Lead-free Green

DMGD7N45SSD

450V DUAL N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)\ MAX}$	I_D T_A = +25°C
450V	4Ω @ V_{GS} = 10V	0.85A

Description

This new generation complementary MOSFET features low on-resistance and fast switching, making it ideal for high efficiency power management applications.

Applications

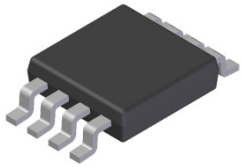
- Motor Control
- Backlighting
- DC-DC Converters
- Power Management Functions

Features

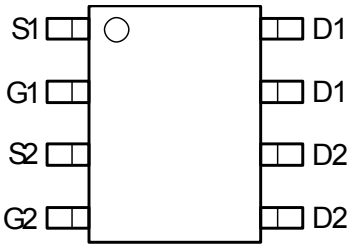
- Low Input Capacitance
- High BVDss Rating for Power Application
- Low Input/Output Leakage
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

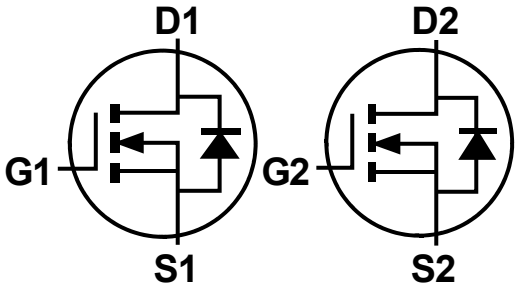
- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See diagram below
- Terminals: Finish - Matte Tin annealed over Copper lead frame. Solderable per MIL-STD-202, Method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



Top View



Top View
Pin Configuration



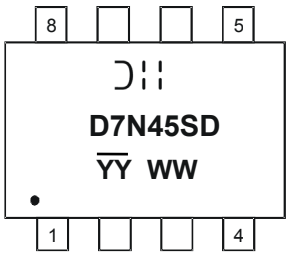
Equivalent Circuit

Ordering Information (Note 4)

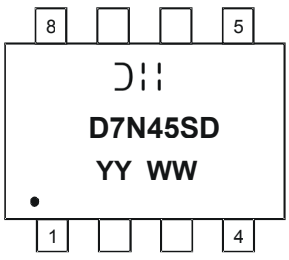
Part Number	Compliance	Case	Packaging
DMGD7N45SSD-13	Standard	SO-8	2,500/Tape & Reel

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
D7N45SD = Product Type Marking Code
YYWW = Date Code Marking
YY or $\overline{YY}$ = Year (ex: 14 = 2014)
WW = Week (01 - 53)
$\underline{YY}$ = Date Code Marking for SAT (Shanghai Assembly/ Test site)
$\overline{YY}$ = Date Code Marking for CAT (Chengdu Assembly/ Test site)

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

Characteristic		Symbol	Value	Units
Drain-Source Voltage		V_{DSS}	450	V
Gate-Source Voltage		V_{GSS}	±30	V
Continuous Drain Current (Note 5) V_{GS} = 10V	Steady State	I_D	0.5	A
	t < 10s		0.62	
	t < 1s		0.85	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)		I_{DM}	2.2	A
Maximum Body Diode Forward Current (Note 5)		I_S	1.7	A
Avalanche Current (Note 6)	L = 60mH	I_{AS}	1.4	A
	L = 10mH (Note 8)		2.2	
Avalanche Energy (Note 6)	L = 60mH	E_{AS}	56	mJ
	L = 10mH (Note 8)		25	

Thermal Characteristics

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)		P_D	1.64	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	$R_{\Theta JA}$	78	°C/W
	t<10s		20.2	°C/W
Thermal Resistance, Junction to Case (Note 5)		$R_{\Theta JC}$	13.3	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	450	—	—	V	V_{GS} = 0V, I_D = 10mA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	µA	V_{DS} = 450V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±30V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	3.5	—	4.5	V	V_{DS} =10V I_D = 1mA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	—	3	4	Ω	V_{GS} = 10V, I_D = 0.4A
Forward Transfer Admittance	$\|Y_{fs}\|$	0.55	1.1	—	S	V_{DS} = 10V, I_D =0.4A
Diode Forward Voltage	V_{SD}	—	0.7	1.2	V	V_{GS} = 0V, I_S = 0.7A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	256	—	pF	V_{DS} = 25V, V_{GS} = 0V f = 1MHz
Output Capacitance	C_{oss}	—	22.5	—		
Reverse Transfer Capacitance	C_{rss}	—	0.83	—		
Gate Resistance	R_G	—	2.3	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (V_{GS} = 10V)	Q_g	—	6.9	—	nC	V_{DS} = 360V,I_D = 0.7A, V_{GS} = 10V
Gate-Source Charge	Q_{gs}	—	1.4	—		
Gate-Drain Charge	Q_{gd}	—	3.4	—		
Turn-On Delay Time	$t_{D(on)}$	—	7	—	nS	V_{GS} = 10V, R_L = 562Ω, R_G = 10Ω, I_D = 0.4A
Turn-On Rise Time	t_r	—	6.4	—		
Turn-Off Delay Time	$t_{D(off)}$	—	18.9	—		
Turn-Off Fall Time	t_f	—	56.6	—		
Body Diode Reverse Recovery Time	t_{rr}	—	103	—	nS	I_F = 1A, dI/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q_{rr}	—	314	—	nC	

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
6. I_{AR} and E_{AR} rating are based on low frequency and duty cycles to keep T_J = +25°C.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to product testing.

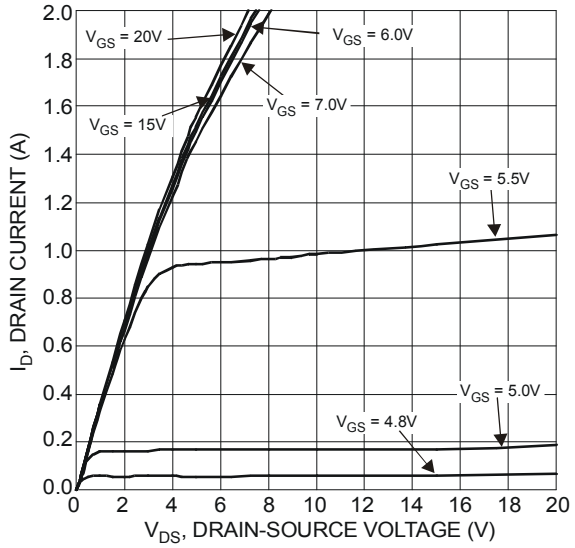


Figure 1 Typical Output Characteristics

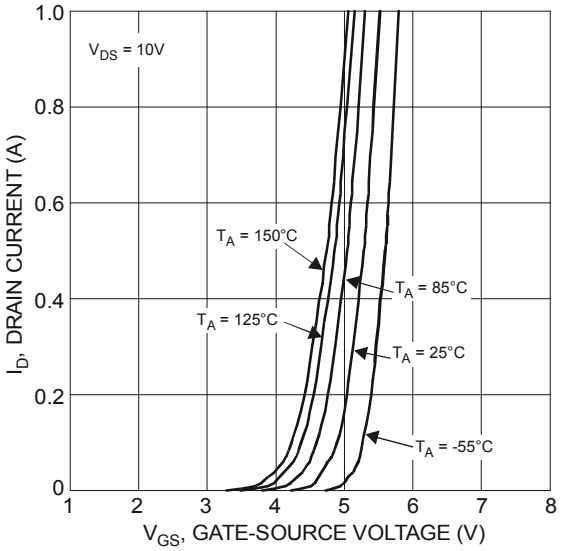


Figure 2 Typical Transfer Characteristics

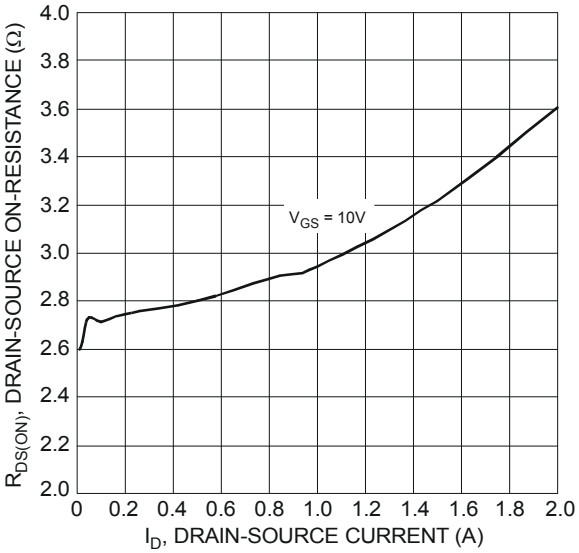


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

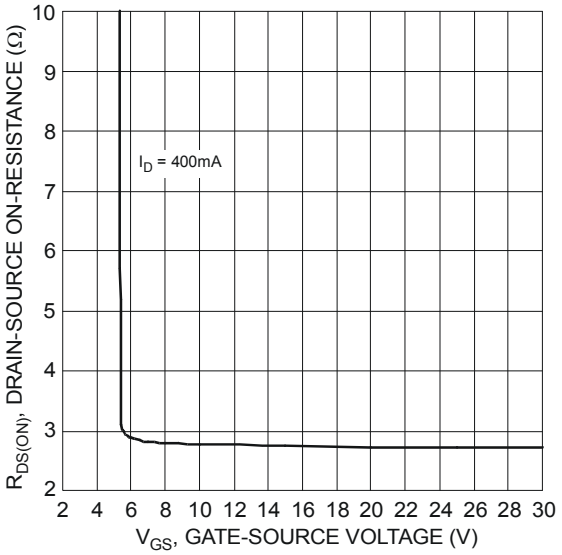


Figure 4 Typical Transfer Characteristic

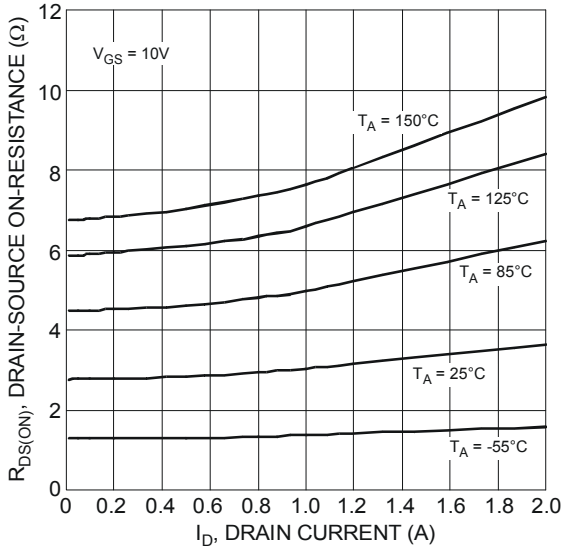


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

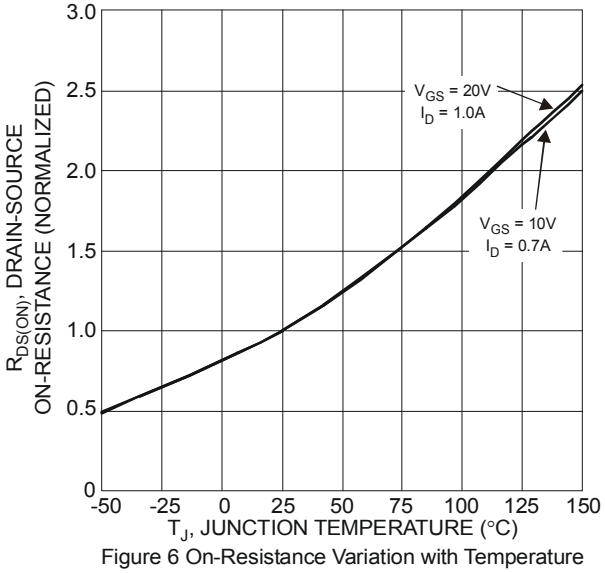


Figure 6 On-Resistance Variation with Temperature

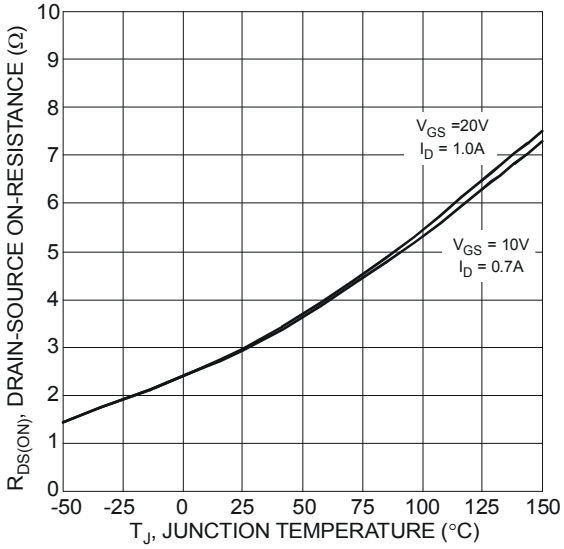


Figure 7 On-Resistance Variation with Temperature

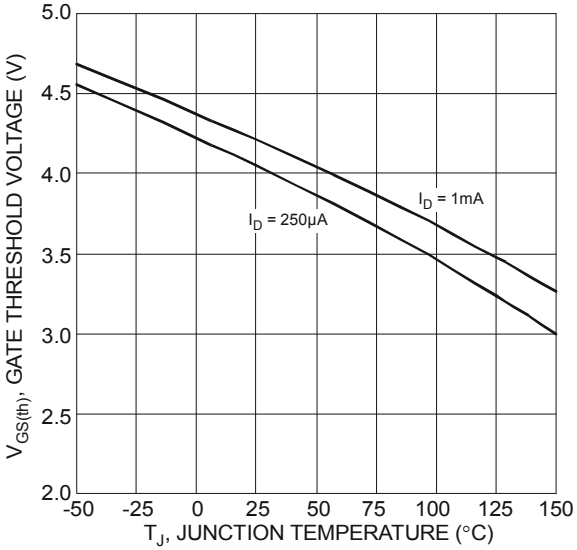


Figure 8 Gate Threshold Variation vs. Ambient Temperature

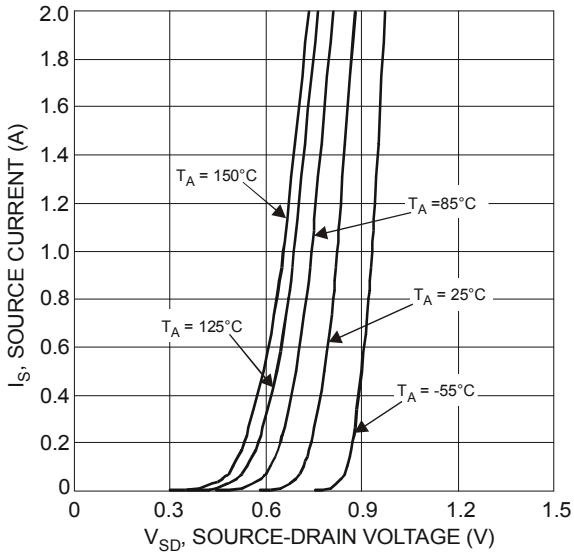


Figure 9 Diode Forward Voltage vs. Current

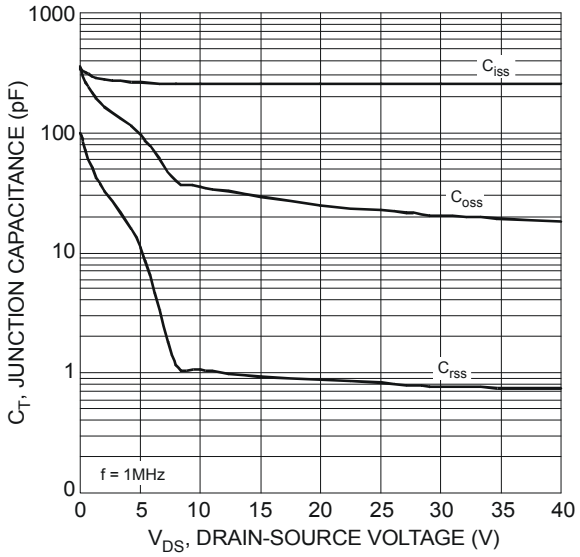


Figure 10 Typical Junction Capacitance

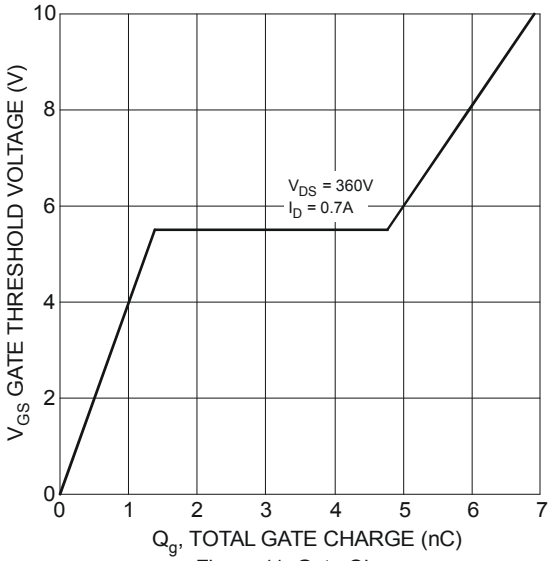


Figure 11 Gate Charge

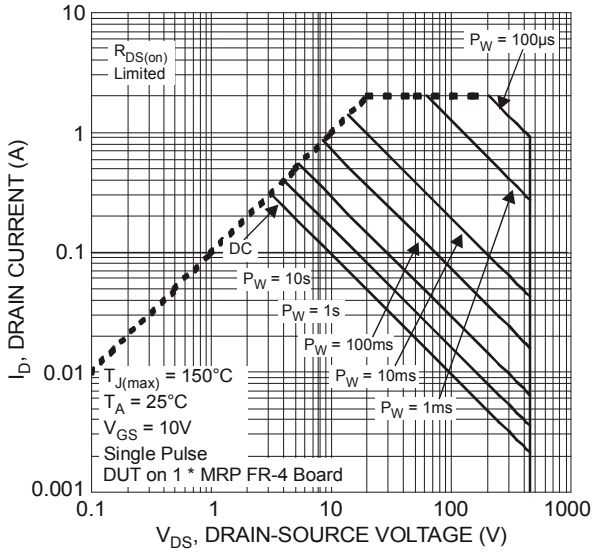


Figure 12 SOA, Safe Operation Area

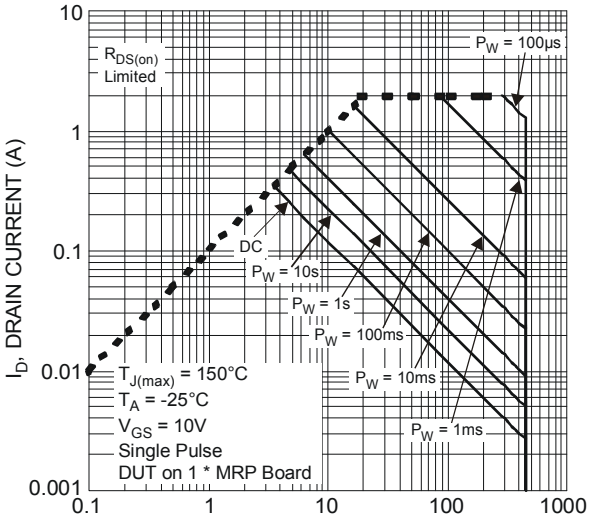


Figure 13 SOA, Safe Operation Area

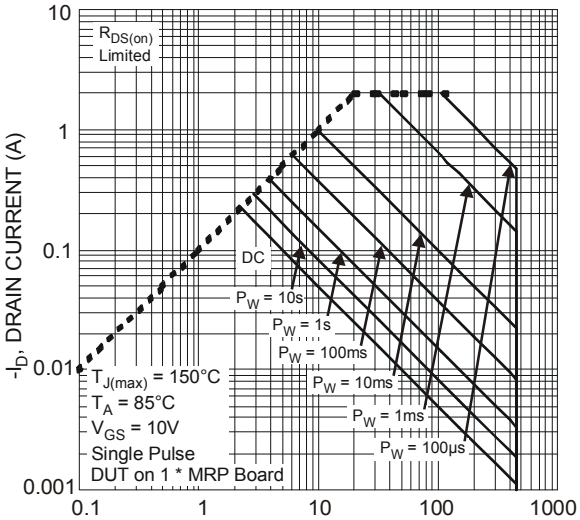


Figure 14 SOA, Safe Operation Area

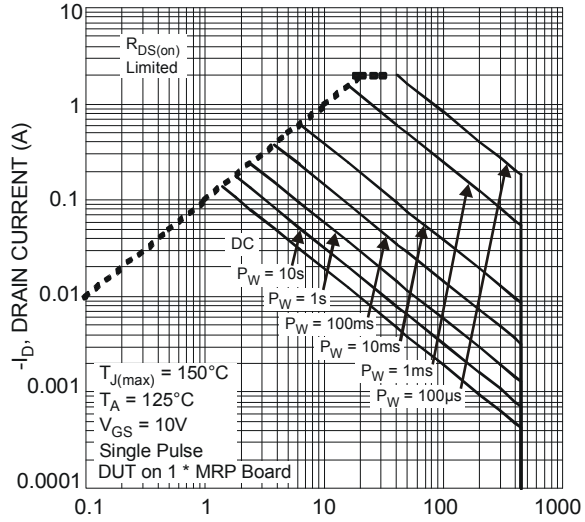


Figure 15 SOA, Safe Operation Area

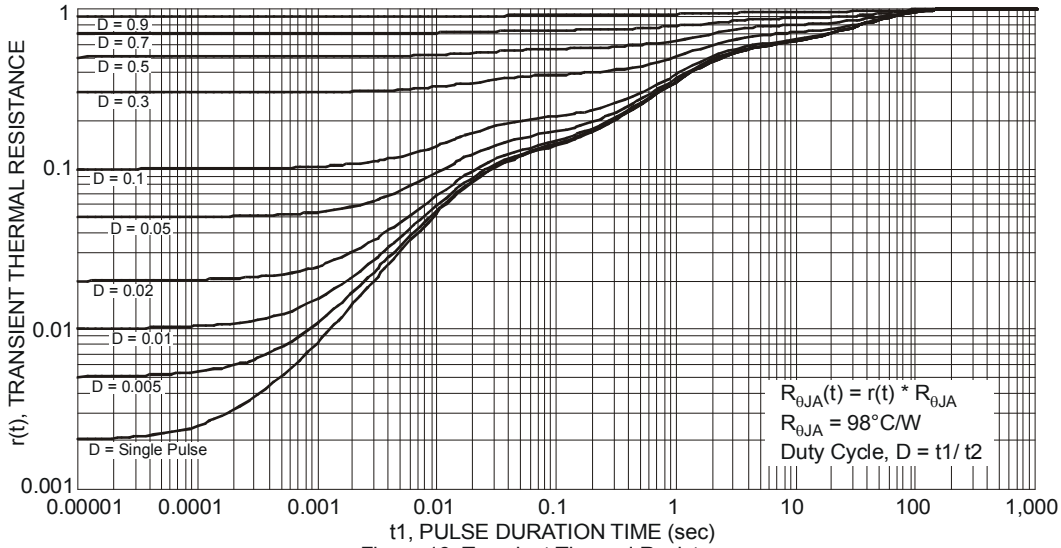
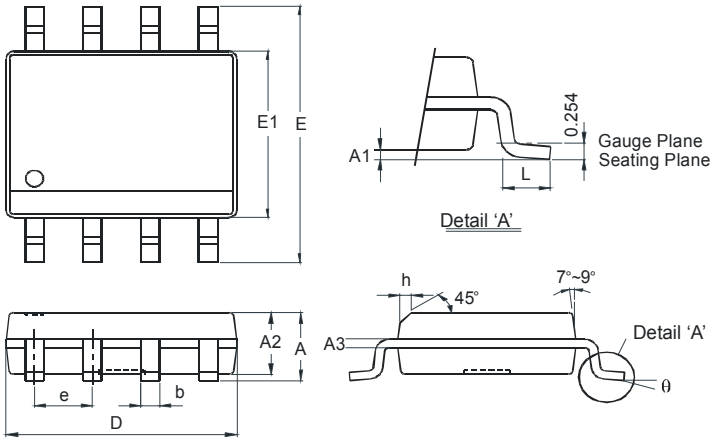


Figure 16 Transient Thermal Resistance

Package Outline Dimensions

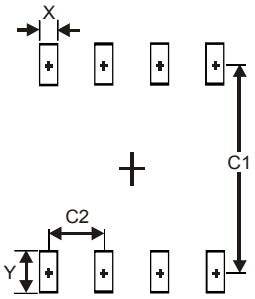
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



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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