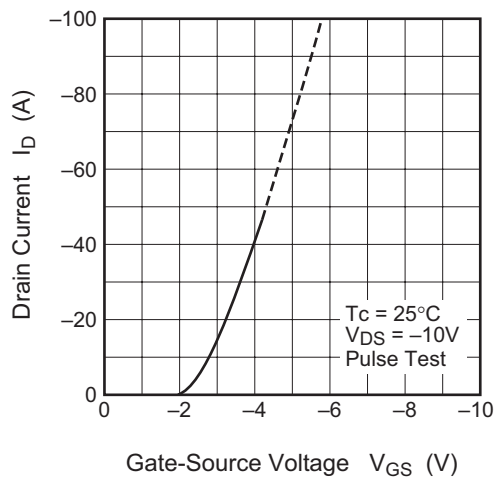
On-State Voltage vs. Gate-Source Voltage (Typical)



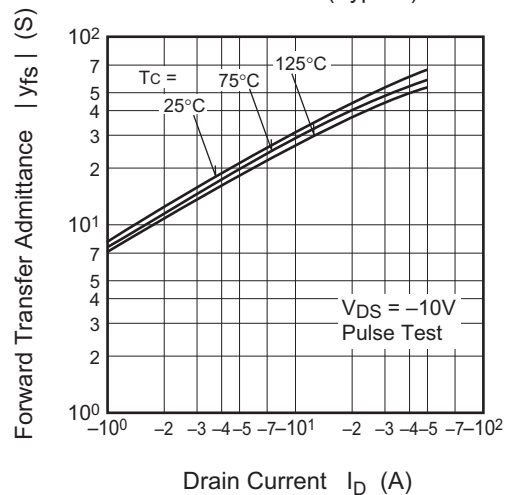
On-State Resistance vs. Drain Current (Typical)



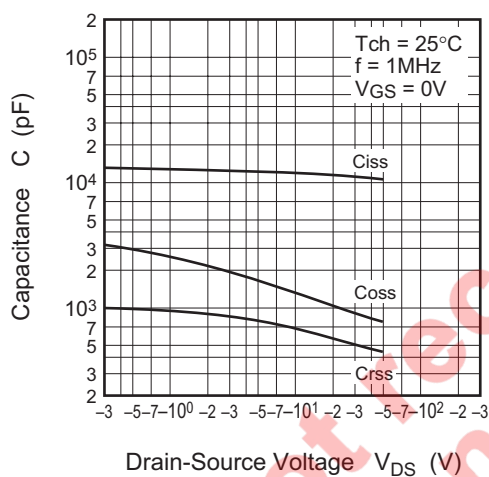
Transfer Characteristics (Typical)



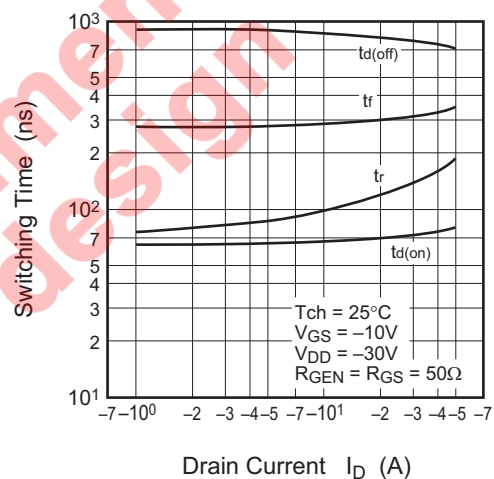
Forward Transfer Admittance vs. Drain Current (Typical)



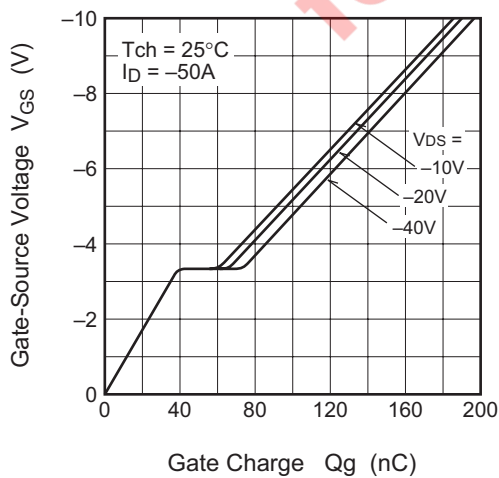
Capacitance vs. Drain-Source Voltage (Typical)



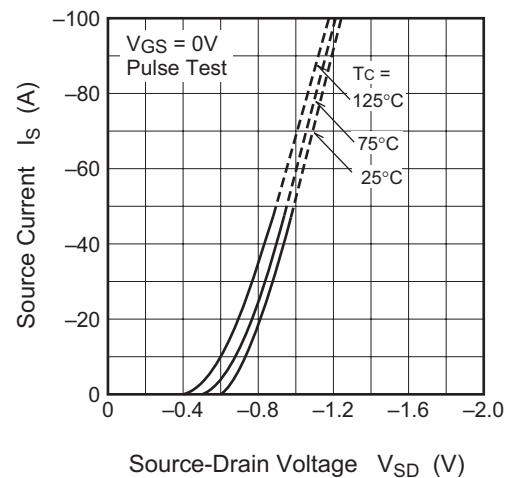
Switching Characteristics (Typical)

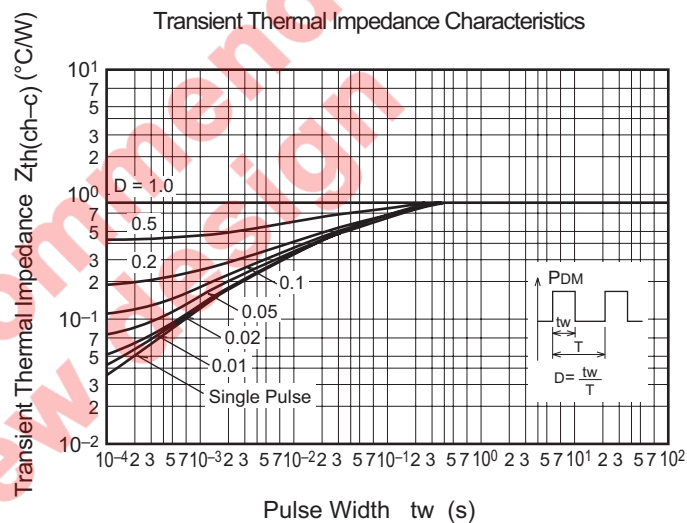
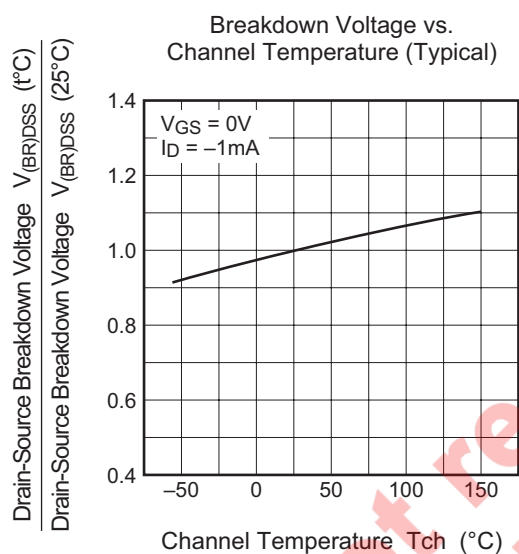
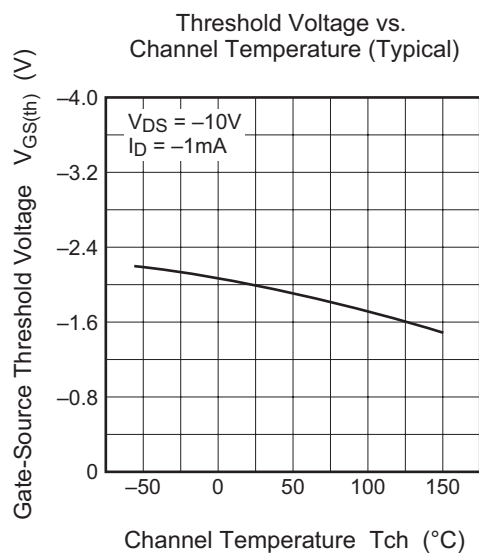
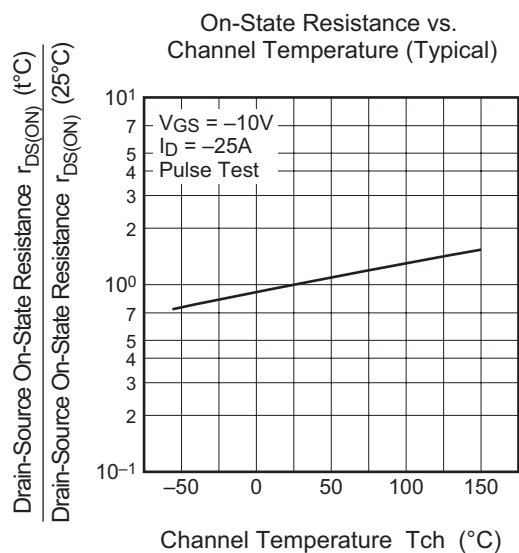


Gate-Source Voltage vs. Gate Charge (Typical)

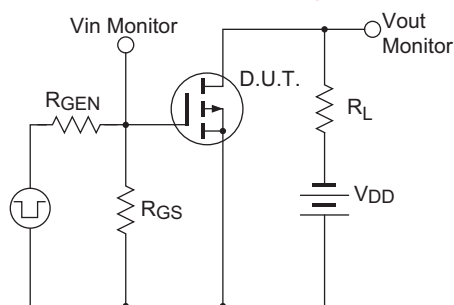


Source-Drain Diode Forward Characteristics (Typical)

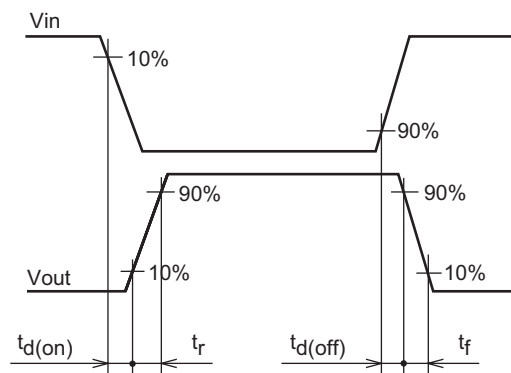




Switching Time Measurement Circuit



Switching Waveform



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