

# FS5VSH-3

HIGH-SPEED SWITCHING USE

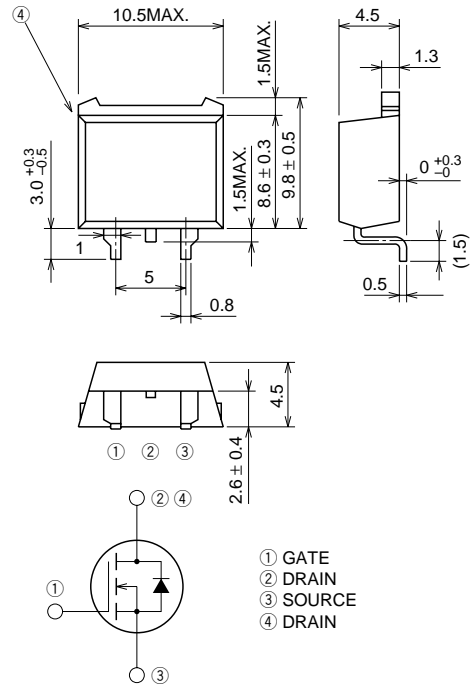
## FS5VSH-3



- 2.5V DRIVE
- $V_{DSS}$  ..... 150V
- $r_{DS(ON)}$  (MAX) .....  $0.35\Omega$
- $I_D$  ..... 5A
- Integrated Fast Recovery Diode (TYP.) ..... 85ns

## OUTLINE DRAWING

Dimensions in mm



TO-220S

## APPLICATION

Motor control, Lamp control, Solenoid control  
DC-DC converter, etc.

## MAXIMUM RATINGS (Tc = 25°C)

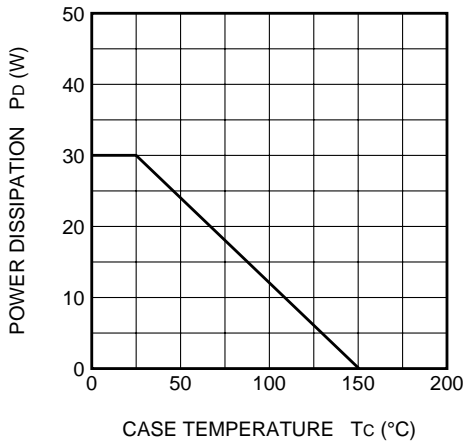
Symbol	Parameter	Conditions	Ratings	Unit
$V_{DSS}$	Drain-source voltage	$V_{GS} = 0V$	150	V
$V_{GSS}$	Gate-source voltage	$V_{DS} = 0V$	$\pm 10$	V
$I_D$	Drain current		5	A
$I_{DM}$	Drain current (Pulsed)		20	A
$I_{DA}$	Avalanche drain current (Pulsed)	$L = 100\mu H$	5	A
$I_S$	Source current		5	A
$I_{SM}$	Source current (Pulsed)		20	A
$P_D$	Maximum power dissipation		30	W
$T_{ch}$	Channel temperature		-55 ~ +150	°C
$T_{stg}$	Storage temperature		-55 ~ +150	°C
—	Weight	Typical value	1.2	g

**ELECTRICAL CHARACTERISTICS** (T<sub>ch</sub> = 25°C)

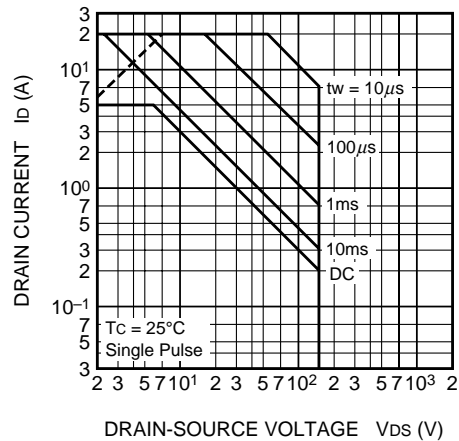
Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
V (BR) DSS	Drain-source breakdown voltage	I <sub>D</sub> = 1mA, V <sub>GS</sub> = 0V	150	—	—	V
I <sub>GSS</sub>	Gate-source leakage current	V <sub>GS</sub> = ±10V, V <sub>DS</sub> = 0V	—	—	±0.1	μA
I <sub>DSS</sub>	Drain-source leakage current	V <sub>DS</sub> = 150V, V <sub>GS</sub> = 0V	—	—	0.1	mA
V <sub>GS</sub> (th)	Gate-source threshold voltage	I <sub>D</sub> = 1mA, V <sub>DS</sub> = 10V	0.6	0.9	1.2	V
r <sub>DS</sub> (ON)	Drain-source on-state resistance	I <sub>D</sub> = 2A, V <sub>GS</sub> = 4V	—	0.27	0.35	Ω
r <sub>DS</sub> (ON)	Drain-source on-state resistance	I <sub>D</sub> = 2A, V <sub>GS</sub> = 2.5V	—	0.28	0.37	Ω
V <sub>DS</sub> (ON)	Drain-source on-state voltage	I <sub>D</sub> = 2A, V <sub>GS</sub> = 4V	—	0.54	0.70	V
y <sub>fs</sub>	Forward transfer admittance	I <sub>D</sub> = 2A, V <sub>DS</sub> = 5V	—	12	—	S
C <sub>iss</sub>	Input capacitance	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V, f = 1MHz	—	1200	—	pF
C <sub>oss</sub>	Output capacitance		—	100	—	pF
C <sub>rss</sub>	Reverse transfer capacitance		—	35	—	pF
t <sub>d</sub> (on)	Turn-on delay time	V <sub>DD</sub> = 80V, I <sub>D</sub> = 2A, V <sub>GS</sub> = 4V, R <sub>GEN</sub> = R <sub>GS</sub> = 50Ω	—	19	—	ns
t <sub>r</sub>	Rise time		—	34	—	ns
t <sub>d</sub> (off)	Turn-off delay time		—	100	—	ns
t <sub>f</sub>	Fall time		—	60	—	ns
V <sub>SD</sub>	Source-drain voltage	I <sub>S</sub> = 2A, V <sub>GS</sub> = 0V	—	1.0	1.5	V
R <sub>th</sub> (ch-c)	Thermal resistance	Channel to case	—	—	4.17	°C/W
t <sub>rr</sub>	Reverse recovery time	I <sub>S</sub> = 5A, di <sub>s</sub> /dt = -100A/μs	—	85	—	ns

**PERFORMANCE CURVES**

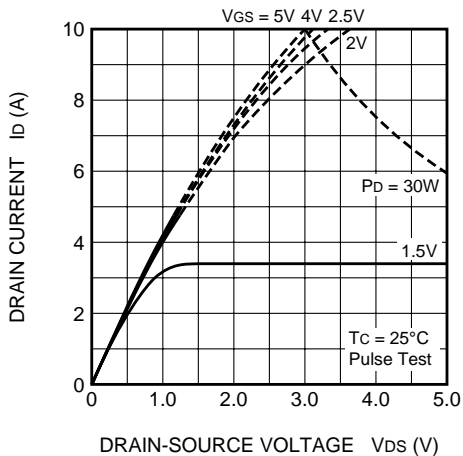
**POWER DISSIPATION DERATING CURVE**



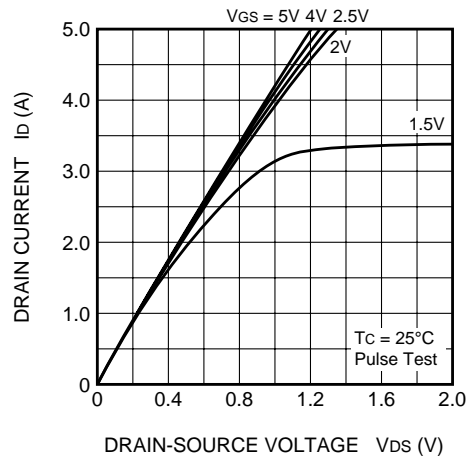
**MAXIMUM SAFE OPERATING AREA**



**OUTPUT CHARACTERISTICS (TYPICAL)**



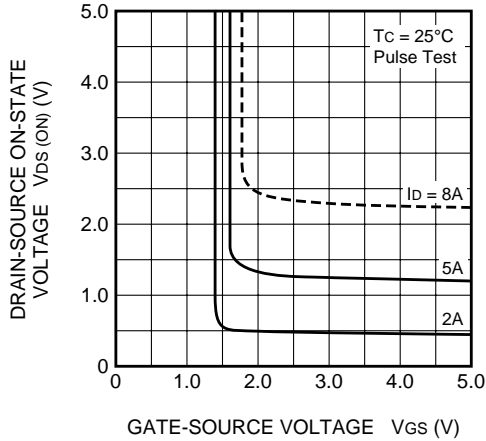
**OUTPUT CHARACTERISTICS (TYPICAL)**



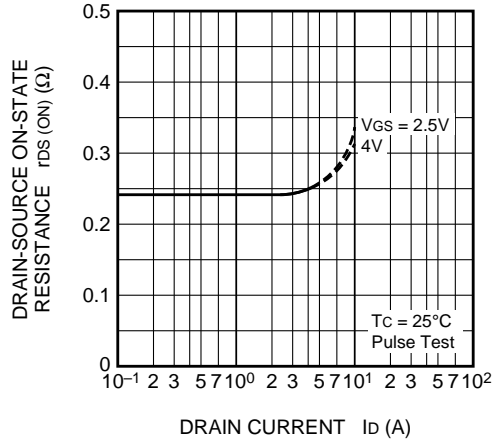
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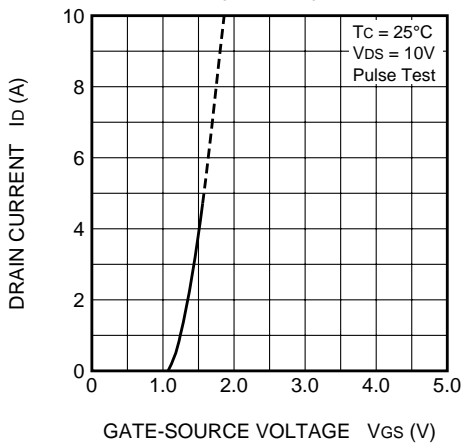
**ON-STATE VOLTAGE VS. GATE-SOURCE VOLTAGE (TYPICAL)**



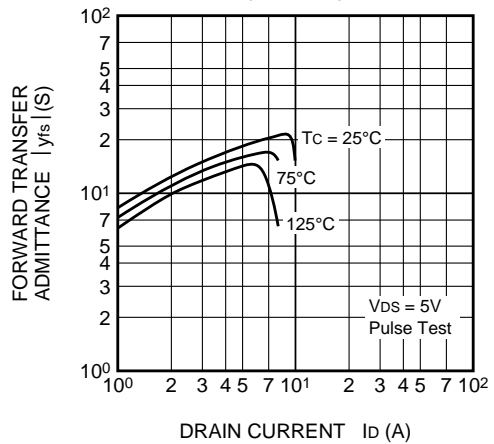
**ON-STATE RESISTANCE VS. DRAIN CURRENT (TYPICAL)**



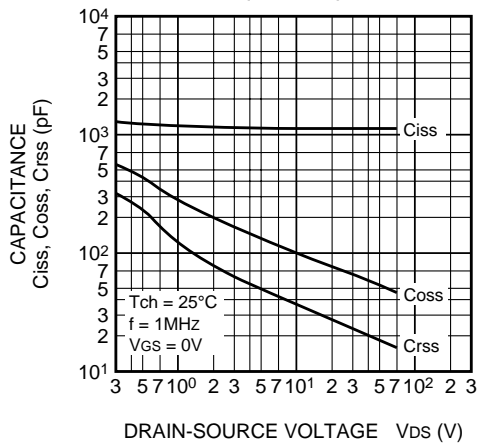
**TRANSFER CHARACTERISTICS (TYPICAL)**



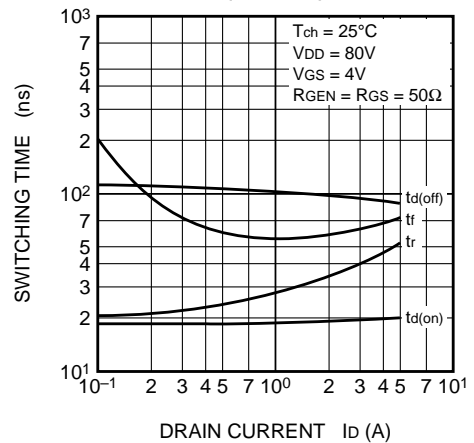
**FORWARD TRANSFER ADMITTANCE VS. DRAIN CURRENT (TYPICAL)**



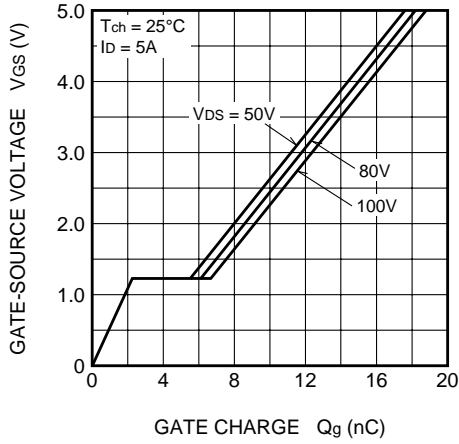
**CAPACITANCE VS. DRAIN-SOURCE VOLTAGE (TYPICAL)**



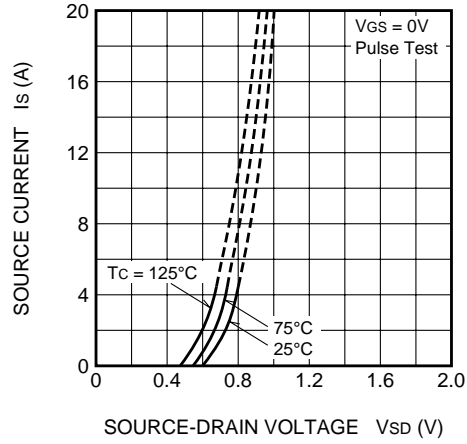
**SWITCHING CHARACTERISTICS (TYPICAL)**



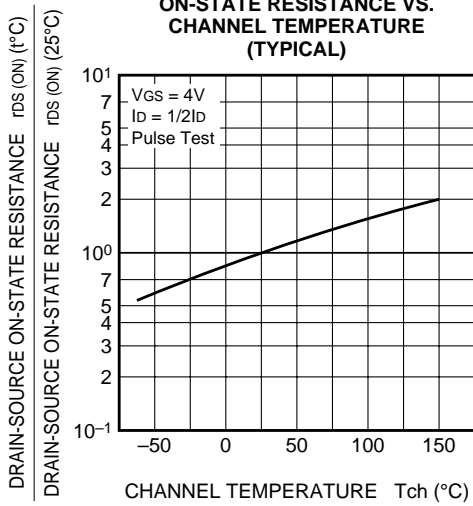
**GATE-SOURCE VOLTAGE VS. GATE CHARGE (TYPICAL)**



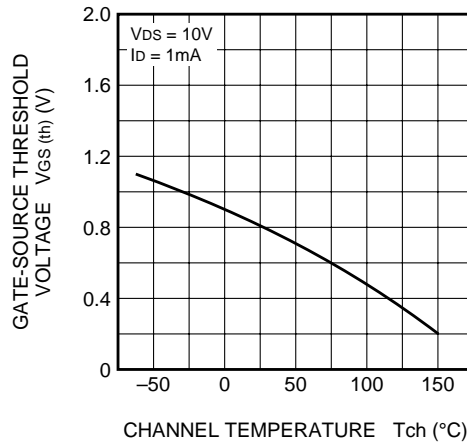
**SOURCE-DRAIN DIODE FORWARD CHARACTERISTICS (TYPICAL)**



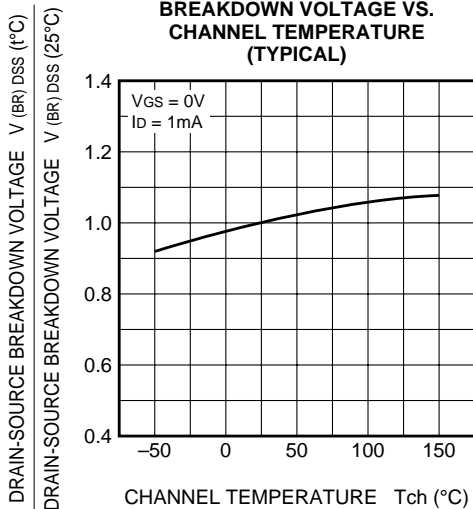
**ON-STATE RESISTANCE VS. CHANNEL TEMPERATURE (TYPICAL)**



**THRESHOLD VOLTAGE VS. CHANNEL TEMPERATURE (TYPICAL)**



**BREAKDOWN VOLTAGE VS. CHANNEL TEMPERATURE (TYPICAL)**



**TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS**

