

# FS30VSJ-2

HIGH-SPEED SWITCHING USE

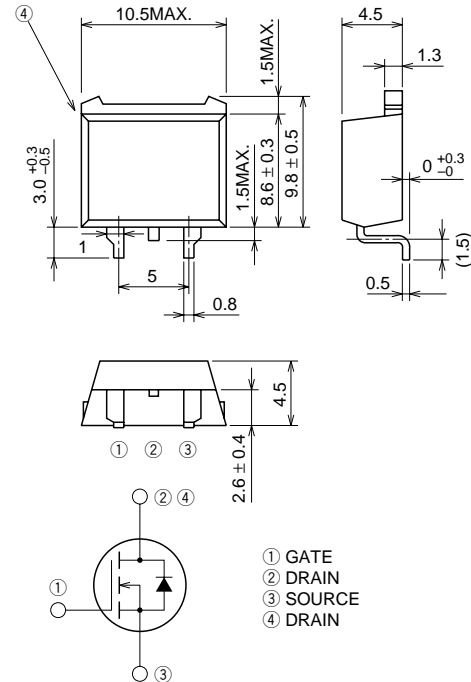
## FS30VSJ-2



- 4V DRIVE
- $V_{DS}$  ..... 100V
- $r_{DS} (ON) (MAX)$  .....  $84\Omega$
- $I_D$  ..... 30A
- Integrated Fast Recovery Diode (TYP.) ..... 80ns

## OUTLINE DRAWING

Dimensions in mm



TO-220S

## APPLICATION

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

## MAXIMUM RATINGS (T<sub>c</sub> = 25°C)

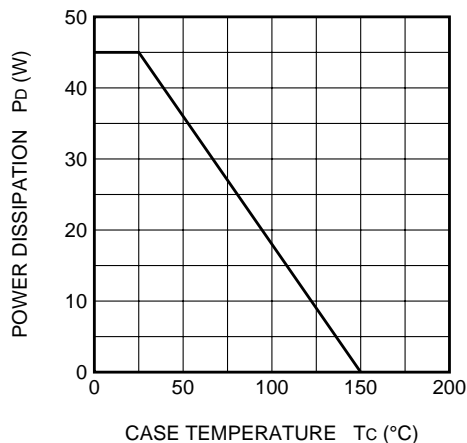
Symbol	Parameter	Conditions	Ratings	Unit
$V_{DS}$	Drain-source voltage	$V_{GS} = 0V$	100	V
$V_{GS}$	Gate-source voltage	$V_{DS} = 0V$	$\pm 20$	V
$I_D$	Drain current		30	A
$I_{DM}$	Drain current (Pulsed)		120	A
$I_{DA}$	Avalanche drain current (Pulsed)	$L = 100\mu H$	30	A
$I_S$	Source current		30	A
$I_{SM}$	Source current (Pulsed)		120	A
$P_D$	Maximum power dissipation		45	W
$T_{ch}$	Channel temperature		$-55 \sim +150$	°C
$T_{stg}$	Storage temperature		$-55 \sim +150$	°C
—	Weight	Typical value	1.2	g

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

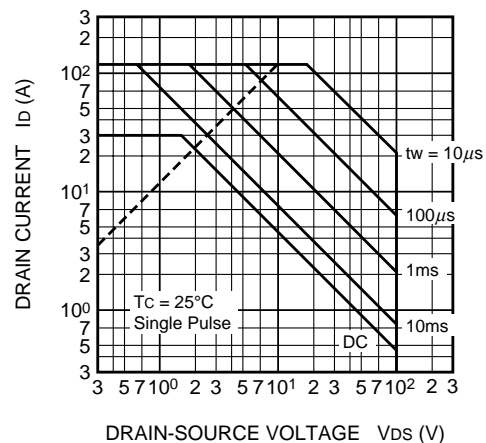
Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
$V_{(BR)DSS}$	Drain-source breakdown voltage	$I_D = 1\text{mA}$ , $V_{GS} = 0\text{V}$	100	—	—	V
$I_{GSS}$	Gate-source leakage current	$V_{GS} = \pm 20\text{V}$ , $V_{DS} = 0\text{V}$	—	—	$\pm 0.1$	$\mu\text{A}$
$I_{DSS}$	Drain-source 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	$I_D = 15\text{A}$ , $V_{GS} = 10\text{V}$	—	65	84	$\text{m}\Omega$
$r_{DS(on)}$	Drain-source on-state resistance	$I_D = 15\text{A}$ , $V_{GS} = 4\text{V}$	—	70	91	$\text{m}\Omega$
$V_{DS(on)}$	Drain-source on-state voltage	$I_D = 15\text{A}$ , $V_{GS} = 10\text{V}$	—	0.98	1.26	V
$ y_{fs} $	Forward transfer admittance	$I_D = 15\text{A}$ , $V_{DS} = 10\text{V}$	—	23	—	S
$C_{iss}$	Input capacitance	$V_{DS} = 10\text{V}$ , $V_{GS} = 0\text{V}$ , $f = 1\text{MHz}$	—	1800	—	pF
$C_{oss}$	Output capacitance		—	230	—	pF
$C_{rss}$	Reverse transfer capacitance		—	120	—	pF
$t_{d(on)}$	Turn-on delay time	$V_{DD} = 50\text{V}$ , $I_D = 15\text{A}$ , $V_{GS} = 10\text{V}$ , $R_{GEN} = R_{GS} = 50\Omega$	—	17	—	ns
$t_r$	Rise time		—	46	—	ns
$t_{d(off)}$	Turn-off delay time		—	135	—	ns
$t_f$	Fall time		—	95	—	ns
$V_{SD}$	Source-drain voltage	$I_S = 15\text{A}$ , $V_{GS} = 0\text{V}$	—	1.0	1.5	V
$R_{th(ch-c)}$	Thermal resistance	Channel to case	—	—	2.77	$^{\circ}\text{C/W}$
$t_{rr}$	Reverse recovery time	$I_S = 30\text{A}$ , $di/dt = -100\text{A}/\mu\text{s}$	—	80	—	ns

**PERFORMANCE CURVES**

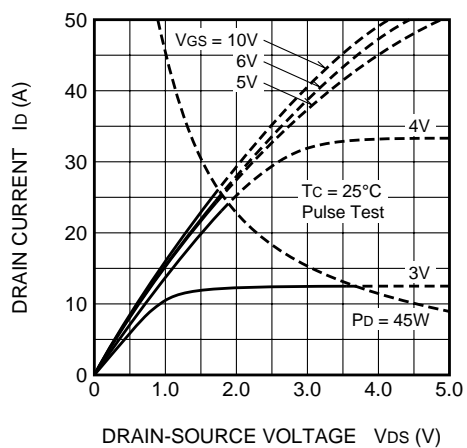
**POWER DISSIPATION DERATING CURVE**



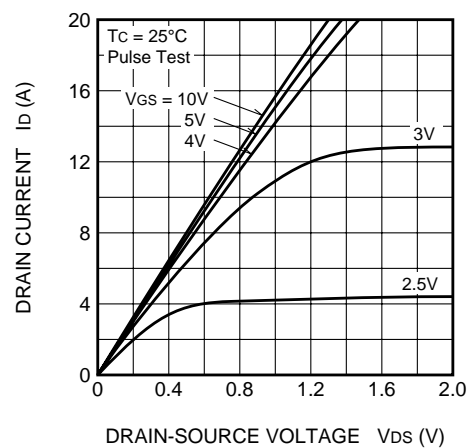
**MAXIMUM SAFE OPERATING AREA**



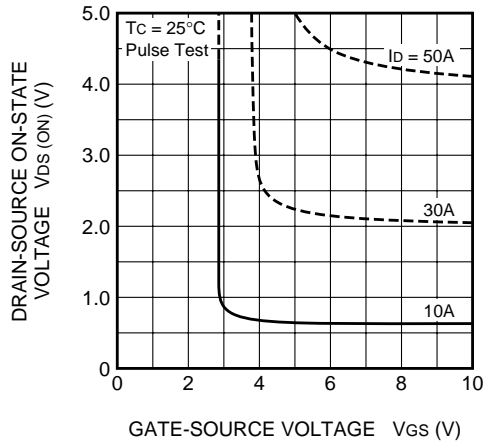
**OUTPUT CHARACTERISTICS (TYPICAL)**



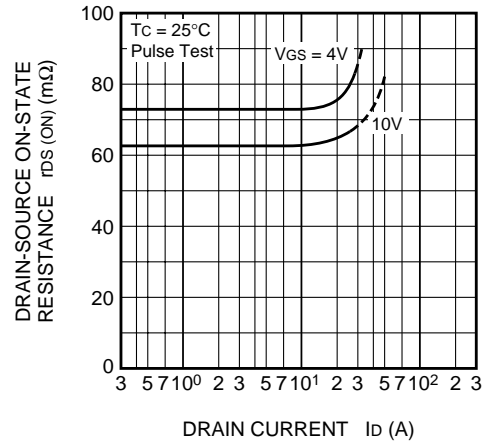
**OUTPUT CHARACTERISTICS (TYPICAL)**



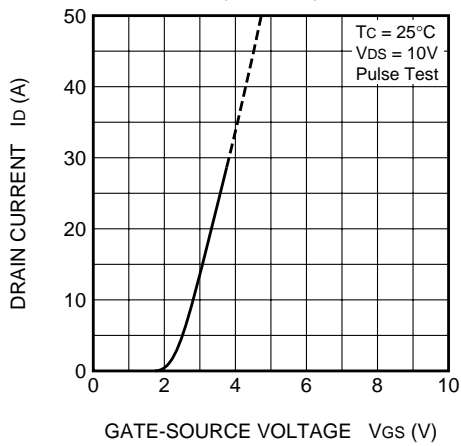
ON-STATE VOLTAGE VS.  
GATE-SOURCE VOLTAGE  
(TYPICAL)



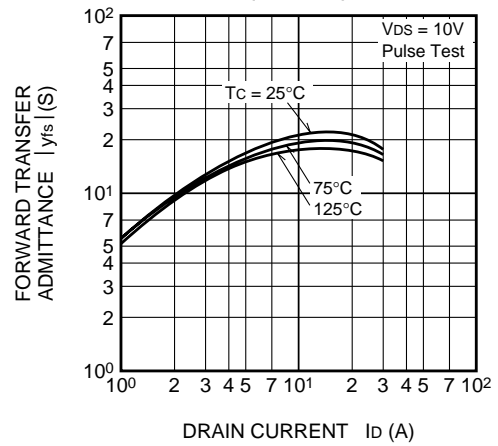
ON-STATE RESISTANCE VS.  
DRAIN CURRENT  
(TYPICAL)



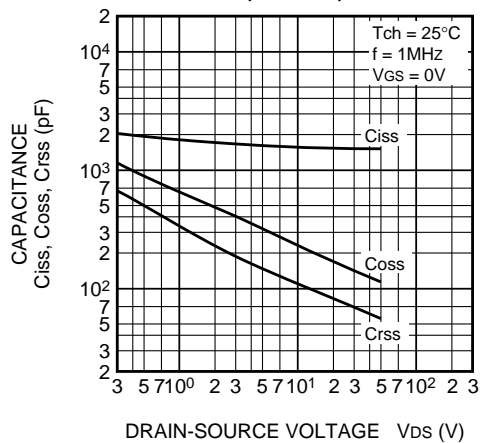
TRANSFER CHARACTERISTICS  
(TYPICAL)



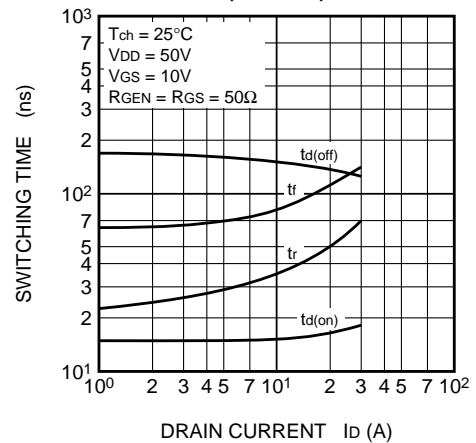
FORWARD TRANSFER ADMITTANCE  
VS. DRAIN CURRENT  
(TYPICAL)



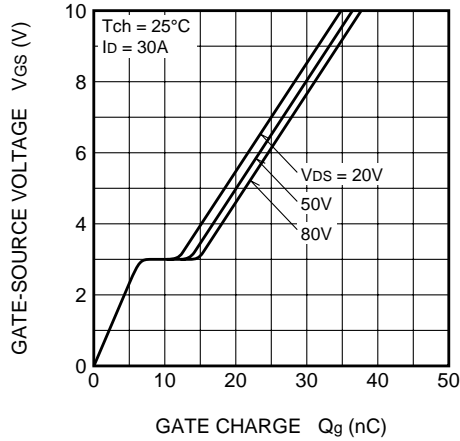
CAPACITANCE VS.  
DRAIN-SOURCE VOLTAGE  
(TYPICAL)



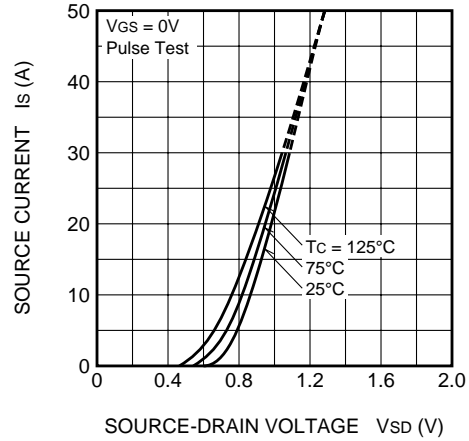
SWITCHING CHARACTERISTICS  
(TYPICAL)



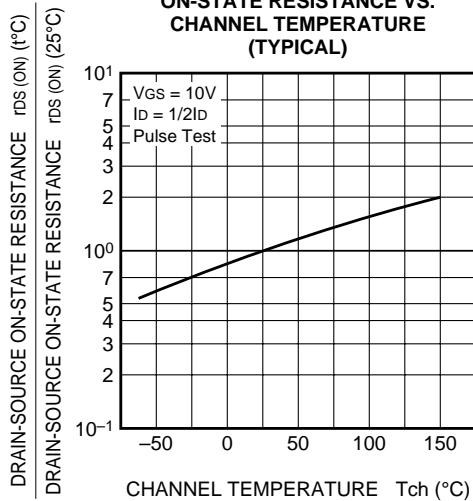
**GATE-SOURCE VOLTAGE  
VS. GATE CHARGE  
(TYPICAL)**



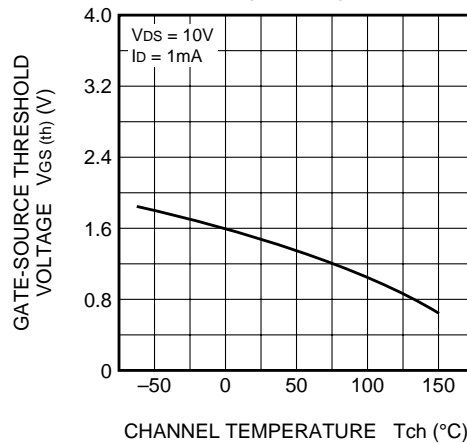
**SOURCE-DRAIN DIODE  
FORWARD CHARACTERISTICS  
(TYPICAL)**



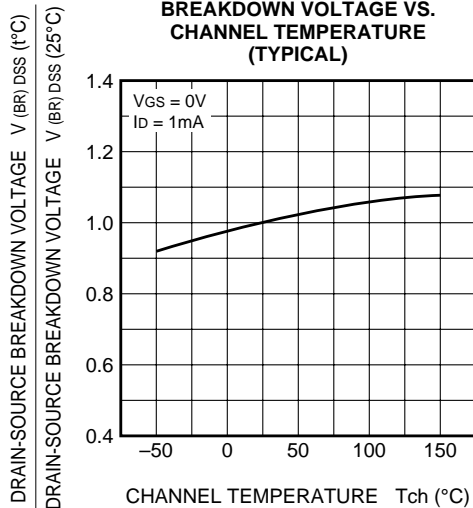
**ON-STATE RESISTANCE VS.  
CHANNEL TEMPERATURE  
(TYPICAL)**



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



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



**TRANSIENT THERMAL IMPEDANCE  
CHARACTERISTICS**

