

# FS5ASJ-06F

High-Speed Switching Use  
Nch Power MOS FET

REJ03G0239-0200

Rev.2.00

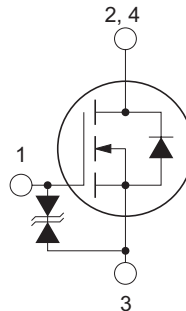
Dec 19, 2008

## Features

- Drive voltage : 4 V
- $V_{DSS}$  : 60 V
- $r_{DS(ON) (max)}$  : 140 m $\Omega$
- $I_D$  : 5 A
- Recovery Time of the Integrated Fast Recovery Diode (TYP.) : 30 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<sub>c</sub> = 25°C)

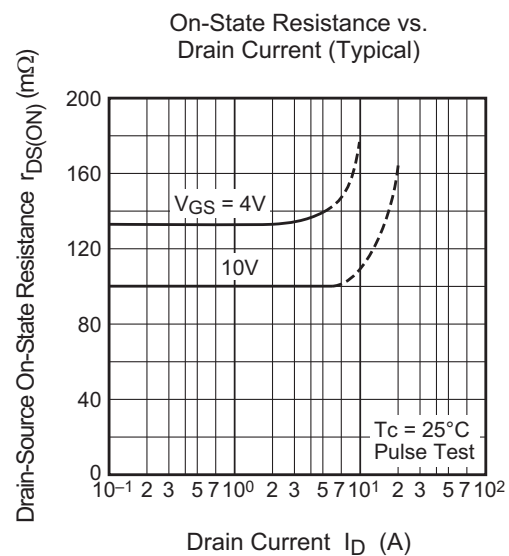
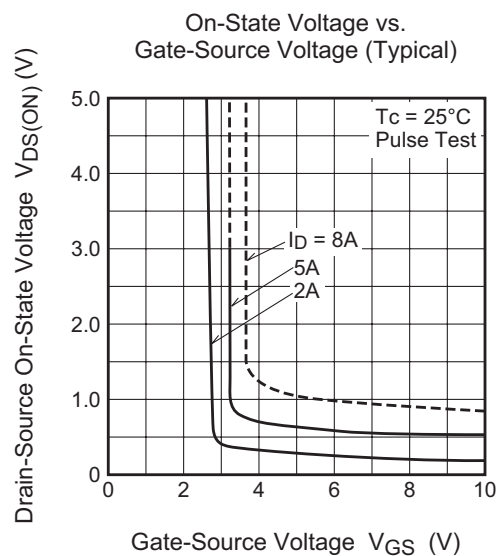
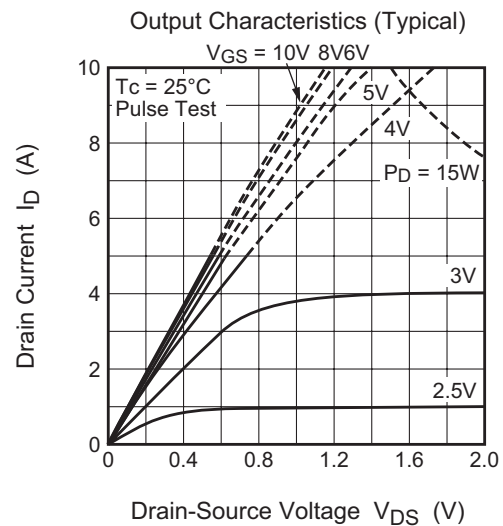
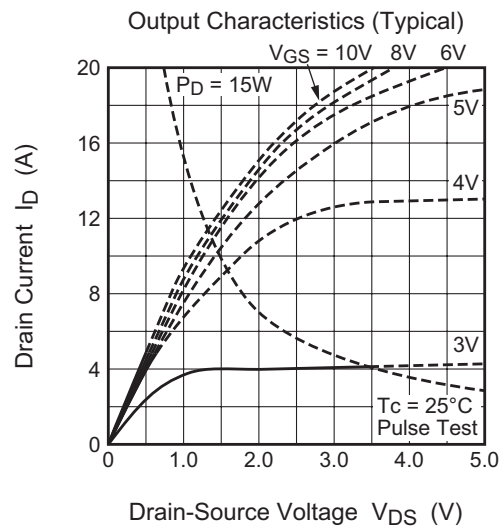
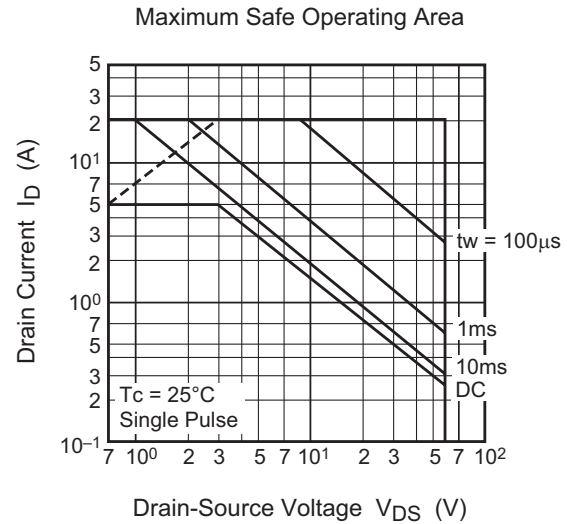
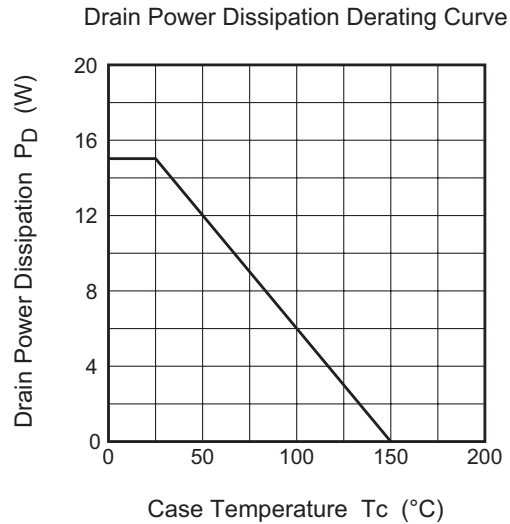
Parameter	Symbol	Ratings	Unit	Conditions
Drain-source voltage	$V_{DSS}$	60	V	$V_{GS} = 0$ V
Gate-source voltage	$V_{GSS}$	$\pm 20$	V	$V_{DS} = 0$ V
Drain current	$I_D$	5	A	
Drain current (Pulse)	$I_{DM}$	20	A	
Avalanche current (Pulse)	$I_{DA}$	5	A	$L = 100$ $\mu$ H
Source current	$I_S$	5	A	
Source current (Pulse)	$I_{SM}$	20	A	
Maximum power dissipation	$P_D$	15	W	
Channel temperature	T <sub>ch</sub>	- 55 to +150	°C	
Storage temperature	T <sub>stg</sub>	- 55 to +150	°C	
Mass	—	0.32	g	Typical value

## Electrical Characteristics

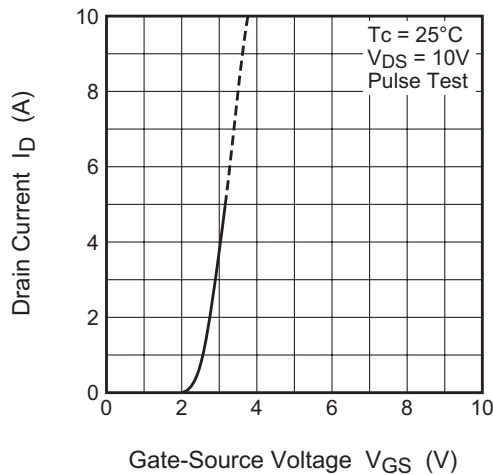
(Tch = 25°C)

Parameter	Symbol	Min.	TYP.	Max.	Unit	Test conditions
Drain-source breakdown voltage	$V_{(BR)DSS}$	60	—	—	V	$I_D = 1 \text{ mA}$ , $V_{GS} = 0 \text{ V}$
Gate-source breakdown voltage	$V_{(BR)GSS}$	$\pm 20$	—	—	V	$I_G = \pm 100 \text{ }\mu\text{A}$ , $V_{DS} = 0 \text{ V}$
Drain-source leakage current	$I_{DSS}$	—	—	100	$\mu\text{A}$	$V_{DS} = 60 \text{ V}$ , $V_{GS} = 0 \text{ V}$
Gate-source leakage current	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 20 \text{ V}$ , $V_{DS} = 0 \text{ V}$
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	$r_{DS(ON)}$	—	110	140	$\text{m}\Omega$	$I_D = 2 \text{ A}$ , $V_{GS} = 10 \text{ V}$
Drain-source on-state resistance	$r_{DS(ON)}$	—	140	190	$\text{m}\Omega$	$I_D = 2 \text{ A}$ , $V_{GS} = 4 \text{ V}$
Drain-source on-state voltage	$V_{DS(ON)}$	—	0.22	0.28	V	$I_D = 2 \text{ A}$ , $V_{GS} = 10 \text{ V}$
Forward transfer admittance	$ y_{fs} $	—	6.0	—	S	$I_D = 2 \text{ A}$ , $V_{DS} = 10 \text{ V}$
Input capacitance	$C_{iss}$	—	340	—	pF	$V_{DS} = 10 \text{ V}$ , $V_{GS} = 0 \text{ V}$ , $f = 1 \text{ MHz}$
Output capacitance	$C_{oss}$	—	65	—	pF	
Reverse transfer capacitance	$C_{rss}$	—	40	—	pF	
Turn-on delay time	$t_{d(on)}$	—	4	—	ns	$V_{DD} = 30 \text{ V}$ , $I_D = 2 \text{ A}$ , $V_{GS} = 10 \text{ V}$ , $R_{GEN} = R_{GS} = 50 \text{ }\Omega$
Rise time	$t_r$	—	10	—	ns	
Turn-off delay time	$t_{d(off)}$	—	35	—	ns	
Fall time	$t_f$	—	17	—	ns	
Source-drain voltage	$V_{SD}$	—	1.0	1.5	V	$I_S = 2 \text{ A}$ , $V_{GS} = 0 \text{ V}$
Thermal resistance	$R_{th(ch-c)}$	—	—	8.33	$^{\circ}\text{C/W}$	Channel to case
Reverse recovery time	$t_{rr}$	—	30	—	ns	$I_S = 5 \text{ A}$ , $\text{dis}/\text{dt} = -100 \text{ A}/\mu\text{s}$

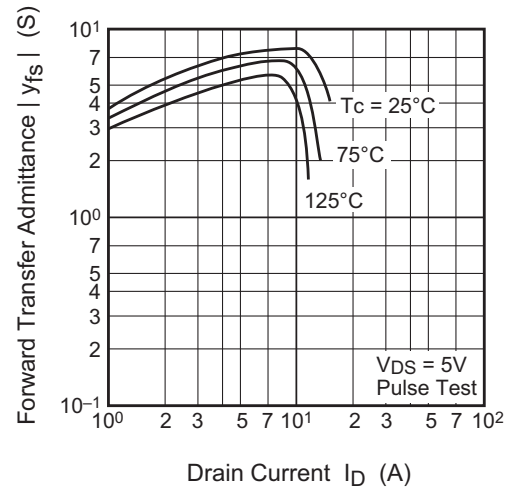
## Performance Curves



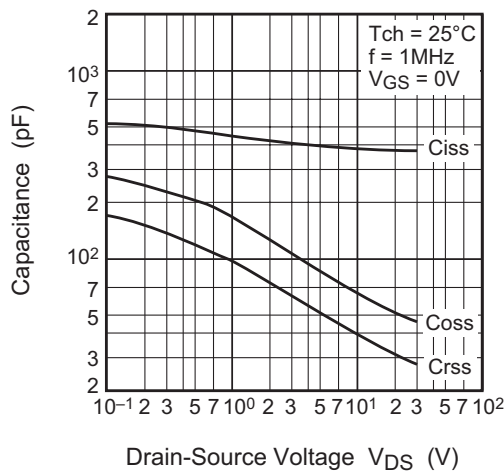
Transfer Characteristics (Typical)



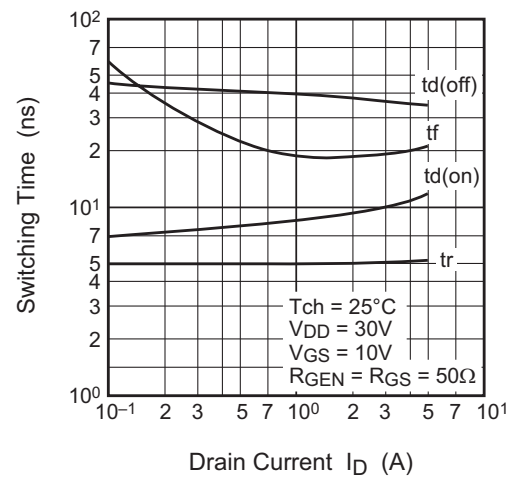
Forward Transfer Admittance vs. Drain Current (Typical)



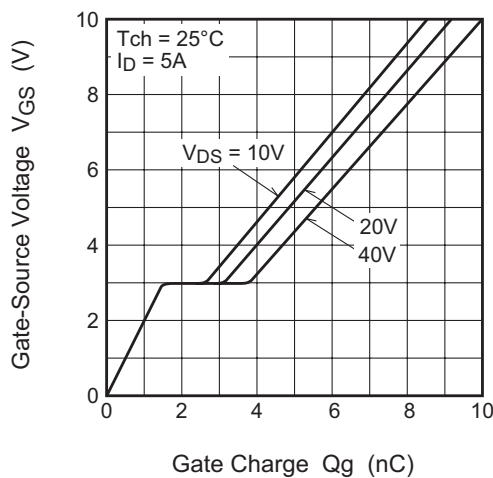
Capacitance vs. Drain-Source Voltage (Typical)



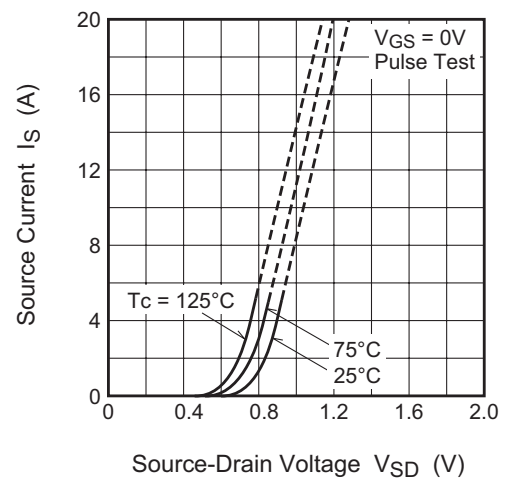
Switching Characteristics (Typical)

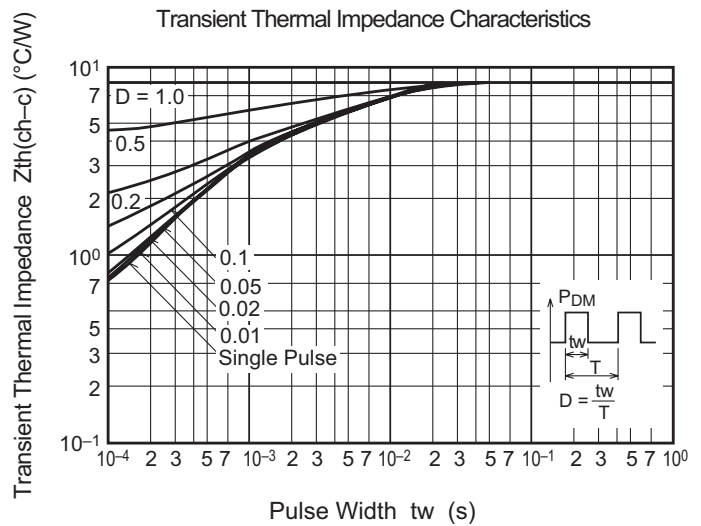
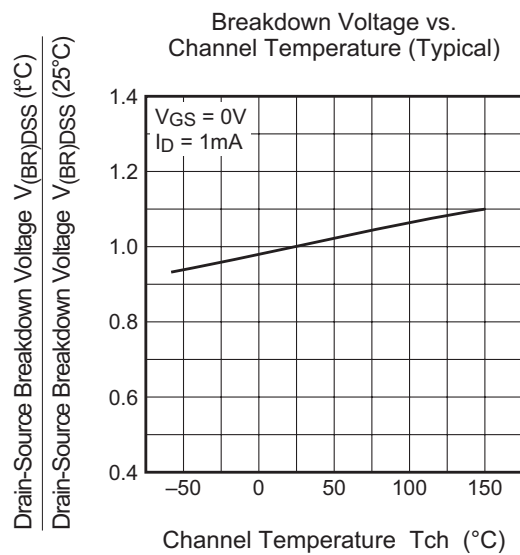
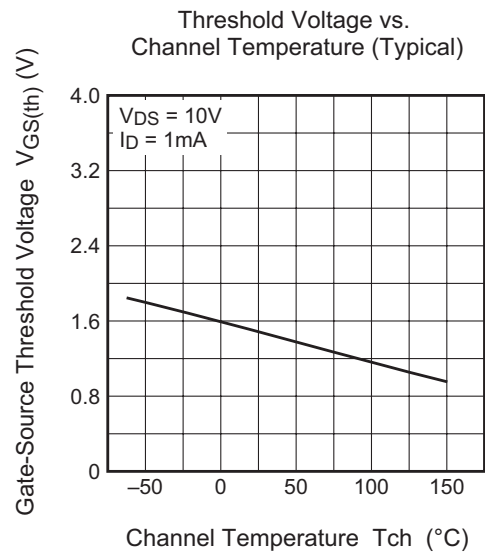
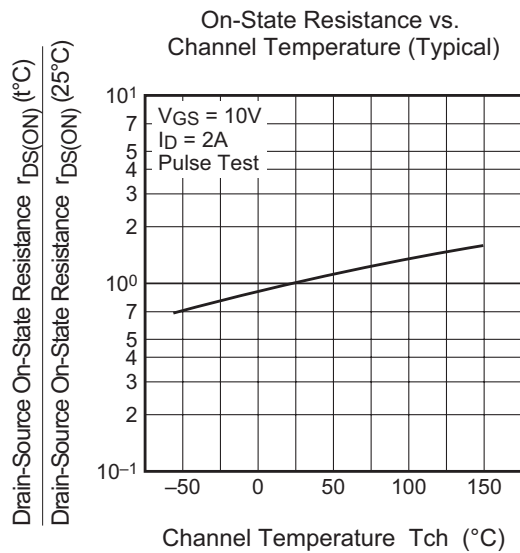


Gate-Source Voltage vs. Gate Charge (Typical)

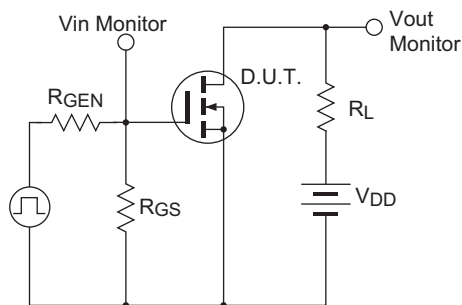


Source-Drain Diode Forward Characteristics (Typical)

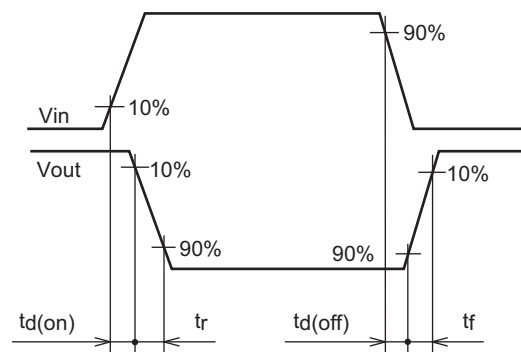




Switching Time Measurement Circuit



Switching Waveform



## Package Dimensions

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:** Overall width 6.6 mm, body width 5.3 ± 0.2 mm, lead width 2.3 ± 0.2 mm. Lead spacing is 0.76 ± 0.2 mm, with a minimum of 0.76 mm. Lead thickness is 1 mm.
- Side View:** Total height 10.4 mm (Max), body height 6.1 ± 0.2 mm, lead height 2.5 mm (Min). Lead thickness is 0.5 ± 0.2 mm.
- Bottom View:** Shows the lead profile with a thickness of 0.1 ± 0.1 mm and a lead width of 1.4 ± 0.2 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	FS5ASJ-06F-T13
Surface-mounted type	Plastic Magazine (Tube)	75	Type name	FS5ASJ-06F

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

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