

## Product Summary

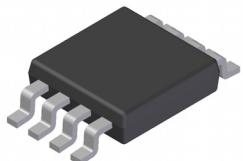
MOSFET		
$V_{(BR)DSS}$	$R_{DS(on)}$ max	$I_D$
-20V	85mΩ @ $V_{GS} = -10V$	-3.3A
	125mΩ @ $V_{GS} = -4.5V$	-2.8A
SCHOTTKY DIODE		
$V_R$	$V_F$ max	$I_o$
20V	400mV @ $I_F = 0.5A$	1.0A
	470mV @ $I_F = 1.0A$	

## Description

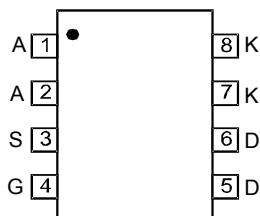
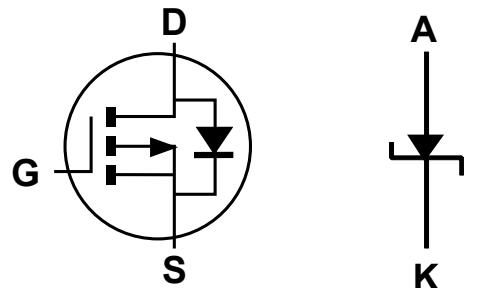
This new generation MOSFET has been designed to minimize the on-state resistance ( $R_{DS(ON)}$ ) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

## Applications

- DC-DC Converters
- Power Management Functions
- Backlighting



Top View

Top View  
Internal Schematic

Q1 P-Channel MOSFET      D1 Schottky Diode

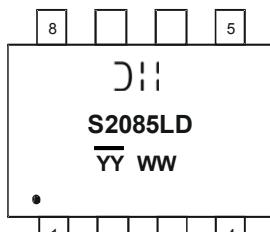
## Ordering Information (Note 4)

Part Number	Case	Packaging
DMS2085LSD-13	SO-8	2,500/Tape & Reel

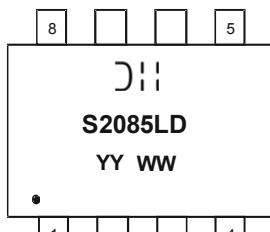
Notes:

- 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



Chengdu A/T Site



Shanghai A/T Site

DII = Manufacturer's Marking  
 S2085LD = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY or YY = Year (ex: 13 = 2013)  
 WW = Week (01 - 53)  
 YY = Date Code Marking for SAT (Shanghai Assembly/ Test site)  
 YY = Date Code Marking for CAT (Chengdu Assembly/ Test site)

**Maximum Ratings – P-CHANNEL MOSFET – Q1** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			$V_{DSS}$	-20	V
Gate-Source Voltage			$V_{GSS}$	$\pm 20$	V
Continuous Drain Current (Note 6) $V_{GS} = 10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	-3.3 -2.7	A
	$t < 10\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	-4.3 -3.4	A
Maximum Body Diode Forward Current (Note 6)			$I_S$	-1.5	A
Pulsed Drain Current (10 $\mu\text{s}$ pulse, duty cycle = 1%)			$I_{DM}$	-11.2	A
Avalanche Current (Notes 7) $L = 5\text{mH}$			$I_{AR}$	-5	A
Avalanche Energy (Notes 7) $L = 5\text{mH}$			$E_{AR}$	50	mJ

**Maximum Ratings – SCHOTTKY – D1** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Peak Repetitive Reverse Voltage	$V_{RRM}$		
Working Peak Reverse Voltage	$V_{RWPM}$	20	V
DC Blocking Voltage	$V_R$		
Average Rectified Output Current (Note 7, $t < 10\text{s}$ )	$I_O$	1	A
Peak Repetitive Forward Current (Note 7, $t < 10\text{s}$ )	$I_{FRM}$	2	A
Non-Repetitive Peak Forward Surge Current (Note 7, $t < 10\text{s}$ ) Single half sine-wave superimposed on rated load	$I_{FSM}$	20	A

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

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	$T_A = +25^\circ\text{C}$	1.1	W
		1.8	
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	108	°C/W
		65	
Total Power Dissipation (Note 6)	$T_A = +25^\circ\text{C}$	1.8	W
		2.3	
Thermal Resistance, Junction to Ambient (Note 6)	Steady state	78	°C/W
		50	
Thermal Resistance, Junction to Case (Note 6)	$R_{\theta JC}$	22	
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	°C

**Electrical Characteristics P-Channel Q1 (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)**

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 8)</b>						
Drain-Source Breakdown Voltage	$\text{BV}_{\text{DSS}}$	-20	—	—	V	$\text{V}_{\text{GS}} = 0\text{V}$ , $\text{I}_D = -250\mu\text{A}$
Zero Gate Voltage Drain Current	$\text{I}_{\text{DSS}}$	—	—	-1	$\mu\text{A}$	$\text{V}_{\text{DS}} = -20\text{V}$ , $\text{V}_{\text{GS}} = 0\text{V}$
Gate-Source Leakage	$\text{I}_{\text{GS}}$	—	—	$\pm 100$	nA	$\text{V}_{\text{GS}} = \pm 20\text{V}$ , $\text{V}_{\text{DS}} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	$\text{V}_{\text{GS}(\text{th})}$	-0.5	-1.5	-2.2	V	$\text{V}_{\text{DS}} = \text{V}_{\text{GS}}$ , $\text{I}_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$\text{R}_{\text{DS}(\text{ON})}$	—	70	85	$\text{m}\Omega$	$\text{V}_{\text{GS}} = -10\text{V}$ , $\text{I}_D = -3.05\text{A}$
		—	100	125		$\text{V}_{\text{GS}} = -4.5\text{V}$ , $\text{I}_D = -1.50\text{A}$
Diode Forward Voltage	$\text{V}_{\text{SD}}$	—	-0.8	-1.0	V	$\text{V}_{\text{GS}} = 0\text{V}$ , $\text{I}_S = -1.0\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	$\text{C}_{\text{iss}}$	—	353	—	pF	$\text{V}_{\text{DS}} = -15\text{V}$ , $\text{V}_{\text{GS}} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	$\text{C}_{\text{oss}}$	—	49	—		
Reverse Transfer Capacitance	$\text{C}_{\text{rss}}$	—	41	—		
Gate Resistance	$\text{R}_{\text{G}}$	—	6.2	—	$\Omega$	$\text{V}_{\text{DS}} = 0\text{V}$ , $\text{V}_{\text{GS}} = 0\text{V}$ , $f = 1.0\text{MHz}$
Total Gate Charge ( $\text{V}_{\text{GS}} = -4.5\text{V}$ )	$\text{Q}_g$	—	3.7	—	nC	$\text{V}_{\text{DS}} = -15\text{V}$ , $\text{I}_D = -3\text{A}$
Total Gate Charge ( $\text{V}_{\text{GS}} = -10\text{V}$ )	$\text{Q}_g$	—	7.8	—		
Gate-Source Charge	$\text{Q}_{\text{gs}}$	—	1.1	—		
Gate-Drain Charge	$\text{Q}_{\text{gd}}$	—	1.3	—		
Turn-On Delay Time	$\text{t}_{\text{D}(\text{on})}$	—	3.3	—	nS	$\text{V}_{\text{DS}} = -15\text{V}$ , $\text{R}_L = 15\Omega$ $\text{V}_{\text{GS}} = -10\text{V}$ , $\text{R}_G = 6\Omega$
Turn-On Rise Time	$\text{t}_r$	—	3.0	—		
Turn-Off Delay Time	$\text{t}_{\text{D}(\text{off})}$	—	14	—		
Turn-Off Fall Time	$\text{t}_f$	—	6.8	—		
Body Diode Reverse Recovery Time	$\text{t}_{\text{rr}}$	—	33	—	nS	$\text{I}_S = -3.05\text{A}$ , $d\text{I}/dt = 100\text{A}/\mu\text{s}$
Body Diode Reverse Recovery Charge	$\text{Q}_{\text{rr}}$	—	46	—	nC	$\text{I}_S = -3.05\text{A}$ , $d\text{I}/dt = 100\text{A}/\mu\text{s}$

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

7.  $\text{I}_{\text{AS}}$  and  $\text{E}_{\text{AS}}$  rating are based on low frequency and duty cycles to keep  $\text{T}_J = +25^\circ\text{C}$

8. Short duration pulse test used to minimize self-heating effect.

9. Guaranteed by design. Not subject to product testing.

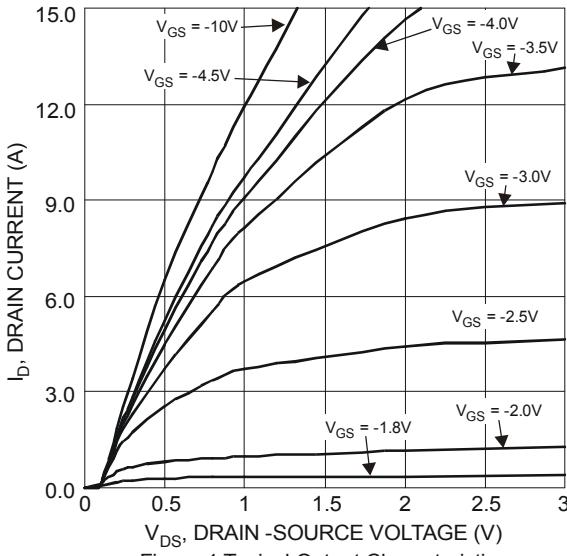


Figure 1 Typical Output Characteristics

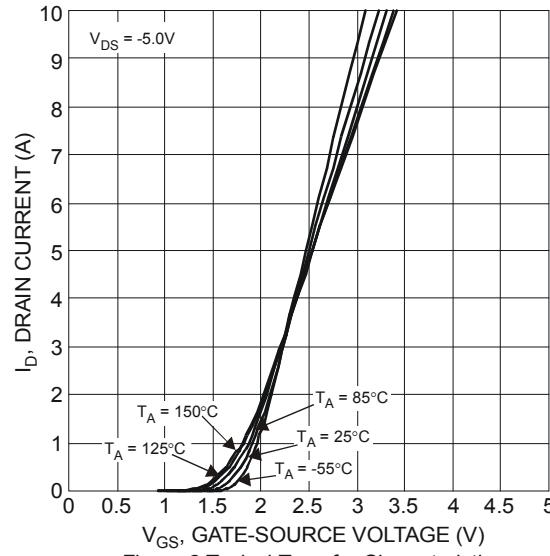


Figure 2 Typical Transfer Characteristics

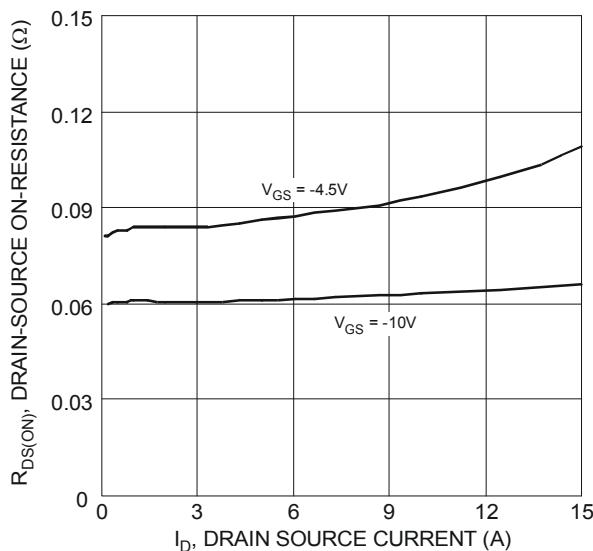


Figure 3 Typical On-Resistance vs.  
Drain Current and Gate Voltage

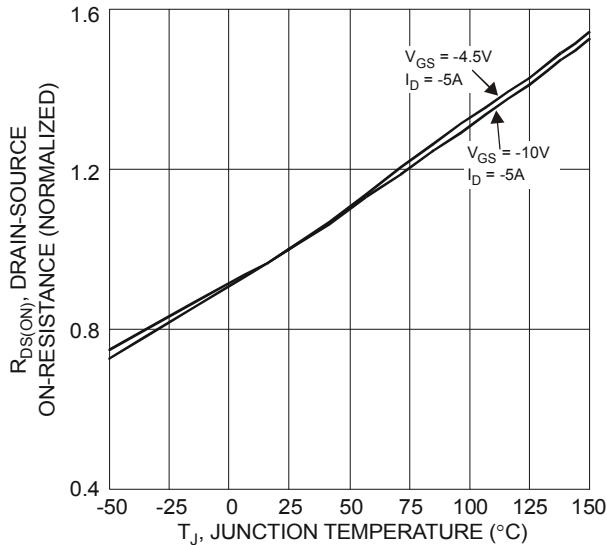


Figure 5 On-Resistance Variation with Temperature

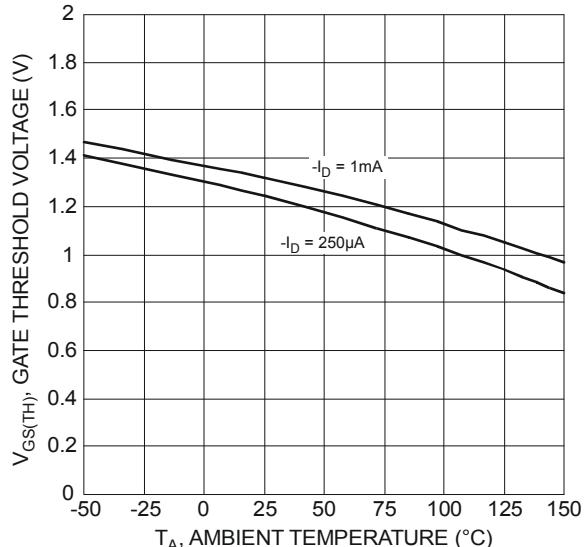


Figure 7 Gate Threshold Variation vs. Ambient Temperature

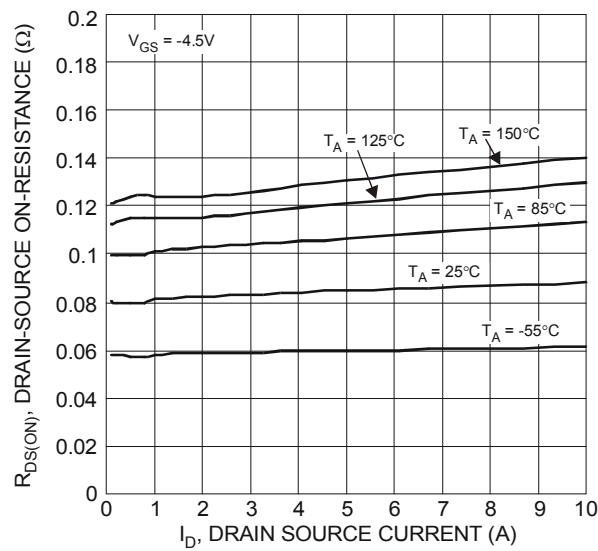


Figure 4 Typical On-Resistance vs.  
Drain Current and Temperature

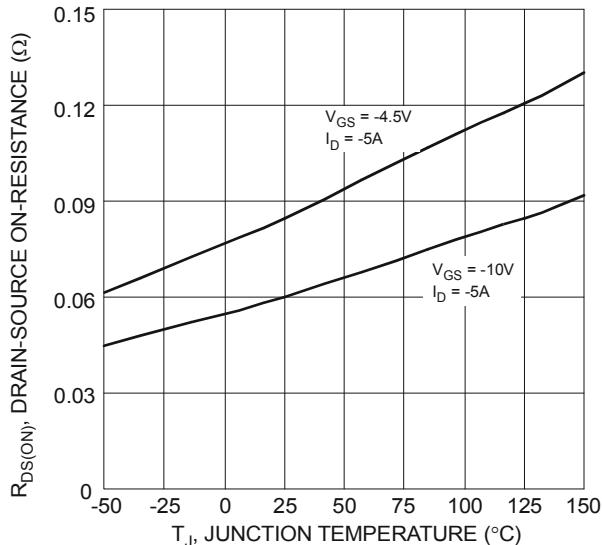


Figure 6 On-Resistance Variation with Temperature

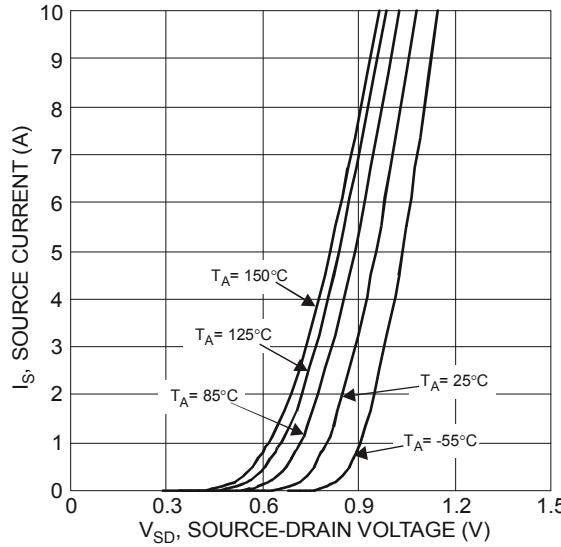


Figure 8 Diode Forward Voltage vs. Current

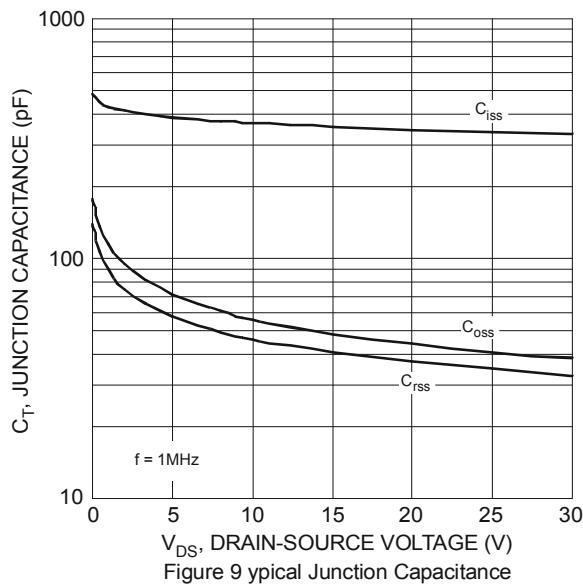


Figure 9 typical Junction Capacitance

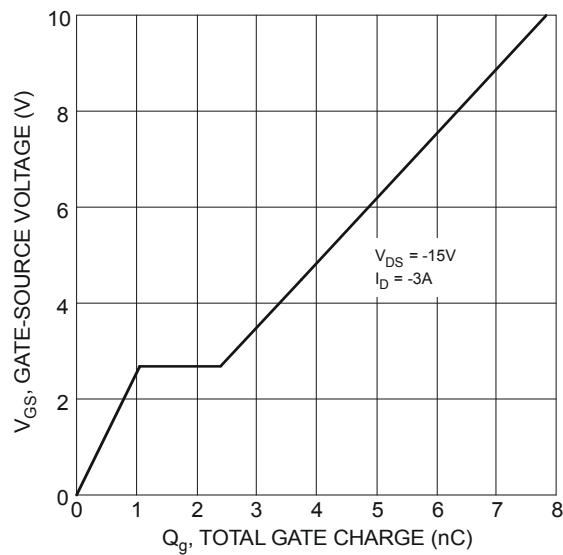


Figure 10 Gate-Charge Characteristics

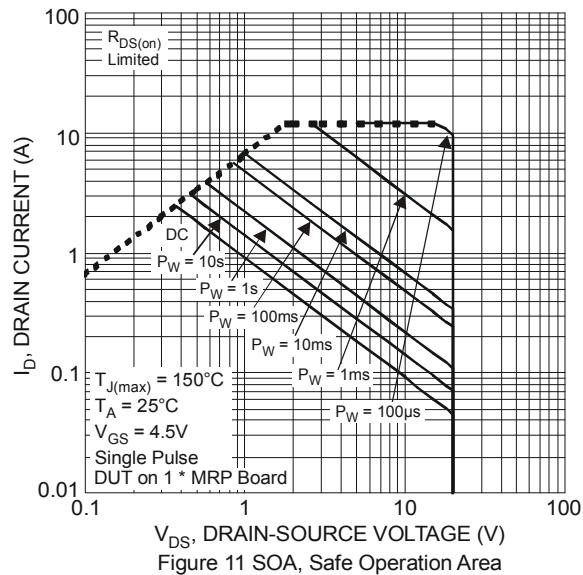


Figure 11 SOA, Safe Operation Area

**Electrical Characteristics – SCHOTTKY – D1** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Breakdown Voltage (Note 8)	$V_{(\text{BR})R}$	20	35	—	V	$I_R = 1\text{mA}$
Forward Voltage (Note 8)	$V_F$	—	—	0.40 0.47	V	$I_F = 0.5\text{A}$ $I_F = 1.0\text{A}$
Reverse Current (Note 8)	$I_R$	—	30	80	$\mu\text{A}$	$V_R = 20\text{V}$

Notes: 8. Short duration pulse test used to minimize self-heating effect.

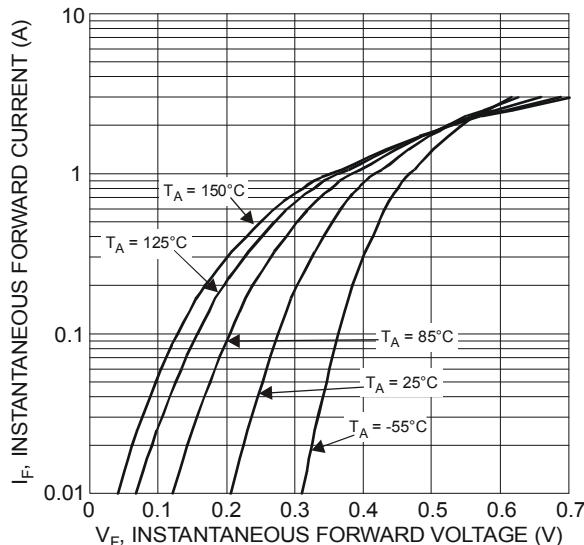


Figure 12 Typical Forward Characteristics

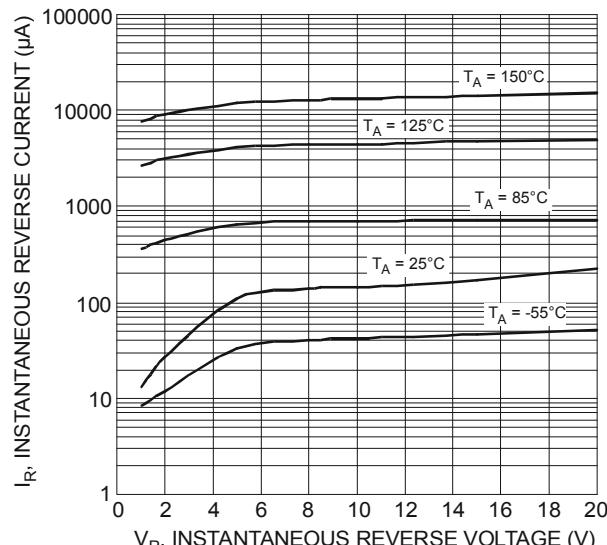
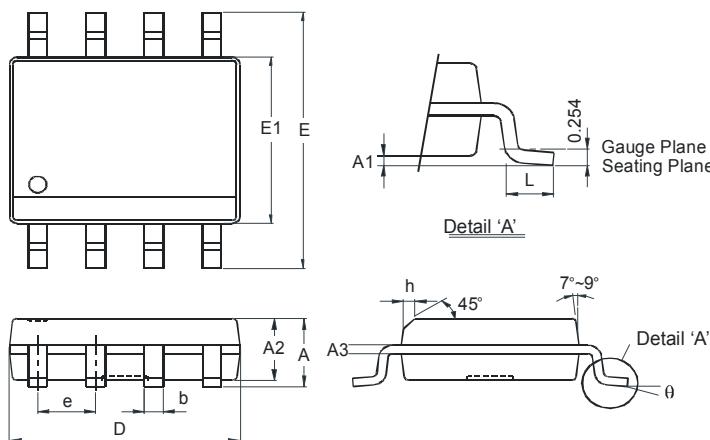


Figure 13 Typical Reverse Characteristics

**Package Outline Dimensions**

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

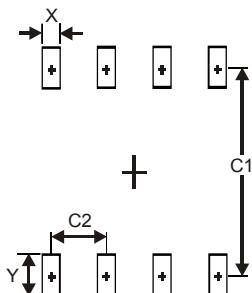


SO-8		
Dim	Min	Max
<b>A</b>	-	1.75
<b>A1</b>	0.10	0.20
<b>A2</b>	1.30	1.50
<b>A3</b>	0.15	0.25
<b>b</b>	0.3	0.5
<b>D</b>	4.85	4.95
<b>E</b>	5.90	6.10
<b>E1</b>	3.85	3.95
<b>e</b>	1.27 Typ	
<b>h</b>	-	0.35
<b>L</b>	0.62	0.82
<b>θ</b>	0°	8°

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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