

FS50UMJ-2

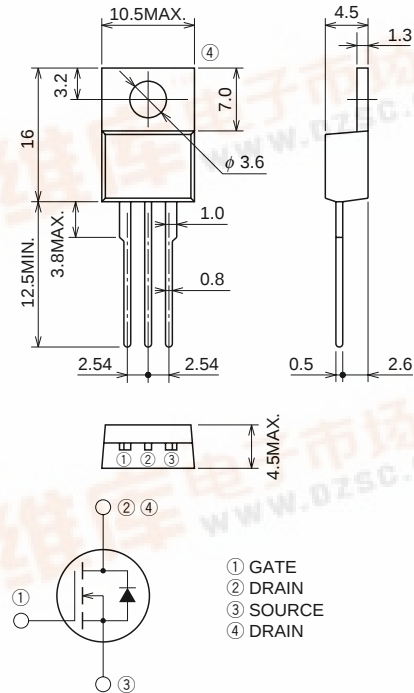
HIGH-SPEED SWITCHING USE

FS50UMJ-2

- 4V DRIVE
- V_{DS} 100V
- $r_{DS(ON)}$ (MAX) $48m\Omega$
- I_D 50A
- Integrated Fast Recovery Diode (TYP.) 90ns

OUTLINE DRAWING

Dimensions in mm

**TO-220****APPLICATION**

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

MAXIMUM RATINGS ($T_c = 25^\circ\text{C}$)

Symbol	Parameter	Conditions	Ratings	Unit
V_{DS}	Drain-source voltage	$V_{GS} = 0V$	100	V
V_{GS}	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)	$L = 50\mu H$	50	A
I_S	Source current		50	A
I_{SM}	Source current (Pulsed)		200	A
P_D	Maximum power dissipation		70	W
T_{ch}	Channel temperature		$-55 \sim +150$	$^\circ\text{C}$
T_{stg}	Storage temperature		$-55 \sim +150$	$^\circ\text{C}$
—	Weight	Typical value	2.0	g

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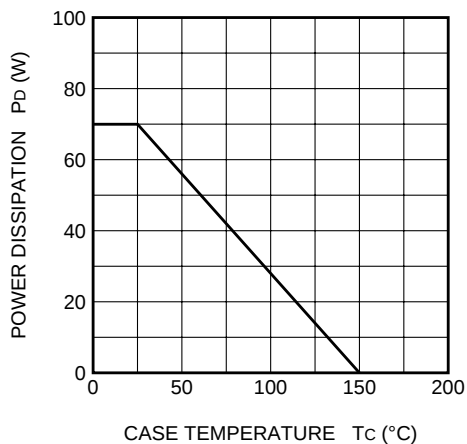
HIGH-SPEED SWITCHING USE

ELECTRICAL CHARACTERISTICS (T_{ch} = 25°C)

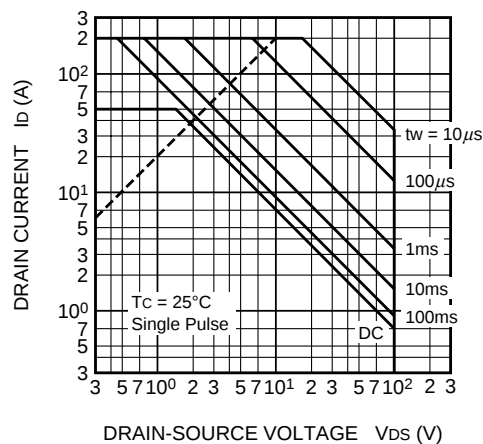
Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
V (BR) DSS	Drain-source breakdown voltage	I _D = 1mA, V _{GS} = 0V	100	—	—	V
I _{GSS}	Gate-source leakage current	V _{GS} = ±20V, V _{DS} = 0V	—	—	±0.1	μA
I _{DSS}	Drain-source leakage current	V _{DS} = 100V, V _{GS} = 0V	—	—	0.1	mA
V _{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 = 25A, V _{GS} = 10V	—	37	48	mΩ
r _{DS} (ON)	Drain-source on-state resistance	I _D = 25A, V _{GS} = 4V	—	40	52	mΩ
V _{DS} (ON)	Drain-source on-state voltage	I _D = 25A, V _{GS} = 10V	—	0.93	1.20	V
y _{fs}	Forward transfer admittance	I _D = 25A, V _{DS} = 10V	—	40	—	S
C _{iss}	Input capacitance	V _{DS} = 10V, V _{GS} = 0V, f = 1MHz	—	3000	—	pF
C _{oss}	Output capacitance		—	410	—	pF
C _{rss}	Reverse transfer capacitance		—	210	—	pF
t _d (on)	Turn-on delay time	V _{DD} = 50V, I _D = 25A, V _{GS} = 10V, R _{GEN} = R _{GS} = 50Ω	—	22	—	ns
t _r	Rise time		—	65	—	ns
t _d (off)	Turn-off delay time		—	270	—	ns
t _f	Fall time		—	160	—	ns
V _{SD}	Source-drain voltage	I _S = 25A, 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 = 50A, di _s /dt = -100A/μs	—	90	—	ns

PERFORMANCE CURVES

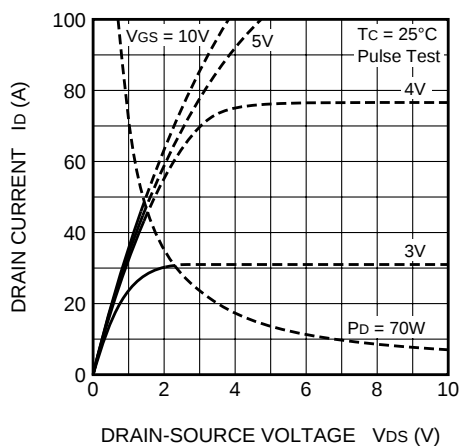
POWER DISSIPATION DERATING CURVE



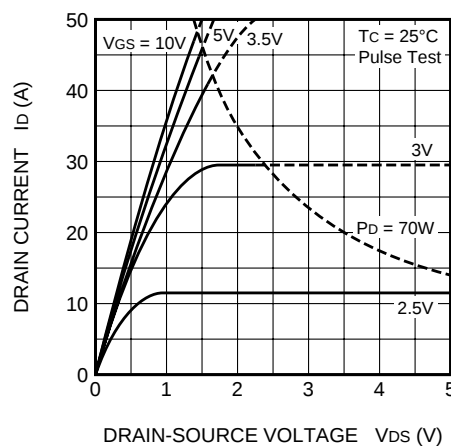
MAXIMUM SAFE OPERATING AREA



OUTPUT CHARACTERISTICS (TYPICAL)



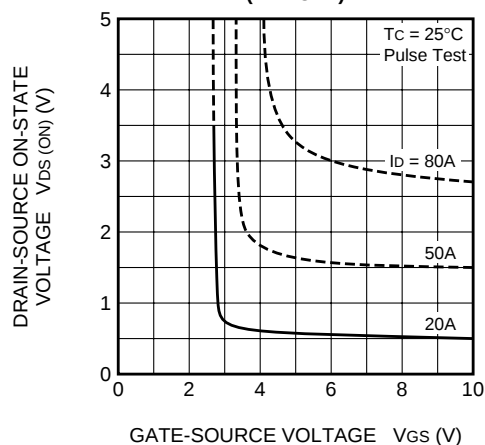
OUTPUT CHARACTERISTICS (TYPICAL)



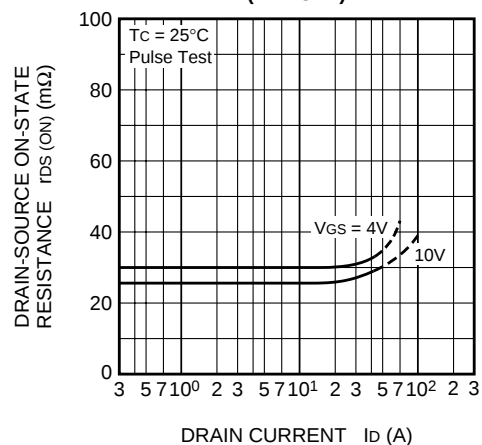
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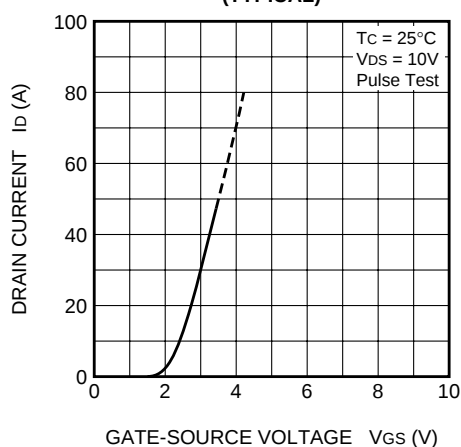
ON-STATE VOLTAGE VS.
GATE-SOURCE VOLTAGE
(TYPICAL)



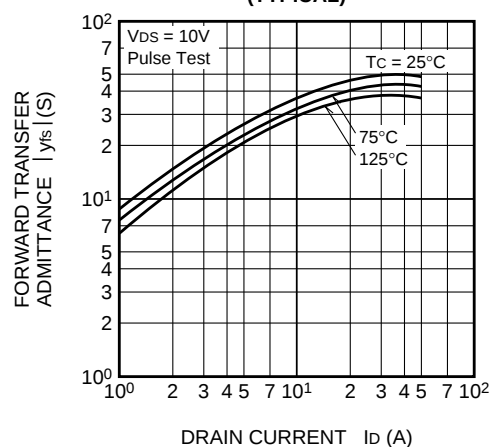
ON-STATE RESISTANCE VS.
DRAIN CURRENT
(TYPICAL)



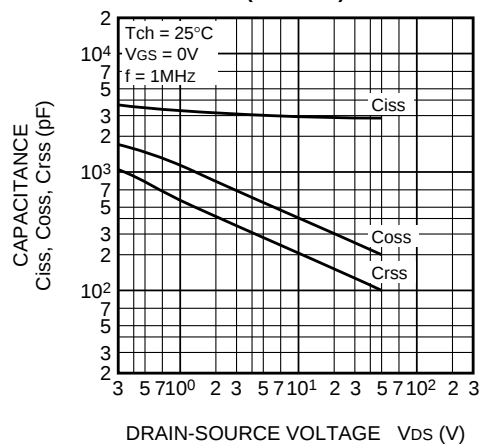
TRANSFER CHARACTERISTICS
(TYPICAL)



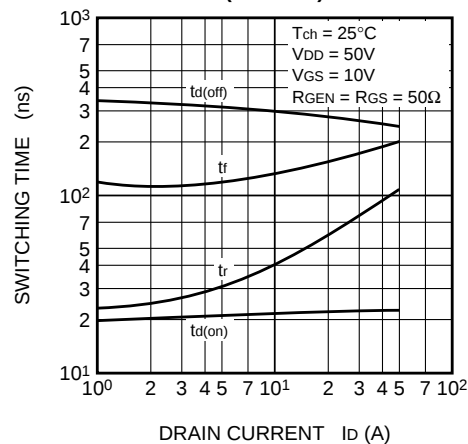
FORWARD TRANSFER ADMITTANCE
VS. DRAIN CURRENT
(TYPICAL)



CAPACITANCE VS.
DRAIN-SOURCE VOLTAGE
(TYPICAL)



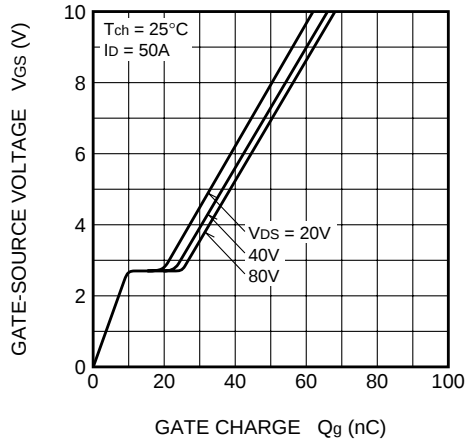
SWITCHING CHARACTERISTICS
(TYPICAL)



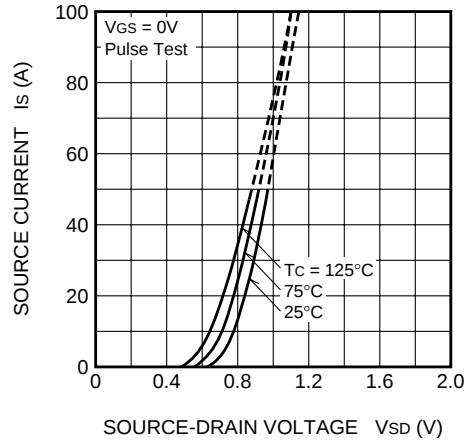
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HIGH-SPEED SWITCHING USE

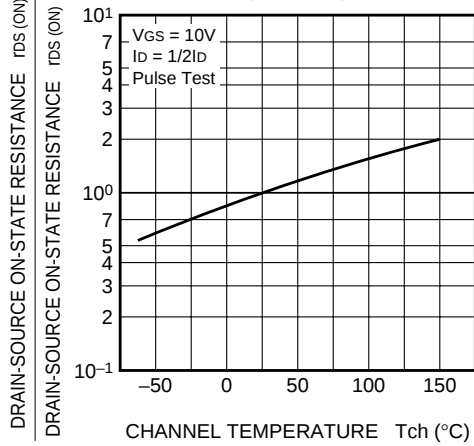
**GATE-SOURCE VOLTAGE
VS. GATE CHARGE
(TYPICAL)**



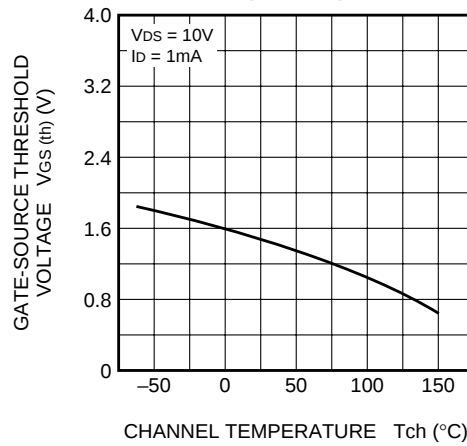
**SOURCE-DRAIN DIODE
FORWARD CHARACTERISTICS
(TYPICAL)**



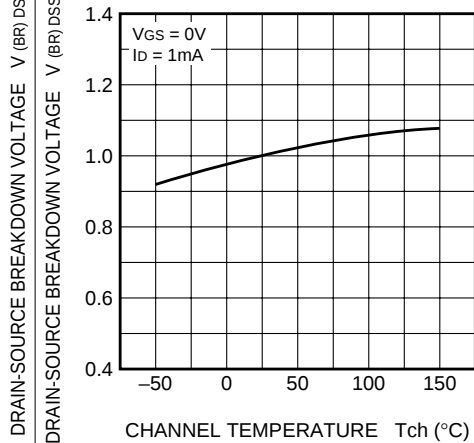
**ON-STATE RESISTANCE VS.
CHANNEL TEMPERATURE
(TYPICAL)**



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



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



**TRANSIENT THERMAL IMPEDANCE
CHARACTERISTICS**

