

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ max	Package	$I_D$ $T_A = +25^\circ C$
20V	25mΩ @ $V_{GS} = 4.5V$	SO-8	5.8A
	35mΩ @ $V_{GS} = 2.5V$		4.8A

## Description

This new generation MOSFET has been designed to minimize the on-state resistance ( $R_{DS(ON)}$ ) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

## Applications

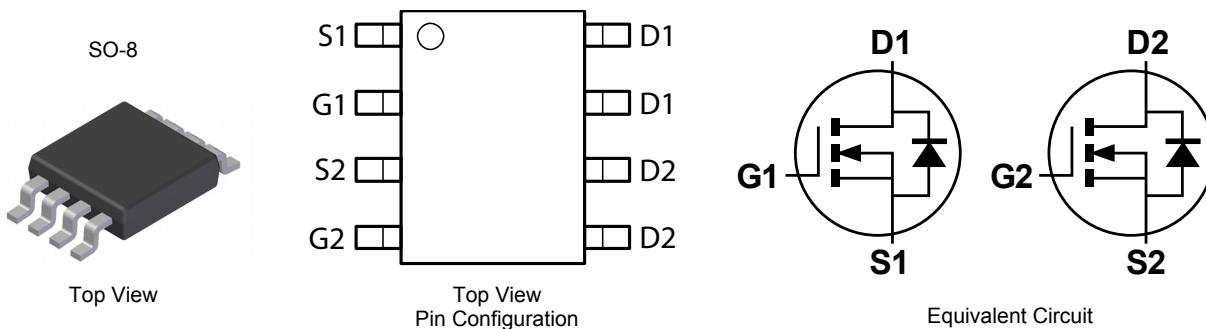
- DC-DC Converters
- Power Management Functions
- Backlighting

## Features

- Low Input Capacitance
- 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
- Terminal Connections: See Diagram
- Terminals: Finish – Tin Finish annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 ③
- Weight: 0.074 grams (approximate)



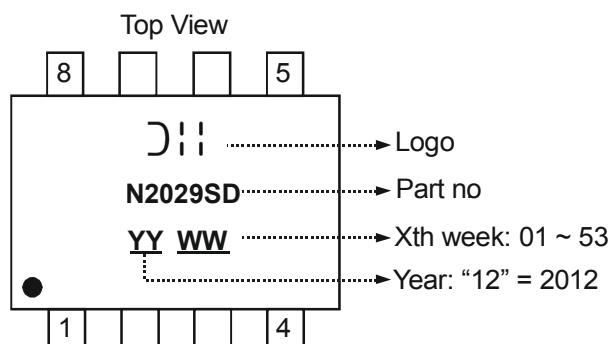
## Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2029USD-13	SO-8	2,500/Tape & Reel

Notes:

- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
- See [http://www.diodes.com/quality/lead\\_free.html](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.
- Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
- For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



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

Characteristic			Symbol	Value	Units
Drain-Source Voltage			$V_{DSS}$	20	V
Gate-Source Voltage			$V_{GSS}$	$\pm 8$	V
Continuous Drain Current (Note 6) $V_{GS} = 4.5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	5.8 4.7	A
	$t < 10\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	6.9 5.7	A
Maximum Body Diode Forward Current (Note 6)			$I_S$	2.1	A
Pulsed Drain Current (10 $\mu\text{s}$ pulse, duty cycle = 1%)			$I_{DM}$	30	A
Avalanche Current (Note 7) $L = 0.1\text{mH}$			$I_{AS}$	15	A
Avalanche Energy (Note 7) $L = 0.1\text{mH}$			$E_{AS}$	11.2	$\text{mJ}$

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

Characteristic			Symbol	Value	Units
Total Power Dissipation (Note 5)	$T_A = +25^\circ\text{C}$		$P_D$	1.2	W
	$T_A = +70^\circ\text{C}$			0.7	
Thermal Resistance, Junction to Ambient (Note 5)	Steady state		$R_{\theta JA}$	115	$^\circ\text{C/W}$
	$t < 10\text{s}$			70	
Total Power Dissipation (Note 6)	$T_A = +25^\circ\text{C}$		$P_D$	1.4	W
	$T_A = +70^\circ\text{C}$			0.9	
Thermal Resistance, Junction to Ambient (Note 6)	Steady state		$R_{\theta JA}$	95	$^\circ\text{C/W}$
	$t < 10\text{s}$			60	
Thermal Resistance, Junction to Case (Note 6)			$R_{\theta JC}$	14.5	
Operating and Storage Temperature Range			$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 8)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	20	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 16\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 100$	nA	$V_{GS} = \pm 8\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	$V_{GS(\text{th})}$	0.6	—	1.5	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(\text{ON})}$	—	14	25	$\text{m}\Omega$	$V_{GS} = 4.5\text{V}, I_D = 6.5\text{A}$
		—	19	35		$V_{GS} = 2.5\text{V}, I_D = 5.4\text{A}$
Forward Transfer Admittance	$ Y_{fs} $	—	10	—	S	$V_{DS} = 5\text{V}, I_D = 6.5\text{A}$
Diode Forward Voltage	$V_{SD}$	—	0.7	1.2	V	$V_{GS} = 0\text{V}, I_S = 1.3\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	$C_{iss}$	—	1171	—	pF	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	—	133	—		
Reverse Transfer Capacitance	$C_{rss}$	—	110	—		
Gate Resistance	$R_G$	—	1.2	—	$\Omega$	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Total Gate Charge ( $V_{GS} = 4.5\text{V}$ )	$Q_g$	—	10.4	—	nC	$V_{DS} = 10\text{V}, I_D = 3\text{A}$
Total Gate Charge ( $V_{GS} = 8\text{V}$ )	$Q_g$	—	18.6	—		
Gate-Source Charge	$Q_{gs}$	—	1.9	—		
Gate-Drain Charge	$Q_{gd}$	—	2.3	—		
Turn-On Delay Time	$t_{D(\text{on})}$	—	16.5	—	nS	$V_{GS} = 4.5\text{V}, V_{DD} = 10\text{V}, R_{\text{GEN}} = 6\Omega, I_D = 1\text{A}$
Turn-On Rise Time	$t_r$	—	33.3	—		
Turn-Off Delay Time	$t_{D(\text{off})}$	—	119.3	—		
Turn-Off Fall Time	$t_f$	—	53.5	—		
Body Diode Reverse Recovery Time	$t_{rr}$	—	7.5	—	nS	$I_S = 6.5\text{A}, dI/dt = 100\text{A}/\mu\text{s}$
Body Diode Reverse Recovery Charge	$Q_{rr}$	—	2.0	—	nC	$I_S = 6.5\text{A}, dI/dt = 100\text{A}/\mu\text{s}$

Notes:

- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
- Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
- $I_{AR}$  and  $E_{AR}$  rating are based on low frequency and duty cycles to keep  $T_J = +25^\circ\text{C}$
- Short duration pulse test used to minimize self-heating effect.
- Guaranteed by design. Not subject to product testing.

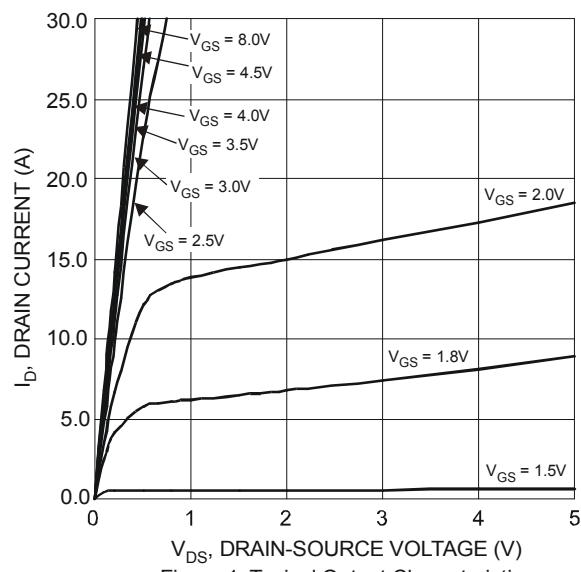


Figure 1 Typical Output Characteristics

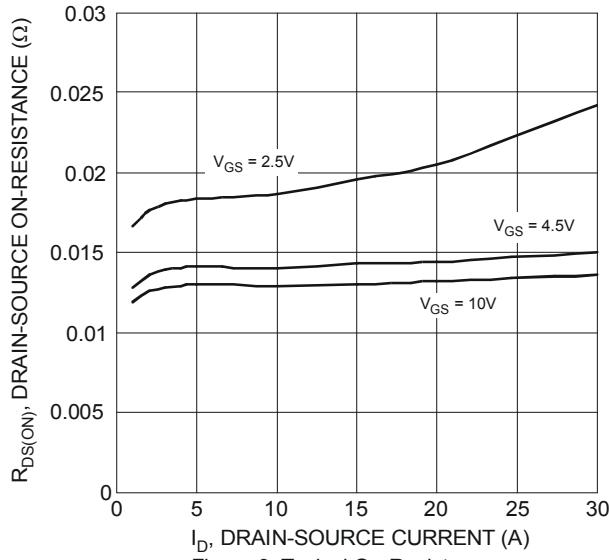


Figure 3 Typical On-Resistance vs.  
Drain Current and Gate Voltage

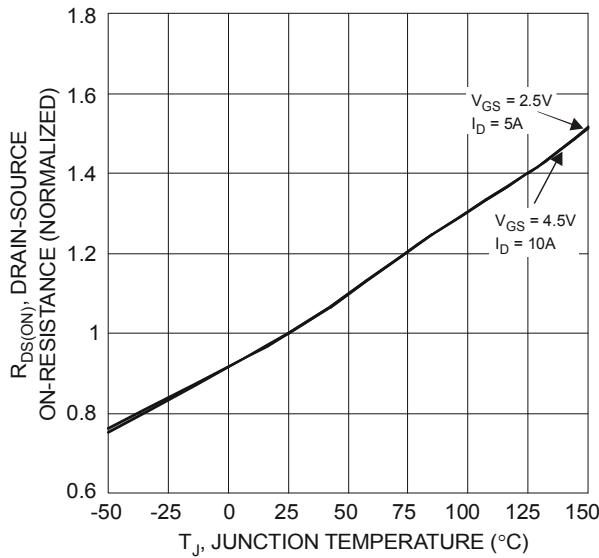


Figure 5 On-Resistance Variation with Temperature

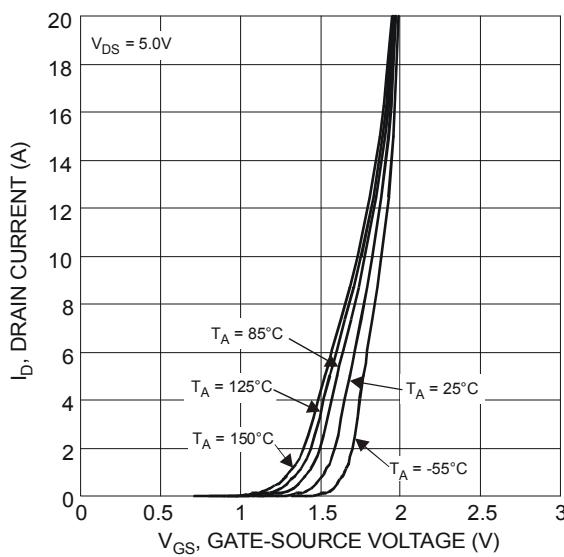


Figure 2 Typical Transfer Characteristics

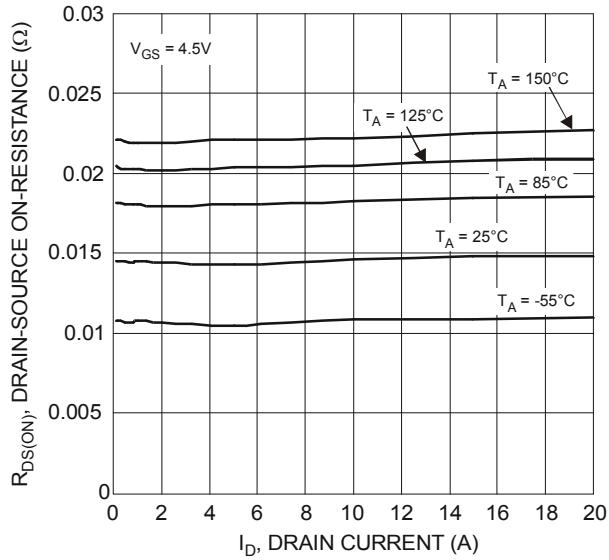


Figure 4 Typical On-Resistance vs.  
Drain Current and Temperature

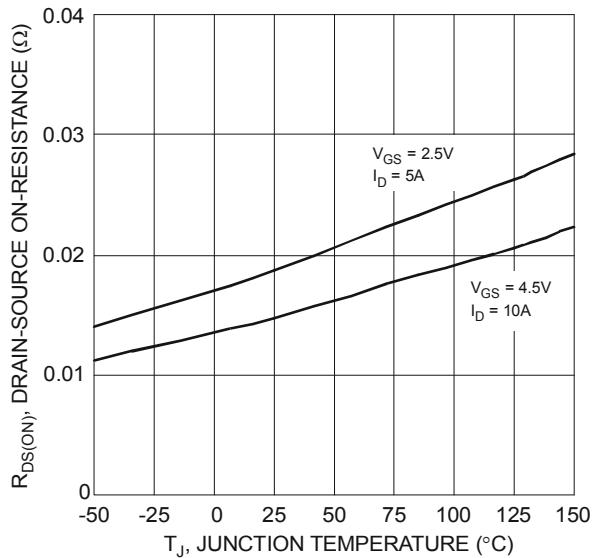


Figure 6 On-Resistance Variation with Temperature

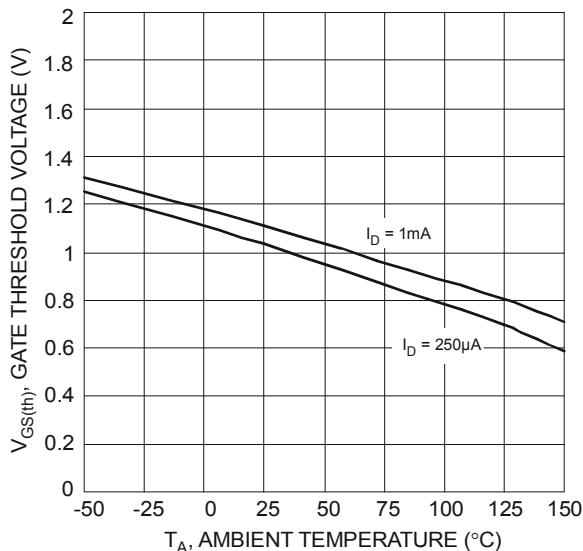


Figure 7 Gate Threshold Variation vs. Ambient Temperature

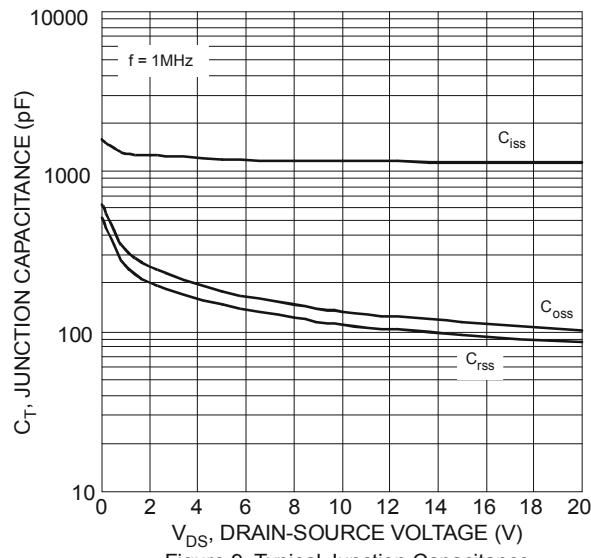


Figure 9 Typical Junction Capacitance

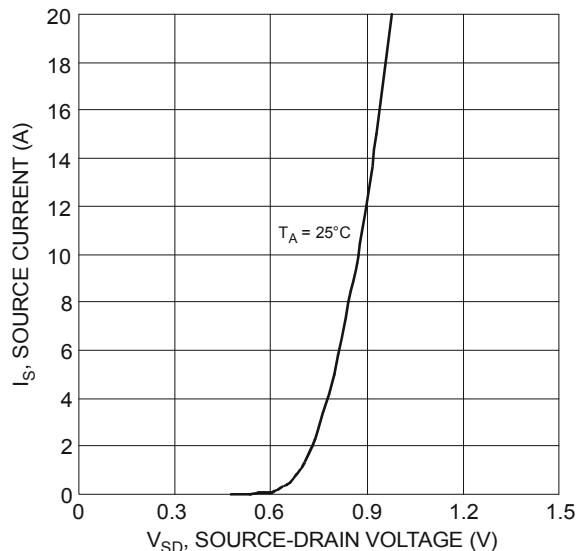


Figure 8 Diode Forward Voltage vs. Current

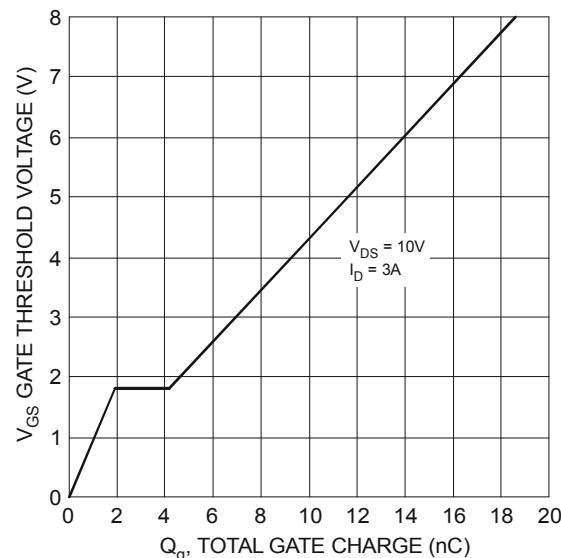


Figure 10 Gate Charge

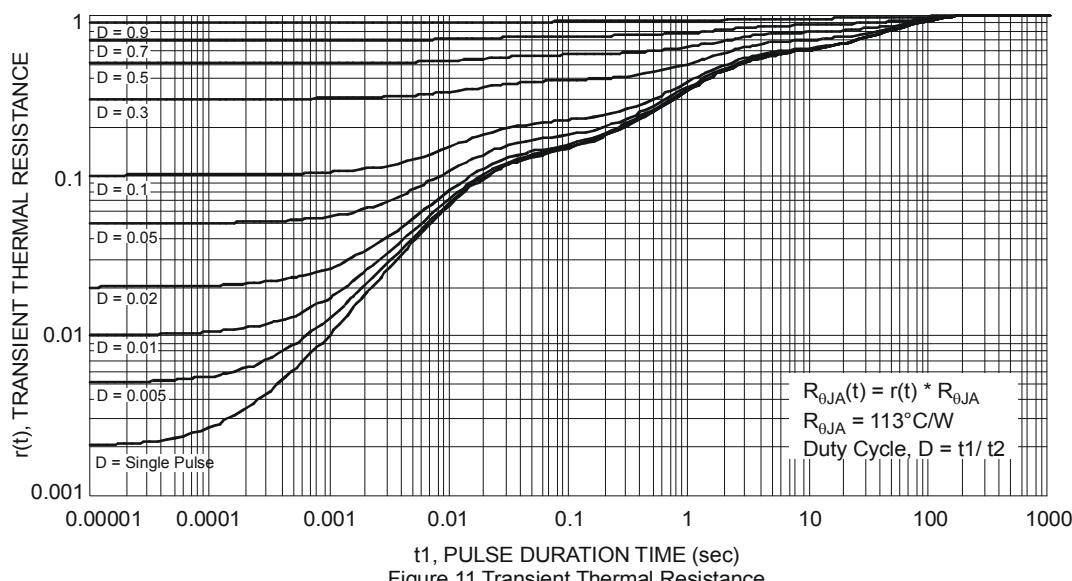
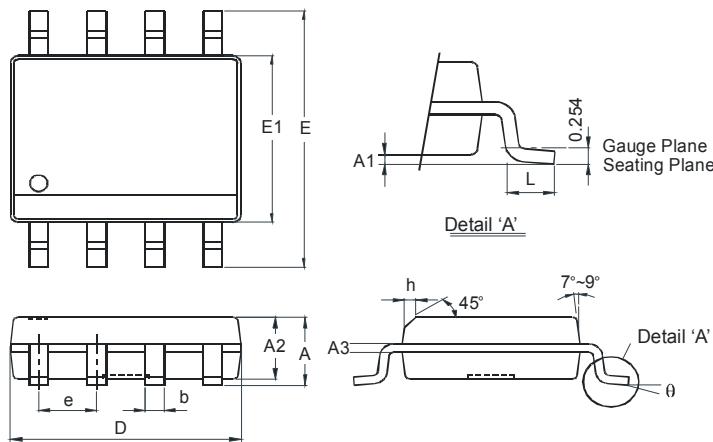


Figure 11 Transient Thermal Resistance

## Package Outline Dimensions

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

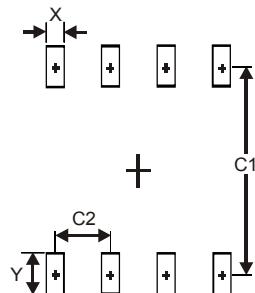


SO-8		
Dim	Min	Max
<b>A</b>	-	1.75
<b>A1</b>	0.10	0.20
<b>A2</b>	1.30	1.50
<b>A3</b>	0.15	0.25
<b>b</b>	0.3	0.5
<b>D</b>	4.85	4.95
<b>E</b>	5.90	6.10
<b>E1</b>	3.85	3.95
<b>e</b>	1.27 Typ	
<b>h</b>	-	0.35
<b>L</b>	0.62	0.82
<b>θ</b>	0°	8°

All Dimensions in mm

## Suggested Pad Layout

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



Dimensions	Value (in mm)
X	0.60
Y	1.55
C1	5.4
C2	1.27

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