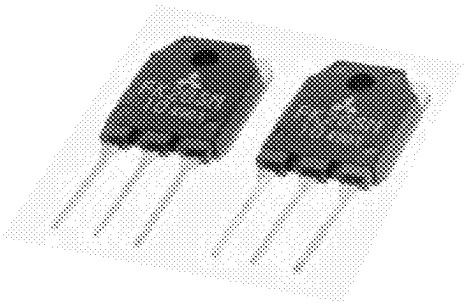
MITSUBISHI Nch POWER MOSFET

FK20SM-10

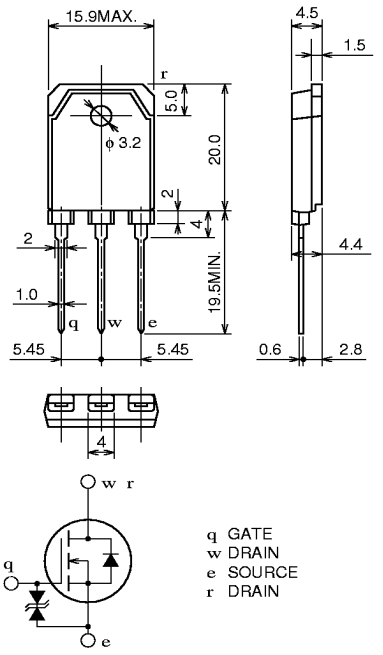
HIGH-SPEED SWITCHING USE

FK20SM-10



- VDSS 500V
- rDS (ON) (MAX) 0.36Ω
- ID 20A
- Integrated Fast Recovery Diode (MAX.) 150ns

OUTLINE DRAWING Dimensions in mm



TO-3P

APPLICATION

Servo motor drive, Robot, UPS, Inverter Fluorecent lamp, etc.

MAXIMUM RATINGS (Tc = 25°C)

Symbol	Parameter	Conditions	Ratings	Unit
VDSS	Drain-source voltage	VGS = 0V	500	V
VGSS	Gate-source voltage	VDS = 0V	±30	V
ID	Drain current		20	A
IDM	Drain current (Pulsed)		60	A
IS	Source current		20	A
ISM	Source current (Pulsed)		60	A
PD	Maximum power dissipation		275	W
Tch	Channel temperature		–55 ~ +150	°C
Tstg	Storage temperature		–55 ~ +150	°C
—	Weight	Typical value	4.8	g

Feb.1999

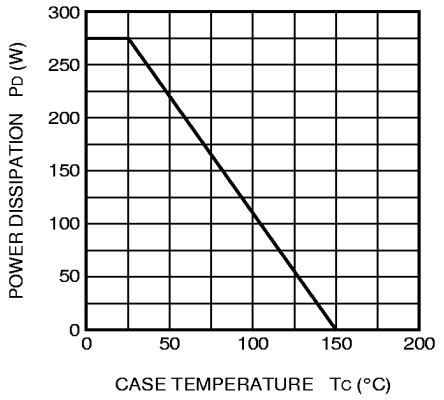
MITSUBISHI ELECTRIC

ELECTRICAL CHARACTERISTICS (Tch = 25°C)

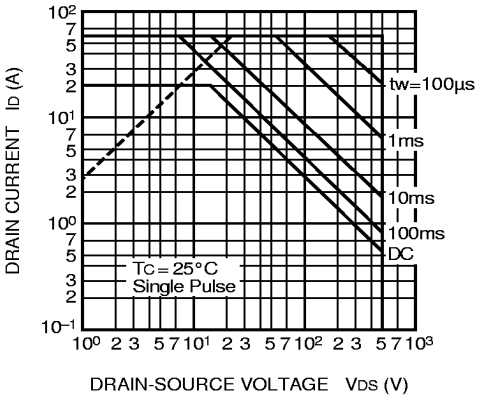
Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
$V_{(BR)DSS}$	Drain-source breakdown voltage	I_D = 1mA, V_{GS} = 0V	500	—	—	V
$V_{(BR)GSS}$	Gate-source breakdown voltage	I_G = ±100µA, V_{DS} = 0V	±30	—	—	V
I_{GSS}	Gate-source leakage current	V_{GS} = ±25V, V_{DS} = 0V	—	—	±10	µA
I_{DSS}	Drain-source leakage current	V_{DS} = 500V, V_{GS} = 0V	—	—	1	mA
$V_{GS(th)}$	Gate-source threshold voltage	I_D = 1mA, V_{DS} = 10V	2	3	4	V
$r_{DS(ON)}$	Drain-source on-state resistance	I_D = 10A, V_{GS} = 10V	—	0.28	0.36	Ω
$V_{DS(ON)}$	Drain-source on-state voltage	I_D = 10A, V_{GS} = 10V	—	2.80	3.60	V
$\|y_{fs}\|$	Forward transfer admittance	I_D = 10A, V_{DS} = 10V	7.0	10.0	—	S
C_{iss}	Input capacitance	V_{DS} = 25V, V_{GS} = 0V, f = 1MHz	—	2800	—	pF
C_{oss}	Output capacitance		—	350	—	pF
C_{rss}	Reverse transfer capacitance		—	55	—	pF
$t_{d(on)}$	Turn-on delay time	V_{DD} = 200V, I_D = 10A, V_{GS} = 10V, R_{GEN} = R_{GS} = 50Ω	—	60	—	ns
t_r	Rise time		—	80	—	ns
$t_{d(off)}$	Turn-off delay time		—	270	—	ns
t_f	Fall time		—	80	—	ns
V_{SD}	Source-drain voltage	I_S = 10A, V_{GS} = 0V	—	1.5	2.0	V
$R_{th(ch-c)}$	Thermal resistance	Channel to case	—	—	0.45	°C/W
t_{rr}	Reverse recovery time	I_S = 20A, di_S/dt = –100A/µs	—	—	150	ns

PERFORMANCE CURVES

POWER DISSIPATION DERATING CURVE



MAXIMUM SAFE OPERATING AREA



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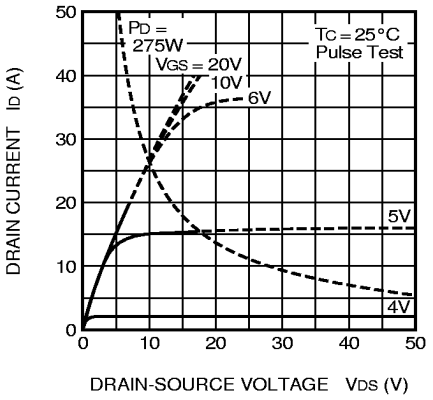
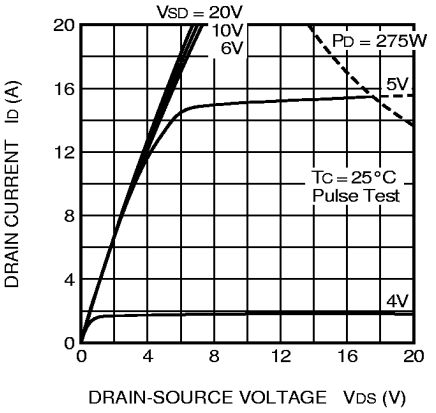
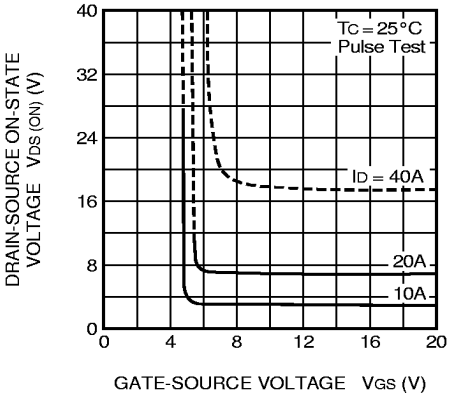
OUTPUT CHARACTERISTICS (TYPICAL)



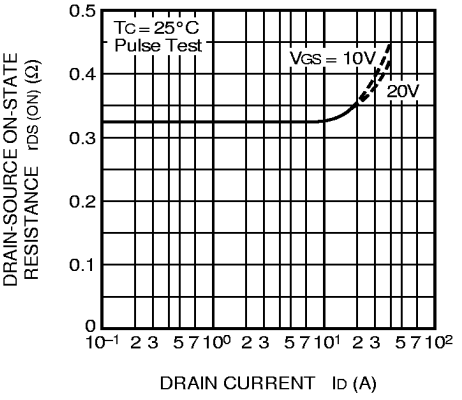
OUTPUT CHARACTERISTICS (TYPICAL)



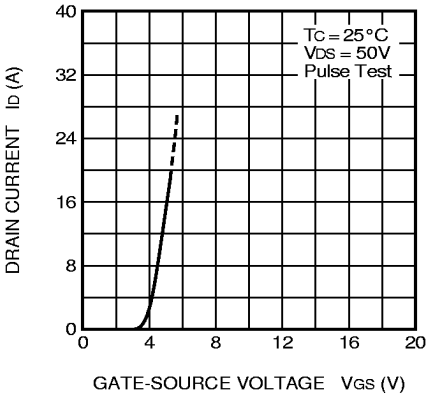
ON-STATE VOLTAGE VS. GATE-SOURCE VOLTAGE (TYPICAL)



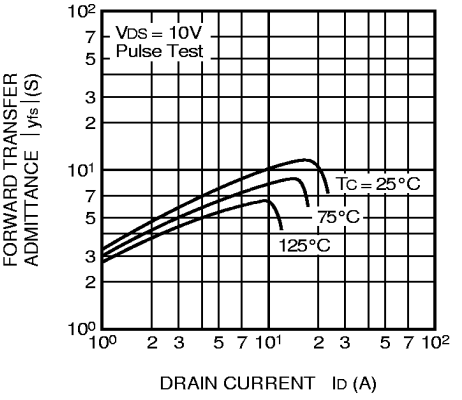
ON-STATE RESISTANCE VS. DRAIN CURRENT (TYPICAL)



TRANSFER CHARACTERISTICS (TYPICAL)



FORWARD TRANSFER ADMITTANCE VS.DRAIN CURRENT (TYPICAL)



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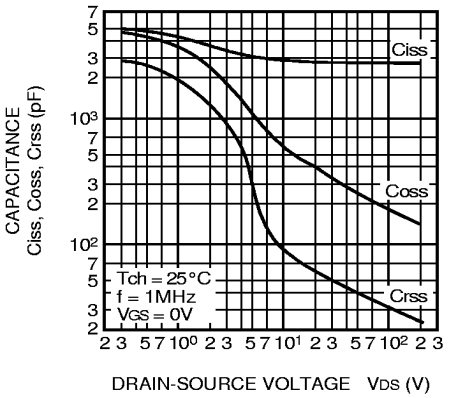
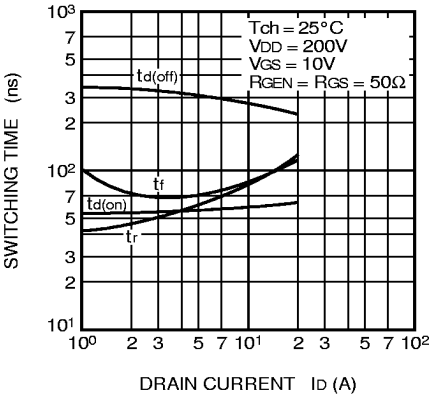
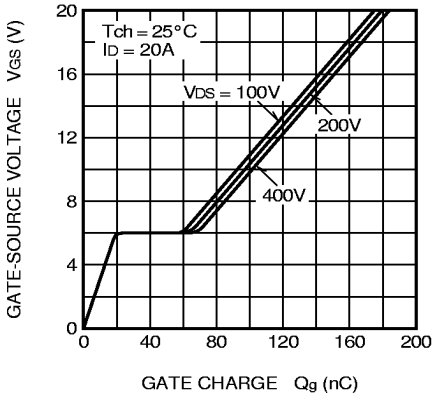
CAPACITANCE VS. DRAIN-SOURCE VOLTAGE (TYPICAL)



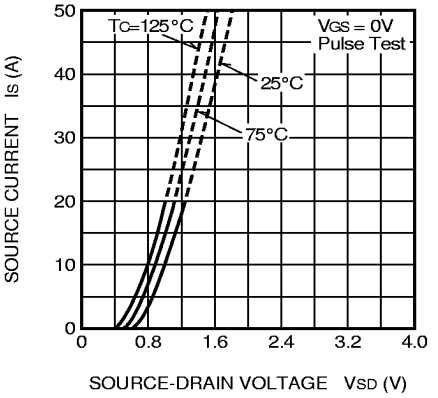
SWITCHING CHARACTERISTICS (TYPICAL)



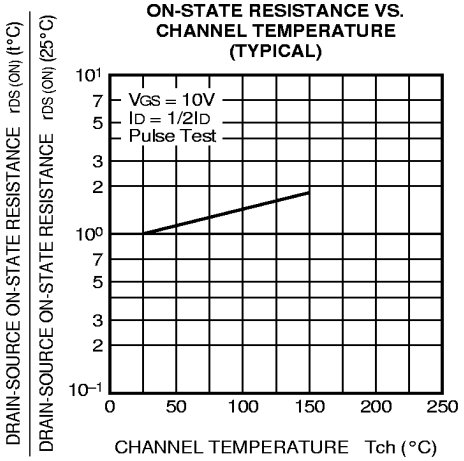
GATE-SOURCE VOLTAGE VS.GATE CHARGE (TYPICAL)



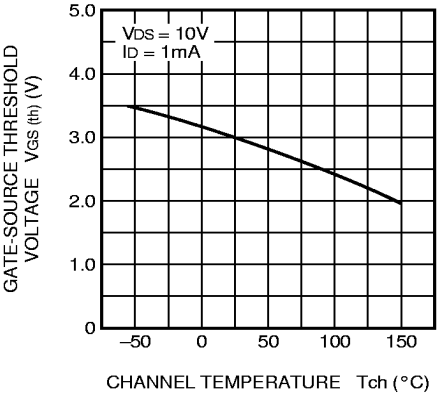
SOURCE-DRAIN DIODE FORWARD CHARACTERISTICS (TYPICAL)



ON-STATE RESISTANCE VS. CHANNEL TEMPERATURE (TYPICAL)



THRESHOLD VOLTAGE VS. CHANNEL TEMPERATURE (TYPICAL)



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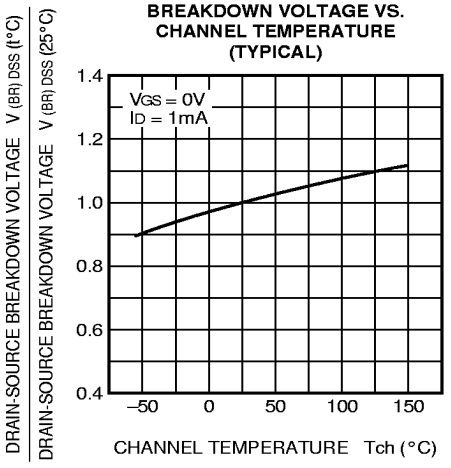
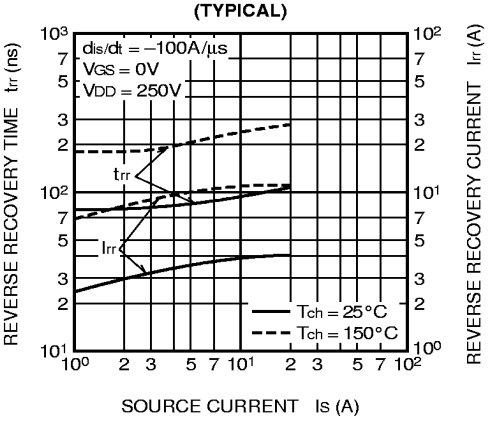
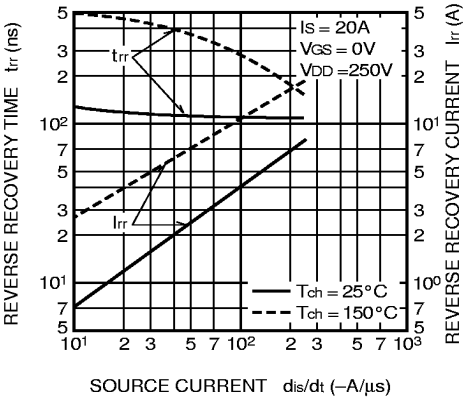
BREAKDOWN VOLTAGE VS. CHANNEL TEMPERATURE (TYPICAL)



DIODE REVERSE VS. SOURCE CURRENT CHARACTERISTIC (TYPICAL)



DIODE REVERSE VS. SOURCE CURRENT dis/dt CHARACTERISTIC (TYPICAL)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS