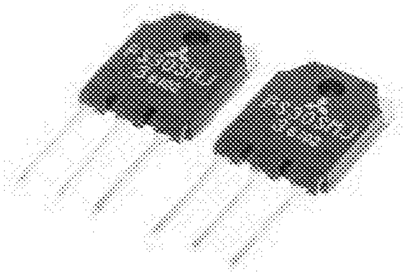
MITSUBISHI Nch POWER MOSFET

FS30SMJ-3

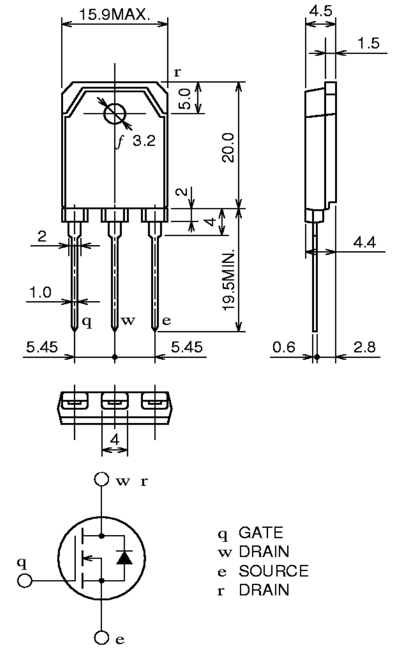
HIGH-SPEED SWITCHING USE

FS30SMJ-3



- 4V DRIVE
- V_{DSS} 150V
- r_{DS} (ON) (MAX) 86mΩ
- I_D 30A
- Integrated Fast Recovery Diode (TYP.) 100ns

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_{DSS}	Drain-source voltage	V_{GS} = 0V	150	V
V_{GSS}	Gate-source voltage	V_{DS} = 0V	±20	V
I_D	Drain current		30	A
I_{DM}	Drain current (Pulsed)		120	A
I_{DA}	Avalanche drain current (Pulsed)	L = 100µH	30	A
I_S	Source current		30	A
I_{SM}	Source current (Pulsed)		120	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

Feb.1999

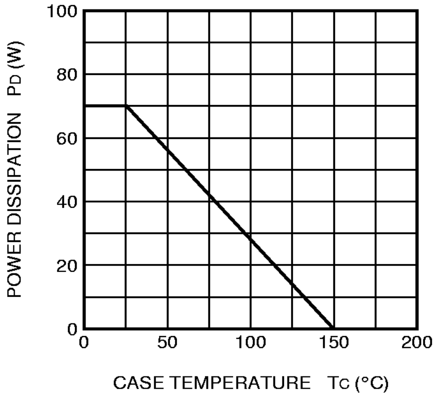
MITSUBISHI ELECTRIC

ELECTRICAL CHARACTERISTICS (Tch = 25°C)

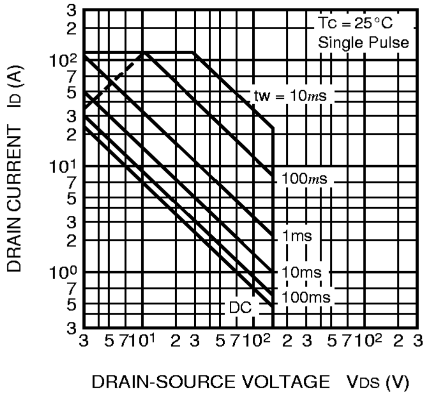
Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
$V_{(BR)DSS}$	Drain-source breakdown voltage	I_D = 1mA, V_{GS} = 0V	150	—	—	V
I_{GSS}	Gate-source leakage current	V_{GS} = ±20V, V_{DS} = 0V	—	—	±0.1	µA
I_{DSS}	Drain-source leakage current	V_{DS} = 150V, V_{GS} = 0V	—	—	0.1	mA
$V_{GS(th)}$	Gate-source threshold voltage	I_D = 1mA, V_{DS} = 10V	1.0	1.5	2.0	V
$r_{DS(ON)}$	Drain-source on-state resistance	I_D = 15A, V_{GS} = 10V	—	66	86	mΩ
$r_{DS(ON)}$	Drain-source on-state resistance	I_D = 15A, V_{GS} = 4V	—	69	90	mΩ
$V_{DS(ON)}$	Drain-source on-state voltage	I_D = 15A, V_{GS} = 10V	—	0.99	1.29	V
$\lvert y_{fs} \rvert$	Forward transfer admittance	I_D = 15A, V_{DS} = 10V	—	38	—	S
C_{iss}	Input capacitance	V_{DS} = 10V, V_{GS} = 0V, f = 1MHz	—	3000	—	pF
C_{oss}	Output capacitance		—	320	—	pF
C_{rss}	Reverse transfer capacitance		—	160	—	pF
$t_{d(on)}$	Turn-on delay time	V_{DD} = 80V, I_D = 15A, V_{GS} = 10V, R_{GEN} = R_{GS} = 50Ω	—	22	—	ns
t_r	Rise time		—	42	—	ns
$t_{d(off)}$	Turn-off delay time		—	280	—	ns
t_f	Fall time		—	130	—	ns
V_{SD}	Source-drain voltage	I_S = 15A, V_{GS} = 0V	—	1.0	1.5	V
$R_{th(ch-c)}$	Thermal resistance	Channel to case	—	—	1.78	°C/W
t_{rr}	Reverse recovery time	I_S = 30A, dis/dt = –100A/µs	—	100	—	ns

PERFORMANCE CURVES

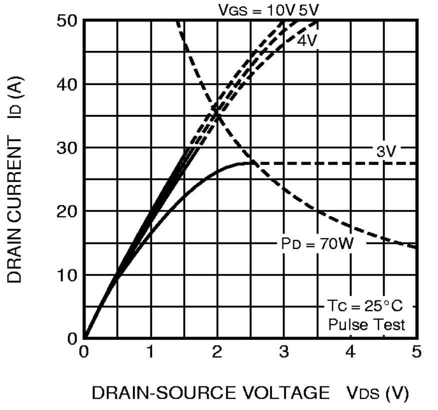
POWER DISSIPATION DERATING CURVE



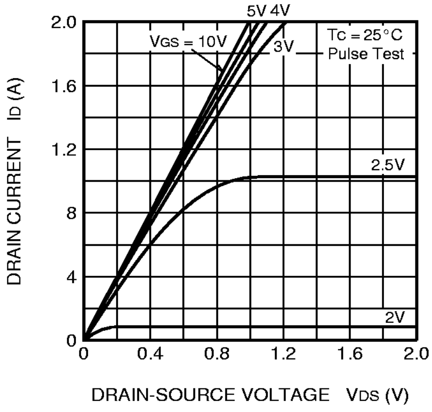
MAXIMUM SAFE OPERATING AREA



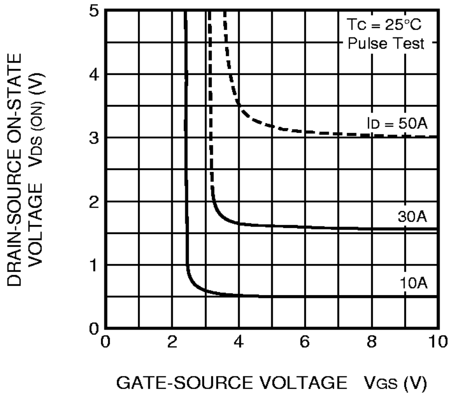
OUTPUT CHARACTERISTICS (TYPICAL)



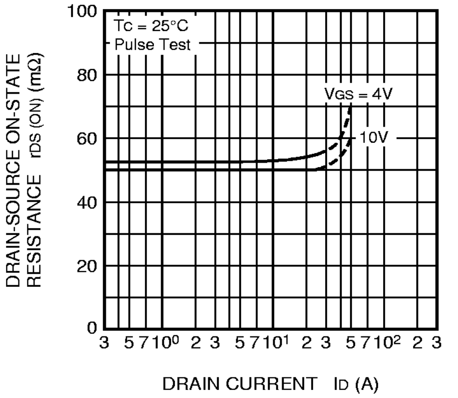
OUTPUT CHARACTERISTICS (TYPICAL)



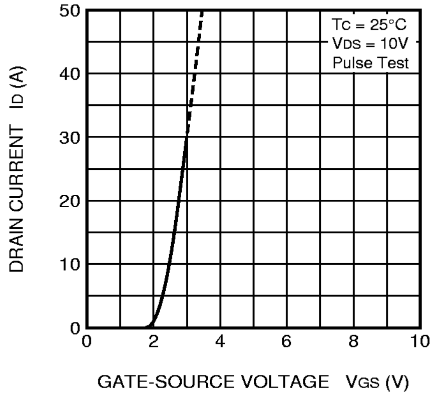
ON-STATE VOLTAGE VS. GATE-SOURCE VOLTAGE (TYPICAL)



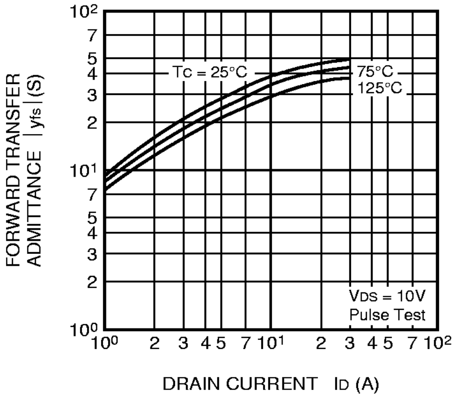
ON-STATE RESISTANCE VS. DRAIN CURRENT (TYPICAL)



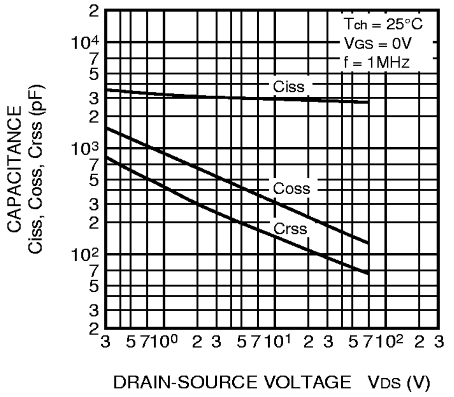
TRANSFER CHARACTERISTICS (TYPICAL)



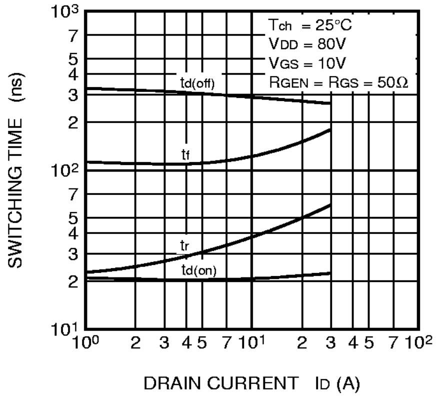
FORWARD TRANSFER ADMITTANCE VS.DRAIN CURRENT (TYPICAL)

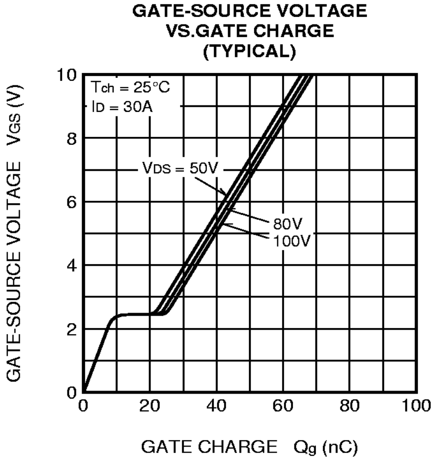


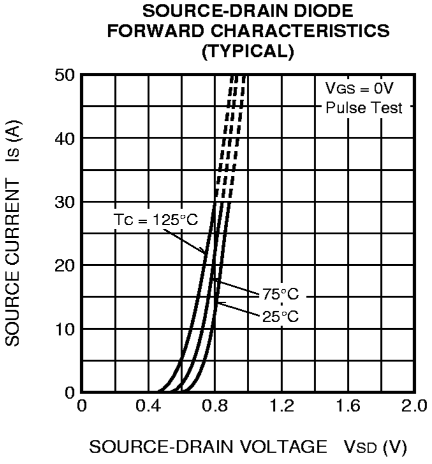
CAPACITANCE VS. DRAIN-SOURCE VOLTAGE (TYPICAL)

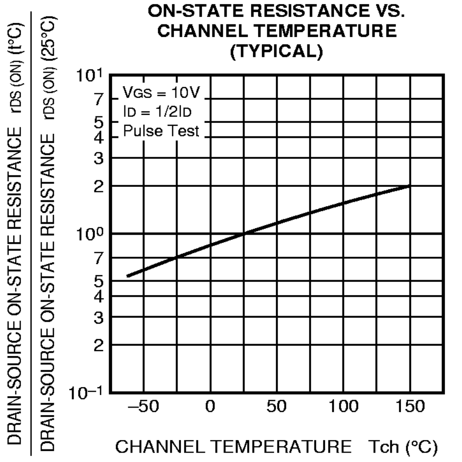


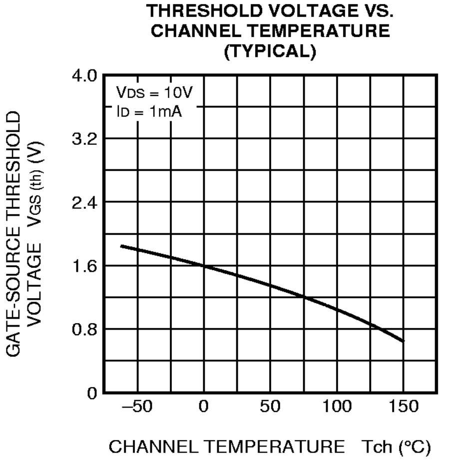
SWITCHING CHARACTERISTICS (TYPICAL)

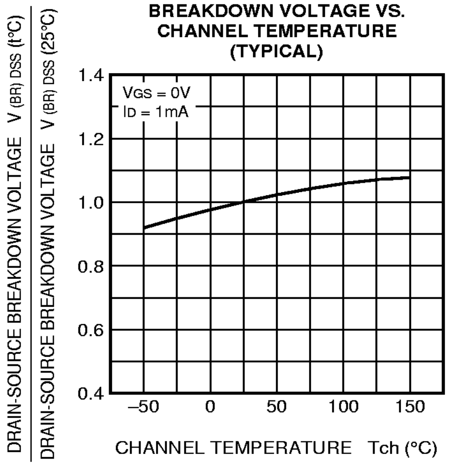


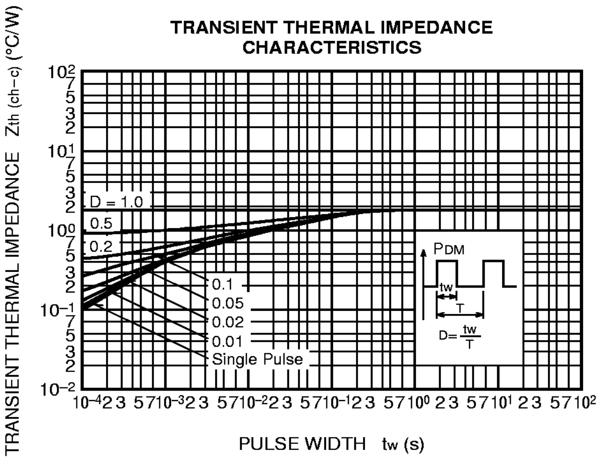

GATE-SOURCE VOLTAGE VS.GATE CHARGE (TYPICAL)


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