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

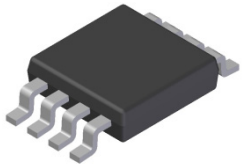
- Motor Control
- Backlighting
- DC-DC Converters
- Power Management Functions

Features

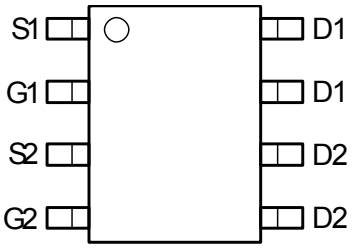
- Low Input Capacitance
- High BVDss Rating for Power Application
- Low Input/Output Leakage
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

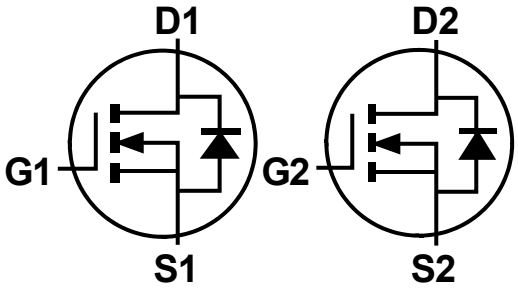
- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See diagram below
- Terminals: Finish - Matte Tin annealed over Copper lead frame. Solderable per MIL-STD-202, Method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



Top View



Top View
Pin Configuration



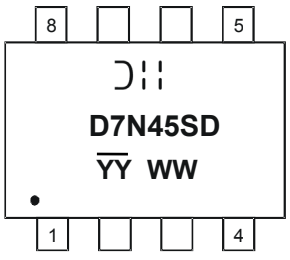
Equivalent Circuit

Ordering Information (Note 4)

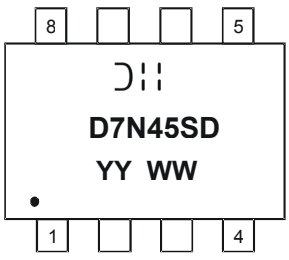
Part Number	Compliance	Case	Packaging
DMGD7N45SSD-13	Standard	SO-8	2,500/Tape & Reel

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)

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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.

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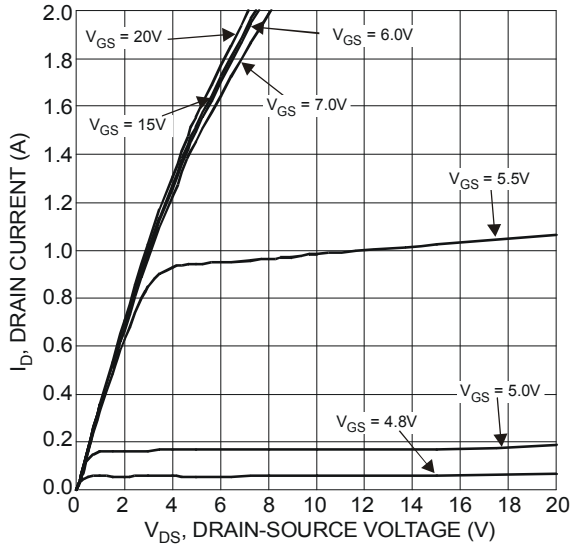


Figure 1 Typical Output Characteristics

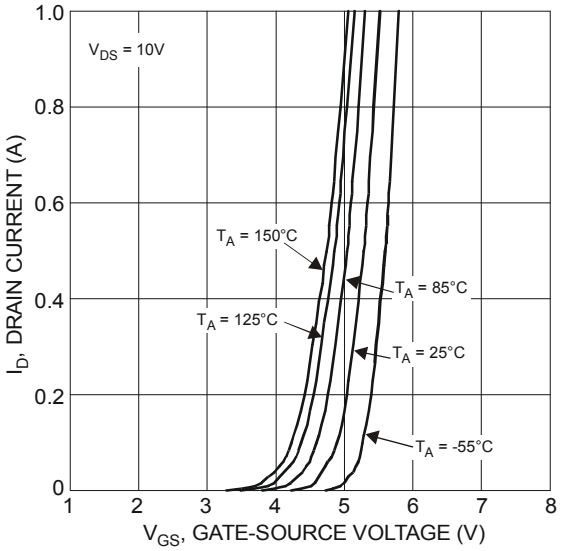


Figure 2 Typical Transfer Characteristics

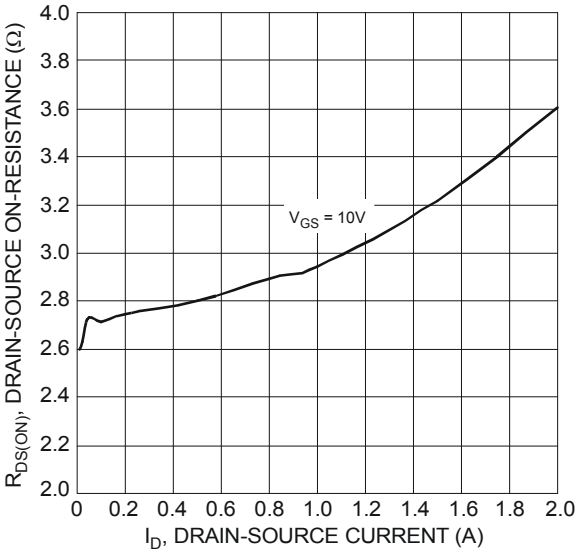


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

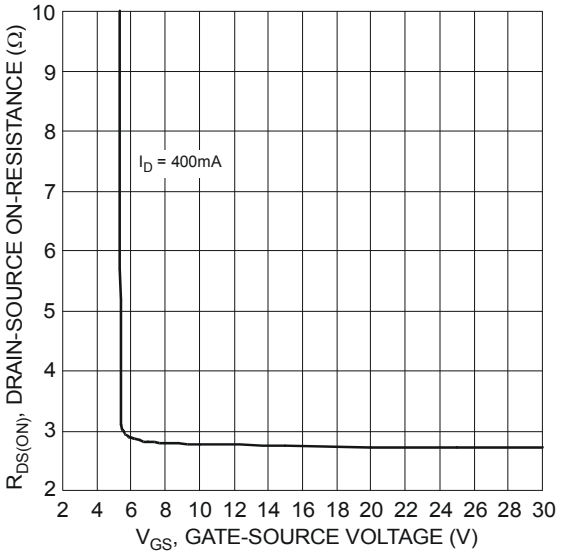


Figure 4 Typical Transfer Characteristic

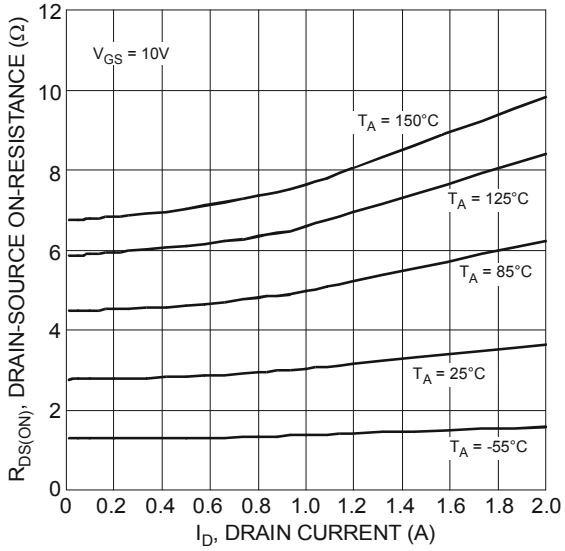


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

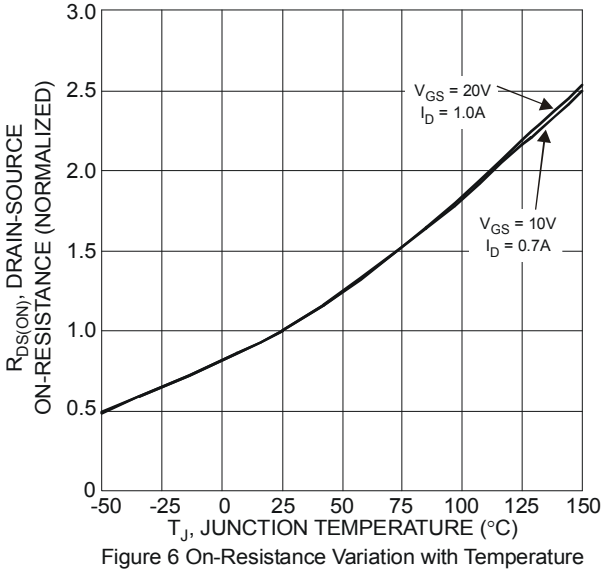


Figure 6 On-Resistance Variation with Temperature

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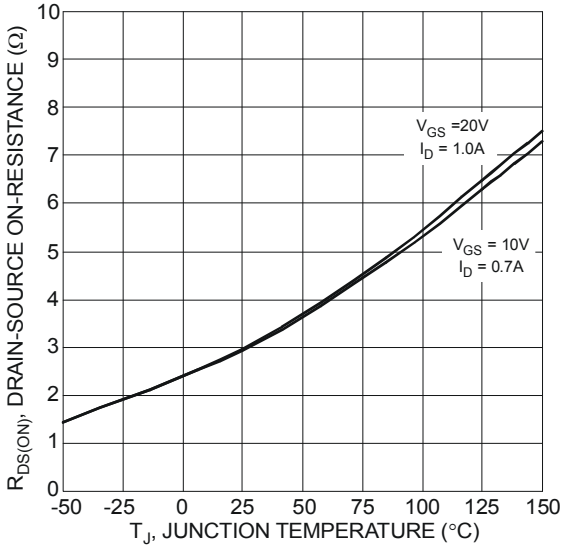


Figure 7 On-Resistance Variation with Temperature

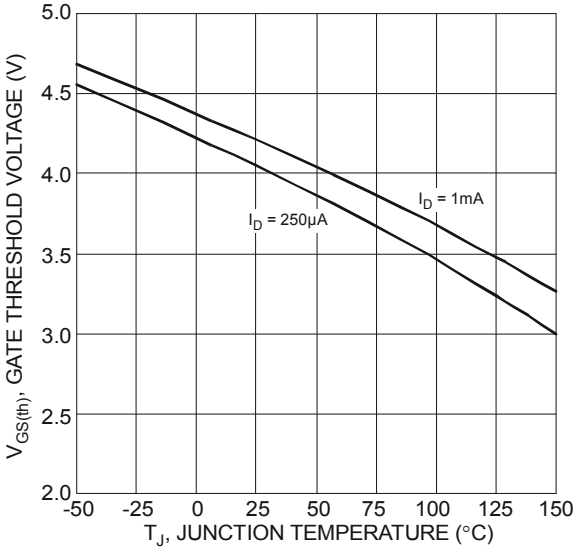


Figure 8 Gate Threshold Variation vs. Ambient Temperature

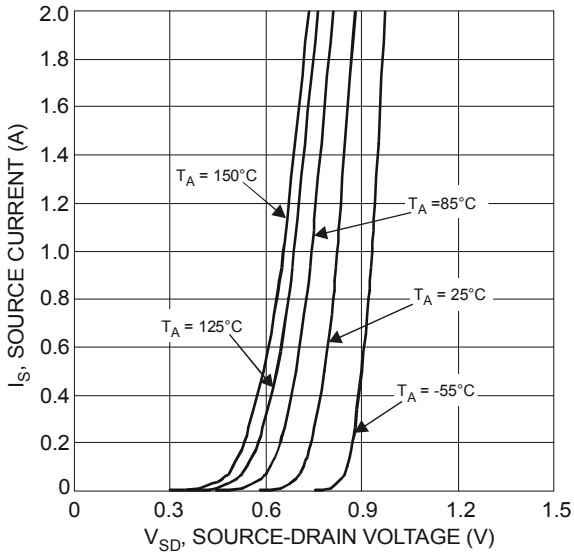


Figure 9 Diode Forward Voltage vs. Current

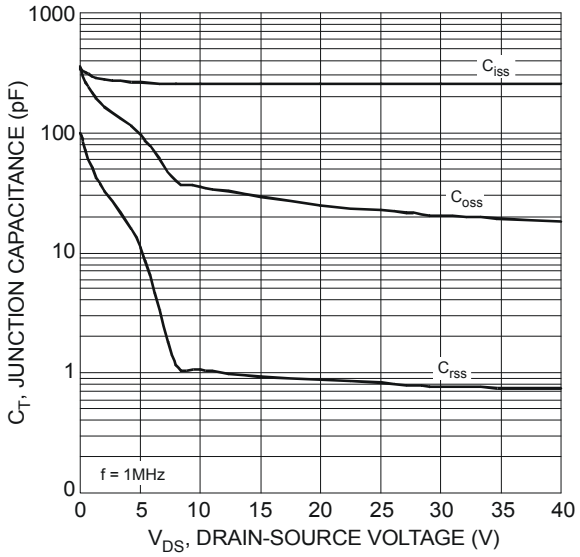


Figure 10 Typical Junction Capacitance

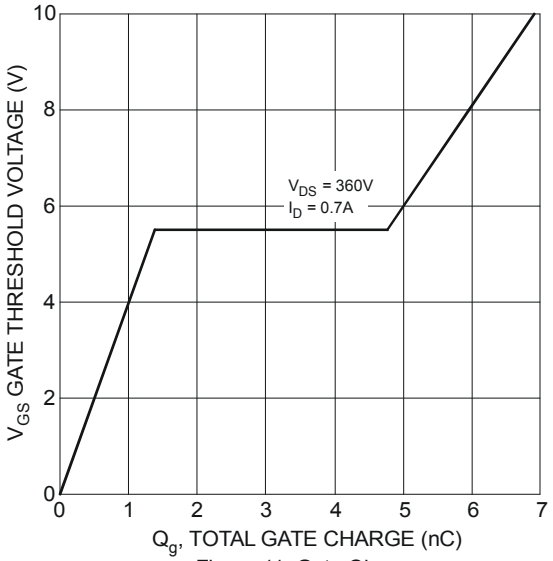


Figure 11 Gate Charge

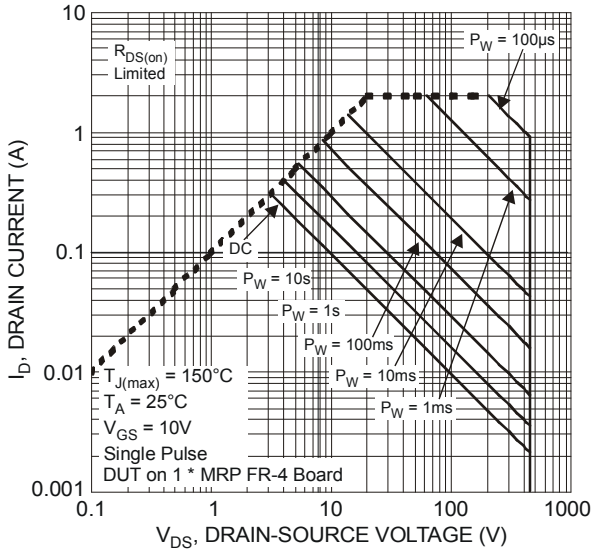


Figure 12 SOA, Safe Operation Area

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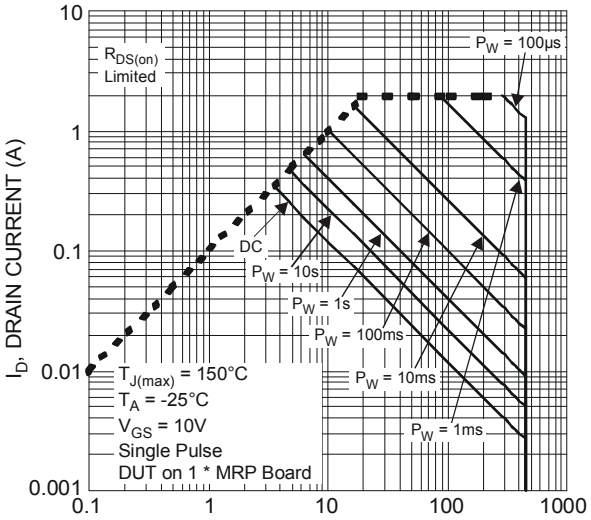


Figure 13 SOA, Safe Operation Area

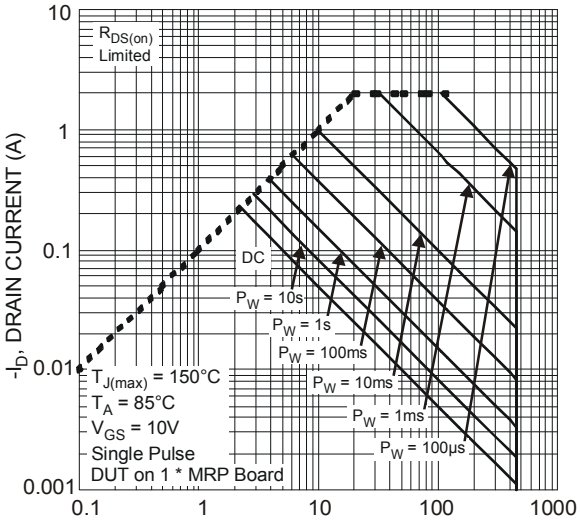


Figure 14 SOA, Safe Operation Area

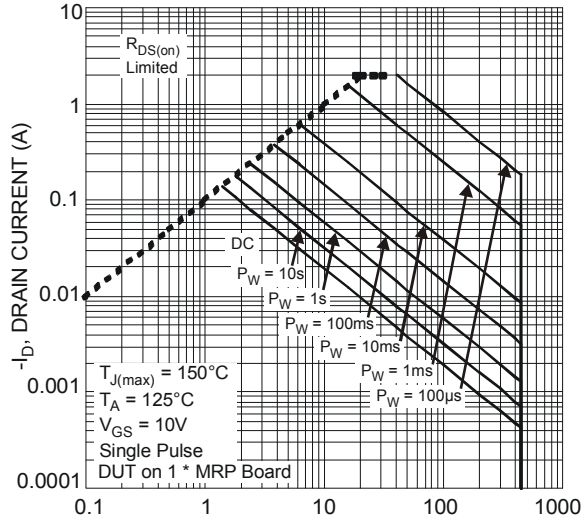


Figure 15 SOA, Safe Operation Area

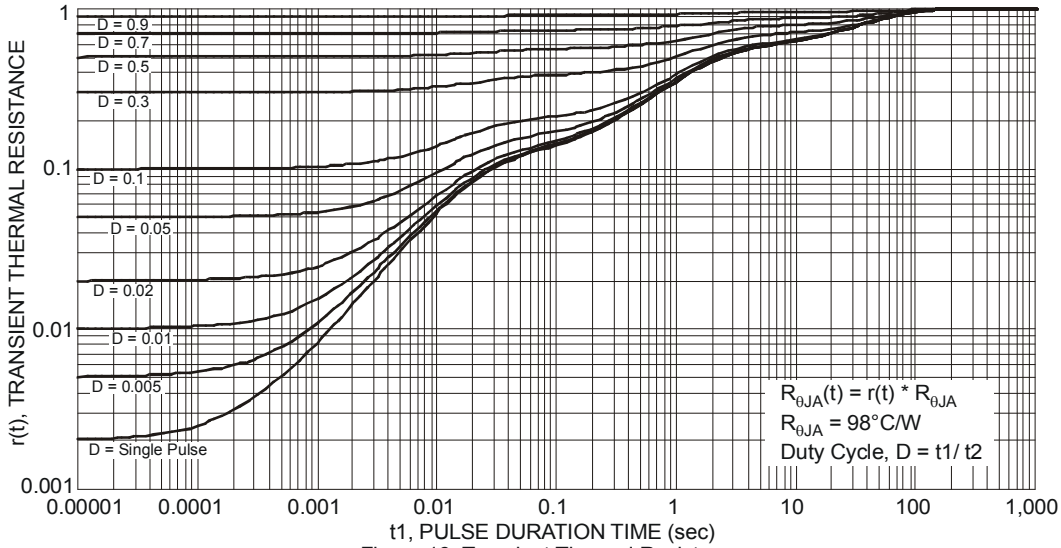
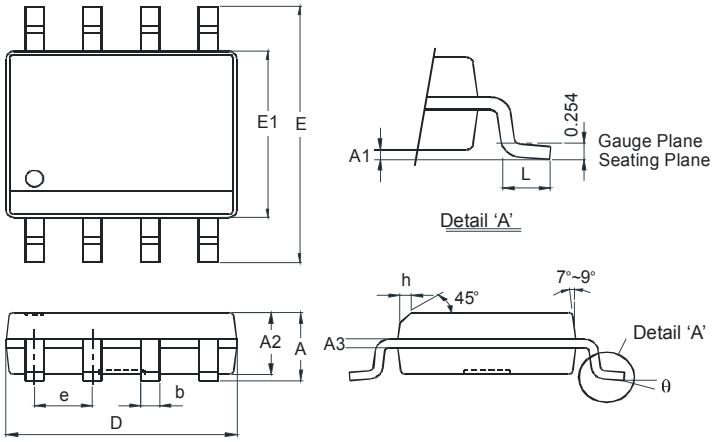


Figure 16 Transient Thermal Resistance

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Package Outline Dimensions

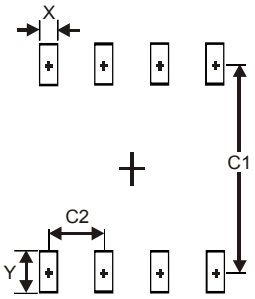
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



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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