

**60V N-CHANNEL ENHANCEMENT MODE MOSFET**

**Product Summary**

$V_{(BR)DSS}$	$R_{DS(on)}$	$I_D$ $T_A = 25^\circ C$
60V	66mΩ @ $V_{GS} = 10V$	5.0A
	97mΩ @ $V_{GS} = 4.5V$	4.1A

**Description and Applications**

This MOSFET has been designed to minimize the on-state resistance and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

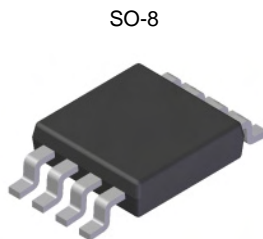
- Motor control
- Backlighting
- DC-DC Converters
- Power management functions

**Features and Benefits**

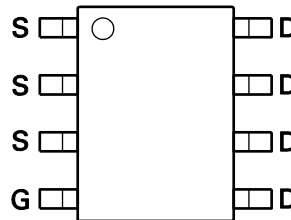
- Low on-resistance
- Fast switching speed
- “Green” component and RoHS compliant (Note 1)
- Qualified to AEC-Q101 Standards for High Reliability

**Mechanical Data**

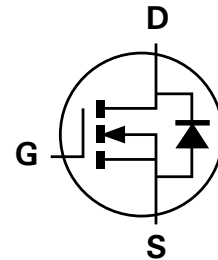
- Case: SO-8
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0 (Note 1)
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See diagram below
- Terminals: Finish - Matte Tin annealed over Copper lead frame. Solderable per MIL-STD-202, Method 208
- Weight: 0.074 grams (approximate)



Top View



Top View



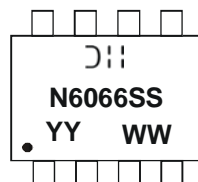
Equivalent Circuit

**Ordering Information** (Note 1)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DMN6066SSS-13	N6066SS	13	12	2,500

Notes: 1. Diodes, Inc. defines “Green” products as those which are RoHS compliant and contain no halogens or antimony compounds; further information about Diodes Inc.’s “Green” Policy can be found on our website. For packaging details, go to our website.

**Marking Information**



DII = Manufacturer's Marking  
 N6066SS = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Year (ex: 09 = 2009)  
 WW = Week (01 - 53)

**Maximum Ratings** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

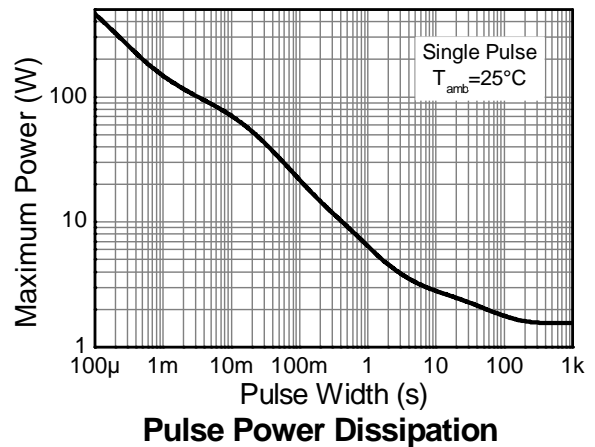
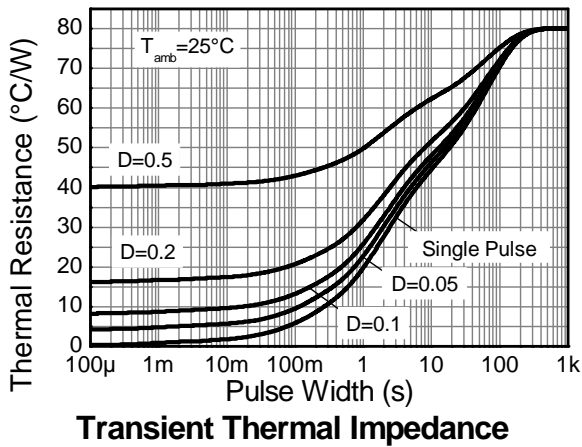
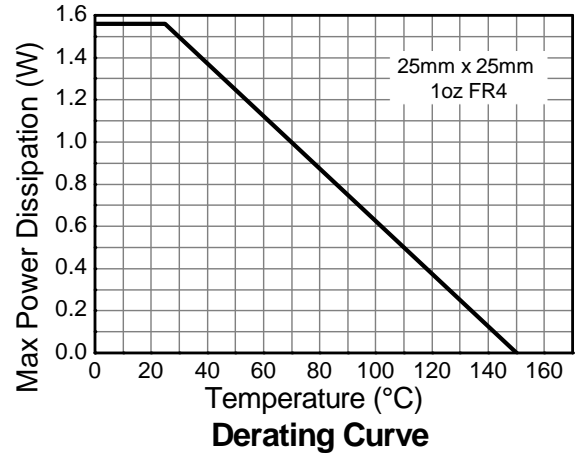
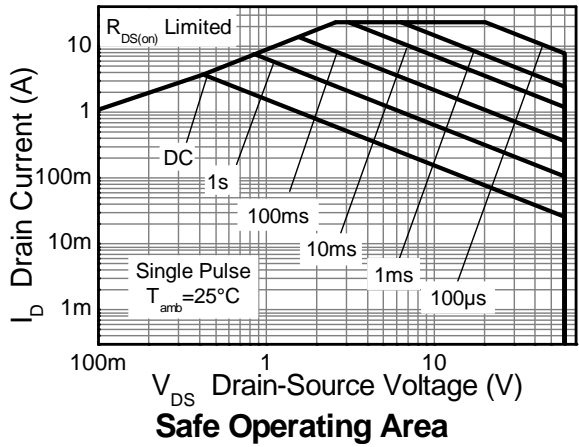
Characteristic		Symbol	Value	Unit	
Drain-Source voltage		$V_{DSS}$	60	V	
Gate-Source voltage	(Note 2)	$V_{GS}$	$\pm 20$	V	
Single Pulsed Avalanche Energy		(Note 7)	$E_{AS}$	37.5	mJ
Single Pulsed Avalanche Current		(Note 7)	$I_{AS}$	5.0	A
Continuous Drain current	$V_{GS} = 10\text{V}$	(Note 4)	$I_D$	5.0	A
		$T_A = 70^\circ\text{C}$ (Note 4)		4.0	
		(Note 3)		3.7	
Pulsed Drain current	$V_{GS} = 10\text{V}$	(Note 5)	$I_{DM}$	23	A
Continuous Source current (Body diode)		(Note 4)	$I_S$	4.0	A
Pulsed Source current (Body diode)		(Note 5)	$I_{SM}$	23	A

**Thermal Characteristics** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic		Symbol	Value	Unit
Power dissipation	(Note 3)	$P_D$	1.56	W
	Linear derating factor		12.5	
(Note 4)			2.81	
			22.5	
Thermal Resistance, Junction to Ambient	(Note 3)	$R_{\theta JA}$	80.0	$^\circ\text{C}/\text{W}$
	(Note 4)		44.5	
Thermal Resistance, Junction to Lead	(Note 6)	$R_{\theta JL}$	37.0	
Operating and storage temperature range		$T_J, T_{STG}$	-55 to 150	

- Notes:
- AEC-Q101  $V_{GS}$  maximum is  $\pm 16\text{V}$ .
  - For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
  - Same as note (3), except the device is measured at  $t \leq 10$  sec.
  - Same as note (3), except the device is pulsed with  $D = 0.02$  and pulse width 300  $\mu\text{s}$ . The pulse current is limited by the maximum junction temperature.
  - Thermal resistance from junction to solder-point (at the end of the drain lead).
  - UIS in production with  $L = 3.0\text{mH}$ ,  $I_{AS} = 5.0\text{A}$ ,  $R_G = 25\Omega$ ,  $V_{DD} = 50\text{V}$ , starting  $T_J = 25^\circ\text{C}$ .

**Thermal Characteristics**

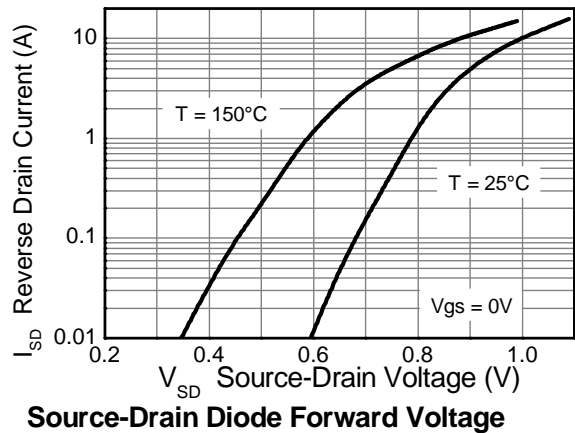
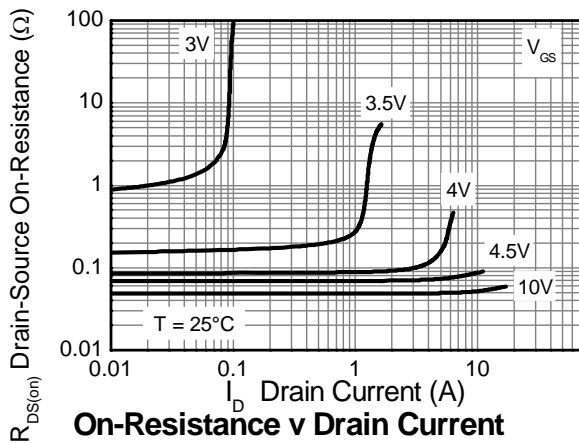
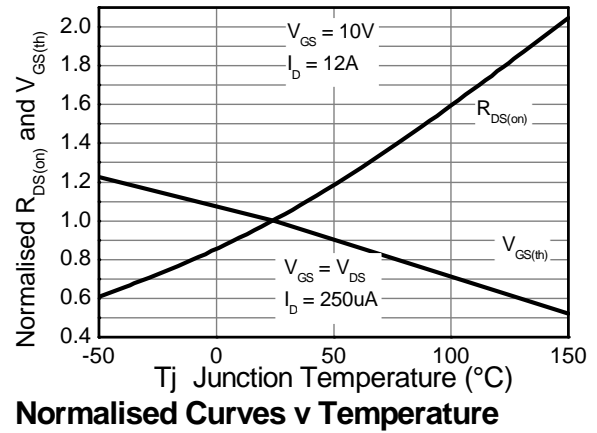
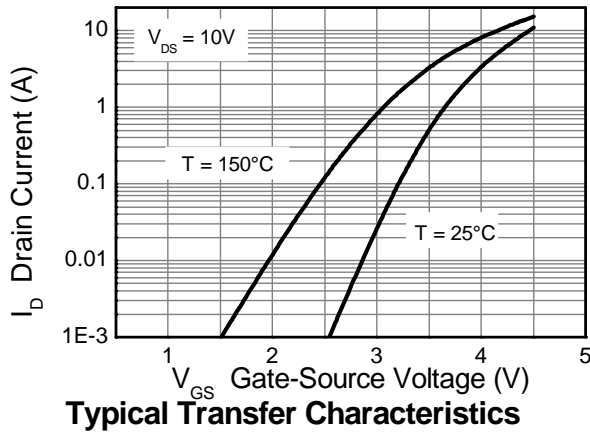
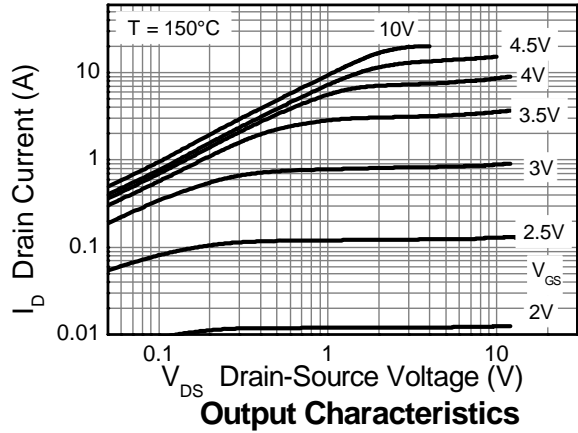
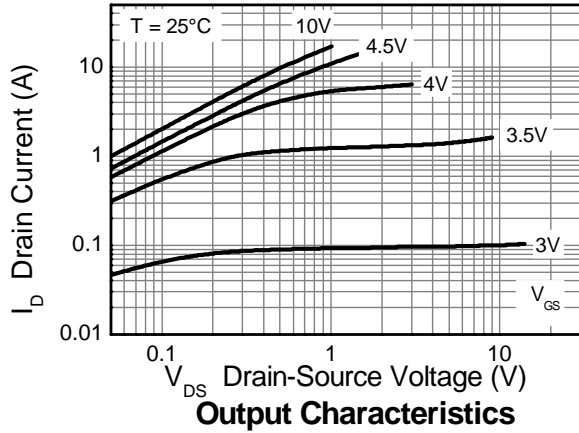


**Electrical Characteristics** @  $T_A = 25^\circ\text{C}$  unless otherwise specified

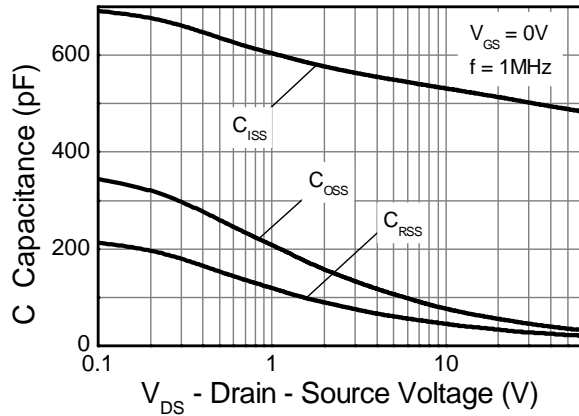
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	60	—	—	V	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	0.5	$\mu\text{A}$	$V_{DS} = 60\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 100$	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(th)}$	1.0	—	3.0	V	$I_D = 250\mu\text{A}, V_{DS} = V_{GS}$
Static Drain-Source On-Resistance (Note 8)	$R_{DS(on)}$	—	0.048	0.066	$\Omega$	$V_{GS} = 10\text{V}, I_D = 4.5\text{A}$
			0.068	0.097		$V_{GS} = 4.5\text{V}, I_D = 3.5\text{A}$
Forward Transconductance (Notes 8 & 9)	$g_{fs}$	—	19.2	—	S	$V_{DS} = 15\text{V}, I_D = 6\text{A}$
Diode Forward Voltage (Note 8)	$V_{SD}$	—	0.89	1.15	V	$I_S = 4.5\text{A}, V_{GS} = 0\text{V}$
Reverse recovery time (Note 9)	$t_{rr}$	—	23	—	ns	$I_S = 2.4\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Reverse recovery charge (Note 9)	$Q_{rr}$	—	19.7	—	nC	
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	$C_{iss}$	—	502	—	pF	$V_{DS} = 30\text{V}, V_{GS} = 0\text{V}$ $f = 1\text{MHz}$
Output Capacitance	$C_{oss}$	—	45.7	—	pF	
Reverse Transfer Capacitance	$C_{rss}$	—	27.1	—	pF	
Total Gate Charge (Note 10)	$Q_g$	—	5.4	—	nC	$V_{GS} = 4.5\text{V}$
Total Gate Charge (Note 10)	$Q_g$	—	10.3	—	nC	$V_{GS} = 10\text{V}$ $V_{DS} = 30\text{V}$ $I_D = 4.5\text{A}$
Gate-Source Charge (Note 10)	$Q_{gs}$	—	1.7	—	nC	
Gate-Drain Charge (Note 10)	$Q_{gd}$	—	3.2	—	nC	
Turn-On Delay Time (Note 10)	$t_{D(on)}$	—	2.7	—	ns	$V_{DD} = 30\text{V}, V_{GS} = 10\text{V}$ $I_D = 1\text{A}, R_G \cong 6.0\Omega$
Turn-On Rise Time (Note 10)	$t_r$	—	2.4	—	ns	
Turn-Off Delay Time (Note 10)	$t_{D(off)}$	—	14.7	—	ns	
Turn-Off Fall Time (Note 10)	$t_f$	—	5.4	—	ns	

- Notes:
8. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$
  9. For design aid only, not subject to production testing.
  10. Switching characteristics are independent of operating junction temperatures.

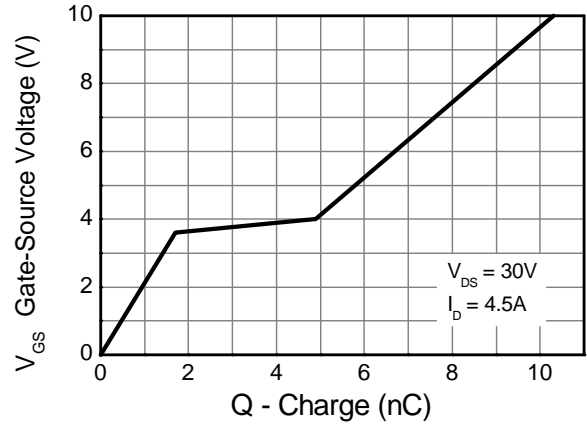
**Typical Characteristics**



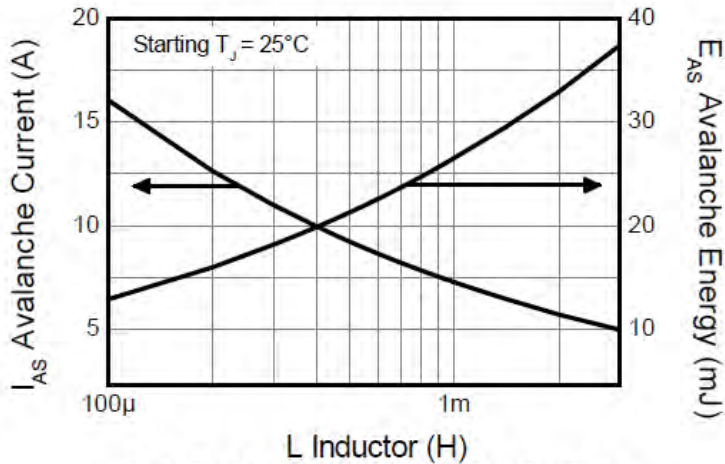
**Typical Characteristics - continued**



**Capacitance v Drain-Source Voltage**

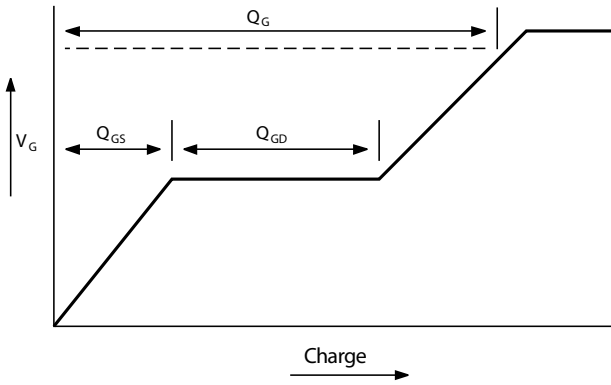


**Gate-Source Voltage v Gate Charge**

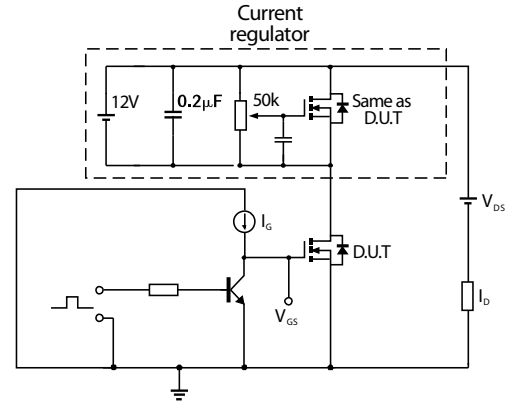


**Single-Pulsed Avalanche Rating**

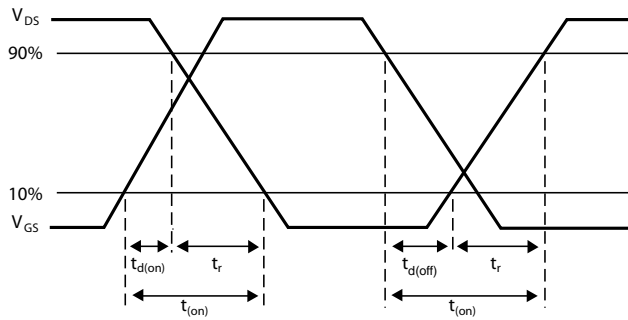
**Test Circuits**



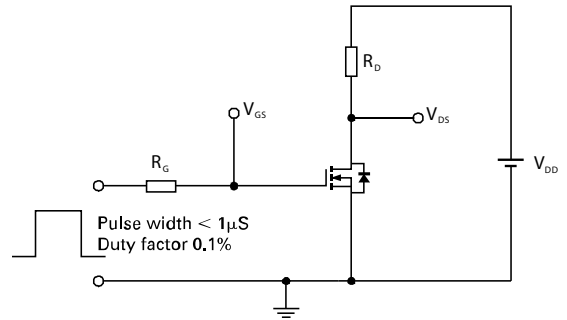
**Basic gate charge waveform**



**Gate charge test circuit**

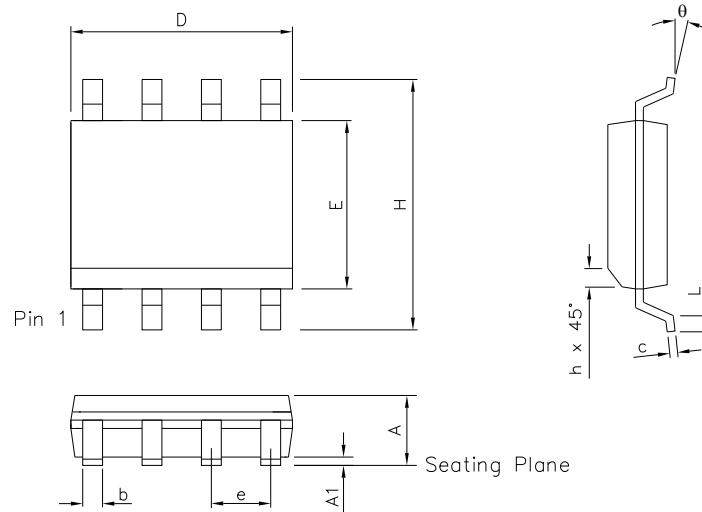


**Switching time waveforms**



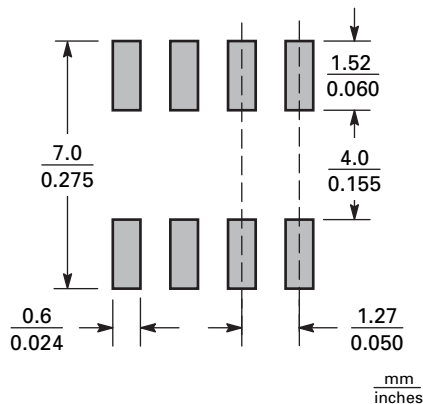
**Switching time test circuit**

**Package Outline Dimensions**



DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.053	0.069	1.35	1.75	e	0.050 BSC		1.27 BSC	
A1	0.004	0.010	0.10	0.25	b	0.013	0.020	0.33	0.51
D	0.189	0.197	4.80	5.00	c	0.008	0.010	0.19	0.25
H	0.228	0.244	5.80	6.20	theta	0°	8°	0°	8°
E	0.150	0.157	3.80	4.00	h	0.010	0.020	0.25	0.50
L	0.016	0.050	0.40	1.27	-	-	-	-	-

**Suggested Pad Layout**



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