

FS50SMJ-06

HIGH-SPEED SWITCHING USE

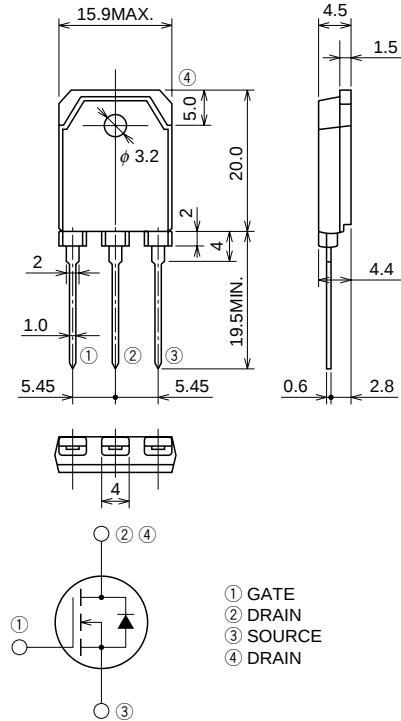
FS50SMJ-06



- 4V DRIVE
- V_{DS} 60V
- $r_{DS(ON)}$ (MAX) 20m Ω
- I_D 50A
- Integrated Fast Recovery Diode (TYP.) 70ns

OUTLINE DRAWING

Dimensions in mm



TO-3P

APPLICATION

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

MAXIMUM RATINGS (Tc = 25°C)

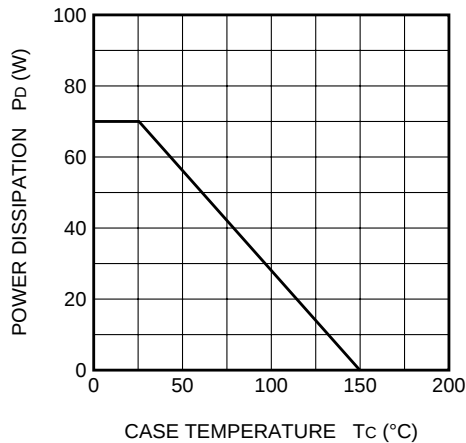
Symbol	Parameter	Conditions	Ratings	Unit
V_{DS}	Drain-source voltage	$V_{GS} = 0V$	60	V
V_{GS}	Gate-source voltage	$V_{DS} = 0V$	± 20	V
I_D	Drain current		50	A
I_{DM}	Drain current (Pulsed)		200	A
I_{DA}	Avalanche drain current (Pulsed)	$L = 100\mu H$	50	A
I_S	Source current		50	A
I_{SM}	Source current (Pulsed)		200	A
P_D	Maximum power dissipation		70	W
T_{ch}	Channel temperature		-55 ~ +150	°C
T_{stg}	Storage temperature		-55 ~ +150	°C
—	Weight	Typical value	4.8	g

ELECTRICAL CHARACTERISTICS (Tch = 25°C)

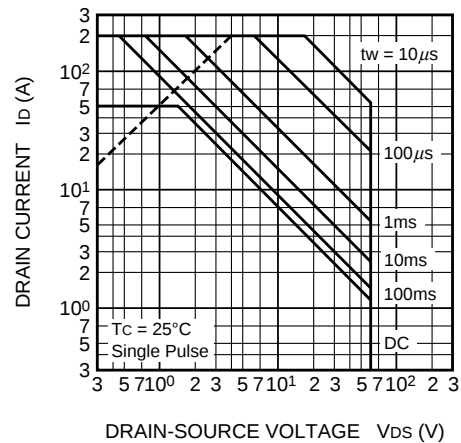
Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
V (BR) DSS	Drain-source breakdown voltage	Id = 1mA, Vgs = 0V	60	—	—	V
IGSS	Gate-source leakage current	Vgs = ±20V, Vds = 0V	—	—	±0.1	μA
IDSS	Drain-source leakage current	Vds = 60V, Vgs = 0V	—	—	0.1	mA
VGS (th)	Gate-source threshold voltage	Id = 1mA, Vds = 10V	1.0	1.5	2.0	V
rDS (ON)	Drain-source on-state resistance	Id = 25A, Vgs = 10V	—	15	20	mΩ
rDS (ON)	Drain-source on-state resistance	Id = 25A, Vgs = 4V	—	18	24	mΩ
VDS (ON)	Drain-source on-state voltage	Id = 25A, Vgs = 10V	—	0.38	0.50	V
yfs	Forward transfer admittance	Id = 25A, Vds = 10V	—	41	—	S
Ciss	Input capacitance	Vds = 10V, Vgs = 0V, f = 1MHz	—	3000	—	pF
Coss	Output capacitance		—	580	—	pF
Crss	Reverse transfer capacitance		—	300	—	pF
td (on)	Turn-on delay time	VDD = 30V, Id = 25A, Vgs = 10V, RGEN = RGS = 50Ω	—	22	—	ns
tr	Rise time		—	65	—	ns
td (off)	Turn-off delay time		—	250	—	ns
tf	Fall time		—	160	—	ns
VSD	Source-drain voltage	Is = 25A, Vgs = 0V	—	1.0	1.5	V
Rth (ch-c)	Thermal resistance	Channel to case	—	—	1.79	°C/W
trr	Reverse recovery time	Is = 50A, dis/dt = -100A/μs	—	70	—	ns

PERFORMANCE CURVES

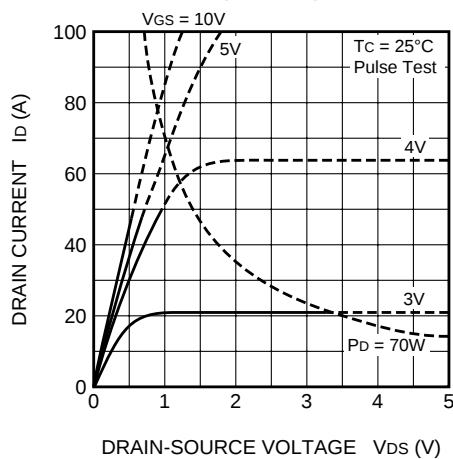
POWER DISSIPATION DERATING CURVE



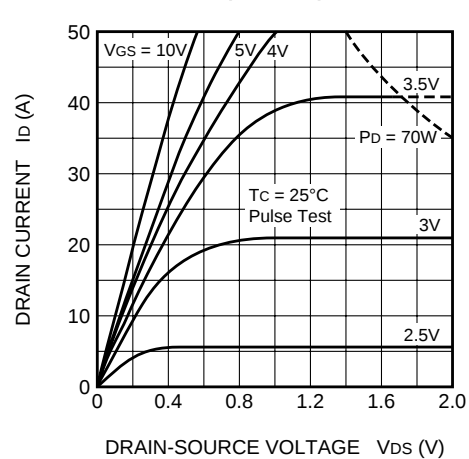
MAXIMUM SAFE OPERATING AREA



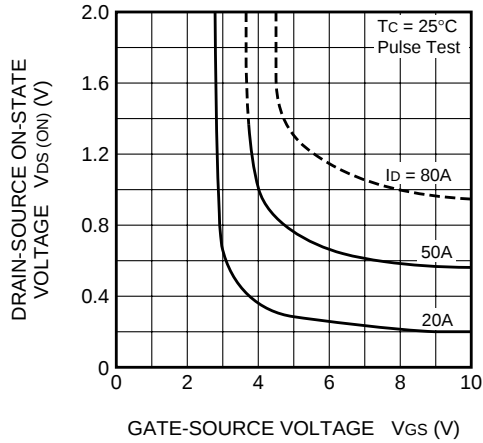
OUTPUT CHARACTERISTICS (TYPICAL)



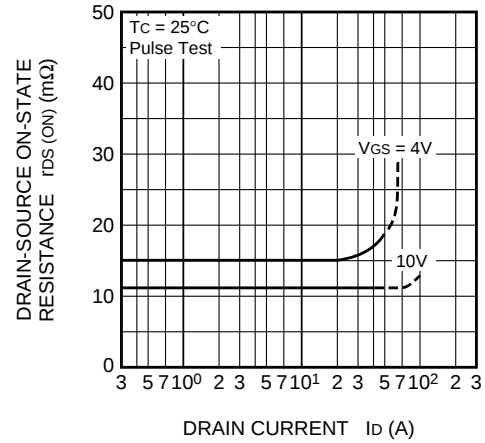
OUTPUT CHARACTERISTICS (TYPICAL)



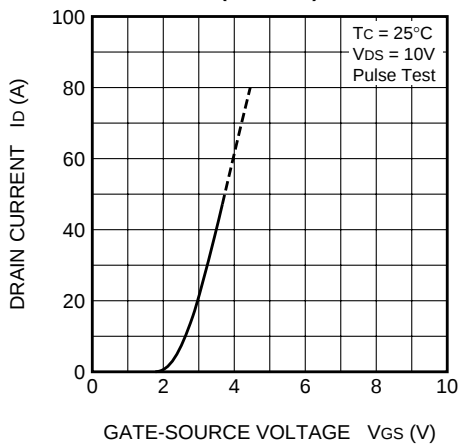
ON-STATE VOLTAGE VS.
GATE-SOURCE VOLTAGE
(TYPICAL)



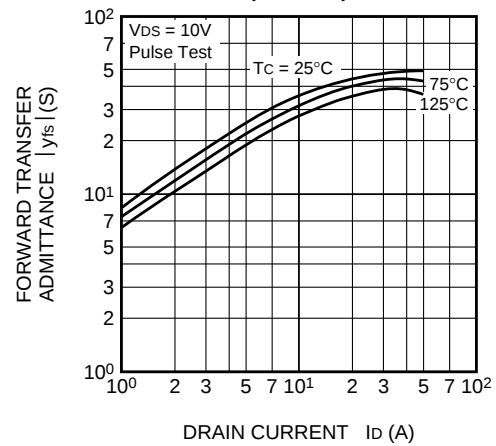
ON-STATE RESISTANCE VS.
DRAIN CURRENT
(TYPICAL)



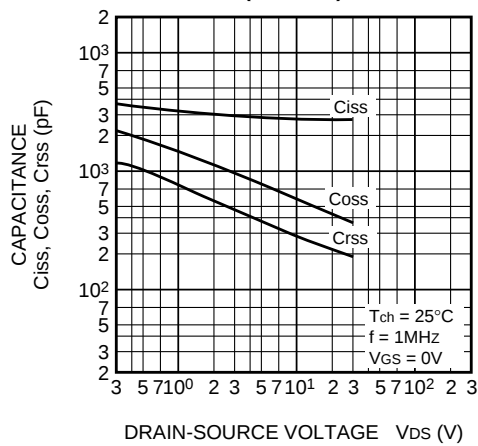
TRANSFER CHARACTERISTICS
(TYPICAL)



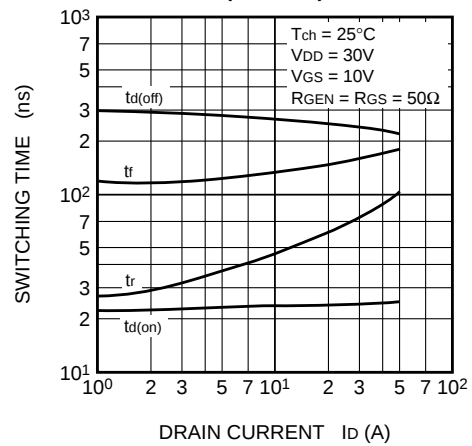
FORWARD TRANSFER ADMITTANCE
VS. DRAIN CURRENT
(TYPICAL)



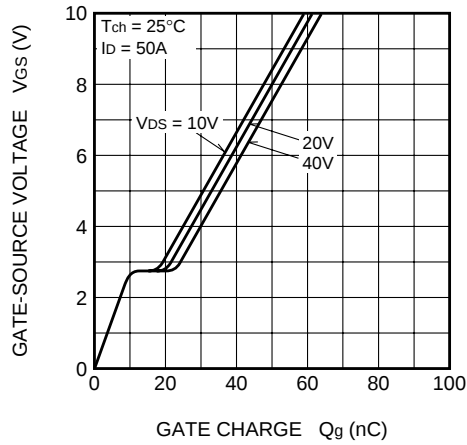
CAPACITANCE VS.
DRAIN-SOURCE VOLTAGE
(TYPICAL)



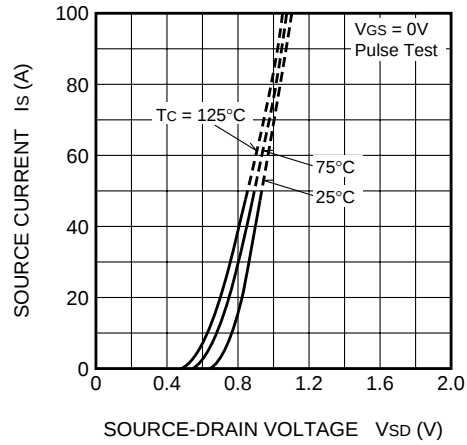
SWITCHING CHARACTERISTICS
(TYPICAL)



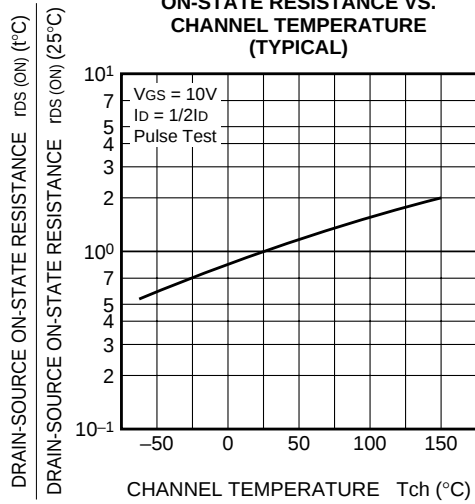
GATE-SOURCE VOLTAGE
VS. GATE CHARGE
(TYPICAL)



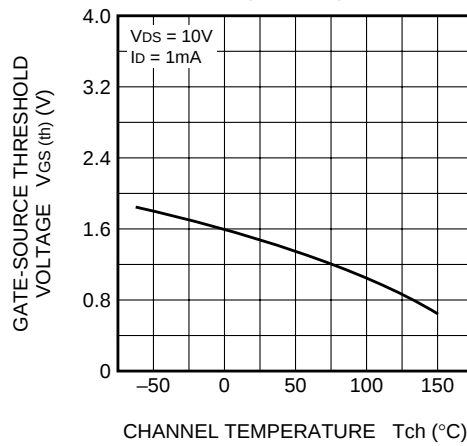
SOURCE-DRAIN DIODE
FORWARD CHARACTERISTICS
(TYPICAL)



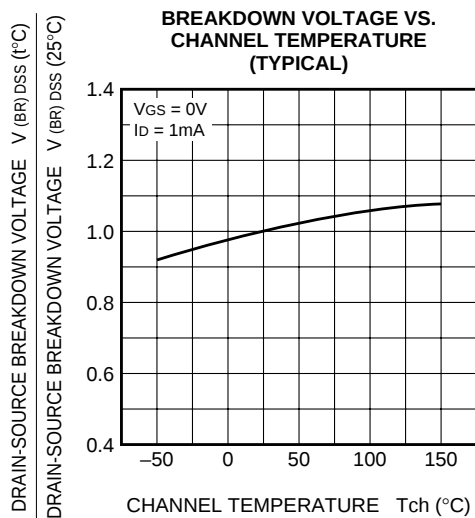
ON-STATE RESISTANCE VS.
CHANNEL TEMPERATURE
(TYPICAL)



THRESHOLD VOLTAGE VS.
CHANNEL TEMPERATURE
(TYPICAL)



BREAKDOWN VOLTAGE VS.
CHANNEL TEMPERATURE
(TYPICAL)



TRANSIENT THERMAL IMPEDANCE
CHARACTERISTICS

