

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ Max	I_D $T_A = +25^\circ C$
40V	27m Ω @ $V_{GS} = 10V$	7.1A
	47m Ω @ $V_{GS} = 4.5V$	5.4A

Description

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.

Applications

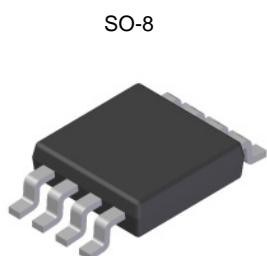
- Motor Control
- Backlighting
- DC-DC Converters
- Power Management Functions

Features and Benefits

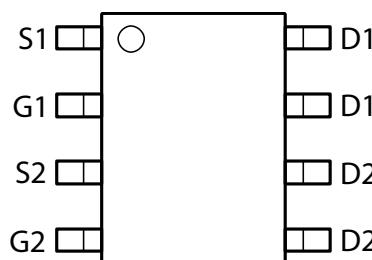
- Low on-resistance
- Fast switching speed
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability

Mechanical Data

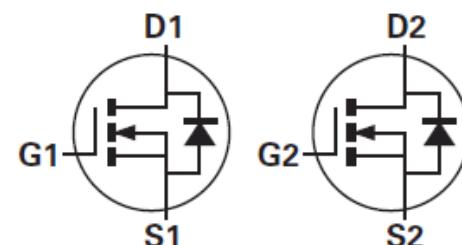
- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See diagram below
- Terminals: Finish - Matte Tin annealed over Copper lead frame. Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.074 grams (approximate)



Top View



Top View



Equivalent Circuit

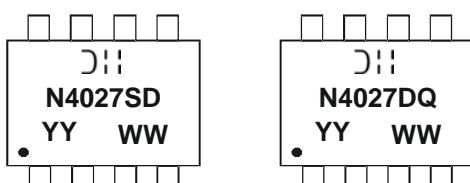
Ordering Information (Note 4)

Part Number	Compliance	Case	Packaging
DMN4027SSD-13	Standard	SO-8	2500 / Tape & Reel
DMN4027SSDQ-13	Automotive	SO-8	2500 / Tape & Reel

Notes:

1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



DII = Manufacturer's Marking

N4027SD = Product Type Marking Code for DMN4027SSD-13

N4027DQ = Product Type Marking Code for DMN4027SSDQ-13

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}	40	V
Gate-Source Voltage	(Note 5)	V_{GS}	± 20	V
Continuous Drain Current	$V_{GS} = 10\text{V}$	I_D	7.1	A
			5.7	
			5.4	
Pulsed Drain Current	$V_{GS} = 10\text{V}$	I_{DM}	28.0	A
Continuous Source Current (Body diode)	(Notes 7)	I_S	3.3	A
Pulsed Source Current (Body diode)	(Notes 8)	I_{SM}	28.0	A

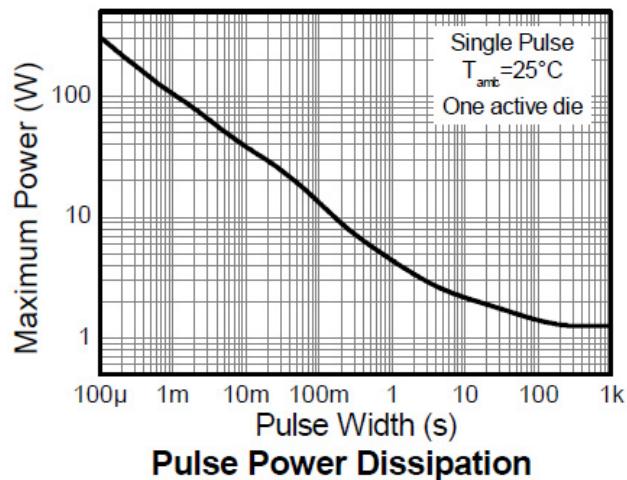
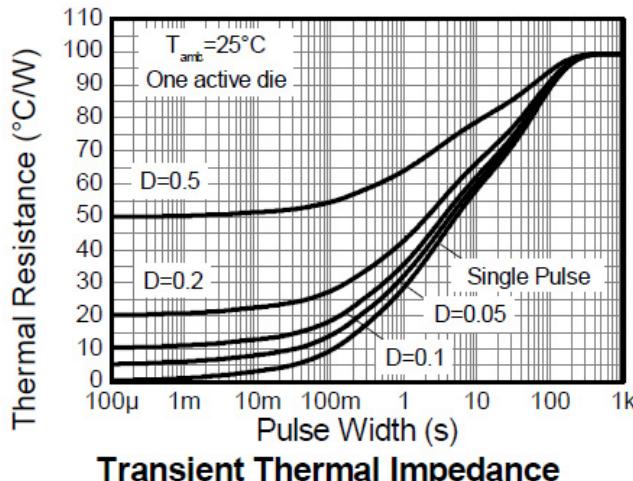
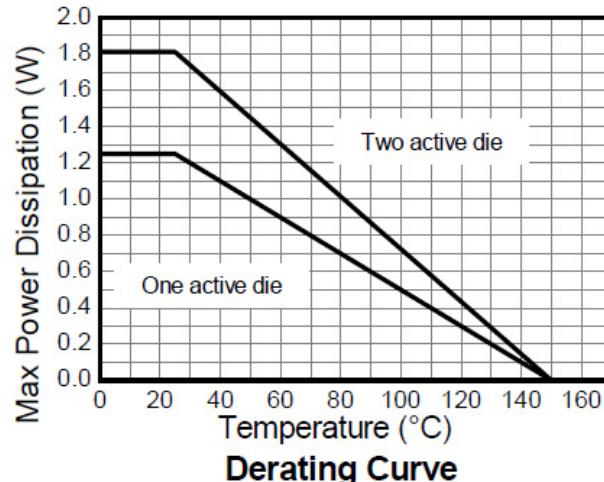
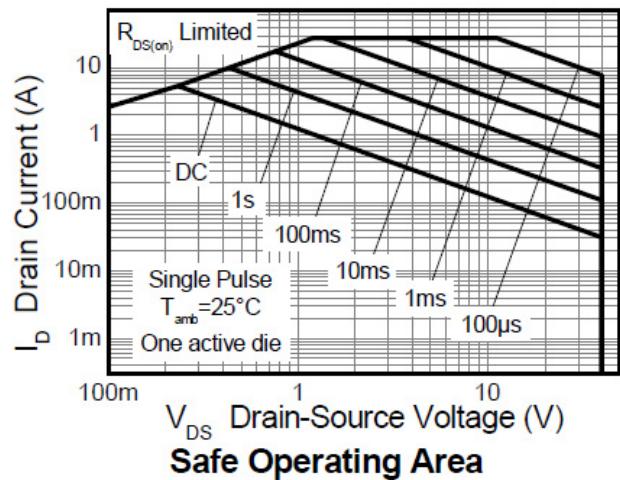
Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Notes 6 & 9)	P_D	1.25	W mW/°C
	(Notes 6 & 10)		10.0	
	(Notes 7 & 9)		1.8	
Thermal Resistance, Junction to Ambient	(Notes 6 & 9)	$R_{\theta JA}$	14.3	°C/W
	(Notes 6 & 10)		2.14	
	(Notes 7 & 9)		58	
Thermal Resistance, Junction to Lead	(Notes 9 & 11)	$R_{\theta JL}$	53	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Notes:

- 5. AEC-Q101 V_{GS} maximum is $\pm 16\text{V}$.
- 6. 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.
- 7. Same as note (3), except the device is measured at $t \leq 10$ sec.
- 8. Same as note (3), except the device is pulsed with $D = 0.02$ and pulse width 300 μs . The pulse current is limited by the maximum junction temperature.
- 9. For a dual device with one active die.
- 10. For a device with two active die running at equal power.
- 11. Thermal resistance from junction to solder-point (at the end of the drain lead).

Thermal Characteristics



Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

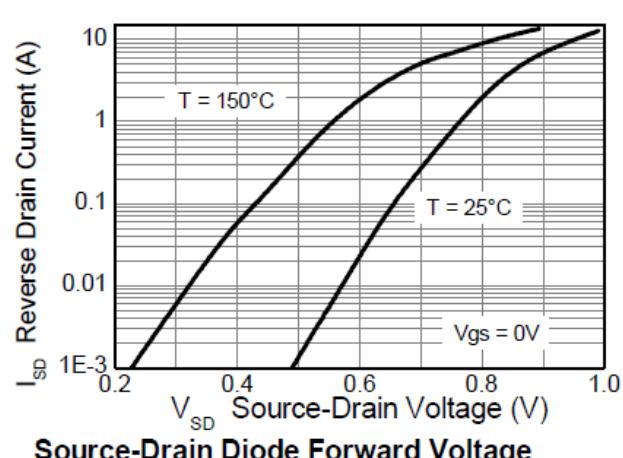
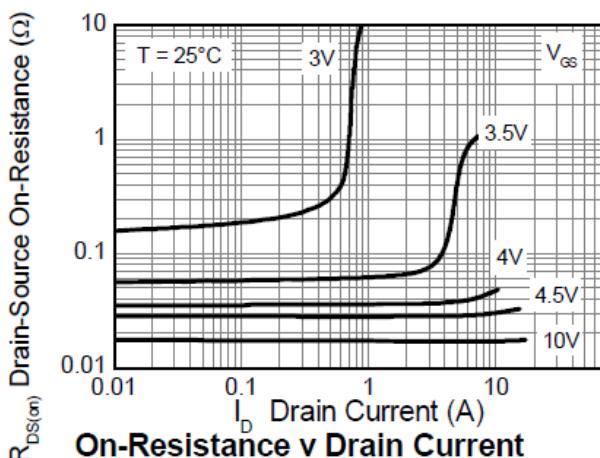
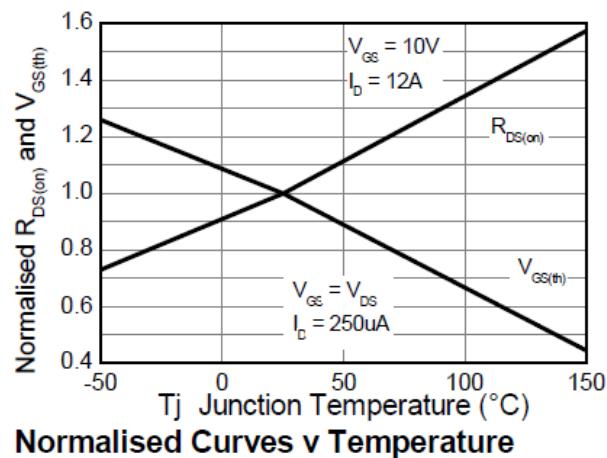
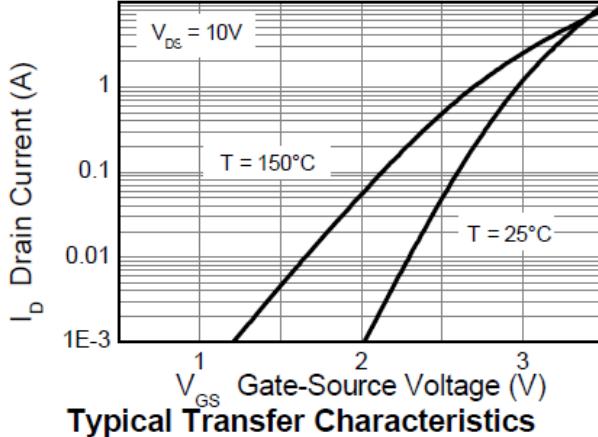
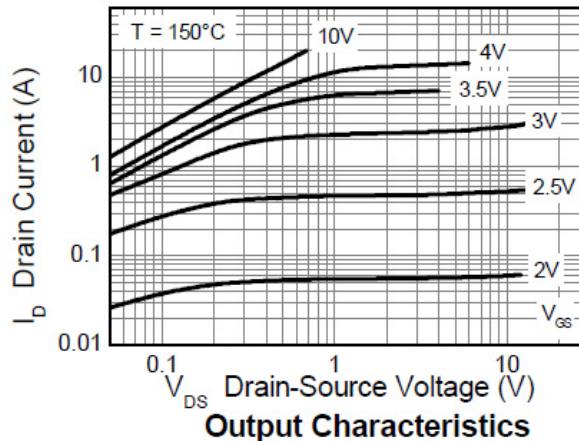
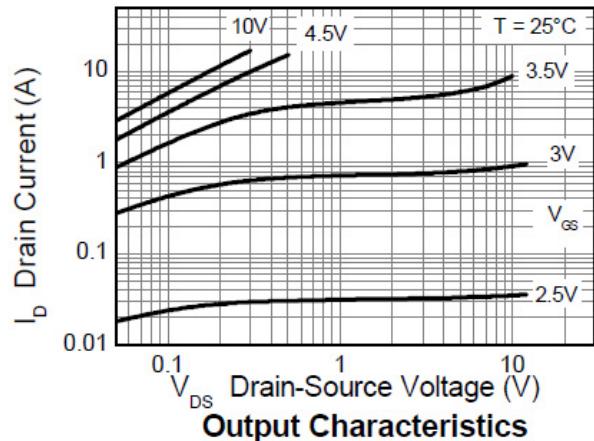
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	40	—	—	V	$I_D = 250\mu\text{A}$, $V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	0.5	μA	$V_{DS} = 40\text{V}$, $V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(\text{th})}$	1.0	—	3.0	V	$I_D = 250\mu\text{A}$, $V_{DS} = V_{GS}$
Static Drain-Source On-Resistance (Note 12)	$R_{DS(\text{ON})}$	—	0.017	0.027	Ω	$V_{GS} = 10\text{V}$, $I_D = 7\text{A}$
			0.031	0.047		$V_{GS} = 4.5\text{V}$, $I_D = 6\text{A}$
Forward Transconductance (Notes 12 & 13)	g_{fs}	—	22.8	—	S	$V_{DS} = 15\text{V}$, $I_D = 7\text{A}$
Diode Forward Voltage (Note 12)	V_{SD}	—	0.86	1.1	V	$I_S = 7\text{A}$, $V_{GS} = 0\text{V}$
Reverse recovery time (Note 13)	t_{rr}	—	12.1	—	ns	$I_S = 2.1\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$
Reverse recovery charge (Note 13)	Q_{rr}	—	5.1	—	nC	
DYNAMIC CHARACTERISTICS (Note 13)						
Input Capacitance	C_{iss}	—	604	—	pF	$V_{DS} = 20\text{V}$, $V_{GS} = 0\text{V}$ $f = 1\text{MHz}$
Output Capacitance	C_{oss}	—	106	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	59.6	—	pF	
Total Gate Charge (Note 14)	Q_g	—	6.3	—	nC	$V_{GS} = 4.5\text{V}$ $V_{GS} = 10\text{V}$ $I_D = 7\text{A}$
Total Gate Charge Note 14)	Q_g	—	12.9	—	nC	
Gate-Source Charge Note 14)	Q_{gs}	—	2.4	—	nC	
Gate-Drain Charge Note 14)	Q_{gd}	—	3.3	—	nC	
Turn-On Delay Time Note 14)	$t_{D(\text{on})}$	—	3.1	—	ns	$V_{DD} = 20\text{V}$, $V_{GS} = 10\text{V}$ $I_D = 1\text{A}$, $R_G \geq 6.0\Omega$
Turn-On Rise Time Note 14)	t_r	—	3.1	—	ns	
Turn-Off Delay Time (Note 14)	$t_{D(\text{off})}$	—	15.4	—	ns	
Turn-Off Fall Time Note 14)	t_f	—	7.5	—	ns	

Notes: 12. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.

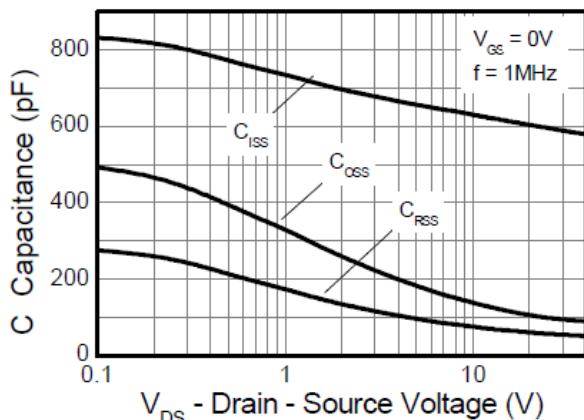
13. For design aid only, not subject to production testing.

14. Switching characteristics are independent of operating junction temperatures.

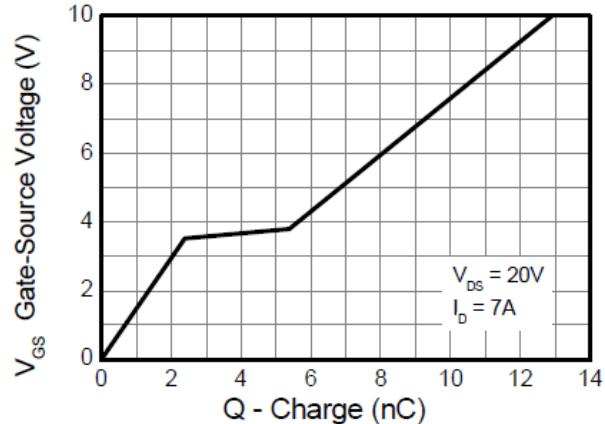
Typical Characteristics



Typical Characteristics (cont.)

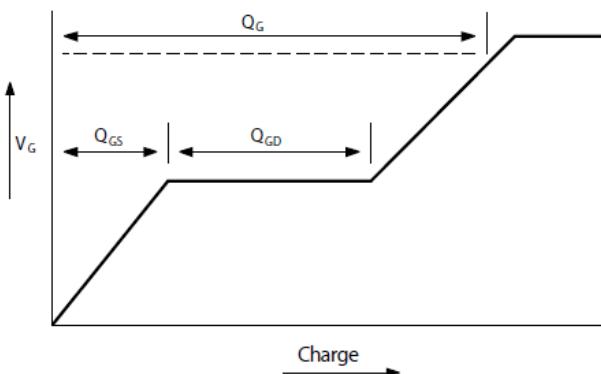


Capacitance v Drain-Source Voltage

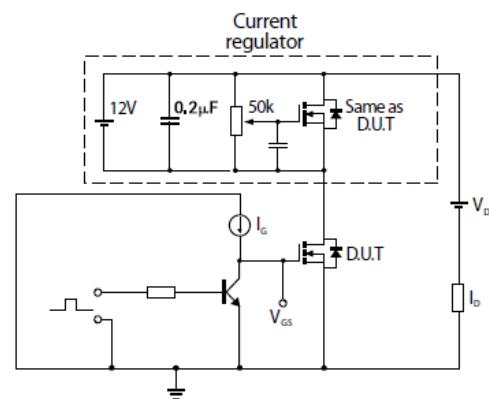


Gate-Source Voltage v Gate Charge

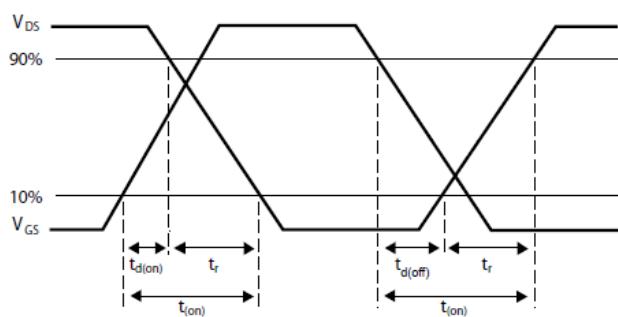
Test Circuits



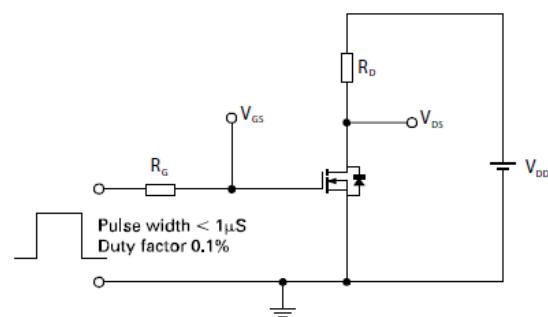
Basic gate charge waveform



Gate charge test circuit



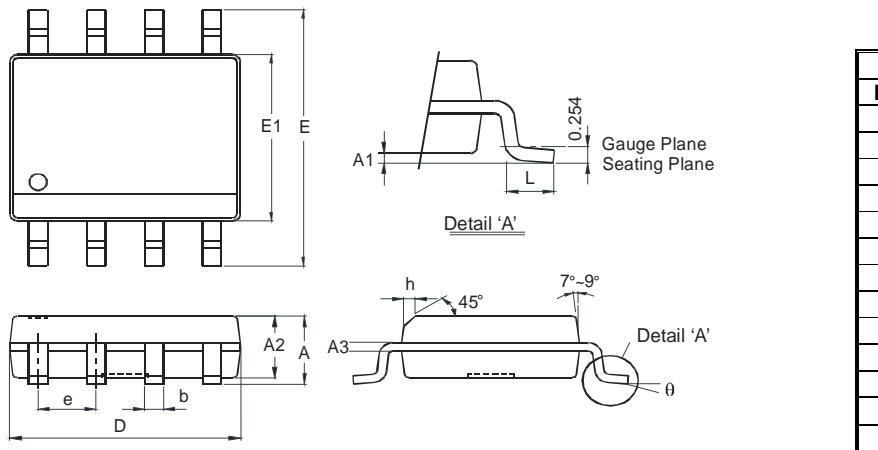
Switching time waveforms



Switching time test circuit

Package Outline Dimensions

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.

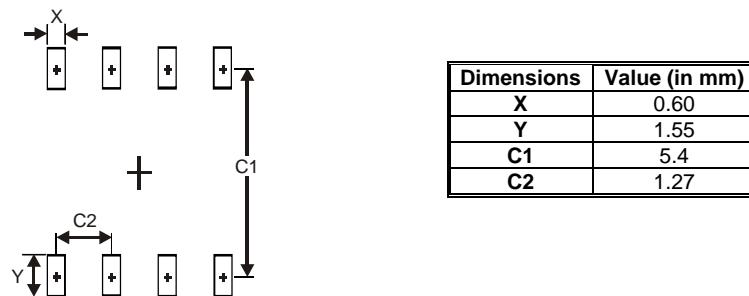


SO-8		
Dim	Min	Max
A	-	1.75
A1	0.10	0.20
A2	1.30	1.50
A3	0.15	0.25
b	0.3	0.5
D	4.85	4.95
E	5.90	6.10
E1	3.85	3.95
e	1.27 Typ	
h	-	0.35
L	0.62	0.82
θ	0°	8°

All Dimensions in mm

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



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