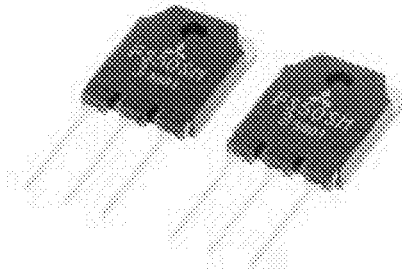


FS50SM-3

HIGH-SPEED SWITCHING USE

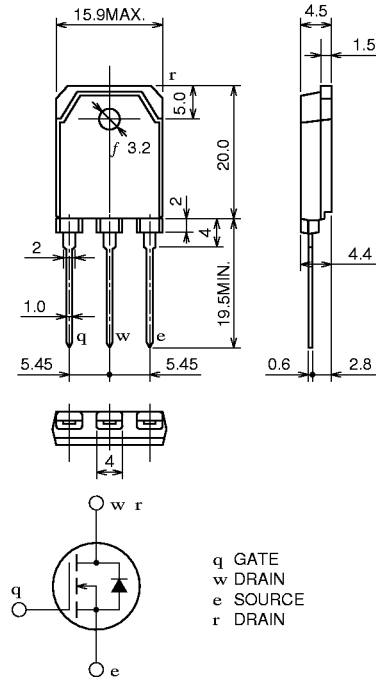
FS50SM-3



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

OUTLINE DRAWING

Dimensions in mm



TO-3P

APPLICATION

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

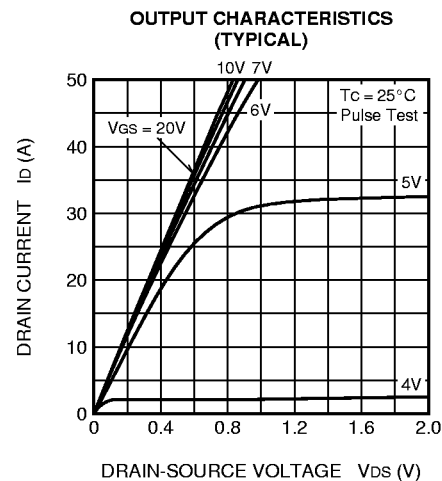
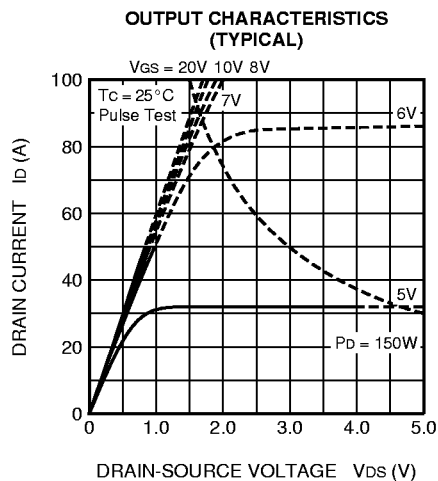
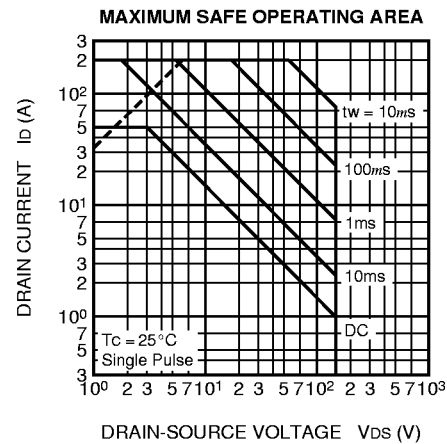
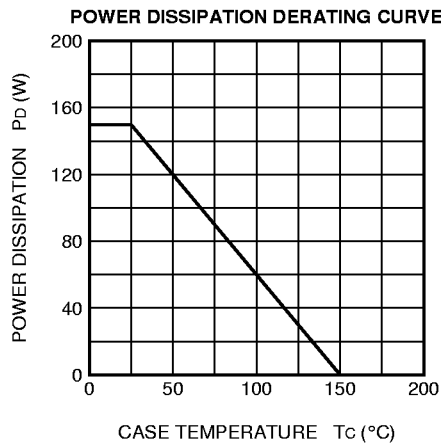
MAXIMUM RATINGS (T_c = 25°C)

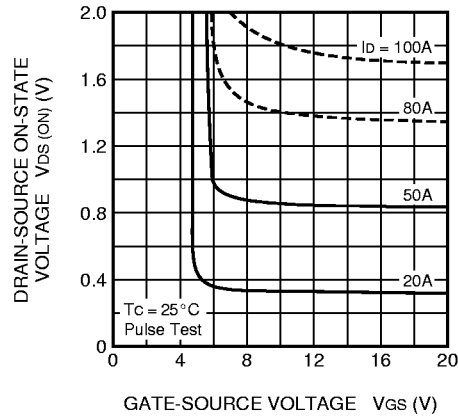
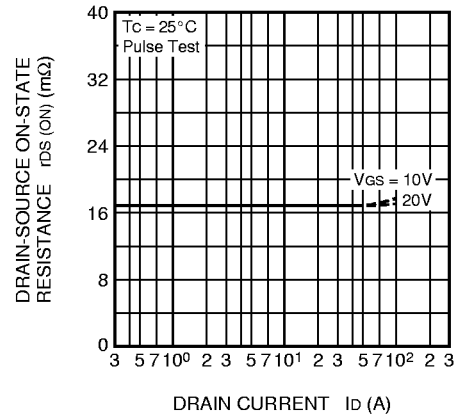
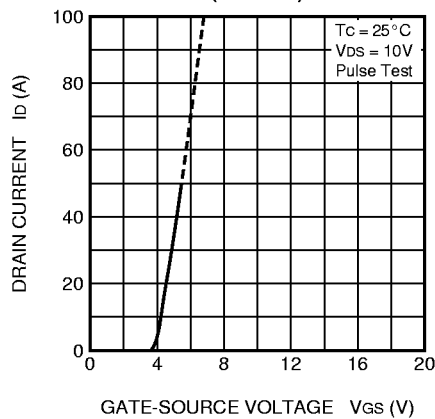
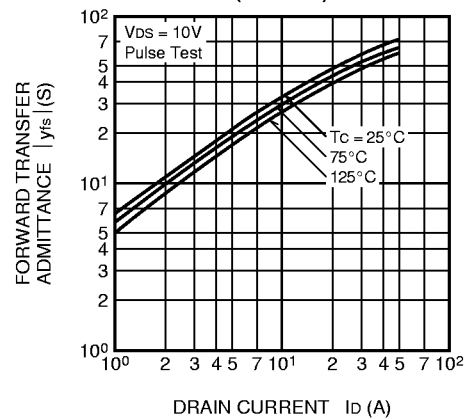
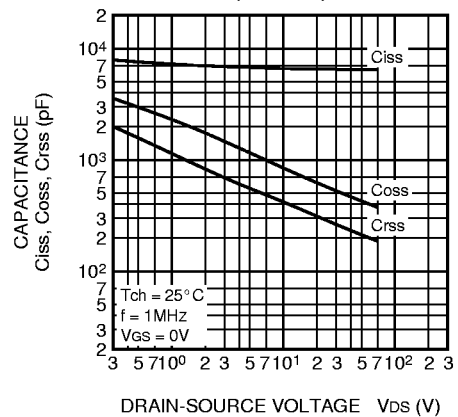
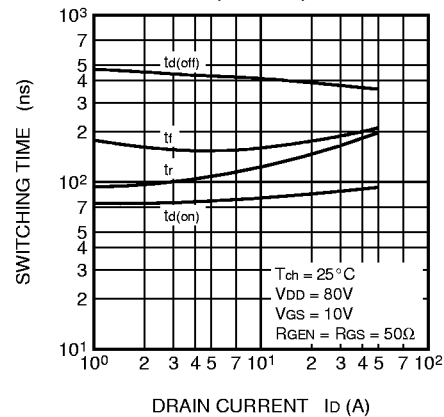
Symbol	Parameter	Conditions	Ratings	Unit
V_{DS}	Drain-source voltage	$V_{GS} = 0V$	150	V
V_{GSS}	Gate-source voltage	$V_{DS} = 0V$	± 20	V
I_D	Drain current		50	A
I_{DM}	Drain current (Pulsed)		200	A
I_{DA}	Avalanche drain current (Pulsed)	$L = 100\mu H$	50	A
I_S	Source current		50	A
I_{SM}	Source current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

ELECTRICAL CHARACTERISTICS ($T_{ch} = 25^{\circ}\text{C}$)

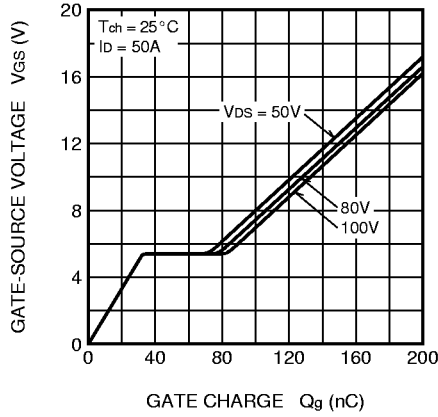
Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
$V_{(BR)DSS}$	Drain-source breakdown voltage	$I_D = 1\text{mA}$, $V_{GS} = 0\text{V}$	150	—	—	V
I_{GSS}	Gate-source leakage current	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$	—	—	± 0.1	μA
I_{DSS}	Drain-source leakage current	$V_{DS} = 150\text{V}$, $V_{GS} = 0\text{V}$	—	—	0.1	mA
$V_{GS(th)}$	Gate-source threshold voltage	$I_D = 1\text{mA}$, $V_{DS} = 10\text{V}$	2.0	3.0	4.0	V
$r_{DS(on)}$	Drain-source on-state resistance	$I_D = 25\text{A}$, $V_{GS} = 10\text{V}$	—	24	31	$\text{m}\Omega$
$V_{DS(on)}$	Drain-source on-state voltage	$I_D = 25\text{A}$, $V_{GS} = 10\text{V}$	—	0.600	0.775	V
$ y_{fs} $	Forward transfer admittance	$I_D = 25\text{A}$, $V_{DS} = 10\text{V}$	—	55	—	S
C_{iss}	Input capacitance	$V_{DS} = 10\text{V}$, $V_{GS} = 0\text{V}$, $f = 1\text{MHz}$	—	6540	—	pF
C_{oss}	Output capacitance		—	860	—	pF
C_{rss}	Reverse transfer capacitance		—	360	—	pF
$t_d(on)$	Turn-on delay time	$V_{DD} = 80\text{V}$, $I_D = 25\text{A}$, $V_{GS} = 10\text{V}$, $R_{GEN} = R_{GS} = 50\Omega$	—	95	—	ns
t_r	Rise time		—	155	—	ns
$t_d(off)$	Turn-off delay time		—	380	—	ns
t_f	Fall time		—	180	—	ns
V_{SD}	Source-drain voltage	$I_S = 25\text{A}$, $V_{GS} = 0\text{V}$	—	1.0	1.5	V
$R_{th(ch-c)}$	Thermal resistance	Channel to case	—	—	0.83	$^{\circ}\text{C/W}$
t_{rr}	Reverse recovery time	$I_S = 50\text{A}$, $di/dt = -100\text{A}/\mu\text{s}$	—	130	—	ns

PERFORMANCE CURVES

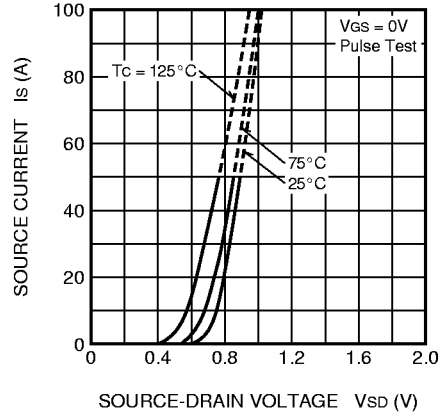


ON-STATE VOLTAGE VS.
GATE-SOURCE VOLTAGE
(TYPICAL)ON-STATE RESISTANCE VS.
DRAIN CURRENT
(TYPICAL)TRANSFER CHARACTERISTICS
(TYPICAL)FORWARD TRANSFER ADMITTANCE
VS. DRAIN CURRENT
(TYPICAL)CAPACITANCE VS.
DRAIN-SOURCE VOLTAGE
(TYPICAL)SWITCHING CHARACTERISTICS
(TYPICAL)

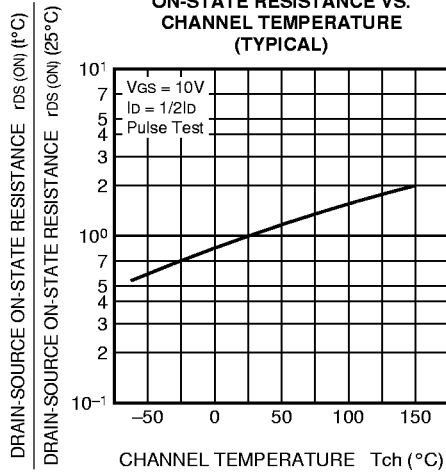
GATE-SOURCE VOLTAGE
VS. GATE CHARGE
(TYPICAL)



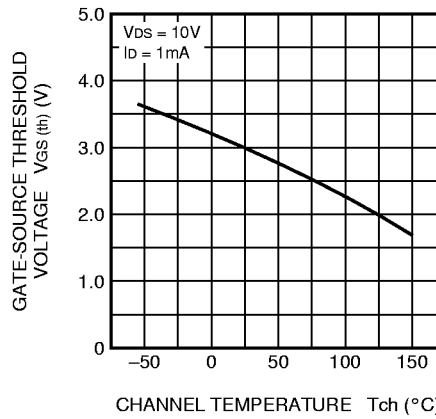
SOURCE-DRAIN DIODE
FORWARD CHARACTERISTICS
(TYPICAL)



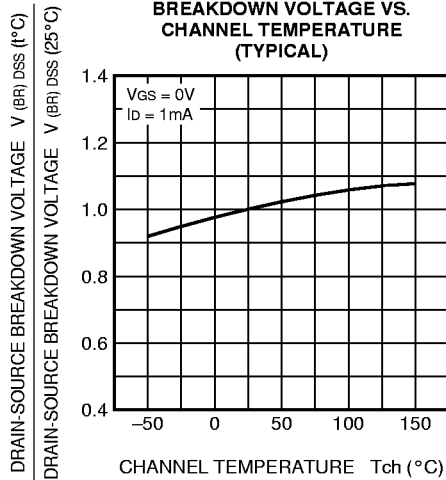
ON-STATE RESISTANCE VS.
CHANNEL TEMPERATURE
(TYPICAL)



THRESHOLD VOLTAGE VS.
CHANNEL TEMPERATURE
(TYPICAL)



BREAKDOWN VOLTAGE VS.
CHANNEL TEMPERATURE
(TYPICAL)



TRANSIENT THERMAL IMPEDANCE
CHARACTERISTICS

