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April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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FS50ASJ-03F

High-Speed Switching Use
Nch Power MOS FET

REJ03G0238-0200

Rev.2.00

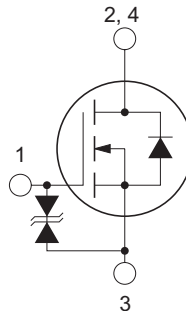
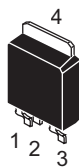
Dec 19, 2008

Features

- Drive Voltage : 4V
- V_{DSS} : 30 V
- $r_{DS(ON)(max)}$: 12.2 m Ω
- I_D : 50 A
- Recovery Time of the Integrated Fast Recovery Diode (TYP.) : 50 ns

Outline

RENESAS Package code: PRSS0004ZG-A
(Package name: MP-3A)



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

Applications

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

Maximum Ratings

(T_c = 25 °C)

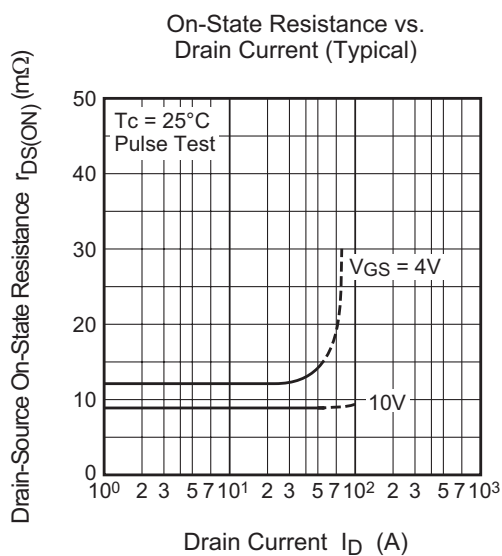
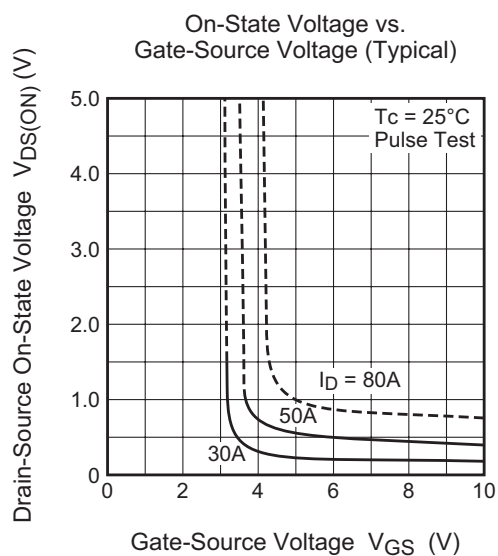
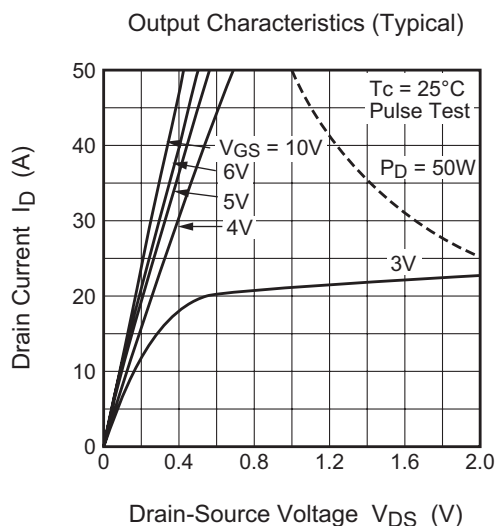
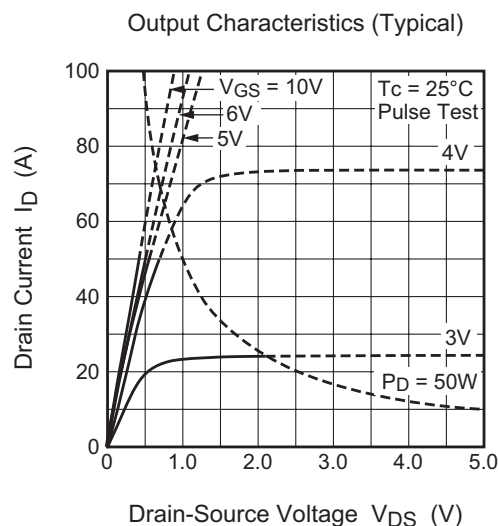
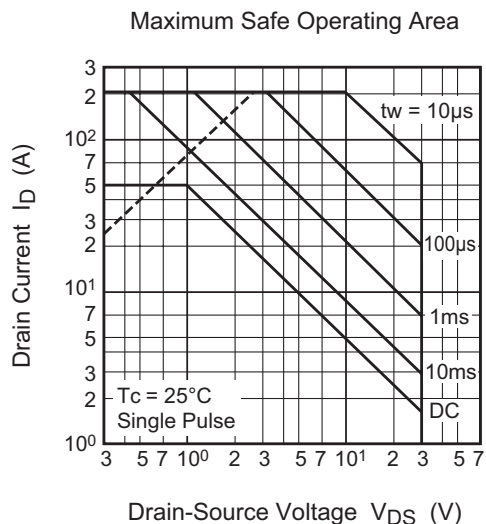
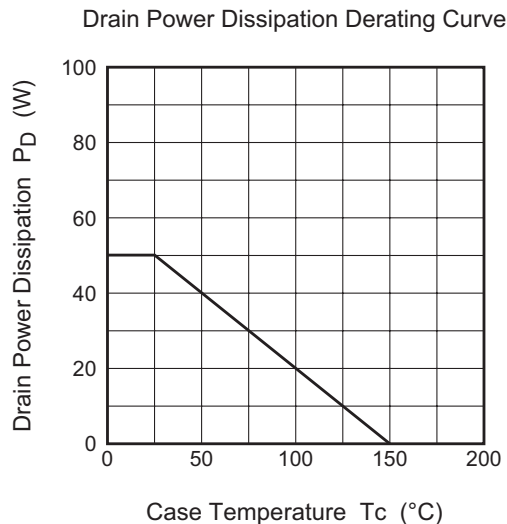
Parameter	Symbol	Ratings	Unit	Conditions
Drain-source voltage	V_{DSS}	30	V	$V_{GS} = 0$ V
Gate-source voltage	V_{GSS}	± 20	V	$V_{DS} = 0$ V
Drain current	I_D	50	A	
Drain current (Pulse)	I_{DM}	200	A	
Avalanche current (Pulse)	I_{DA}	50	A	$L = 6$ μ H
Source current	I_S	50	A	
Source current (Pulse)	I_{SM}	200	A	
Maximum power dissipation	P_D	50	W	
Channel temperature	T _{ch}	– 55 to + 150	°C	
Storage temperature	T _{stg}	– 55 to + 150	°C	
Mass	—	0.32	g	Typical value

Electrical Characteristics

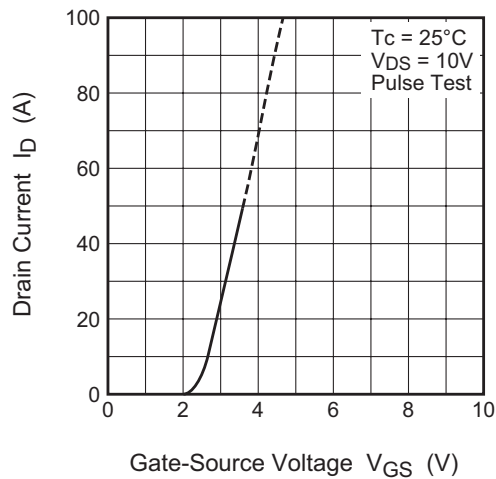
(Tch = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test conditions
Drain-source breakdown voltage	$V_{(BR)DSS}$	30	—	—	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	$V_{DS} = 30 \text{ V}$, $V_{GS} = 0 \text{ V}$
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	$r_{DS(ON)}$	—	9.2	12.2	$\text{m}\Omega$	$I_D = 25 \text{ A}$, $V_{GS} = 10 \text{ V}$
Drain-source on-state resistance	$r_{DS(ON)}$	—	13	19	$\text{m}\Omega$	$I_D = 25 \text{ A}$, $V_{GS} = 4 \text{ V}$
Drain-source on-state voltage	$V_{DS(ON)}$	—	0.23	0.31	V	$I_D = 25 \text{ A}$, $V_{GS} = 10 \text{ V}$
Forward transfer admittance	$ y_{fs} $	—	45	—	S	$I_D = 25 \text{ A}$, $V_{DS} = 10 \text{ V}$
Input capacitance	C_{iss}	—	2100	—	pF	$V_{DS} = 10 \text{ V}$, $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$
Output capacitance	C_{oss}	—	690	—	pF	
Reverse transfer capacitance	C_{rss}	—	340	—	pF	
Turn-on delay time	$t_{d(on)}$	—	16	—	ns	$V_{DD} = 15 \text{ V}$, $I_D = 25 \text{ A}$, $V_{GS} = 10 \text{ V}$, $R_{GEN} = R_{GS} = 50 \text{ }\Omega$
Rise time	t_r	—	90	—	ns	
Turn-off delay time	$t_{d(off)}$	—	130	—	ns	
Fall time	t_f	—	85	—	ns	
Source-drain voltage	V_{SD}	—	1.0	1.5	V	$I_S = 25 \text{ A}$, $V_{GS} = 0 \text{ V}$
Thermal resistance	$R_{th(ch-c)}$	—	—	2.5	$^{\circ}\text{C/W}$	Channel to case
Diode reverse recovery time	t_{rr}	—	50	—	ns	$I_S = 25 \text{ A}$, $\text{dis}/\text{dt} = -50 \text{ A}/\mu\text{s}$

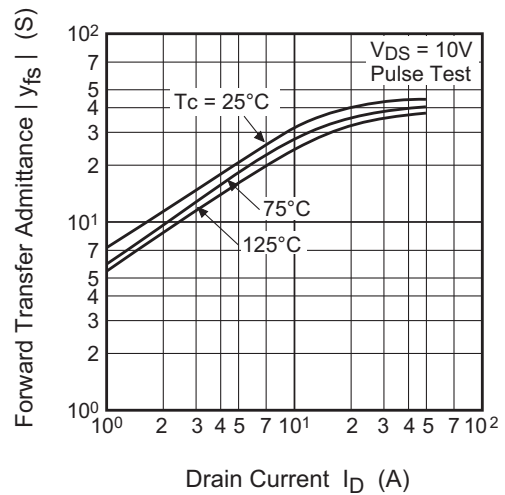
Performance Curves



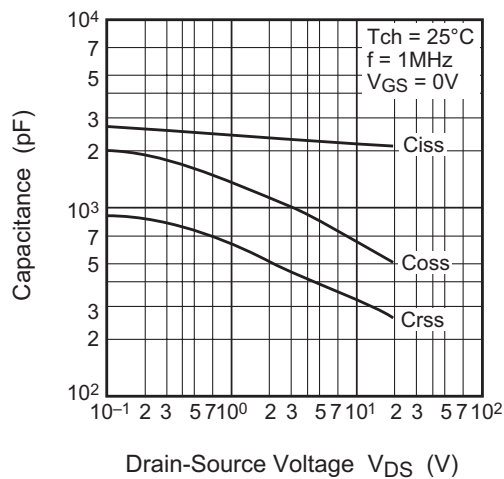
Transfer Characteristics (Typical)



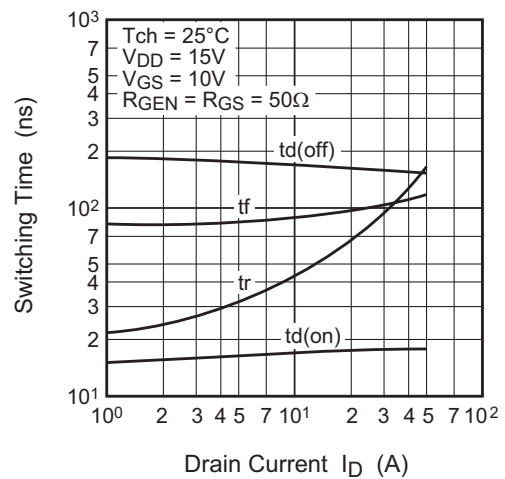
Forward Transfer Admittance vs. Drain Current (Typical)



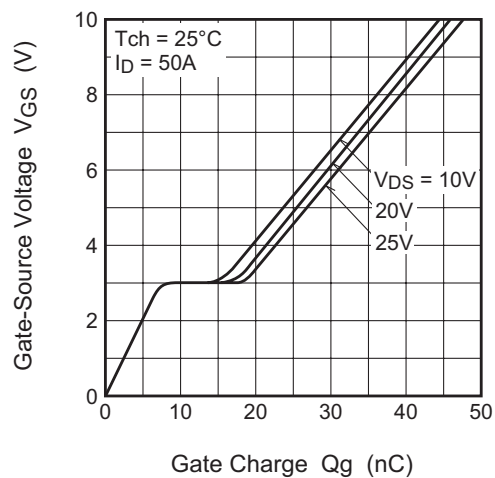
Capacitance vs. Drain-Source Voltage (Typical)



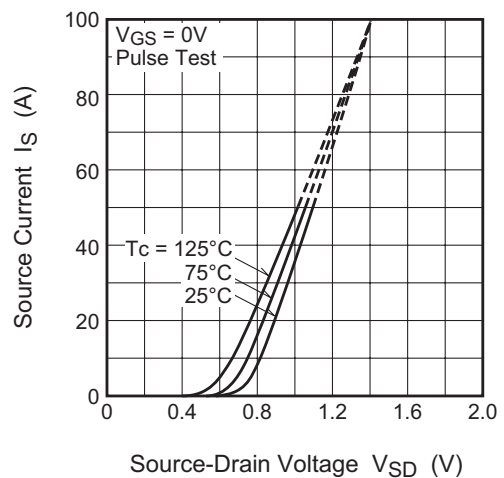
Switching Characteristics (Typical)

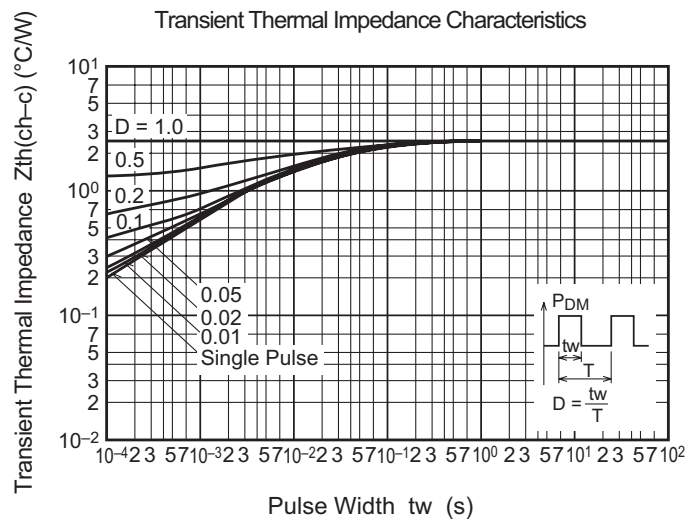
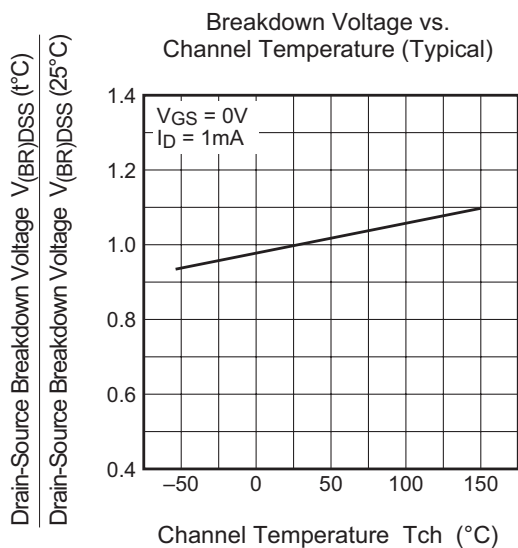
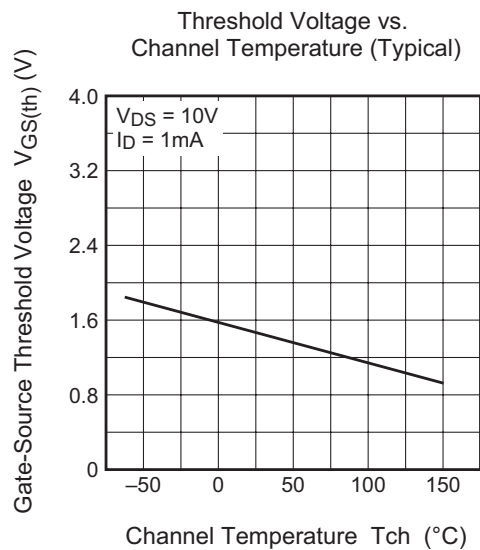
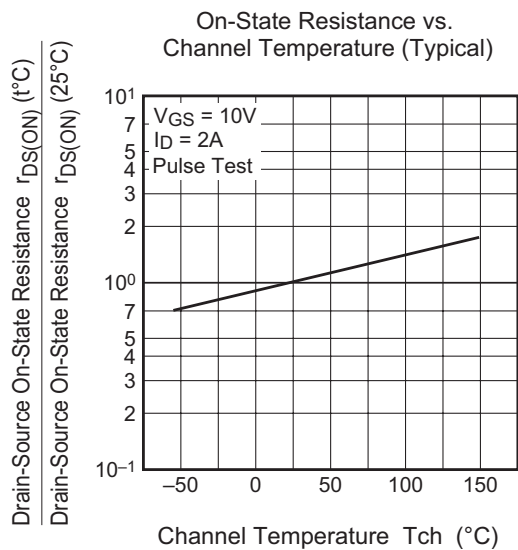


Gate-Source Voltage vs. Gate Charge (Typical)

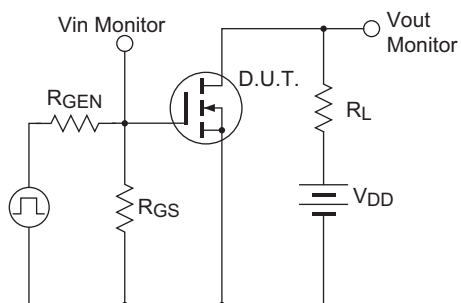


Source-Drain Diode Forward Characteristics (Typical)

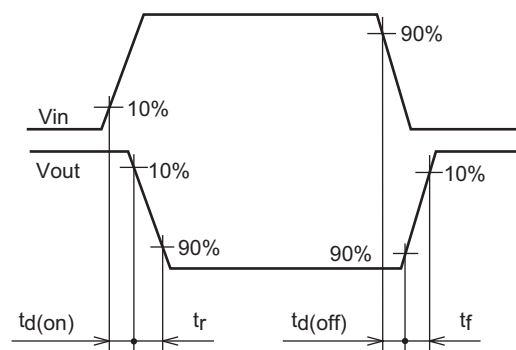




Switching Time Measurement Circuit



Switching Waveform



Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]	Unit: mm
MP-3A	SC-63	PRSS0004ZG-A	—	0.32g	

The drawing shows three views of the package:

- Top View:** A rectangular package with a width of 6.6 mm and a length of 10.4 mm (maximum). The central body has a width of 5.3 ± 0.2 mm and a height of 1 ± 0.2 mm. The leads are 0.76 ± 0.2 mm wide and 2.3 ± 0.2 mm apart. The lead height is 2.5 mm (minimum).
- Side View:** Shows the package height of 2.3 mm. The top flange has a thickness of 0.5 ± 0.2 mm. The central body has a height of 0.1 ± 0.1 mm. The lead height is 1.4 ± 0.2 mm, and the lead thickness is 0.5 ± 0.2 mm.
- Bottom View:** Shows the package from below with a width of 2.3 mm and a height of 1 mm.

Order Code

Lead form	Standard packing	Quantity	Standard order code	Standard order code example
Surface-mounted type	Taping	3000	Type name – T +Direction (1 or 2) +3	FS50ASJ-03F-T13
Surface-mounted type	Plastic Magazine (Tube)	75	Type name	FS50ASJ-03F

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

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