

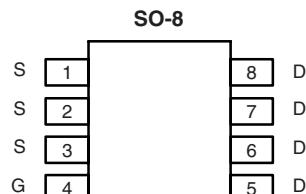
N-Channel 20-V (D-S) MOSFET

PRODUCT SUMMARY

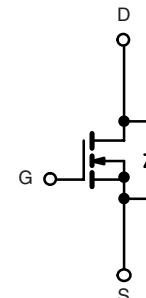
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
20	0.0045 at $V_{GS} = 10$ V	21
	0.0068 at $V_{GS} = 4.5$ V	17

FEATURES

- Halogen-free According to IEC 61249-2-21 Available
- TrenchFET® Power MOSFET
- PWM Optimized for Fast Switching
- Low Switching Losses
- Low Gate Drive Losses
- 100 % R_g Tested



Top View



N-Channel MOSFET

Ordering Information: Si4408DY-T1-E3 (Lead (Pb)-free)
Si4408DY-T1-GE3 (Lead (Pb)-free and Halogen-free)

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted

Parameter	Symbol	10 s	Steady State	Unit
Drain-Source Voltage	V_{DS}	20	± 20	V
Gate-Source Voltage	V_{GS}			
Continuous Drain Current ($T_J = 150$ °C) ^a	I_D	21	14	A
		17	11	
Pulsed Drain Current (10 μ s Pulse Width)	I_{DM}	60		
Continuous Source Current (Diode Conduction) ^a	I_S	2.9	1.3	
Maximum Power Dissipation ^a	P_D	3.5	1.6	W
		2.2	1	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 150		°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^a	$t \leq 10$ s	R_{thJA}	29	35
	Steady State		67	80
Maximum Junction-to-Foot (Drain)	R_{thJF}	13	16	°C/W

Notes:

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

SPECIFICATIONS $T_J = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Gate Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$, $I_D = 250 \mu\text{A}$	1.0			V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0 \text{ V}$, $V_{GS} = \pm 20 \text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 16 \text{ V}$, $V_{GS} = 0 \text{ V}$		1		μA
		$V_{DS} = 16 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 55^\circ\text{C}$		5		
On-State Drain Current ^a	$I_{D(\text{on})}$	$V_{DS} \geq 5 \text{ V}$, $V_{GS} = 10 \text{ V}$	30			A
Drain-Source On-State Resistance ^a	$R_{DS(\text{on})}$	$V_{GS} = 10 \text{ V}$, $I_D = 21 \text{ A}$		0.0035	0.0045	Ω
		$V_{GS} = 4.5 \text{ V}$, $I_D = 17 \text{ A}$		0.0054	0.0068	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 6 \text{ V}$, $I_D = 21 \text{ A}$		60		S
Diode Forward Voltage ^a	V_{SD}	$I_S = 2.9 \text{ A}$, $V_{GS} = 0 \text{ V}$		0.75	1.1	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = 10 \text{ V}$, $V_{GS} = 4.5 \text{ V}$, $I_D = 21 \text{ A}$		21	32	nC
Gate-Source Charge	Q_{gs}			8.9		
Gate-Drain Charge	Q_{gd}			6.4		
Gate Resistance	R_g		0.5	1.40	2.4	Ω
Turn-On Delay Time	$t_{d(\text{on})}$	$V_{DD} = 10 \text{ V}$, $R_L = 10 \Omega$ $I_D \geq 1 \text{ A}$, $V_{GEN} = 4.5 \text{ V}$, $R_g = 6 \Omega$		42	65	ns
Rise Time	t_r			42	65	
Turn-Off Delay Time	$t_{d(\text{off})}$			60	90	
Fall Time	t_f			26	40	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 2.9 \text{ A}$, $di/dt = 100 \text{ A}/\mu\text{s}$		55	80	

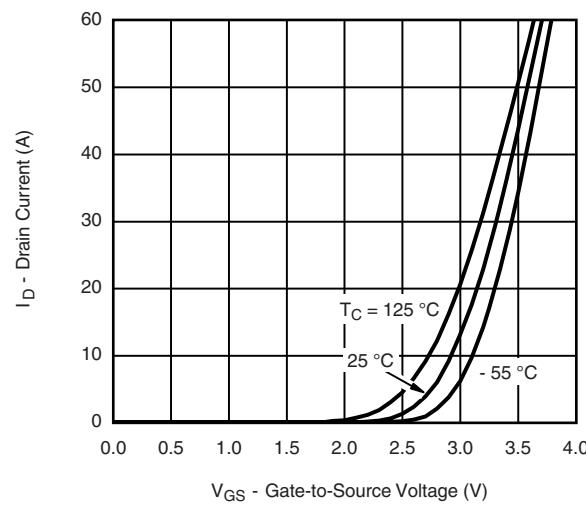
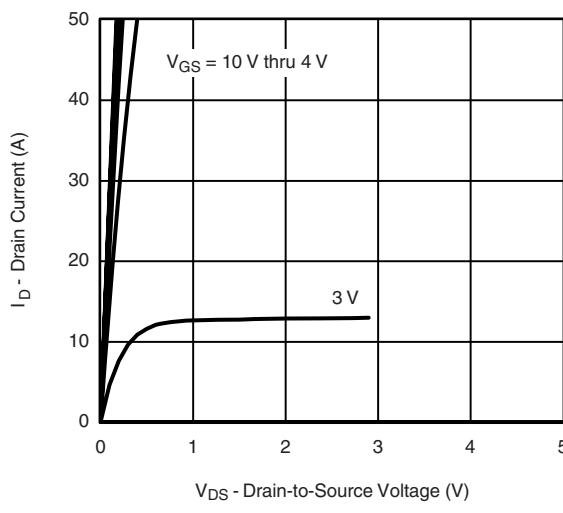
Notes:

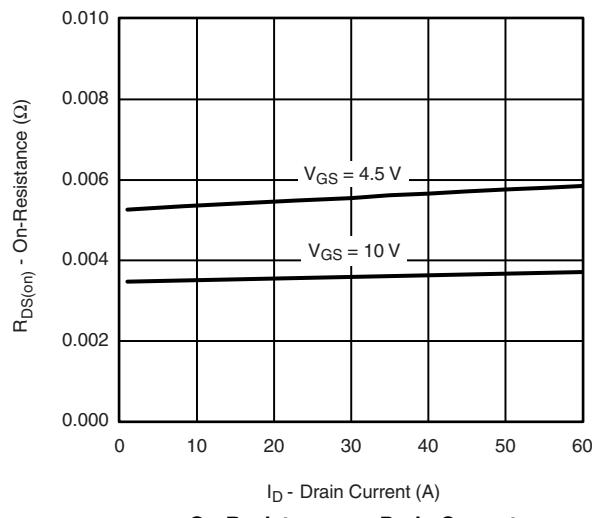
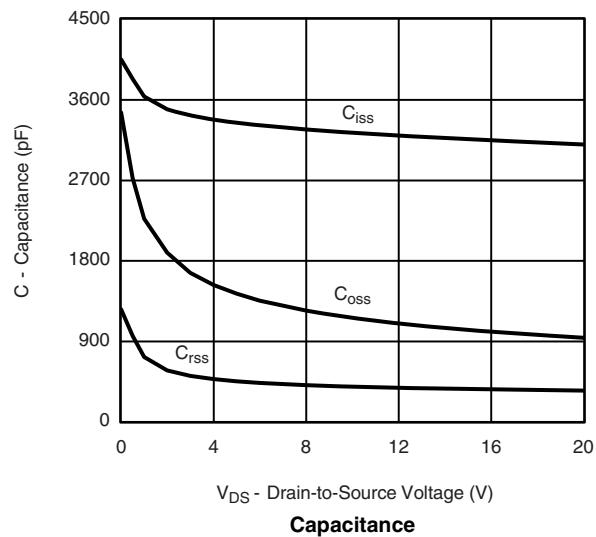
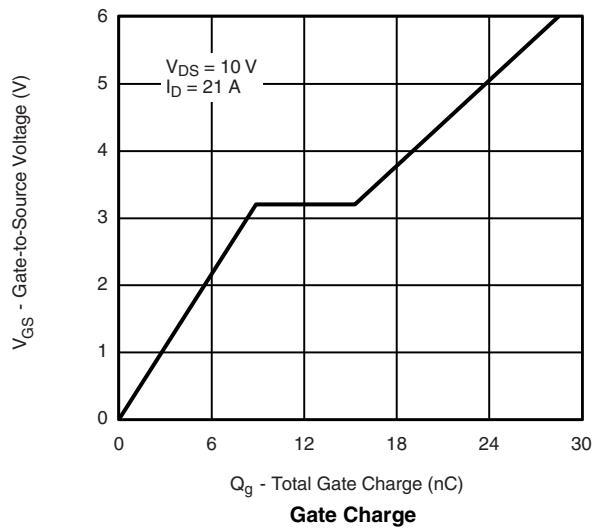
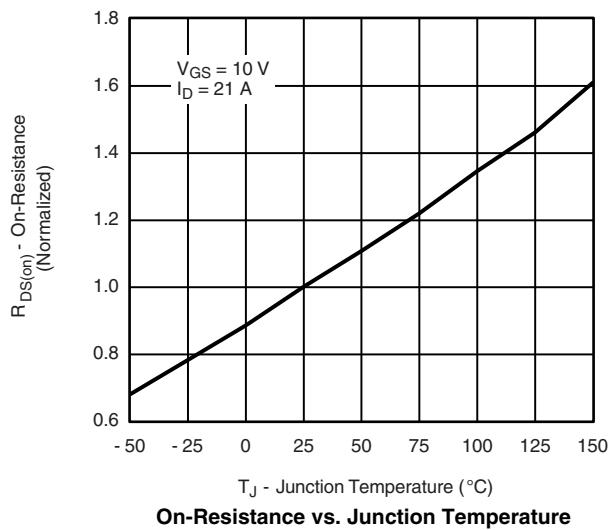
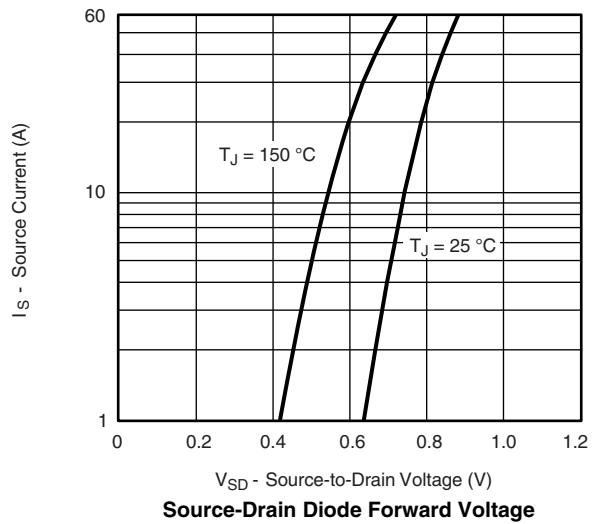
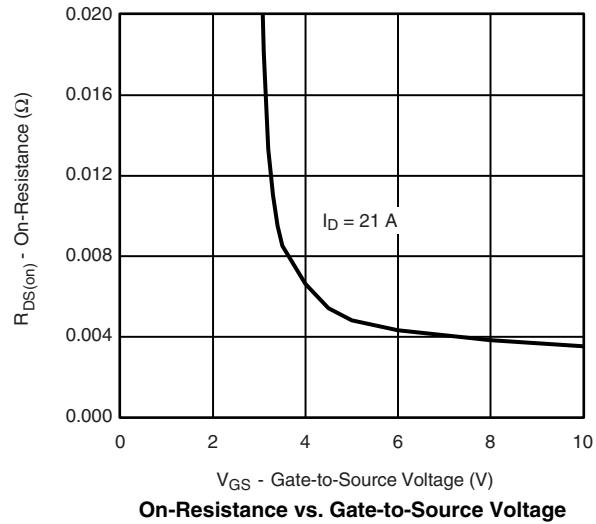
a. Pulse test; pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2 \%$.

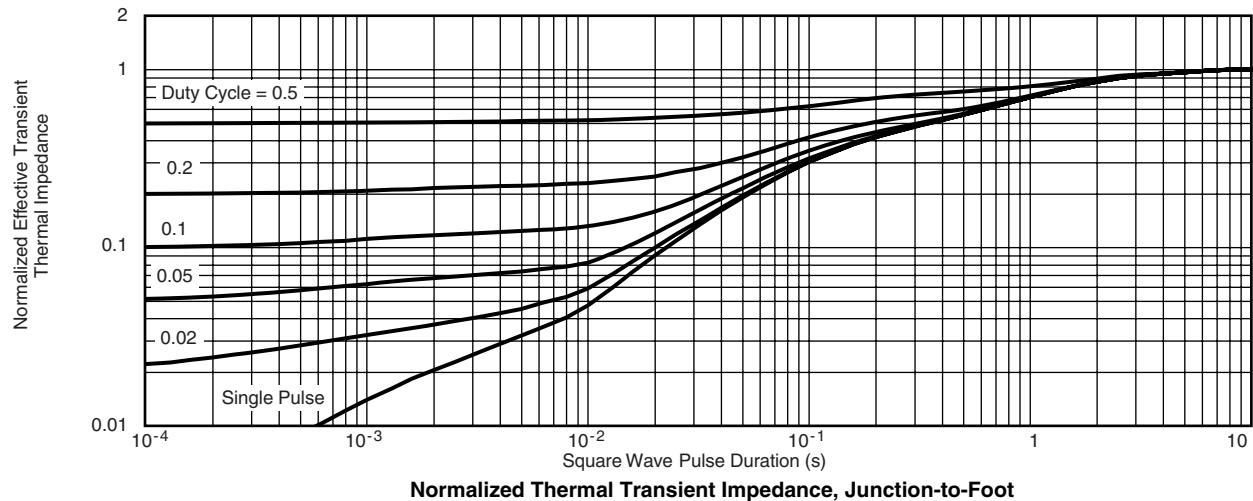
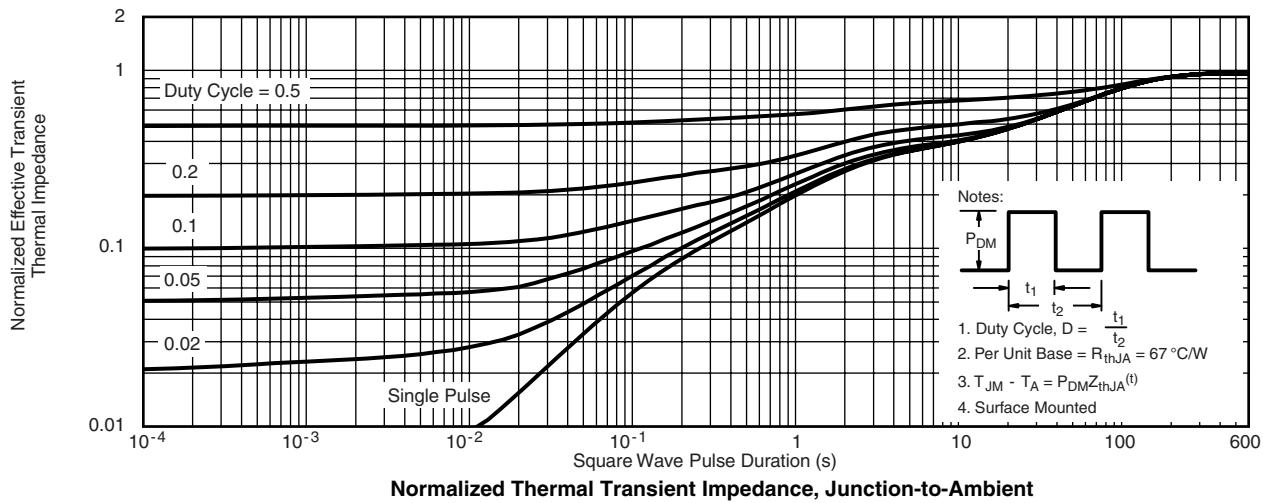
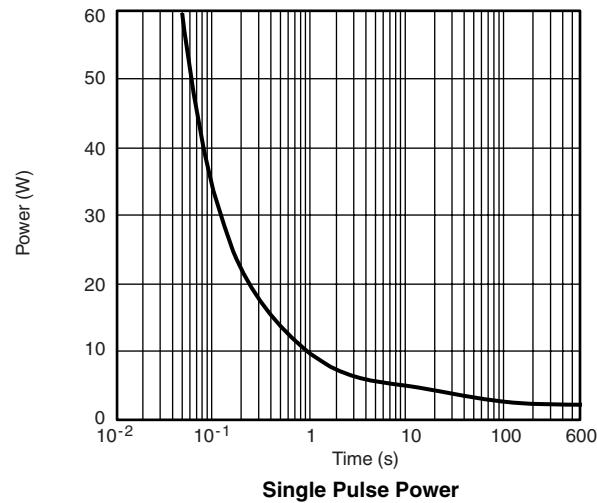
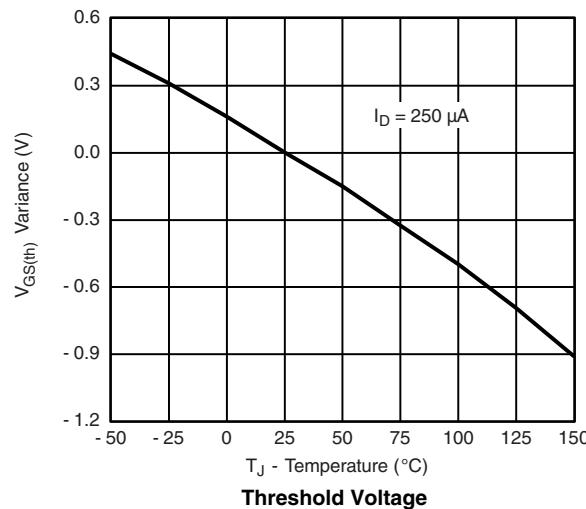
b. Guaranteed by design, not subject to production testing.

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



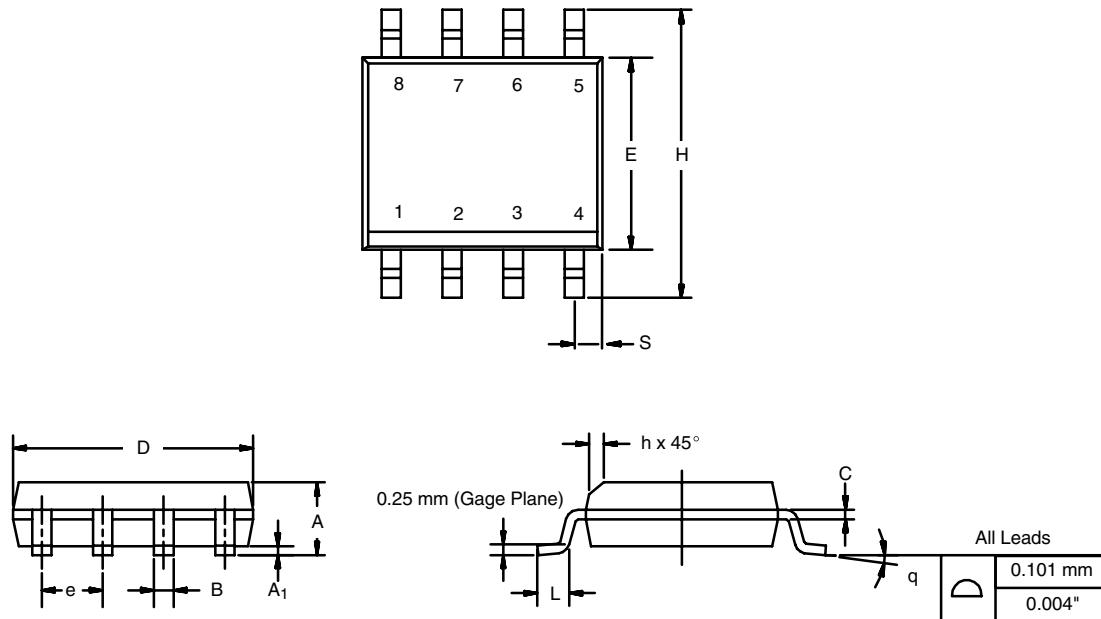
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

On-Resistance vs. Drain Current

Capacitance

Gate Charge

On-Resistance vs. Junction Temperature

Source-Drain Diode Forward Voltage

On-Resistance vs. Gate-to-Source Voltage

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted


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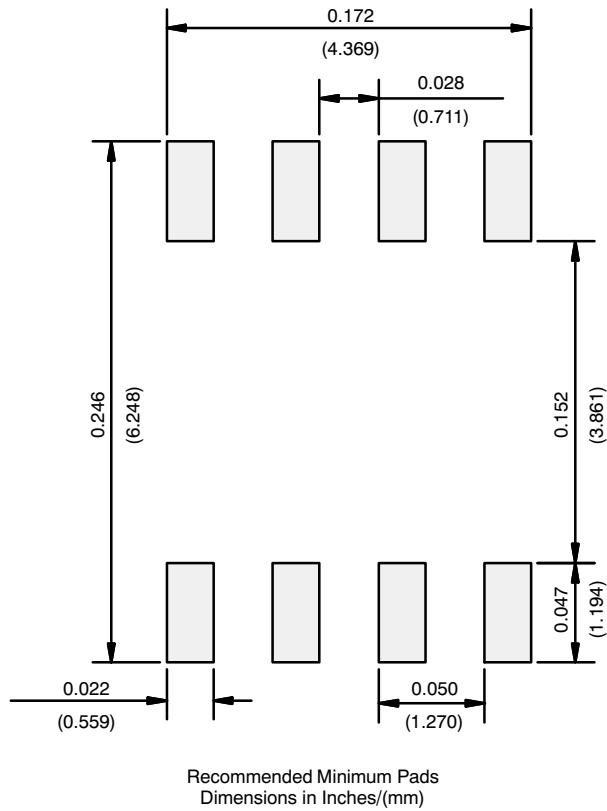
SOIC (NARROW): 8-LEAD

JEDEC Part Number: MS-012



DIM	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A ₁	0.10	0.20	0.004	0.008
B	0.35	0.51	0.014	0.020
C	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
e	1.27 BSC		0.050 BSC	
H	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



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