

Product Summary

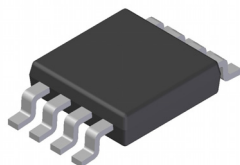
MOSFET		
$V_{(BR)DSS}$	$R_{DS(on) \max}$	I_D
-20V	85mΩ @ $V_{GS} = -10V$	-3.3A
	125mΩ @ $V_{GS} = -4.5V$	-2.8A
SCHOTTKY DIODE		
V_R	$V_F \max$	I_O
20V	400mV @ $I_F = 0.5A$	1.0A
	470mV @ $I_F = 1.0A$	

Description

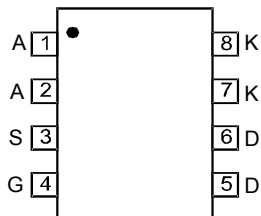
This new generation MOSFET has been designed to minimize the on-state resistance ($R_{DS(ON)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

Applications

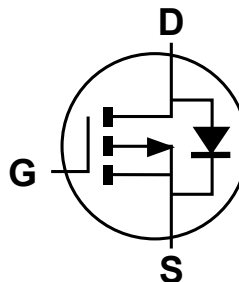
- DC-DC Converters
- Power Management Functions
- Backlighting



Top View



Top View
Internal Schematic



Q1 P-Channel MOSFET



D1 Schottky Diode

Features and Benefits

- Low Input Capacitance
- MOSFET with Low $R_{DS(ON)}$ – Minimize Conduction Losses
- Schottky Diode with Low Forward Voltage Drop
- 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

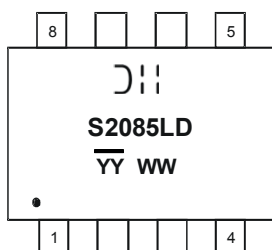
- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – Matte Tin annealed over Copper leadframe Solderable per MIL-STD-202, Method 208 e3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

Ordering Information (Note 4)

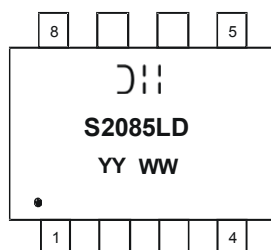
Part Number	Case	Packaging
DMS2085LSD-13	SO-8	2,500/Tape & Reel

- 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



Chengdu A/T Site



Shanghai A/T Site

- ⌋⌋⌋ = 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°C, unless otherwise specified.)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V _{DSS}	-20	V
Gate-Source Voltage			V _{GSS}	±20	V
Continuous Drain Current (Note 6) V _{GS} = 10V	Steady State	T _A = +25°C T _A = +70°C	I _D	-3.3 -2.7	A
	t<10s	T _A = +25°C T _A = +70°C	I _D	-4.3 -3.4	A
Maximum Body Diode Forward Current (Note 6)			I _S	-1.5	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)			I _{DM}	-11.2	A
Avalanche Current (Notes 7) L = 5mH			I _{AR}	-5	A
Avalanche Energy (Notes 7) L = 5mH			E _{AR}	50	mJ

Maximum Ratings – SCHOTTKY – D1 (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Peak Repetitive Reverse Voltage	V _R RM	20	V
Working Peak Reverse Voltage	V _R WM		
DC Blocking Voltage	V _R		
Average Rectified Output Current (Note 7, t<10s)	I _O	1	A
Peak Repetitive Forward Current (Note 7, t<10s)	I _{FRM}	2	A
Non-Repetitive Peak Forward Surge Current (Note 7, t<10s) Single half sine-wave superimposed on rated load	I _{FSM}	20	A

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	P _D	T _A = +25°C	1.1
		T _A = +70°C	1.8
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	Steady state	108
		t<10s	65
Total Power Dissipation (Note 6)	P _D	T _A = +25°C	1.8
		T _A = +70°C	2.3
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	Steady state	78
		t<10s	50
Thermal Resistance, Junction to Case (Note 6)	R _{θJC}	22	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	-20	—	—	V	$V_{GS} = 0V, I_D = -250\mu A$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	μA	$V_{DS} = -20V, V_{GS} = 0V$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(th)}$	-0.5	-1.5	-2.2	V	$V_{DS} = V_{GS}, I_D = -250\mu A$
Static Drain-Source On-Resistance	$R_{DS(on)}$	—	70	85	m Ω	$V_{GS} = -10V, I_D = -3.05A$
		—	100	125		$V_{GS} = -4.5V, I_D = -1.50A$
Diode Forward Voltage	V_{SD}	—	-0.8	-1.0	V	$V_{GS} = 0V, I_S = -1.0A$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	353	—	pF	$V_{DS} = -15V, V_{GS} = 0V$ $f = 1.0MHz$
Output Capacitance	C_{oss}	—	49	—		
Reverse Transfer Capacitance	C_{rss}	—	41	—		
Gate Resistance	R_G	—	6.2	—	Ω	$V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz$
Total Gate Charge ($V_{GS} = -4.5V$)	Q_g	—	3.7	—	nC	$V_{DS} = -15V, I_D = -3A$
Total Gate Charge ($V_{GS} = -10V$)	Q_g	—	7.8	—		
Gate-Source Charge	Q_{gs}	—	1.1	—		
Gate-Drain Charge	Q_{gd}	—	1.3	—		
Turn-On Delay Time	$t_{D(on)}$	—	3.3	—	nS	$V_{DS} = -15V, R_L = 15\Omega$ $V_{GS} = -10V, R_G = 6\Omega$
Turn-On Rise Time	t_r	—	3.0	—		
Turn-Off Delay Time	$t_{D(off)}$	—	14	—		
Turn-Off Fall Time	t_f	—	6.8	—		
Body Diode Reverse Recovery Time	t_{rr}	—	33	—	nS	$I_S = -3.05A, dI/dt = 100A/\mu s$
Body Diode Reverse Recovery Charge	Q_{rr}	—	46	—	nC	$I_S = -3.05A, dI/dt = 100A/\mu s$

- 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_{AS} and E_{AS} 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.

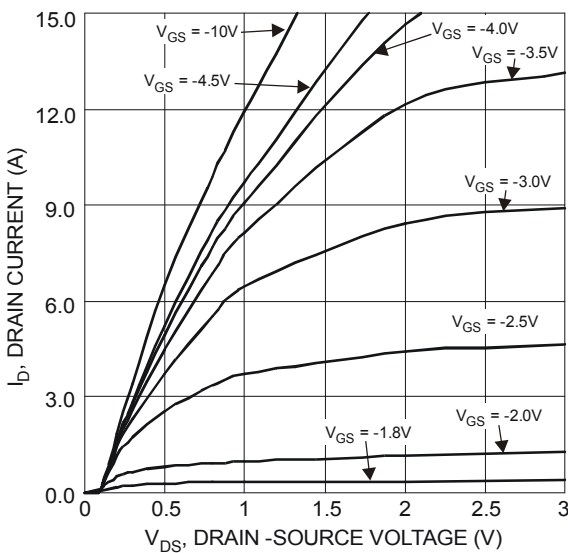


Figure 1 Typical Output Characteristics

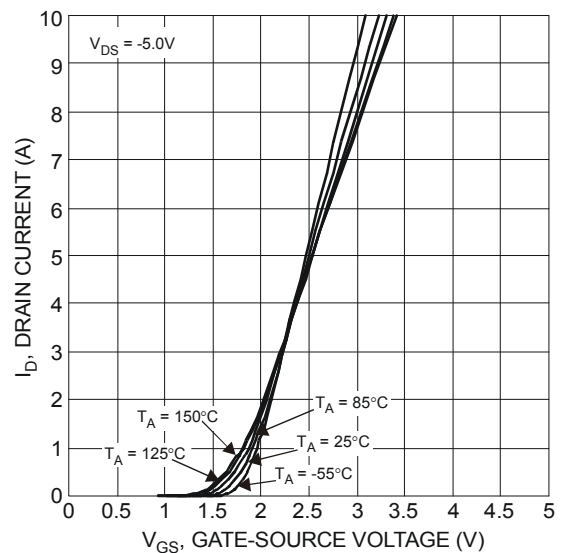


Figure 2 Typical Transfer Characteristics

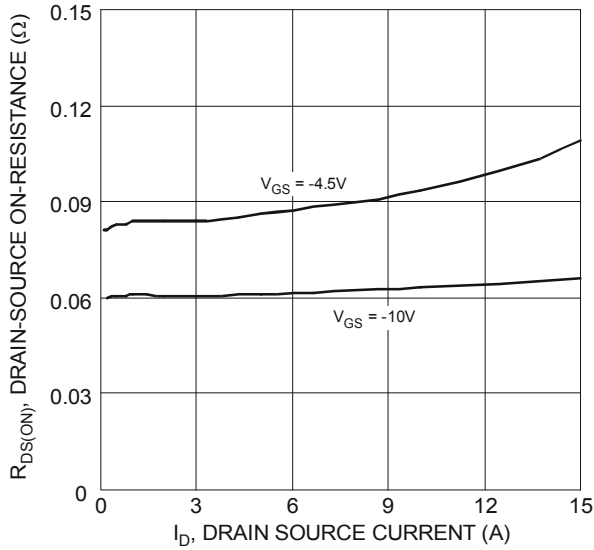


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

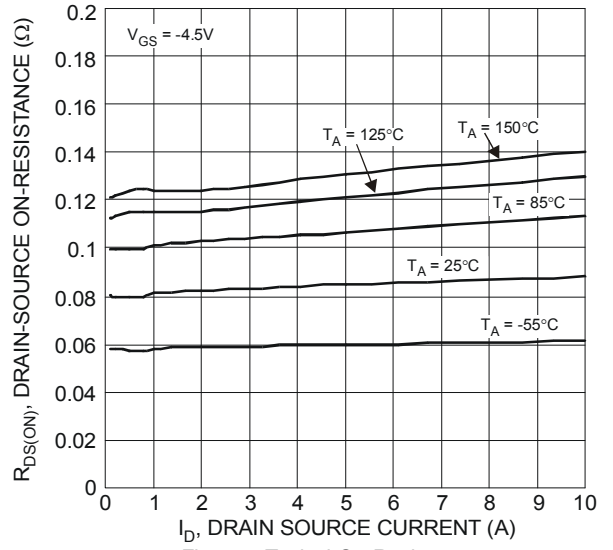


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

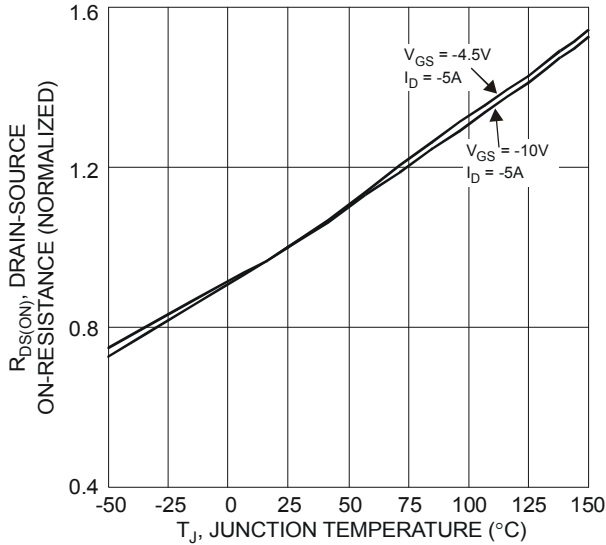


Figure 5 On-Resistance Variation with Temperature

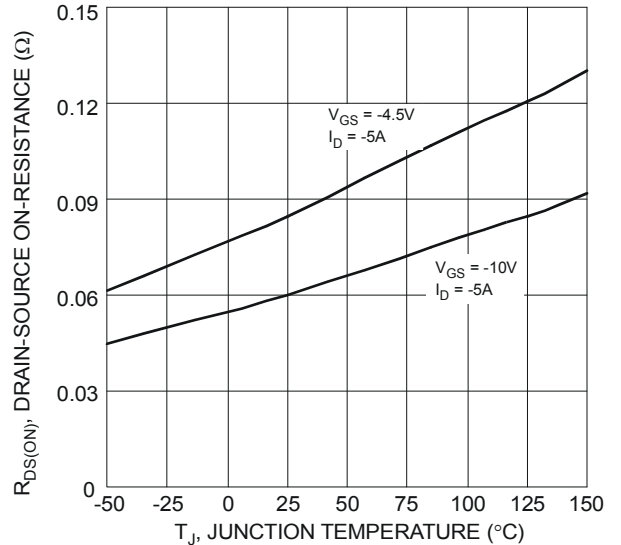


Figure 6 On-Resistance Variation with Temperature

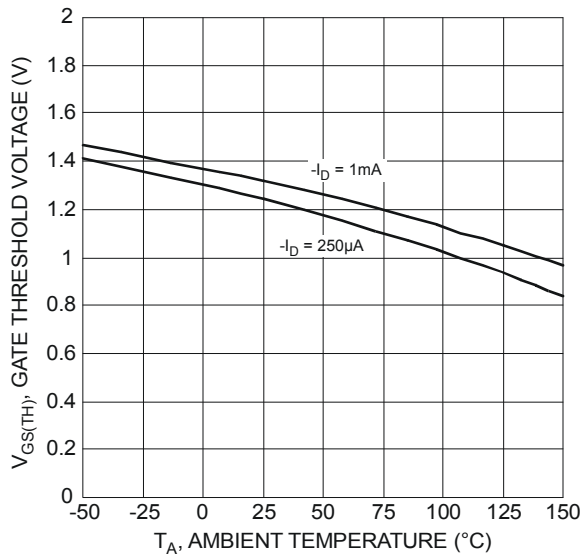


Figure 7 Gate Threshold Variation vs. Ambient Temperature

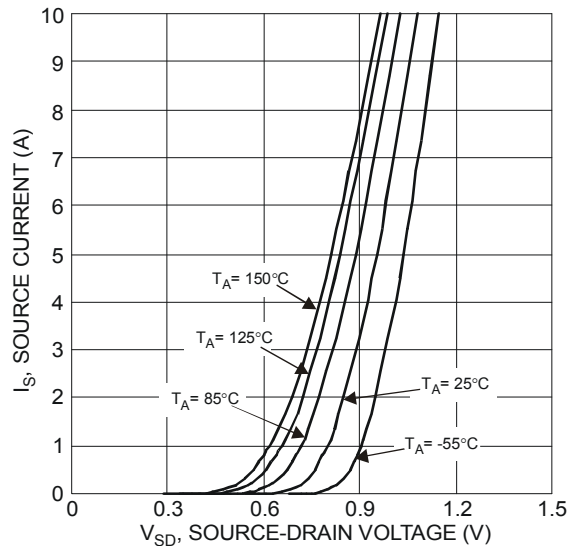
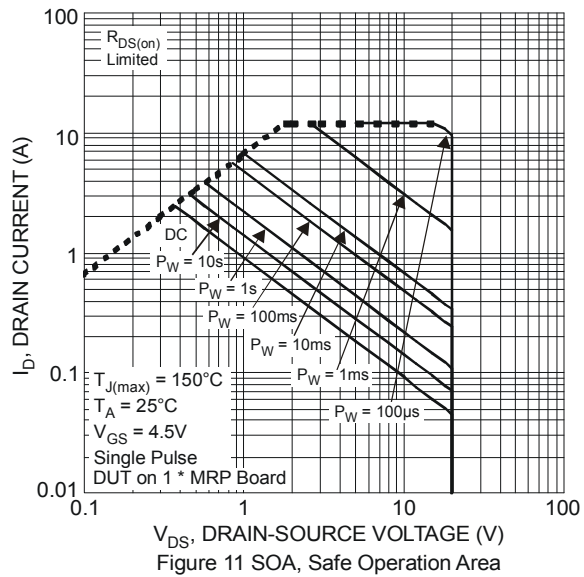
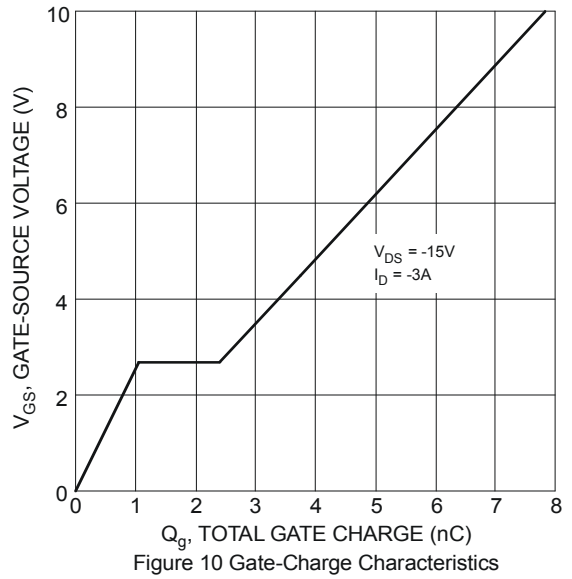
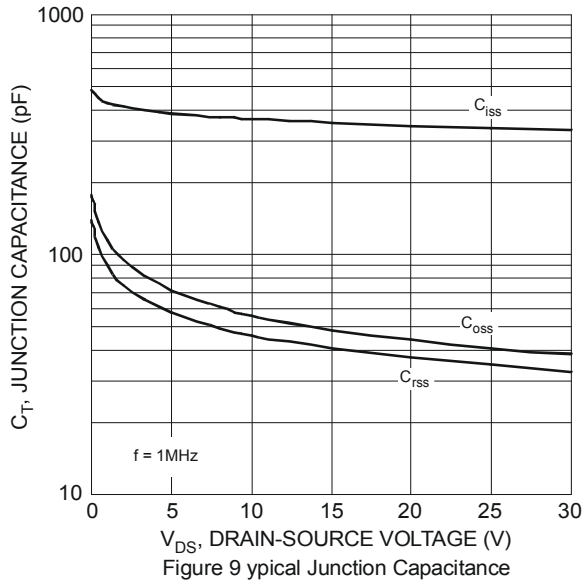


Figure 8 Diode Forward Voltage vs. Current



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)	$V_{(BR)R}$	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	μA	$V_R = 20\text{V}$

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

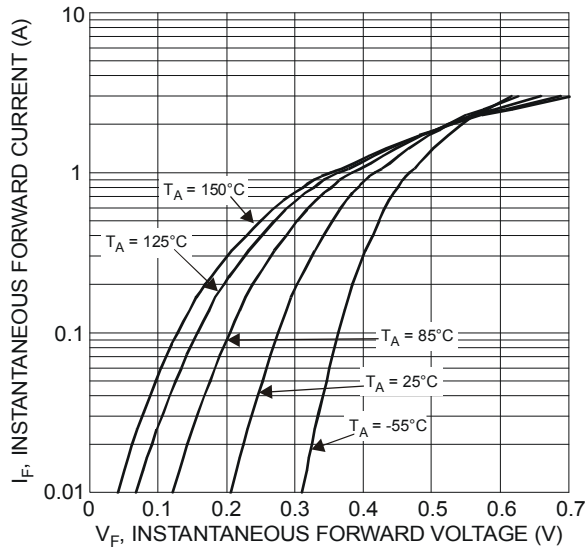


Figure 12 Typical Forward Characteristics

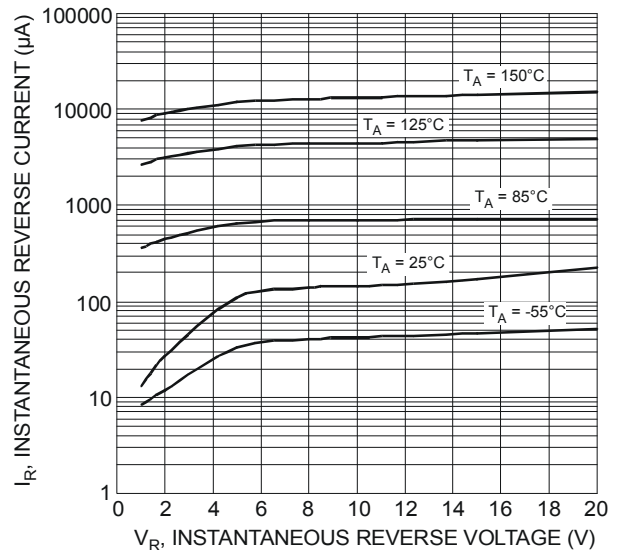
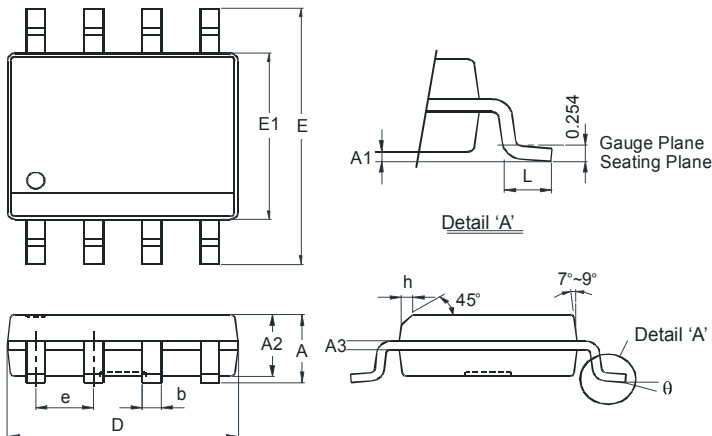


Figure 13 Typical Reverse Characteristics

Package Outline Dimensions

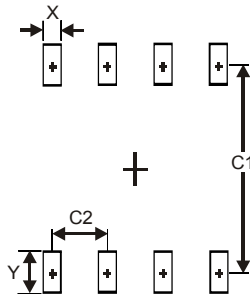
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SO-8		
Dim	Min	Max
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.



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

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