

# FS5AS-3

## High-Speed Switching Use Nch Power MOS FET

REJ03G0245-0100

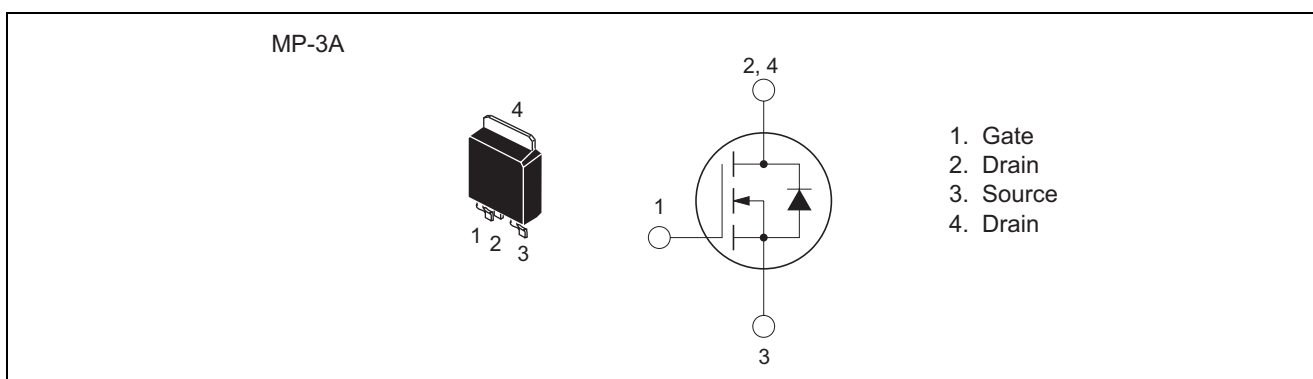
Rev.1.00

Aug.20.2004

### Features

- Drive voltage : 10 V
- $V_{DSS}$  : 150 V
- $r_{DS(ON) (max)}$  : 0.38  $\Omega$
- $I_D$  : 5 A
- Recovery Time of the Integrated Fast Recovery Diode (TYP.) : 85 ns

### Outline



### Applications

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

### Maximum Ratings

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

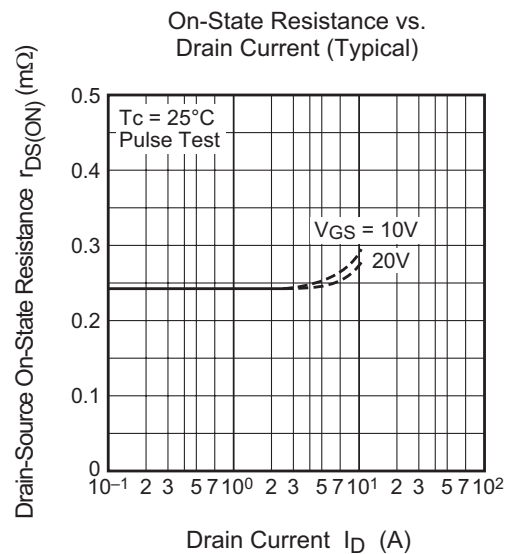
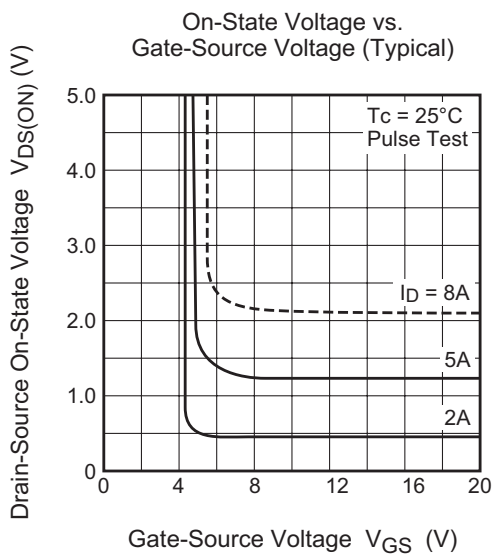
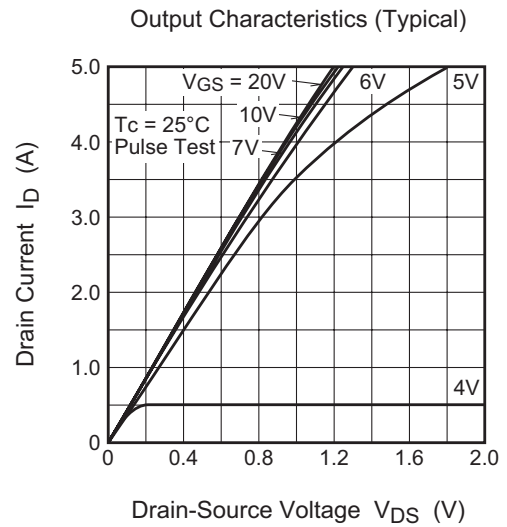
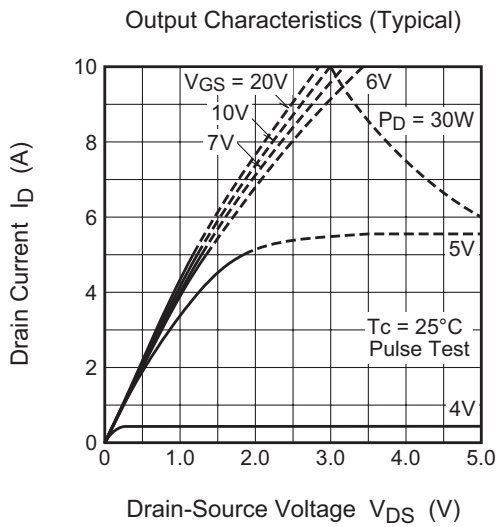
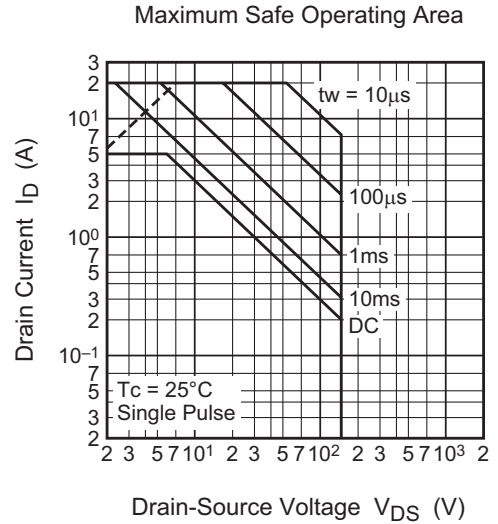
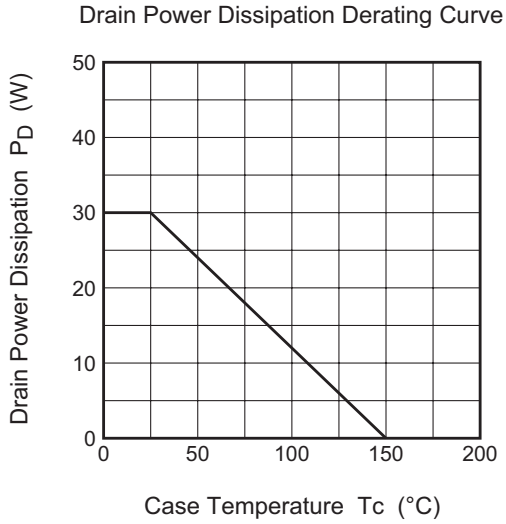
Parameter	Symbol	Ratings	Unit	Conditions
Drain-source voltage	$V_{DSS}$	150	V	$V_{GS} = 0\text{ V}$
Gate-source voltage	$V_{GSS}$	$\pm 20$	V	$V_{DS} = 0\text{ V}$
Drain current	$I_D$	5	A	
Drain current (Pulsed)	$I_{DM}$	20	A	
Avalanche current (Pulsed)	$I_{DA}$	5	A	$L = 100\ \mu\text{H}$
Source current	$I_S$	5	A	
Source current (Pulsed)	$I_{SM}$	20	A	
Maximum power dissipation	$P_D$	30	W	
Channel temperature	$T_{ch}$	- 55 to +150	$^\circ\text{C}$	
Storage temperature	$T_{stg}$	- 55 to +150	$^\circ\text{C}$	
Mass	—	0.32	g	Typical value

## Electrical Characteristics

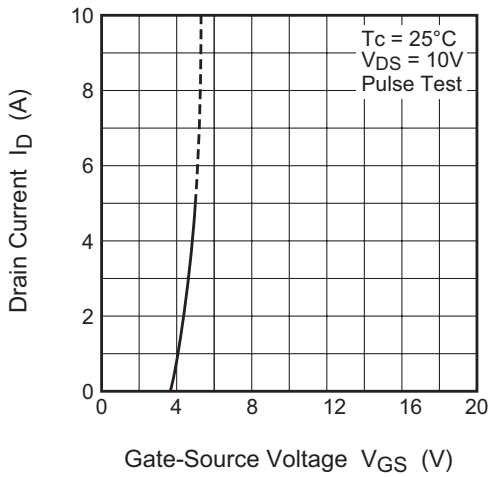
(T<sub>ch</sub> = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test conditions
Drain-source breakdown voltage	$V_{(BR)DSS}$	150	—	—	V	$I_D = 1 \text{ mA}, V_{GS} = 0 \text{ V}$
Gate-source leakage current	$I_{GSS}$	—	—	$\pm 0.1$	$\mu\text{A}$	$V_{GS} = \pm 20 \text{ V}, V_{DS} = 0 \text{ V}$
Drain-source leakage current	$I_{DSS}$	—	—	0.1	mA	$V_{DS} = 150 \text{ V}, V_{GS} = 0 \text{ V}$
Gate-source threshold voltage	$V_{GS(th)}$	2.0	3.0	4.0	V	$I_D = 1 \text{ mA}, V_{DS} = 10 \text{ V}$
Drain-source on-state resistance	$r_{DS(ON)}$	—	0.28	0.38	$\Omega$	$I_D = 2 \text{ A}, V_{GS} = 10 \text{ V}$
Drain-source on-state voltage	$V_{DS(ON)}$	—	0.56	0.76	V	$I_D = 2 \text{ A}, V_{GS} = 10 \text{ V}$
Forward transfer admittance	$ y_{fs} $	—	6.5	—	S	$I_D = 2 \text{ A}, V_{DS} = 5 \text{ V}$
Input capacitance	$C_{iss}$	—	600	—	pF	$V_{DS} = 10 \text{ V}, V_{GS} = 0 \text{ V},$ $f = 1\text{MHz}$
Output capacitance	$C_{oss}$	—	100	—	pF	
Reverse transfer capacitance	$C_{rss}$	—	30	—	pF	
Turn-on delay time	$t_{d(on)}$	—	18	—	ns	$V_{DD} = 80 \text{ V}, I_D = 2 \text{ A},$ $V_{GS} = 10 \text{ V},$ $R_{GEN} = R_{GS} = 50 \Omega$
Rise time	$t_r$	—	18	—	ns	
Turn-off delay time	$t_{d(off)}$	—	30	—	ns	
Fall time	$t_f$	—	15	—	ns	
Source-drain voltage	$V_{SD}$	—	1.0	1.5	V	$I_S = 2 \text{ A}, V_{GS} = 0 \text{ V}$
Thermal resistance	$R_{th(ch-c)}$	—	—	4.17	$^{\circ}\text{C/W}$	Channel to case
Reverse recovery time	$t_{rr}$	—	85	—	ns	$I_S = 5 \text{ A}, \text{dis}/\text{dt} = -100 \text{ A}/\mu\text{s}$

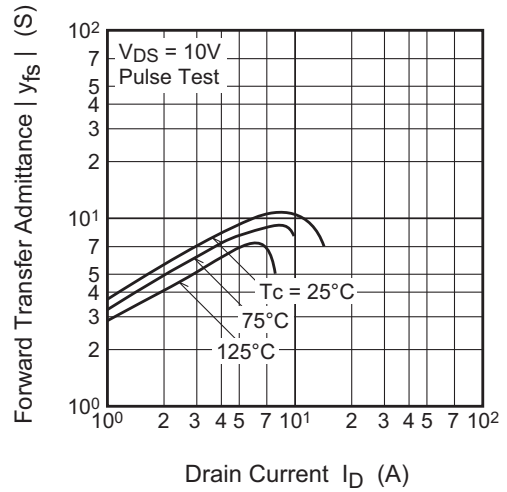
Performance Curves



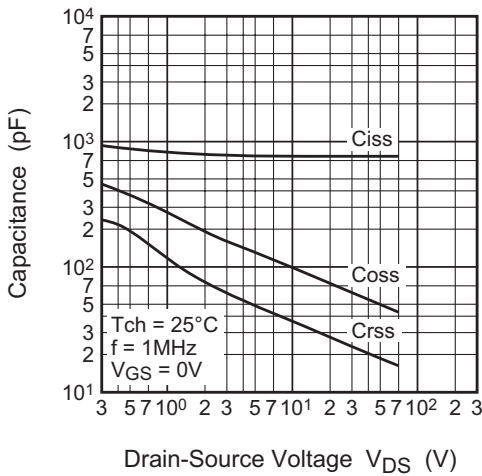
Transfer Characteristics (Typical)



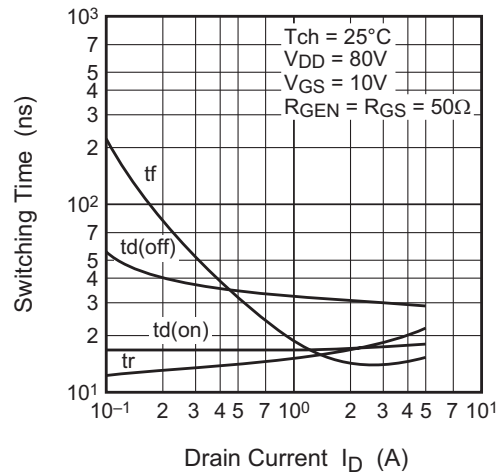
Forward Transfer Admittance vs. Drain Current (Typical)



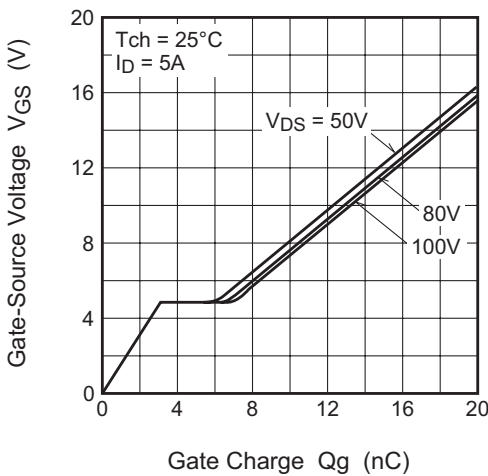
Capacitance vs. Drain-Source Voltage (Typical)



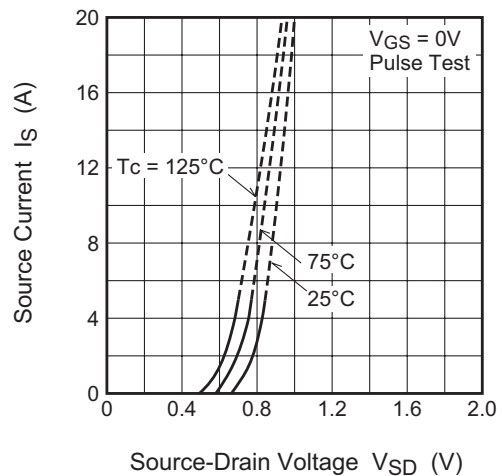
Switching Characteristics (Typical)

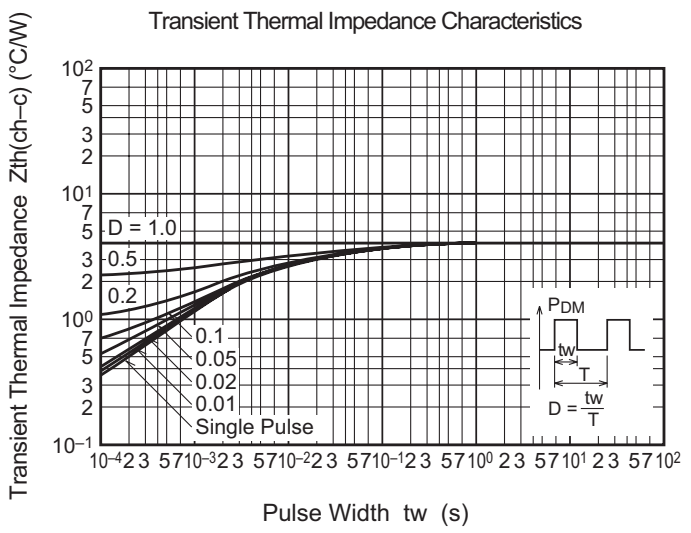
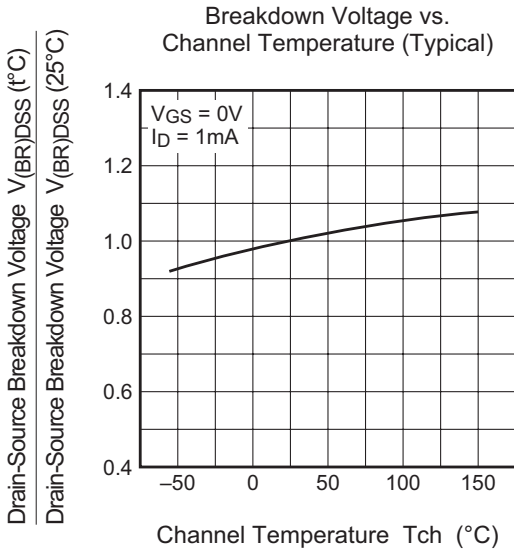
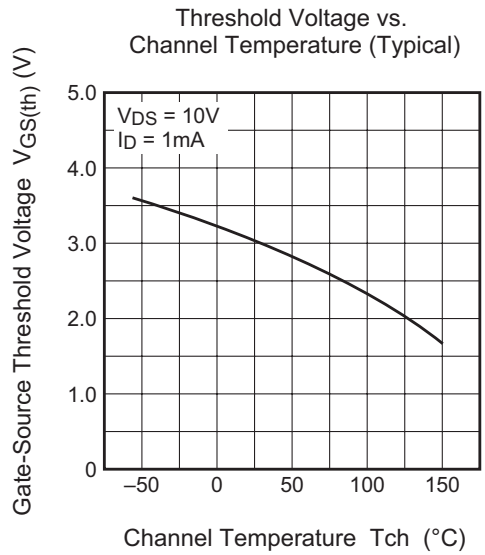
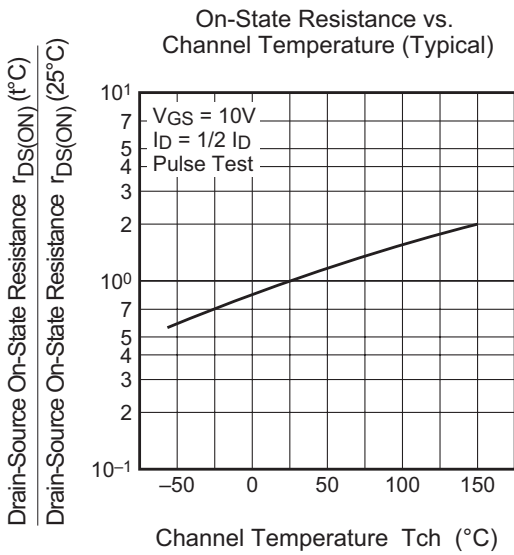


Gate-Source Voltage vs. Gate Charge (Typical)

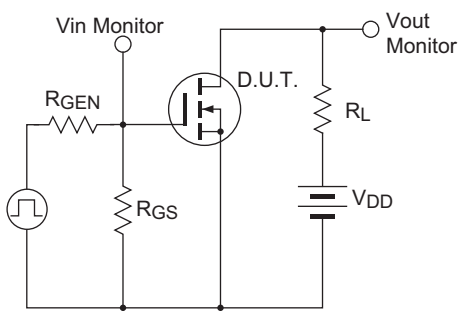


Source-Drain Diode Forward Characteristics (Typical)

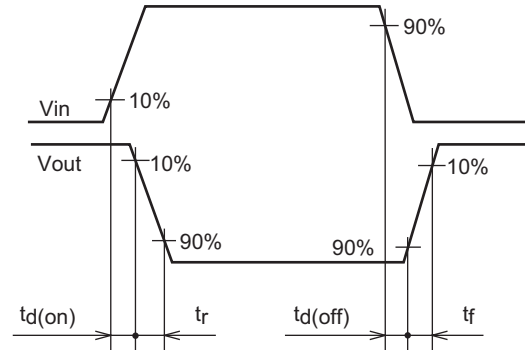




Switching Time Measurement Circuit



Switching Waveform



## Package Dimensions

**MP-3A**

EIAJ Package Code	JEDEC Code	Mass (g) (reference value)	Lead Material
—	—	0.32	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 <sub>1</sub>	—	—	—
A <sub>2</sub>	—	—	—
b	—	—	—
D	—	—	—
E	—	—	—
e	—	—	—
x	—	—	—
y	—	—	—
y <sub>1</sub>	—	—	—
ZD	—	—	—
ZE	—	—	—

## 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	FS5AS-3-T13
Surface-mounted type	Plastic Magazine (Tube)	75	Type name	FS5AS-3

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

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