



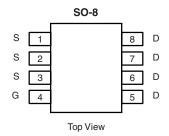
# N-Channel 12-V (D-S) MOSFET

PRODUCT SUMMARY				
V <sub>DS</sub> (V)	$R_{DS(on)}(\Omega)$	I <sub>D</sub> (A)		
12	0.003 at V <sub>GS</sub> = 4.5 V	25		
12	$0.004 \text{ at V}_{GS} = 2.5 \text{ V}$	20		

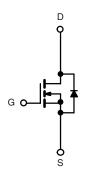
#### **FEATURES**

- Halogen-free According to IEC 61249-2-21 Available
- TrenchFET® Power MOSFETs: 2.5 V Rated
- 100 % R<sub>g</sub> Tested





Ordering Information: Si4838DY-T1-E3 (Lead (Pb)-free) Si4838DY-T1-GE3 (Lead (Pb)-free and Halogen-free)



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T <sub>A</sub> = 25 °C, unless otherwise noted					
Parameter		Symbol	10 s	Steady State	Unit
Drain-Source Voltage		V <sub>DS</sub>	12		V
Gate-Source Voltage		V <sub>GS</sub>	± 8		
Continuous Drain Current /T 150 °C\a	T <sub>A</sub> = 25 °C	- I <sub>D</sub>	25	17	
Continuous Drain Current (T <sub>J</sub> = 150 °C) <sup>a</sup>	T <sub>A</sub> = 70 °C		20	13	
Pulsed Drain Current (10 µs Pulse Width)		I <sub>DM</sub>	60		Α
Continuous Source Current (Diode Conduction) <sup>a</sup>		I <sub>S</sub>	2.9	1.3	
Mariana Barra Biraina in a	T <sub>A</sub> = 25 °C	P <sub>D</sub>	3.5	1.6	W
Maximum Power Dissipation <sup>a</sup>	T <sub>A</sub> = 70 °C	l 'D	2.2	1	
Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>stg</sub>	- 55 to 150		°C

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Marianna lunation to Ambianta	t ≤ 10 s	R <sub>thJA</sub>	29	35	
Maximum Junction-to-Ambient <sup>a</sup>	Steady State		67	80	°C/W
Maximum Junction-to-Foot (Drain)	Steady State	$R_{thJF}$	13	16	

Notes:

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

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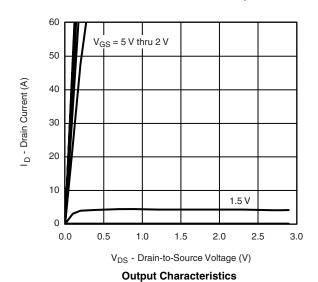
Parameter	Symbol	mbol Test Conditions		Typ.	Max.	Unit	
Static							
Gate Threshold Voltage	V <sub>GS(th)</sub>	$V_{DS} = V_{GS}, I_D = 250 \mu A$	0.6			V	
Gate-Body Leakage	I <sub>GSS</sub>	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 8 \text{ V}$			± 100	nA	
Zero Gate Voltage Drain Current		V <sub>DS</sub> = 9.6 V, V <sub>GS</sub> = 0 V			1	μА	
	I <sub>DSS</sub>	$V_{DS} = 9.6 \text{ V}, V_{GS} = 0 \text{ V}, T_{J} = 55 ^{\circ}\text{C}$			5		
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	$V_{DS} \ge 5 \text{ V}, V_{GS} = 4.5 \text{ V}$	30			Α	
	В	$V_{GS} = 4.5 \text{ V}, I_D = 25 \text{ A}$		0.0024	0.003	Ω	
Drain-Source On-State Resistance <sup>a</sup>	R <sub>DS(on)</sub>	$V_{GS} = 2.5 \text{ V}, I_D = 20 \text{ A}$		0.0031	0.004		
Forward Transconductance <sup>a</sup>	9 <sub>fs</sub>	$V_{DS} = 6 \text{ V}, I_{D} = 25 \text{ A}$		80		S	
Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$I_S = 2.9 \text{ A}, V_{GS} = 0 \text{ V}$		0.75	1.1	V	
Dynamic <sup>b</sup>	<u>'</u>		•	•			
Total Gate Charge	$Q_g$			40	60		
Gate-Source Charge	Q <sub>gs</sub>	$V_{DS} = 6 \text{ V}, V_{GS} = 4.5 \text{ V}, I_{D} = 25 \text{ A}$		6.7		nC	
Gate-Drain Charge	$Q_{gd}$			9.2			
Gate Resistance	$R_{g}$		1.0	1.7	2.9	Ω	
Turn-On Delay Time	t <sub>d(on)</sub>			40	60		
Rise Time	t <sub>r</sub>	$V_{DD} = 6 \text{ V}, R_L = 6 \Omega$		40	60	1	
Turn-Off Delay Time	t <sub>d(off)</sub>	$I_D\cong$ 1 A, $V_{GEN}$ = 4.5 V, $R_g$ = 6 $\Omega$		140	210	ns	
Fall Time	t <sub>f</sub>			70	100	]	
Source-Drain Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 2.9 A, dI/dt = 100 A/μs		50	80		

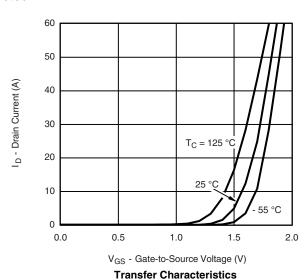
#### Notes:

- 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.

## TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



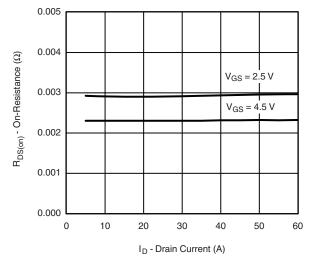




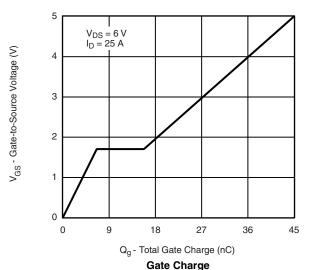


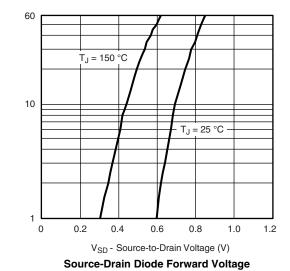


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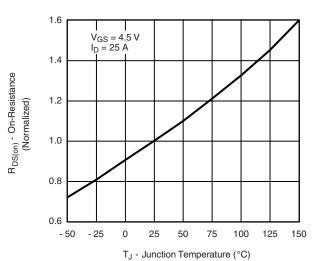
#### On-Resistance vs. Drain Current



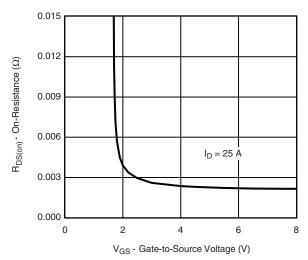


7500 6000 C - Capacitance (pF) Ciss 4500 3000  $C_{oss}$ 1500  $C_{rss}$ 0 0 6 4 10 12 V<sub>DS</sub> - Drain-to-Source Voltage (V)

Capacitance



On-Resistance vs. Junction Temperature



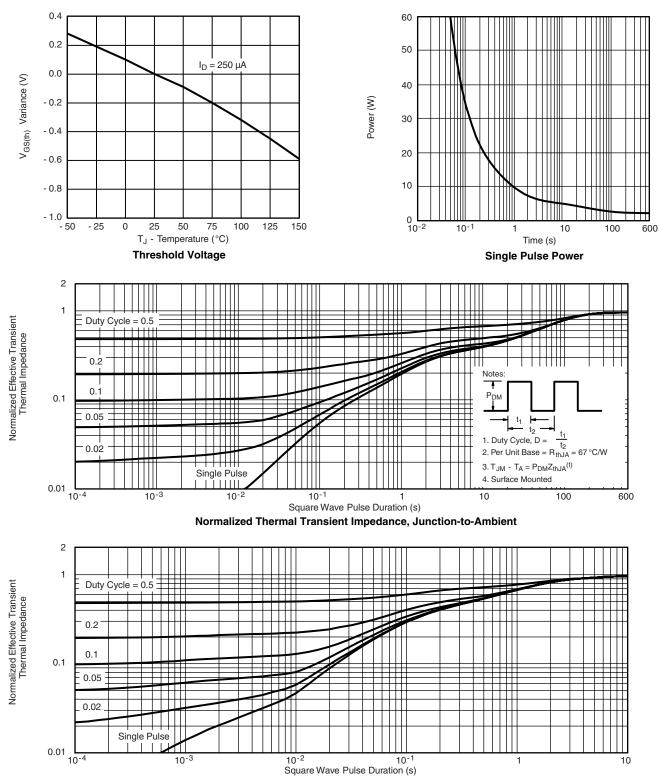
On-Resistance vs. Gate-to-Source Voltage

Is - Source Current (A)

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Normalized Thermal Transient Impedance, Junction-to-Foot



SOIC (NARROW): 8-LEAD JEDEC Part Number: MS-012







	MILLIMETERS INCHES			HES		
DIM	Min	Max	Min	Max		
Α	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		
Е	3.80	4.00	0.150	0.157		
е	1.27	BSC	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		
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### **RECOMMENDED MINIMUM PADS FOR SO-8**



Recommended Minimum Pads Dimensions in Inches/(mm)

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