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April 1st, 2010
Renesas Electronics Corporation

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FS70SMJ-2

High-Speed Switching Use
Nch Power MOS FET

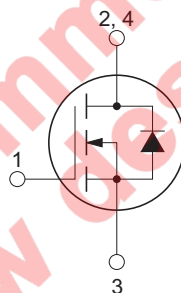
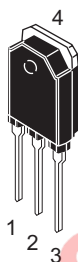
REJ03G1432-0200
(Previous: MEJ02G0074-0101)
Rev.2.00
Aug 07, 2006

Features

- Drive voltage : 4 V
- V_{DSS} : 100 V
- $r_{DS(ON)(max)}$: 17 m Ω
- I_D : 70 A
- Integrated Fast Recovery Diode (TYP.) : 115 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

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

Parameter	Symbol	Ratings	Unit	Conditions
Drain-source voltage	V_{DSS}	100	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 drain current (Pulsed)	I_{DA}	70	A	$L = 100\text{ }\mu\text{H}$
Source current	I_S	70	A	
Source current (Pulsed)	I_{SM}	280	A	
Maximum power dissipation	P_D	150	W	
Channel temperature	T_{ch}	-55 to $+150$	$^\circ\text{C}$	
Storage temperature	T_{stg}	-55 to $+150$	$^\circ\text{C}$	
Mass	—	4.8	g	Typical value

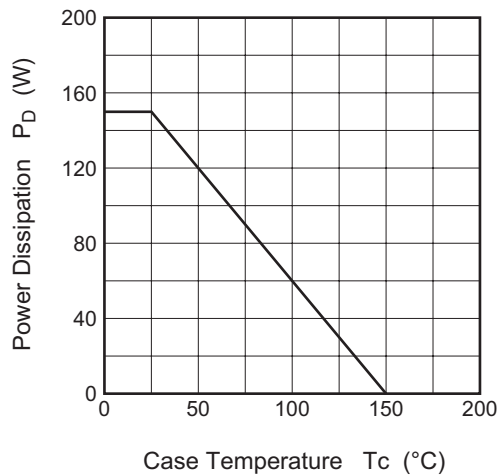
Electrical Characteristics

(Tch = 25°C)

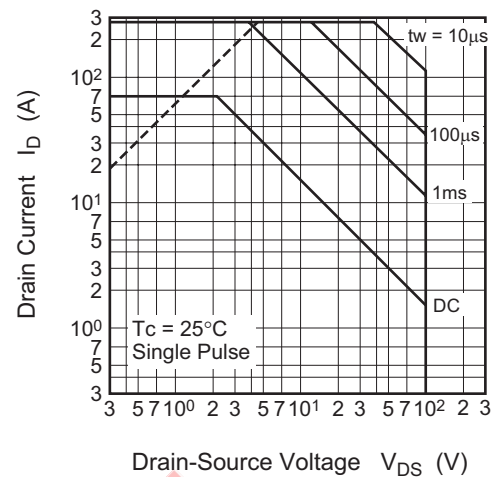
Parameter	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain-source breakdown voltage	$V_{(BR)DSS}$	100	—	—	V	$I_D = 1 \text{ mA}$, $V_{GS} = 0 \text{ V}$
Gate-source leakage current	I_{GSS}	—	—	± 0.1	μA	$V_{GS} = \pm 20 \text{ V}$, $V_{DS} = 0 \text{ V}$
Drain-source leakage current	I_{DSS}	—	—	0.1	mA	$V_{DS} = 100 \text{ V}$, $V_{GS} = 0 \text{ V}$
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	$r_{DS(ON)}$	—	13	17	$\text{m}\Omega$	$I_D = 35 \text{ A}$, $V_{GS} = 10 \text{ V}$
Drain-source on-state resistance	$r_{DS(ON)}$	—	14	18	$\text{m}\Omega$	$I_D = 35 \text{ A}$, $V_{GS} = 4 \text{ V}$
Drain-source on-state voltage	$V_{DS(ON)}$	—	0.46	0.60	V	$I_D = 35 \text{ A}$, $V_{GS} = 10 \text{ V}$
Forward transfer admittance	$ y_{fs} $	—	68	—	S	$I_D = 35 \text{ A}$, $V_{DS} = 10 \text{ V}$
Input capacitance	C_{iss}	—	8200	—	pF	$V_{DS} = 10 \text{ V}$, $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$
Output capacitance	C_{oss}	—	1150	—	pF	
Reverse transfer capacitance	C_{rss}	—	600	—	pF	
Turn-on delay time	$t_{d(on)}$	—	54	—	ns	$V_{DD} = 50 \text{ V}$, $I_D = 35 \text{ A}$, $V_{GS} = 10 \text{ V}$, $R_{GEN} = R_{GS} = 50 \Omega$
Rise time	t_r	—	140	—	ns	
Turn-off delay time	$t_{d(off)}$	—	830	—	ns	
Fall time	t_f	—	350	—	ns	
Source-drain voltage	V_{SD}	—	1.0	1.5	V	$I_S = 35 \text{ A}$, $V_{GS} = 0 \text{ V}$
Thermal resistance	$R_{th(ch-c)}$	—	—	0.83	$^{\circ}\text{C/W}$	Channel to case
Reverse recovery time	t_{rr}	—	115	—	ns	$I_S = 70 \text{ A}$, $d_i/d_t = -100 \text{ A}/\mu\text{s}$

Performance Curves

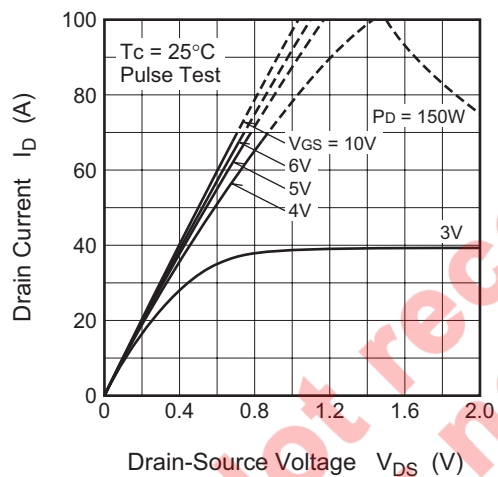
Power Dissipation Derating Curve



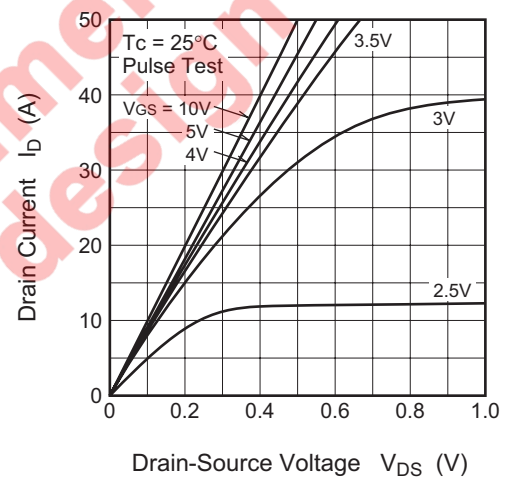
Maximum Safe Operating Area



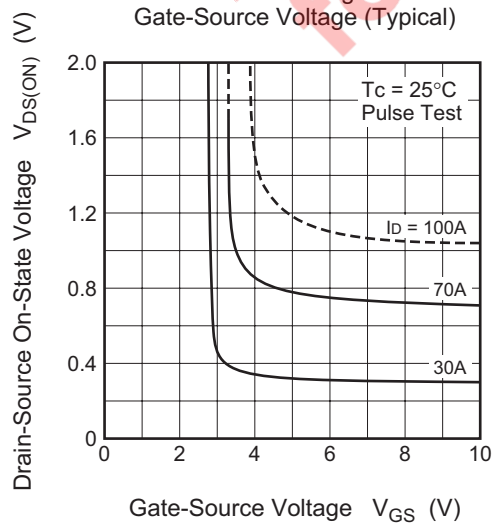
Output Characteristics (Typical)



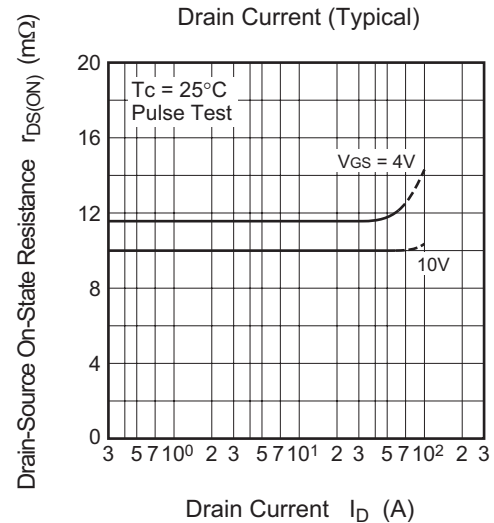
Output Characteristics (Typical)



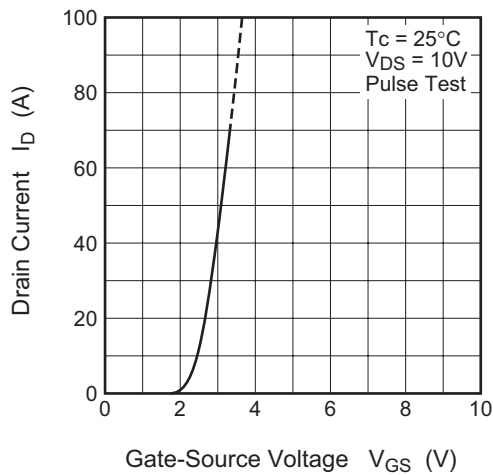
On-State Voltage vs. Gate-Source Voltage (Typical)



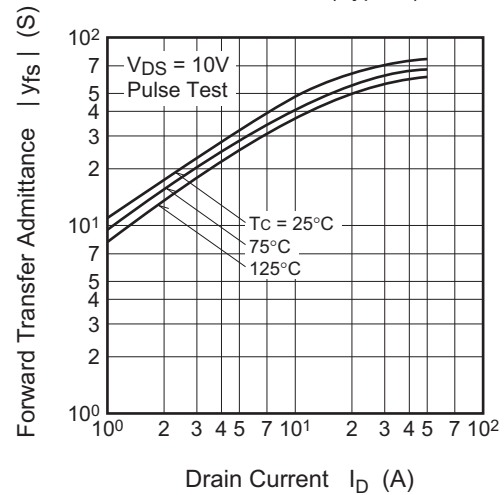
On-State Resistance vs. Drain Current (Typical)



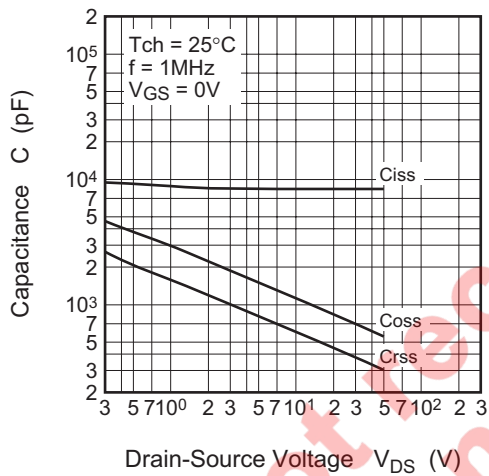
Transfer Characteristics (Typical)



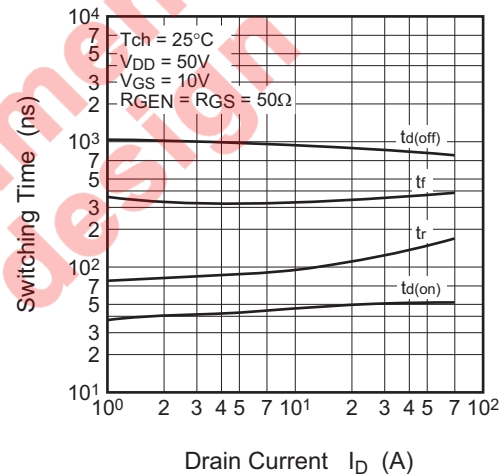
Forward Transfer Admittance vs. Drain Current (Typical)



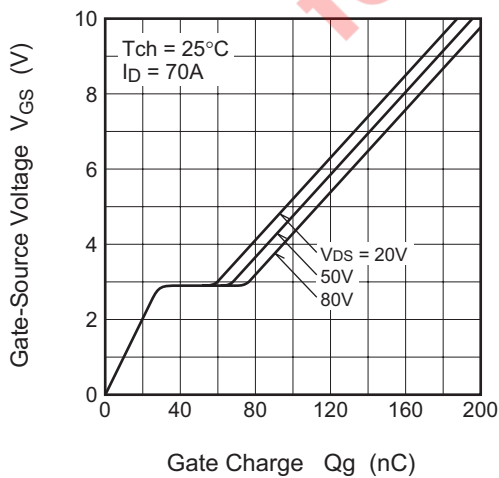
Capacitance vs. Drain-Source Voltage (Typical)



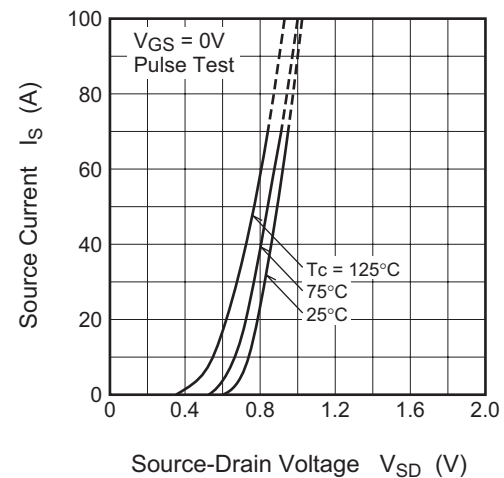
Switching Characteristics (Typical)

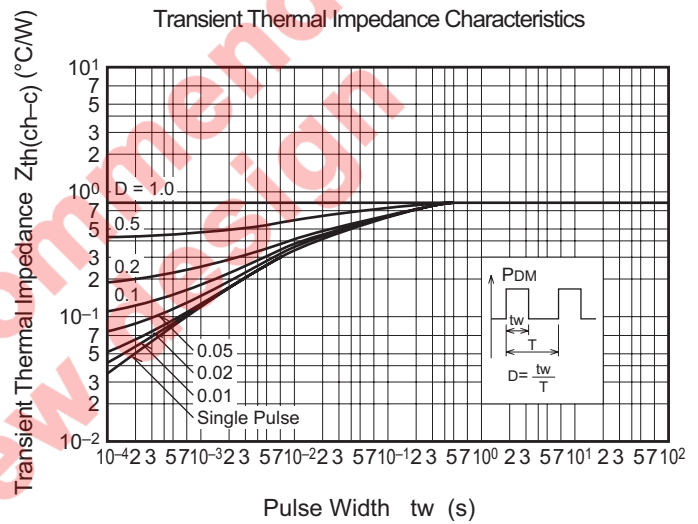
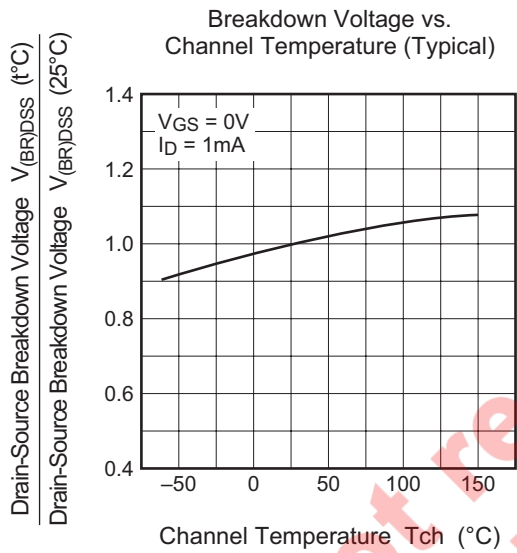
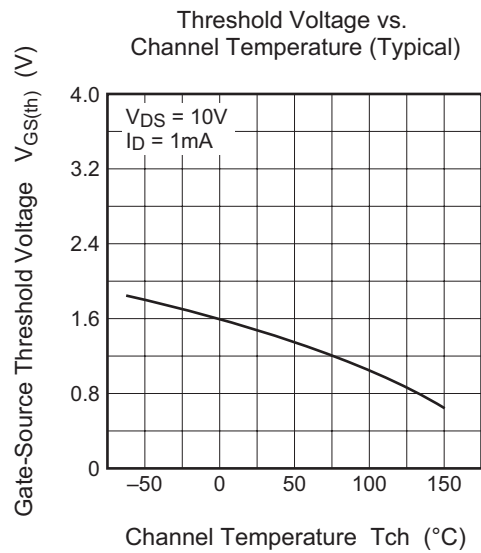
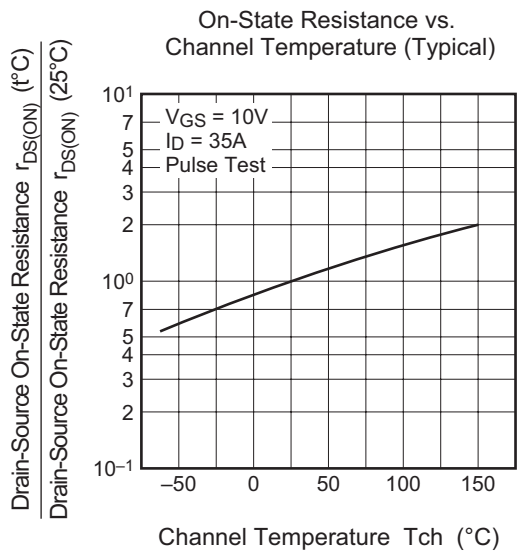


Gate-Source Voltage vs. Gate Charge (Typical)

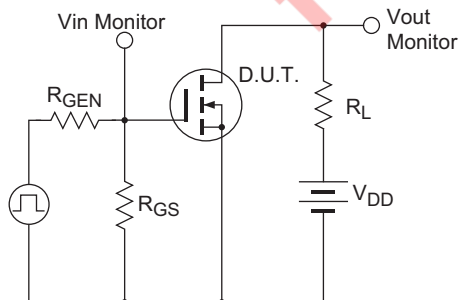


Source-Drain Diode Forward Characteristics (Typical)

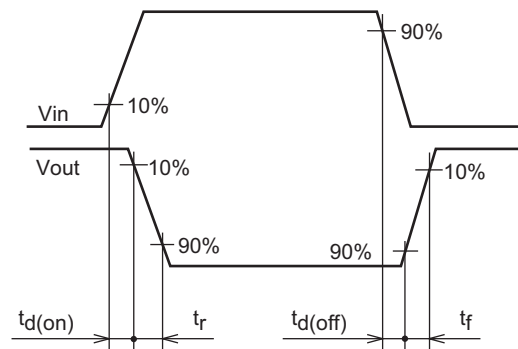




Switching Time Measurement Circuit



Switching Waveform



Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
TO-3P*	SC-65	PRSS0004ZB-A	—	4.8g

Unit: mm

The technical drawing illustrates the dimensions of the FS70SMJ-2 TO-3P package. The top view shows a square body with a maximum width of 15.9 mm and a height of 20.0 mm. A central circular feature has a diameter of $\phi 3.2$. The side view shows a total height of 4.5 mm, with a lead height of 1.5 mm and a base thickness of 4.4 mm. The bottom view shows a square base with a width of 4 mm. The lead length is 19.5 mm minimum, and the lead thickness is 0.6 mm. The lead pitch is 5.45 mm, and the lead width is 2 mm. The lead angle is 1.0 mm. The lead form is straight type.

Order Code

Lead form	Standard packing	Quantity	Standard order code	Standard order code example
Straight type	Static electricity prevention bag	20	Type name	FS70SMJ-2
Lead form	Plastic Magazine (Tube)	30	Type name – Lead forming code	FS70SMJ-2-A8

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

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