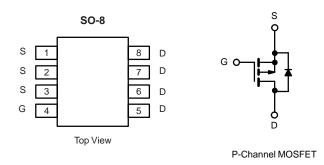


## FSS139-TL-E-VB Datasheet P-Channel 20-V (D-S) MOSFET

PRODUCT SUMMARY						
V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A)	Q <sub>g</sub> (Typ.)			
	0.015 at V <sub>GS</sub> = - 4.5 V	- 13 <sup>a</sup>				
- 20	0.021 at V <sub>GS</sub> = - 2.5 V	- 10 <sup>a</sup>	20 nC			
	0.040 at V <sub>GS</sub> = - 1.8 V	- 8				



#### **FEATURES**

- Halogen-free According to IEC 61249-2-21 . Definition
- •
- Trench Power MOSFET 100 % R<sub>g</sub> Tested Compliant to RoHS Directive 2002/95/EC •



FREE

#### **APPLICATIONS**

- Portable Devices
  - Load Switch
  - Battery Switch
  - Charger Switch

Parameter		Symbol	Limit	Unit
Drain-Source Voltage	V <sub>DS</sub>	- 20	V	
Gate-Source Voltage	V <sub>GS</sub>	± 12	V	
Continuous Drain Current (T <sub>J</sub> = 150 °C)	$T_{C} = 25 °C$ $T_{C} = 70 °C$ $T_{A} = 25 °C$ $T_{A} = 70 °C$	I <sub>D</sub>	- 13 <sup>a</sup> - 10 <sup>a</sup> - 8 <sup>b, c</sup> - 7.1 <sup>b, c</sup>	A
Pulsed Drain Current	I <sub>DM</sub>	- 50	1	
Continuous Source-Drain Diode Current	T <sub>C</sub> = 25 °C T <sub>A</sub> = 25 °C	۱ <sub>S</sub>	- 6 <sup>a</sup> - 2.9 <sup>b, c</sup>	$\neg$
Maximum Power Dissipation	$T_{C} = 25 °C$ $T_{C} = 70 °C$ $T_{A} = 25 °C$ $T_{A} = 70 °C$	P <sub>D</sub>	19 12 3.5 <sup>b, c</sup> 2.2 <sup>b, c</sup>	w
Operating Junction and Storage Temperature R	T <sub>J</sub> , T <sub>stg</sub>	- 55 to 150	℃	
Soldering Recommendations (Peak Temperatur	¥	260		

THERMAL RESISTANCE RATINGS						
Parameter		Symbol	Typical	Maximum	Unit	
Maximum Junction-to-Ambient <sup>b, e</sup>	t ≤ 5 s	R <sub>thJA</sub>	28	36	°C/W	
Maximum Junction-to-Case (Drain)	Steady State	R <sub>thJC</sub>	5.3	6.5	C/ W	

Notes:

a. Package limited.

b. Surface Mounted on 1" x 1" FR4 board.

c. t = 5 s.

d. Rework Conditions: manual soldering with a soldering iron is not recommended for leadless components.

e. Maximum under Steady State conditions is 80 °C/W.



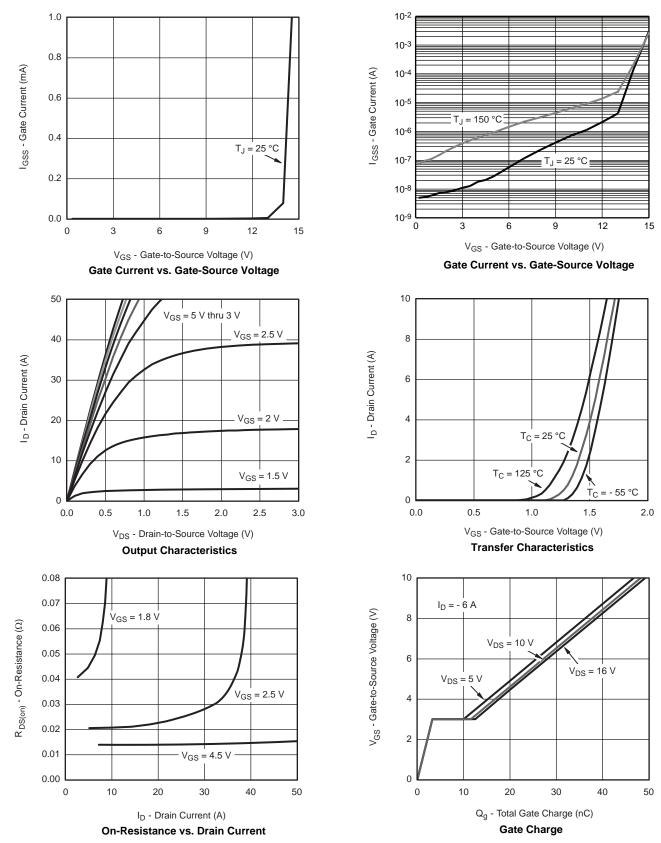
Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit	
Static					I		
Drain-Source Breakdown Voltage	V <sub>DS</sub>	$V_{GS} = 0 V, I_{D} = -250 \mu A$	- 20			V	
V <sub>DS</sub> Temperature Coefficient	$\Delta V_{DS}/T_{J}$	I <sub>D</sub> = - 250 μA		- 12		mV/°C	
V <sub>GS(th)</sub> Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	I <sub>D</sub> = - 250 μA		3			
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	$V_{DS} = V_{GS}$ , $I_D = -250 \ \mu A$	- 0.5		- 1.2	V	
	I <sub>GSS</sub>	$V_{DS} = 0 V, V_{GS} = \pm 12 V$			± 20		
Gate-Source Leakage		$V_{DS} = 0 V, V_{GS} = \pm 4.5 V$			± 0.5		
		$V_{DS} = -20 \text{ V}, \text{ V}_{GS} = 0 \text{ V}$			- 1	μA	
Zero Gate Voltage Drain Current	IDSS	$V_{DS}$ = - 20 V, $V_{GS}$ = 0 V, $T_{J}$ = 55 °C			- 10	1	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	$V_{DS} \leq$ - 5 V, $V_{GS}$ = - 4.5 V	- 20			Α	
		V <sub>GS</sub> = - 4.5 V, I <sub>D</sub> = - 5.6 A		0.015		Ω	
Drain-Source On-State Resistance <sup>a</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = - 2.5 V, I <sub>D</sub> = - 5.3 A		0.021			
		V <sub>GS</sub> = - 1.8 V, I <sub>D</sub> = - 2.5 A		0.040			
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = - 10 V, I <sub>D</sub> = - 5.6 A		35		S	
Dynamic <sup>b</sup>					I.	1	
Total Gate Charge		V <sub>DS</sub> = - 10 V, V <sub>GS</sub> = - 8 V, I <sub>D</sub> = - 5 A		50	75		
	Qg Qgs Qgd			20	20 30		
Gate-Source Charge		$V_{DS}$ = - 10 V, $V_{GS}$ = - 4.5 V, $I_{D}$ = - 5 A		3.3		nC	
Gate-Drain Charge				8.4			
Gate Resistance	R <sub>g</sub>	f = 1 MHz	0.2	1	2	kΩ	
Turn-On Delay Time	t <sub>d(on)</sub>			0.71	1.1		
Rise Time	t <sub>r</sub> t <sub>d(off)</sub>	$V_{DD}$ = - 10 V, $R_L$ = 1 $\Omega$		1.7	2.6	-	
Turn-Off Delay Time		$I_D \cong$ - 5 Å, $V_{GEN}$ = - 4.5 V, $R_g$ = 1		6	9		
Fall Time		Ω		3.2	5		
Turn-On Delay Time	t <sub>d(on)</sub>			0.3	0.45	us	
Rise Time	t <sub>r</sub>	$V_{DD}$ = - 10 V, $R_L$ = 1 $\Omega$		0.6	0.9	-	
Turn-Off Delay Time	t <sub>d(off)</sub>	$I_{D} \cong -5 \text{ A}, V_{GEN} = -10 \text{ V}, \text{ R}_{g} = 1$		10	15		
Fall Time	t <sub>f</sub>	Ω		3.5	5.5		
Drain-Source Body Diode Characterist				L	L		
Continuous Source-Drain Diode Current	۱ <sub>S</sub>	T <sub>C</sub> = 25 °C			- 6		
Pulse Diode Forward Current	I <sub>SM</sub>				- 50	A	
Body Diode Voltage	V <sub>SD</sub>	$I_{S} = -5 \text{ A}, V_{GS} = 0 \text{ V}$		- 0.85	- 1.2	V	
Body Diode Reverse Recovery Time	t <sub>rr</sub>			30	60	ns	
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>			20	40	nC	
Reverse Recovery Fall Time	t <sub>a</sub>	$I_F = 6 \text{ A}, \text{ dI/dt} = 100 \text{ A/}\mu\text{s}, \text{ T}_J = 25 \text{ °C}$		13		ns	
Reverse Recovery Rise Time	t <sub>b</sub>			17			

Notes:

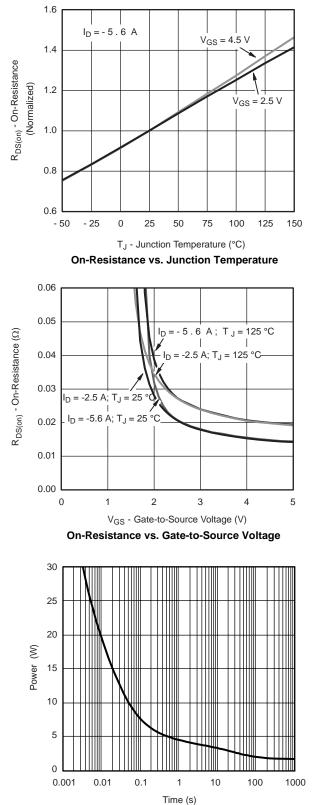
a. Pulse test; pulse width  $\leq$  300  $\mu s,$  duty cycle  $\leq$  2 %. b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

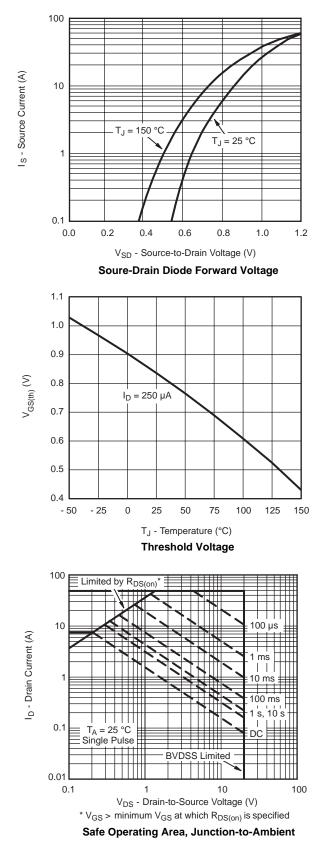






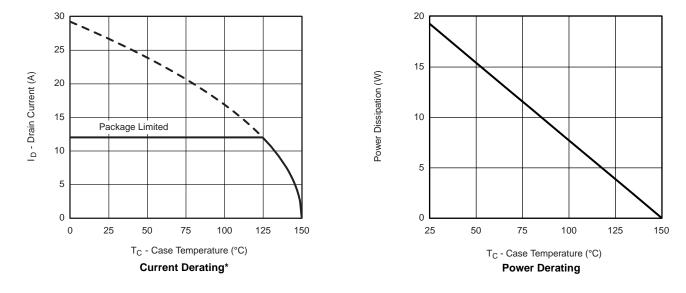


Single Pulse Power, Junction-to-Ambient



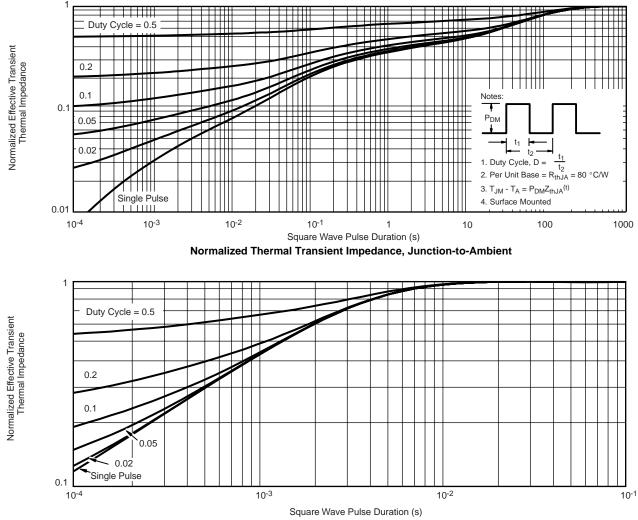
服务热线:400-655-8788





\* The power dissipation  $P_D$  is based on  $T_{J(max)}$  = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.



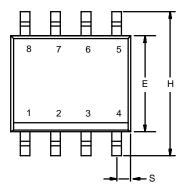


Normalized Thermal Transient Impedance, Junction-to-Case



### SOIC (NARROW): 8-LEAD

JEDEC Part Number: MS-012

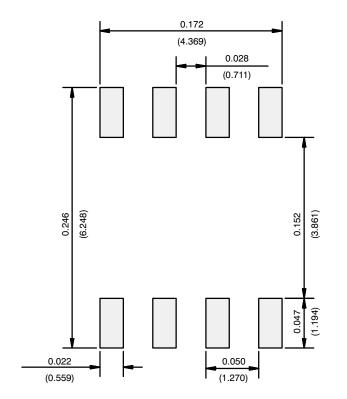




	MILLIM	IETERS	INC	HES		
DIM	Min	Мах	Min	Max		
A	1.35	1.75	0.053	0.069		
A <sub>1</sub>	0.10	0.20	0.004	0.008		
В	0.35	0.51	0.014	0.020		
С	0.19	0.25	0.0075	0.010		
D	4.80	5.00	0.189	0.196		
E	3.80	4.00	0.150	0.157		
е	1.27 BSC		0.050	0.050 BSC		
Н	5.80	6.20	0.228	0.244		
h	0.25	0.50	0.010	0.020		
L	0.50	0.93	0.020	0.037		
q	0°	8°	0°	8°		
S	0.44	0.64	0.018	0.026		
ECN: C-06527-Rev. I, 11-Sep-06 DWG: 5498						



**RECOMMENDED MINIMUM PADS FOR SO-8** 



Recommended Minimum Pads Dimensions in Inches/(mm)



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