FX70SMJ-03

HIGH-SPEED SWITCHING USE

FX70SMJ-03

- 4V DRIVE
- VDSS .... −30V
- rDS (ON) (MAX) 12.3mΩ
- ID .... −70A
- Integrated Fast Recovery Diode (TYP.) 70ns

OUTLINE DRAWING   Dimensions in mm

① GATE
② DRAIN
③ SOURCE
④ DRAIN

TO-3P

APPLICATION

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

MAXIMUM RATINGS (Tc = 25°C)

Symbol	Parameter	Conditions	Ratings	Unit
VDSS	Drain-source voltage	VGS = 0V	−30	V
VGSS	Gate-source voltage	VDS = 0V	±20	V
ID	Drain current		−70	A
IDM	Drain current (Pulsed)		−280	A
IDA	Avalanche drain current (Pulsed)	L = 10µH	−70	A
IS	Source current		−70	A
ISM	Source current (Pulsed)		−280	A
PD	Maximum power dissipation		150	W
Tch	Channel temperature		−55 ~ +150	°C
Tstg	Storage temperature		−55 ~ +150	°C
—	Weight	Typical value	4.8	g

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ELECTRICAL CHARACTERISTICS (Tch = 25°C)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V (BR) DSS	Drain-source breakdown voltage	ID = −1mA, VDS = 0V	−30	—	—	V
IGSS	Gate-source leakage current	VGS = ±20V, VDS = 0V	—	—	±0.1	µA
IDSS	Drain-source leakage current	VDS = −30V, VGS = 0V	—	—	−0.1	mA
VGS (th)	Gate-source threshold voltage	ID = −1mA, VDS = −10V	−1.3	−1.8	−2.3	V
rDS (ON)	Drain-source on-state resistance	ID = −35A, VGS = −10V	—	10.0	12.3	mΩ
rDS (ON)	Drain-source on-state resistance	ID = −26A, VGS = −4V	—	19	25	mΩ
VDS (ON)	Drain-source on-state voltage	ID = −35A, VGS = −10V	—	−0.35	−0.43	V
|yfs|	Forward transfer admittance	ID = −35A, VDS = −10V	—	55.8	—	S
Ciss	Input capacitance	VDS = −10V, VGS = 0V, f = 1MHz	—	11140	—	pF
Coss	Output capacitance		—	2300	—	pF
Crss	Reverse transfer capacitance		—	1000	—	pF
td (on)	Turn-on delay time	VDD = −15V, ID = −35A, VGS = −10V, RGEN = RGS = 50Ω	—	85	—	ns
tr	Rise time		—	228	—	ns
td (off)	Turn-off delay time		—	751	—	ns
tf	Fall time		—	360	—	ns
VSD	Source-drain voltage	IS = −35A, VGS = 0V	—	−1.0	−1.5	V
Rth (ch-c)	Thermal resistance	Channel to case	—	—	0.83	°C/W
trr	Reverse recovery time	IS = −35A, dis/dt = 50A/µs	—	70	—	ns

PERFORMANCE CURVES

POWER DISSIPATION DERATING CURVE
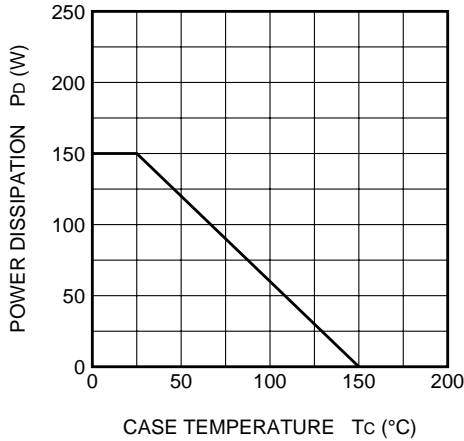
MAXIMUM SAFE OPERATING AREA
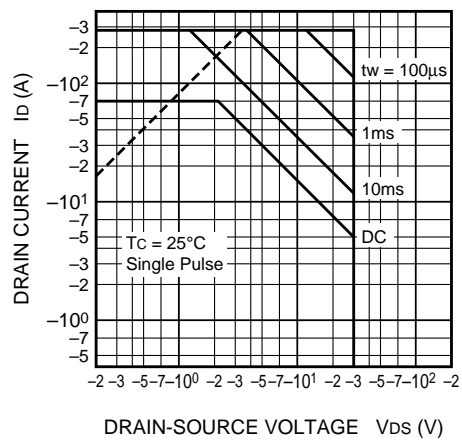
OUTPUT CHARACTERISTICS (TYPICAL)

OUTPUT CHARACTERISTICS (TYPICAL)

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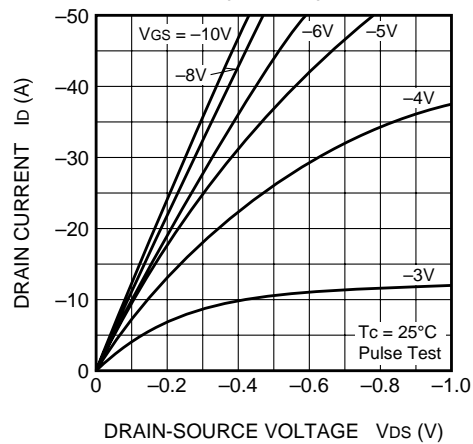
PRELIMINARY

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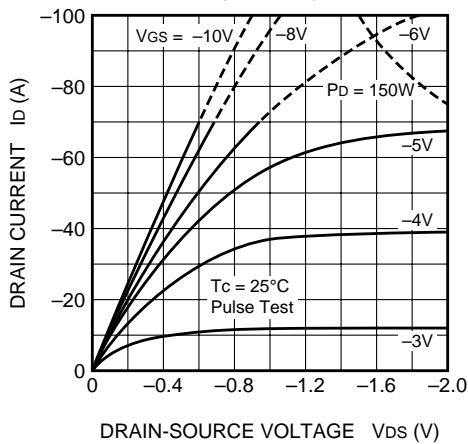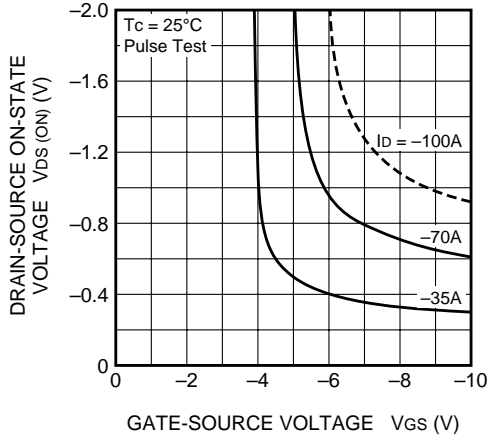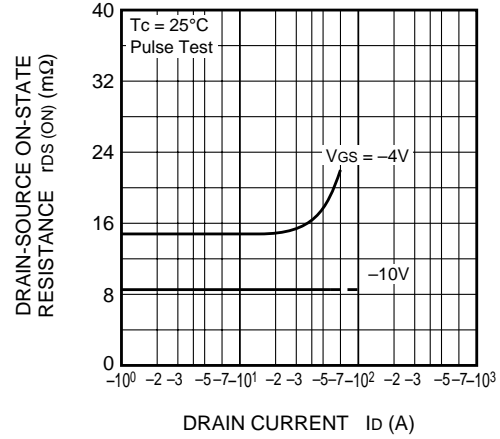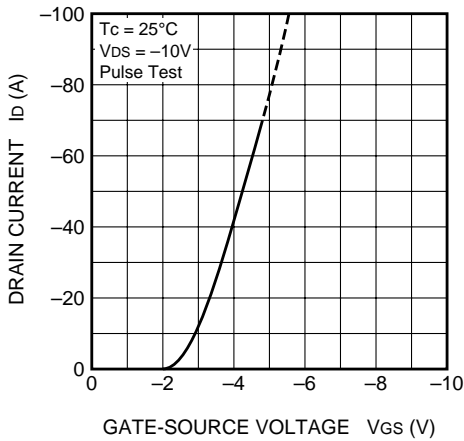Some parametric limits are subject to change.

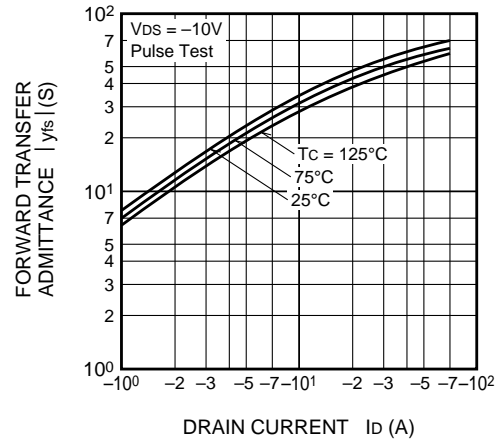**ON-STATE VOLTAGE VS.
GATE-SOURCE VOLTAGE
(TYPICAL)**

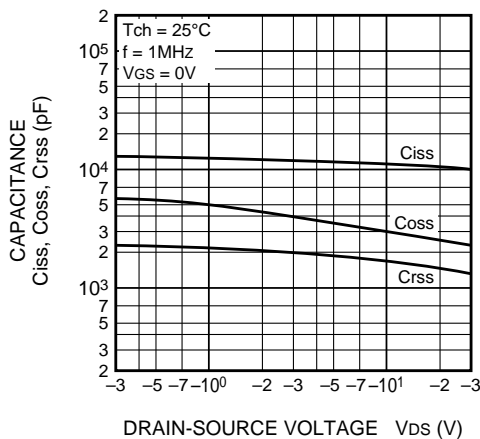**ON-STATE RESISTANCE VS.
DRAIN CURRENT
(TYPICAL)**

**TRANSFER CHARACTERISTICS
(TYPICAL)**

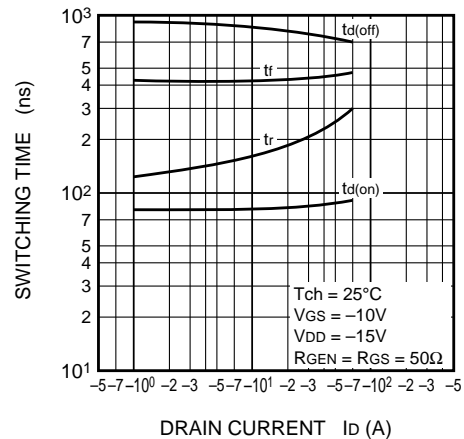**FORWARD TRANSFER ADMITTANCE
VS.DRAIN CURRENT
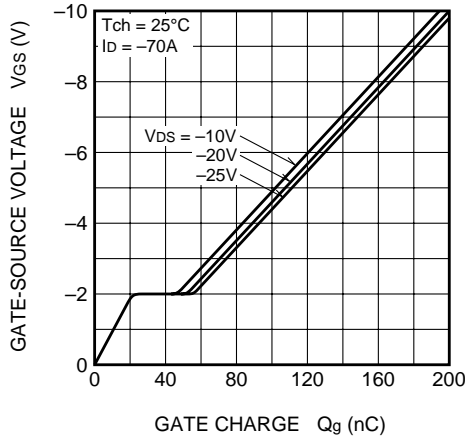(TYPICAL)**

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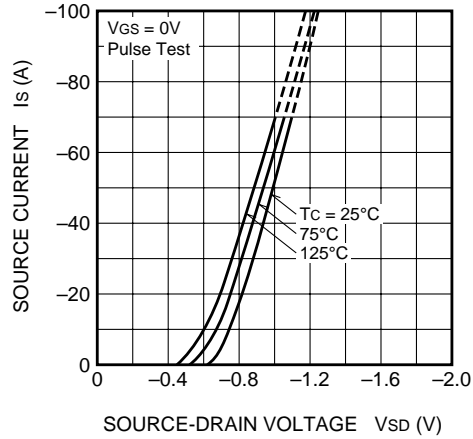(TYPICAL)**

**SWITCHING CHARACTERISTICS
(TYPICAL)**

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MITSUBISHI Pch POWER MOSFET

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HIGH-SPEED SWITCHING USE

GATE-SOURCE VOLTAGE VS.GATE CHARGE (TYPICAL)

Tch = 25°C
ID = −70A
VDS = −10V
−20V
−25V

GATE-SOURCE VOLTAGE VGS (V)
GATE CHARGE Qg (nC)

SOURCE-DRAIN DIODE FORWARD CHARACTERISTICS (TYPICAL)

VGS = 0V
Pulse Test
TC = 25°C
75°C
125°C

SOURCE CURRENT IS (A)
SOURCE-DRAIN VOLTAGE VSD (V)

ON-STATE RESISTANCE VS. CHANNEL TEMPERATURE (TYPICAL)

VGS = −10V
ID = 1/2ID
Pulse Test

DRAIN-SOURCE ON-STATE RESISTANCE $\frac{r_{DS\,(ON)}\,(t°C)}{r_{DS\,(ON)}\,(25°C)}$
CHANNEL TEMPERATURE Tch (°C)
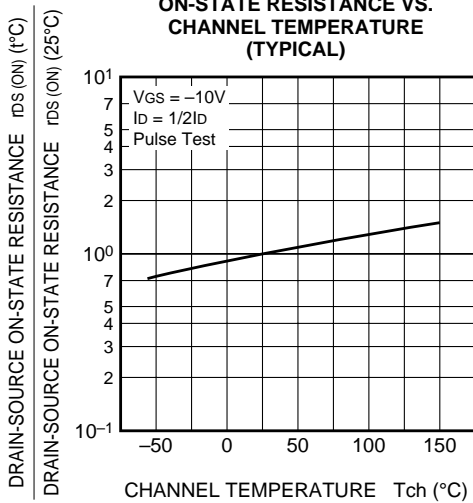
THRESHOLD VOLTAGE VS. CHANNEL TEMPERATURE (TYPICAL)

VDS = −10V
ID = −1mA

GATE-SOURCE THRESHOLD VOLTAGE VGS (th) (V)
CHANNEL TEMPERATURE Tch (°C)
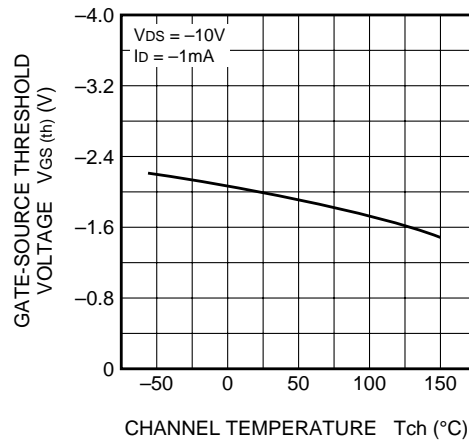
BREAKDOWN VOLTAGE VS. CHANNEL TEMPERATURE (TYPICAL)

VGS = 0V
ID = −1mA

DRAIN-SOURCE BREAKDOWN VOLTAGE $\frac{V_{(BR)\,DSS}\,(t°C)}{V_{(BR)\,DSS}\,(25°C)}$
CHANNEL TEMPERATURE Tch (°C)
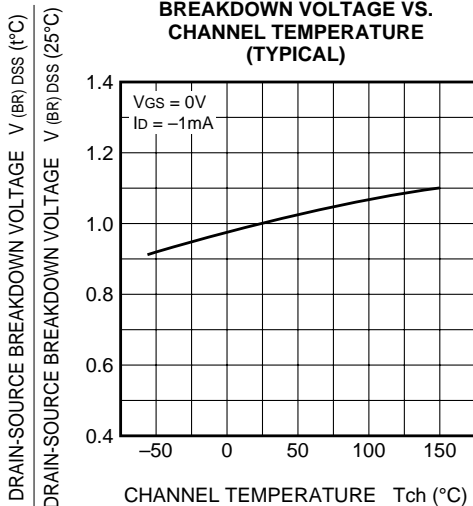
TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS

D = 1.0
0.5
0.2
0.1
0.05
0.02
0.01
Single Pulse
PDM
tw
T
$D = \frac{tw}{T}$

TRANSIENT THERMAL IMPEDANCE Zth (ch−c) (°C/W)
PULSE WIDTH tw (s)

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