

# FS50VS-3

HIGH-SPEED SWITCHING USE

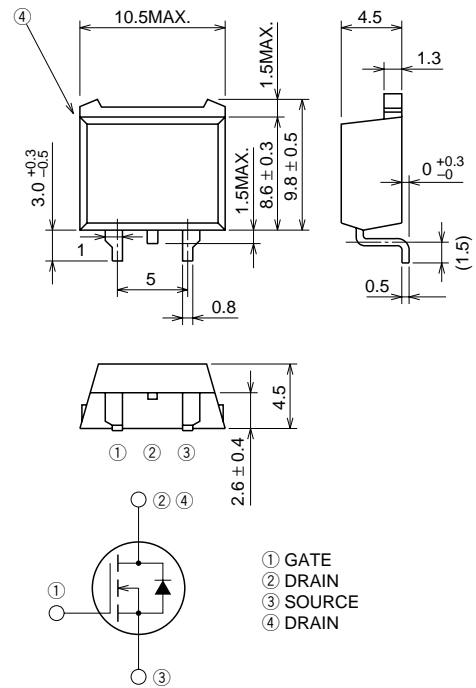
## FS50VS-3



- 10V DRIVE
- $V_{DS}$  ..... 150V
- $r_{DS(ON)}$  (MAX) ..... 31m $\Omega$
- $I_D$  ..... 50A
- Integrated Fast Recovery Diode (TYP.) ..... 130ns

## OUTLINE DRAWING

Dimensions in mm



TO-220S

## APPLICATION

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

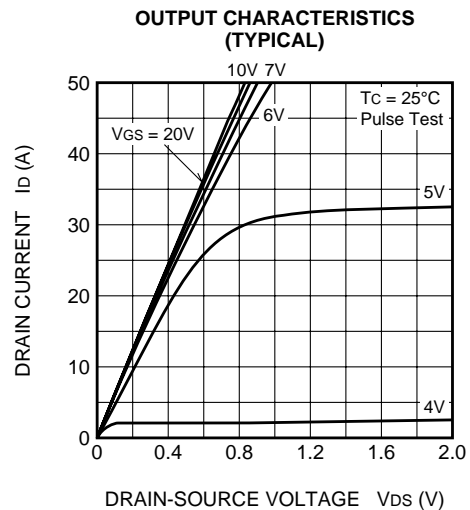
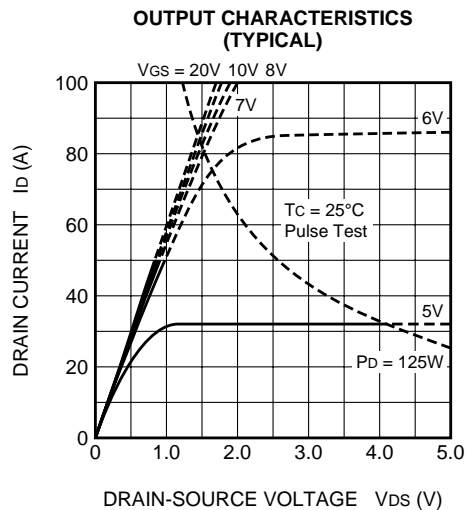
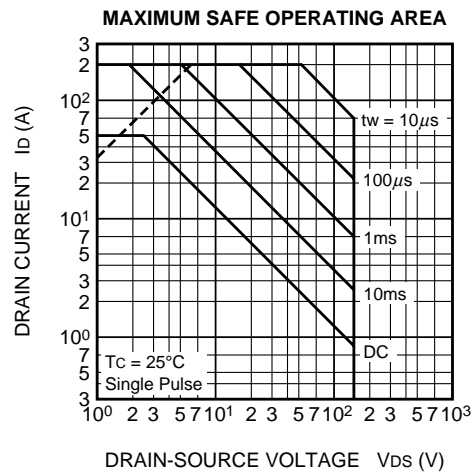
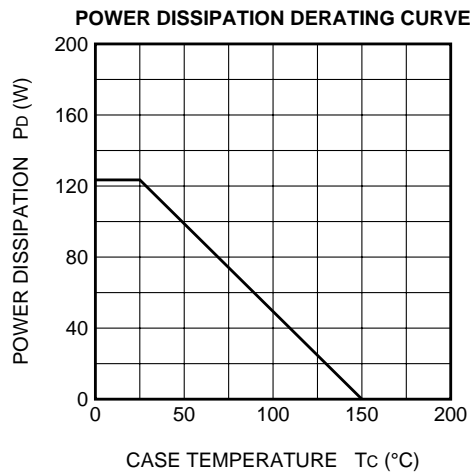
## MAXIMUM RATINGS (T<sub>c</sub> = 25°C)

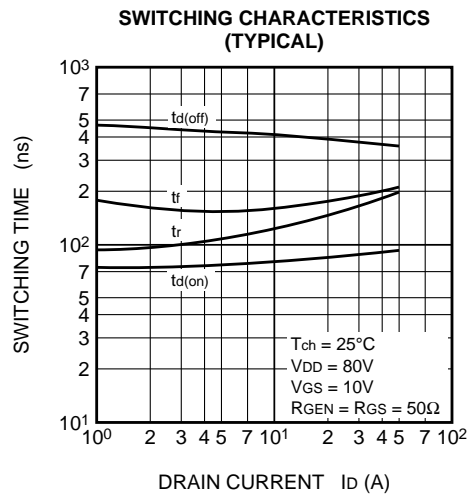
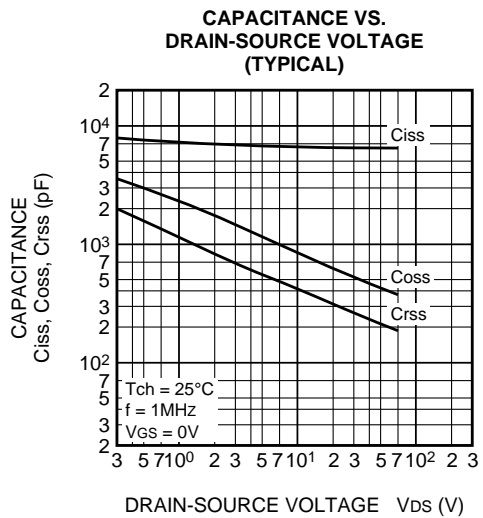
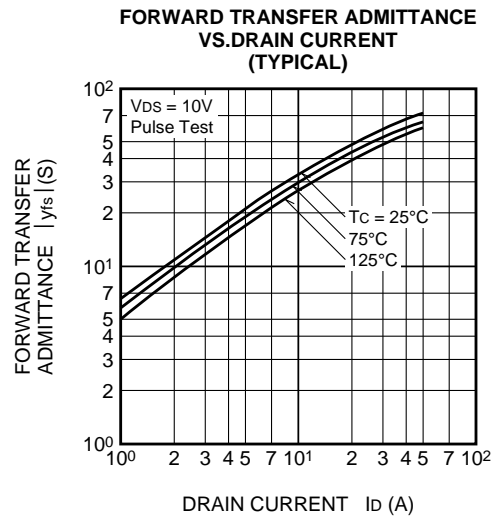
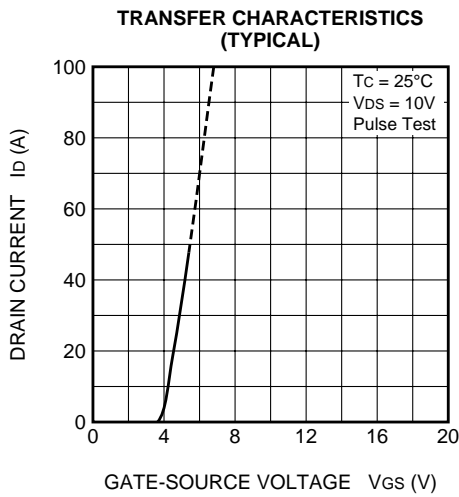
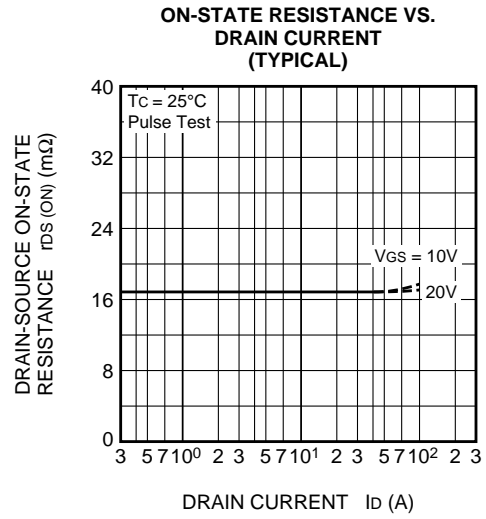
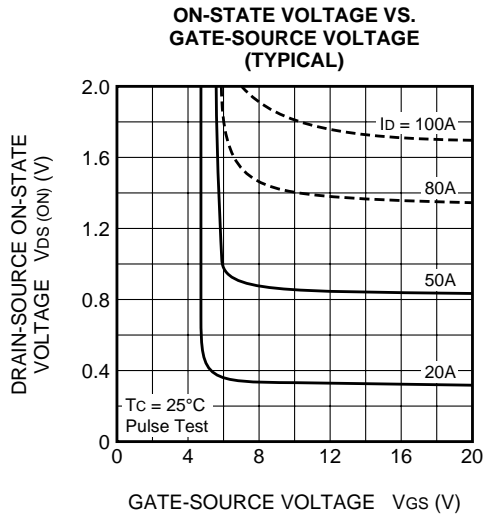
Symbol	Parameter	Conditions	Ratings	Unit
$V_{DS}$	Drain-source voltage	$V_{GS} = 0V$	150	V
$V_{GS}$	Gate-source voltage	$V_{DS} = 0V$	±20	V
$I_D$	Drain current		50	A
$I_{DM}$	Drain current (Pulsed)		200	A
$I_{DA}$	Avalanche drain current (Pulsed)	$L = 100\mu H$	50	A
$I_S$	Source current		50	A
$I_{SM}$	Source current (Pulsed)		200	A
$P_D$	Maximum power dissipation		125	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)

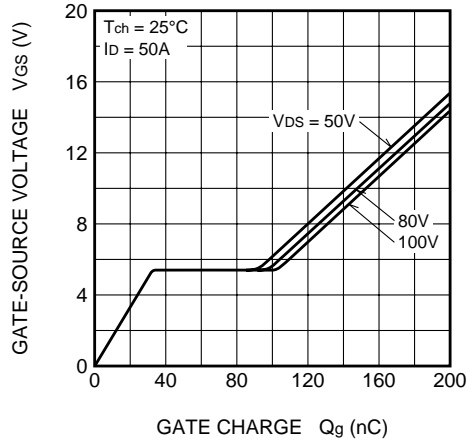
Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
V <sub>(BR)DSS</sub>	Drain-source breakdown voltage	I <sub>D</sub> = 1mA, V <sub>GS</sub> = 0V	150	—	—	V
I <sub>GSS</sub>	Gate-source leakage current	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V	—	—	±0.1	μA
I <sub>DSS</sub>	Drain-source leakage current	V <sub>DS</sub> = 150V, V <sub>GS</sub> = 0V	—	—	0.1	mA
V <sub>GS(th)</sub>	Gate-source threshold voltage	I <sub>D</sub> = 1mA, V <sub>DS</sub> = 10V	2.0	3.0	4.0	V
r <sub>DS(on)</sub>	Drain-source on-state resistance	I <sub>D</sub> = 25A, V <sub>GS</sub> = 10V	—	24	31	mΩ
V <sub>DS(on)</sub>	Drain-source on-state voltage	I <sub>D</sub> = 25A, V <sub>GS</sub> = 10V	—	0.600	0.775	V
y <sub>fs</sub>	Forward transfer admittance	I <sub>D</sub> = 25A, V <sub>DS</sub> = 10V	—	55	—	S
C <sub>iss</sub>	Input capacitance	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V, f = 1MHz	—	6540	—	pF
C <sub>oss</sub>	Output capacitance		—	860	—	pF
C <sub>rss</sub>	Reverse transfer capacitance		—	360	—	pF
t <sub>d(on)</sub>	Turn-on delay time	V <sub>DD</sub> = 80V, I <sub>D</sub> = 25A, V <sub>GS</sub> = 10V, R <sub>GEN</sub> = R <sub>GS</sub> = 50Ω	—	95	—	ns
t <sub>r</sub>	Rise time		—	155	—	ns
t <sub>d(off)</sub>	Turn-off delay time		—	380	—	ns
t <sub>f</sub>	Fall time		—	180	—	ns
V <sub>SD</sub>	Source-drain voltage	I <sub>S</sub> = 25A, V <sub>GS</sub> = 0V	—	1.0	1.5	V
R <sub>th(ch-c)</sub>	Thermal resistance	Channel to case	—	—	1.0	°C/W
t <sub>rr</sub>	Reverse recovery time	I <sub>S</sub> = 50A, di/dt = -100A/μs	—	130	—	ns

PERFORMANCE CURVES

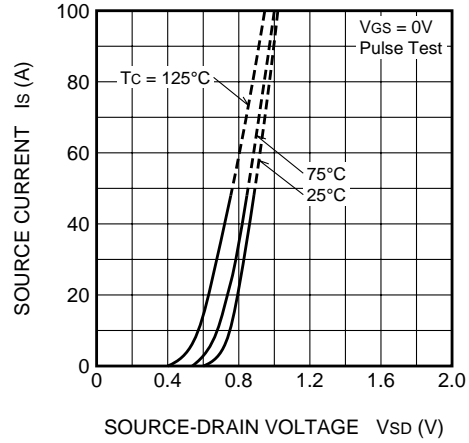




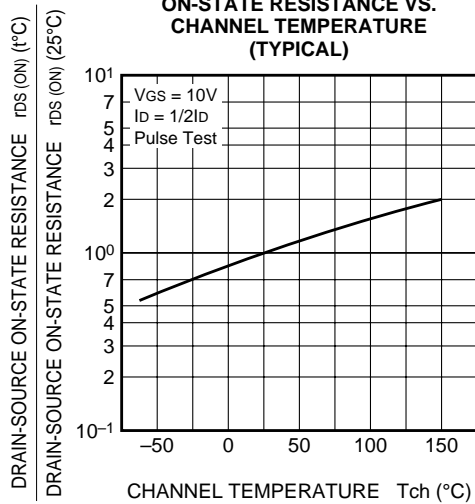
GATE-SOURCE VOLTAGE  
VS. GATE CHARGE  
(TYPICAL)



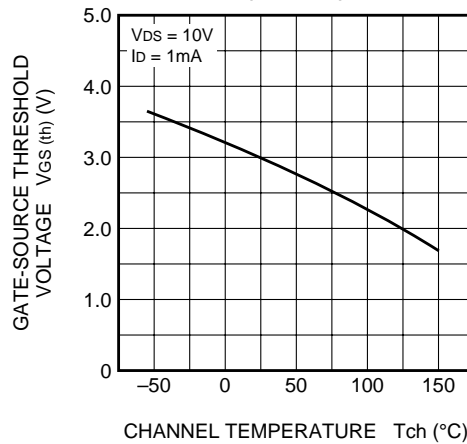
SOURCE-DRAIN DIODE  
FORWARD CHARACTERISTICS  
(TYPICAL)



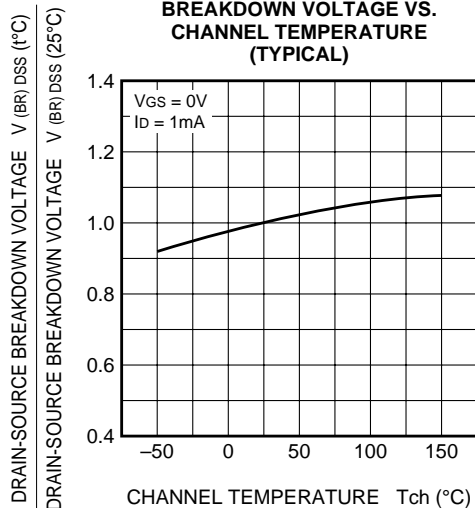
ON-STATE RESISTANCE VS.  
CHANNEL TEMPERATURE  
(TYPICAL)



THRESHOLD VOLTAGE VS.  
CHANNEL TEMPERATURE  
(TYPICAL)



BREAKDOWN VOLTAGE VS.  
CHANNEL TEMPERATURE  
(TYPICAL)



TRANSIENT THERMAL IMPEDANCE  
CHARACTERISTICS

