

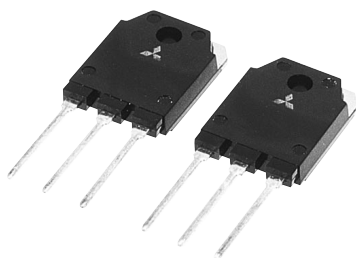
PRELIMINARY
 Notice: This is not a final specification.
 Some parametric limits are subject to change.

MITSUBISHI Pch POWER MOSFET

FX50SMJ-2

HIGH-SPEED SWITCHING USE

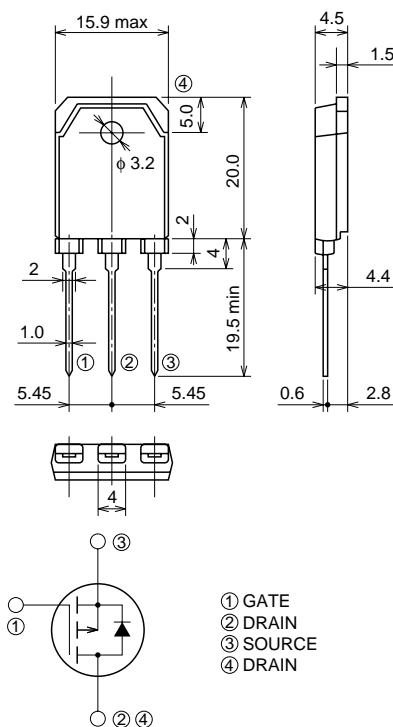
FX50SMJ-2



- 4V DRIVE
- V_{DS} -100V
- $r_{DS(ON)}$ (MAX) $50m\Omega$
- I_D -50A
- 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 (Tc = 25°C)

Symbol	Parameter	Conditions	Ratings	Unit
V_{DS}	Drain-source voltage	$V_{GS} = 0V$	-100	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)	$L = 30\mu H$	-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

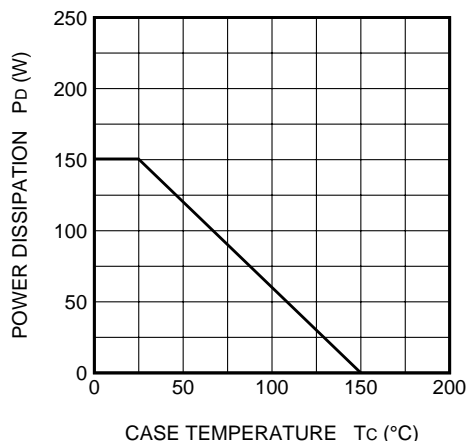
Jan.1999

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

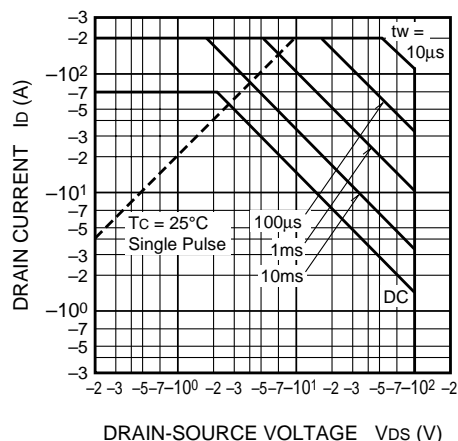
Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
$V_{(BR)DSS}$	Drain-source breakdown voltage	$I_D = -1\text{mA}$, $V_{GS} = 0\text{V}$	-100	—	—	V
I_{GSS}	Gate-source leakage current	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$	—	—	± 0.1	μA
I_{DSS}	Drain-source leakage current	$V_{DS} = -100\text{V}$, $V_{GS} = 0\text{V}$	—	—	-0.1	mA
$V_{GS(th)}$	Gate-source threshold voltage	$I_D = -1\text{mA}$, $V_{DS} = -10\text{V}$	-1.0	-1.5	-2.0	V
$r_{DS(on)}$	Drain-source on-state resistance	$I_D = -25\text{A}$, $V_{GS} = -10\text{V}$	—	39	50	$\text{m}\Omega$
$r_{DS(on)}$	Drain-source on-state resistance	$I_D = -25\text{A}$, $V_{GS} = -4\text{V}$	—	47	61	$\text{m}\Omega$
$V_{DS(on)}$	Drain-source on-state voltage	$I_D = -25\text{A}$, $V_{GS} = -10\text{V}$	—	-0.98	-1.25	V
$ y_{fs} $	Forward transfer admittance	$I_D = -25\text{A}$, $V_{DS} = -10\text{V}$	—	49.2	—	S
C_{iss}	Input capacitance	$V_{DS} = -10\text{V}$, $V_{GS} = 0\text{V}$, $f = 1\text{MHz}$	—	11130	—	pF
C_{oss}	Output capacitance		—	896	—	pF
C_{rss}	Reverse transfer capacitance		—	480	—	pF
$t_d(on)$	Turn-on delay time	$V_{DD} = -50\text{V}$, $I_D = -25\text{A}$, $V_{GS} = -10\text{V}$, $R_{GEN} = R_{GS} = 50\Omega$	—	57	—	ns
t_r	Rise time		—	118	—	ns
$t_d(off)$	Turn-off delay time		—	828	—	ns
t_f	Fall time		—	380	—	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	$I_S = -50\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$	—	100	—	ns

PERFORMANCE CURVES

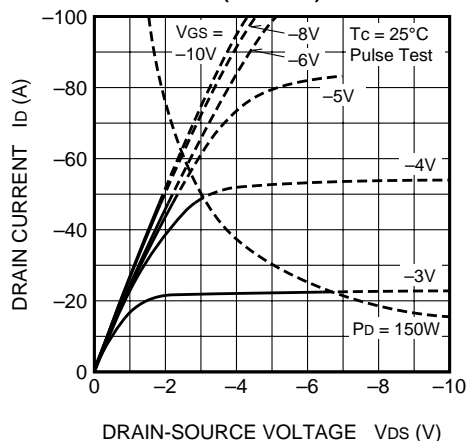
POWER DISSIPATION DERATING CURVE



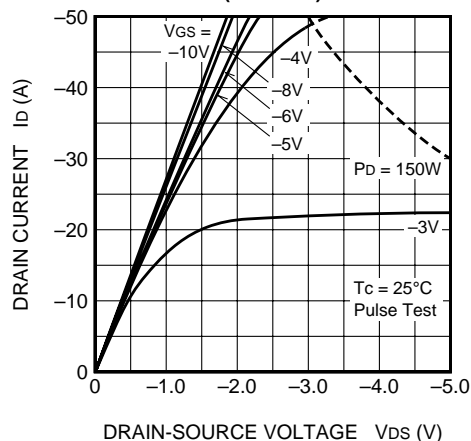
MAXIMUM SAFE OPERATING AREA



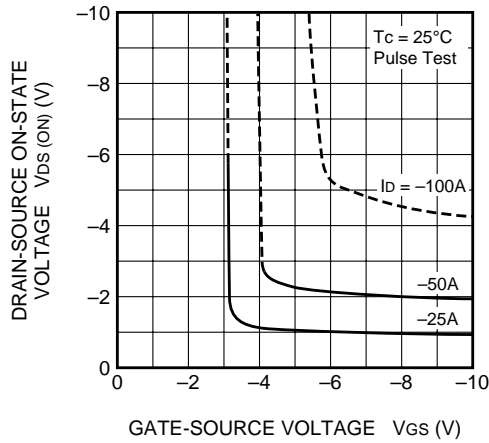
OUTPUT CHARACTERISTICS (TYPICAL)



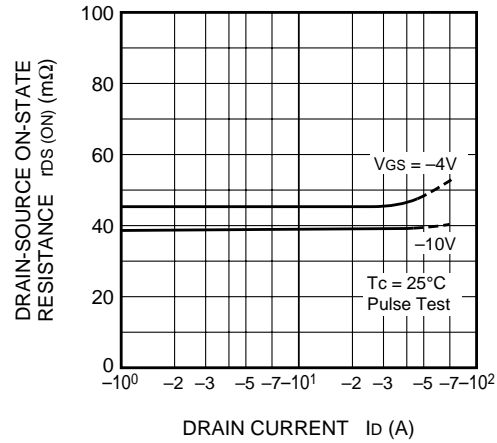
OUTPUT CHARACTERISTICS (TYPICAL)



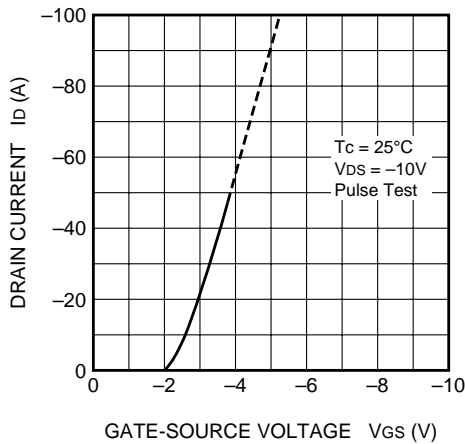
**ON-STATE VOLTAGE VS.
GATE-SOURCE VOLTAGE
(TYPICAL)**



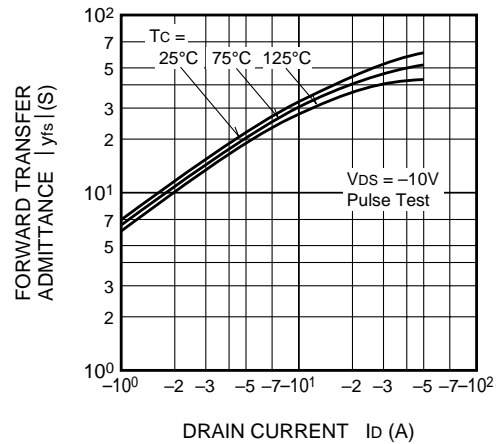
**ON-STATE RESISTANCE VS.
DRAIN CURRENT
(TYPICAL)**



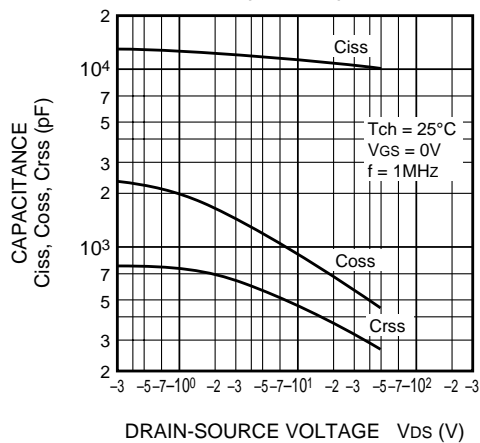
**TRANSFER CHARACTERISTICS
(TYPICAL)**



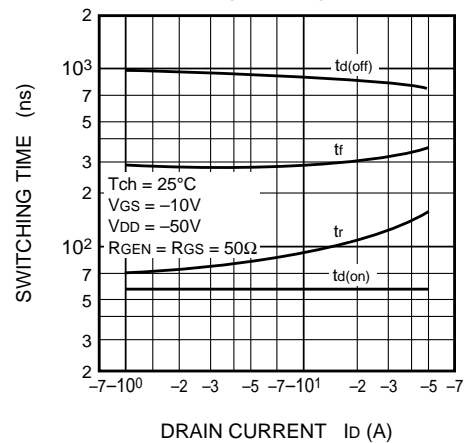
**FORWARD TRANSFER ADMITTANCE
VS. DRAIN CURRENT
(TYPICAL)**



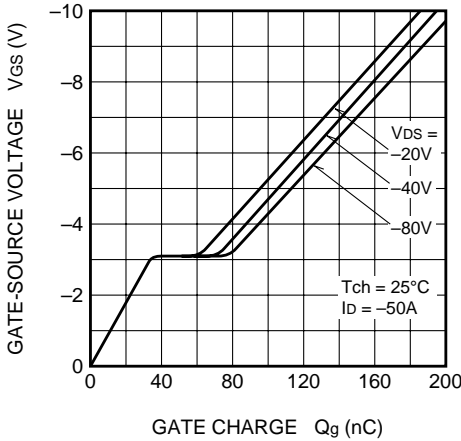
**CAPACITANCE VS.
DRAIN-SOURCE VOLTAGE
(TYPICAL)**



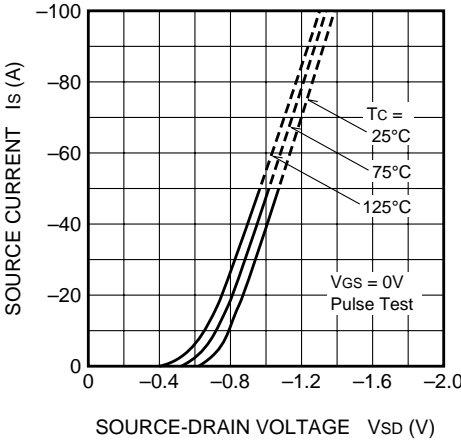
**SWITCHING CHARACTERISTICS
(TYPICAL)**



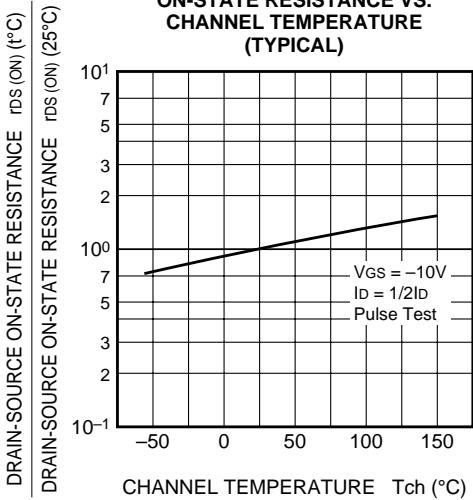
**GATE-SOURCE VOLTAGE
 VS. GATE CHARGE
 (TYPICAL)**



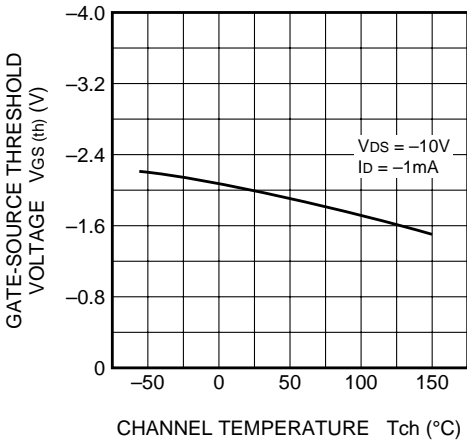
**SOURCE-DRAIN DIODE
 FORWARD CHARACTERISTICS
 (TYPICAL)**



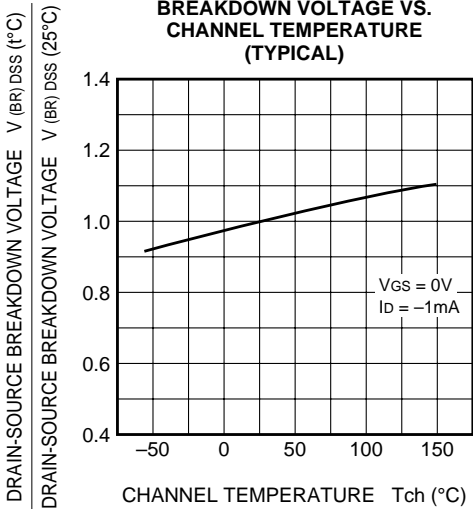
**ON-STATE RESISTANCE VS.
 CHANNEL TEMPERATURE
 (TYPICAL)**



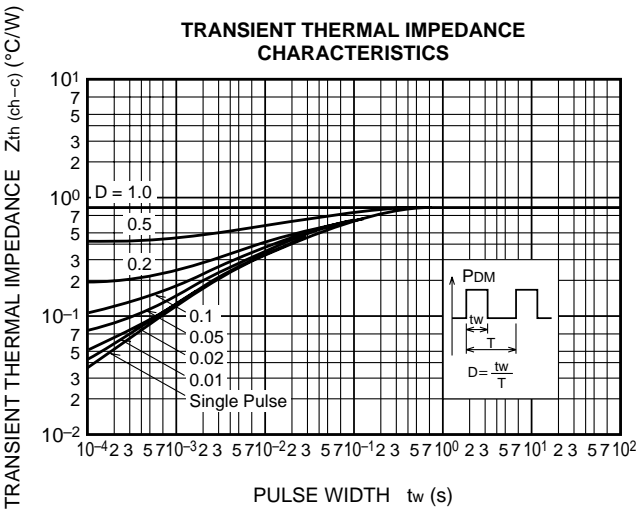
**THRESHOLD VOLTAGE VS.
 CHANNEL TEMPERATURE
 (TYPICAL)**



**BREAKDOWN VOLTAGE VS.
 CHANNEL TEMPERATURE
 (TYPICAL)**



**TRANSIENT THERMAL IMPEDANCE
 CHARACTERISTICS**



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