

450V DUAL N-CHANNEL ENHANCEMENT MODE MOSFET
Product Summary

$V_{(BR)DSS}$	$R_{DS(ON) MAX}$	I_D $T_A = +25^\circ C$
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

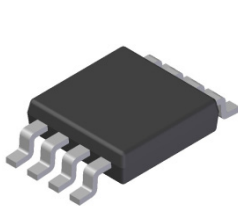
- Motor Control
- Backlighting
- DC-DC Converters
- Power Management Functions

Features

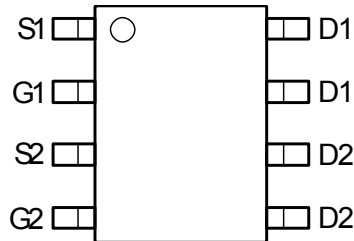
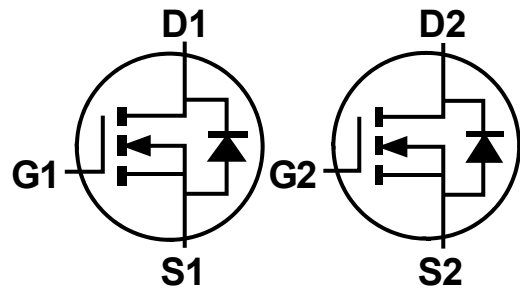
- Low Input Capacitance
- High BVDss Rating for Power Application
- Low Input/Output Leakage
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

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 Ⓔ3
- Weight: 0.074 grams (approximate)



Top View

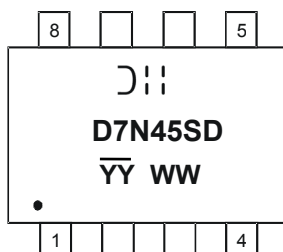

 Top View
Pin Configuration


Equivalent Circuit

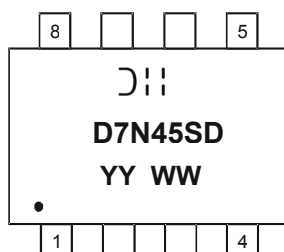
Ordering Information (Note 4)

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

D7N45SD = Manufacturer's Marking
 D7N45SD = Product Type Marking Code
 YYWW = Date Code Marking
 YY or YY = Year (ex: 14 = 2014)
 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 (@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	I _D	Steady State	0.5
		t < 10s	0.62
		t < 1s	0.85
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)	I _{AS}	L = 60mH	1.4
		L = 10mH (Note 8)	2.2
Avalanche Energy (Note 6)	E _{AS}	L = 60mH	56
		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)	R _{θJA}	Steady state	78
		t < 10s	20.2
Thermal Resistance, Junction to Case (Note 5)	R _{θJC}	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:
- 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°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

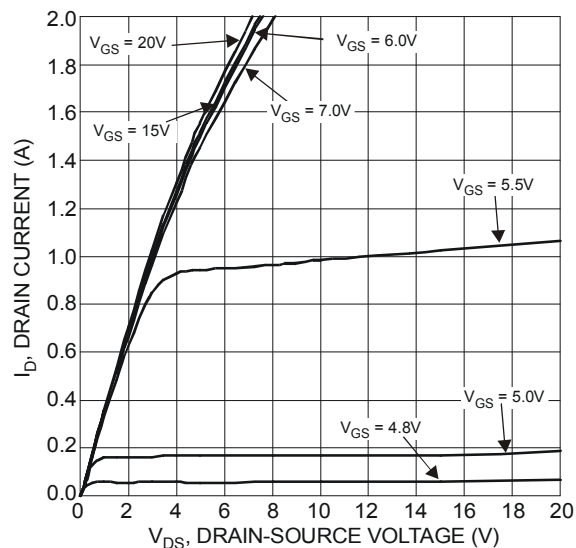


Figure 1 Typical Output Characteristics

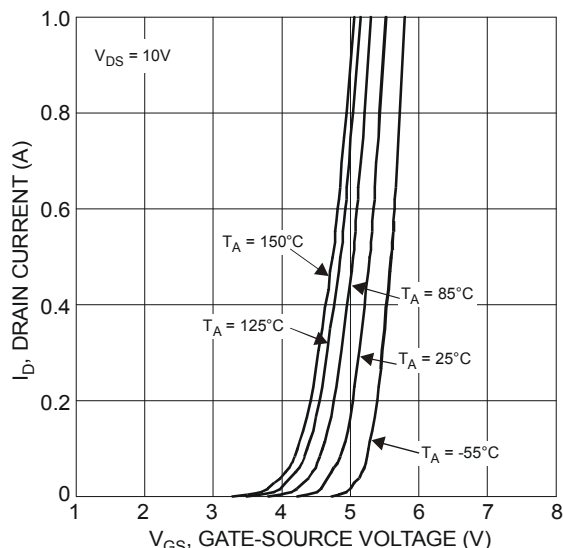


Figure 2 Typical Transfer Characteristics

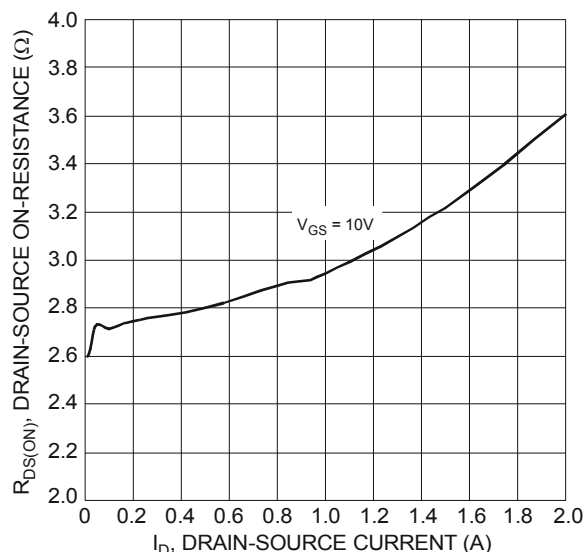


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

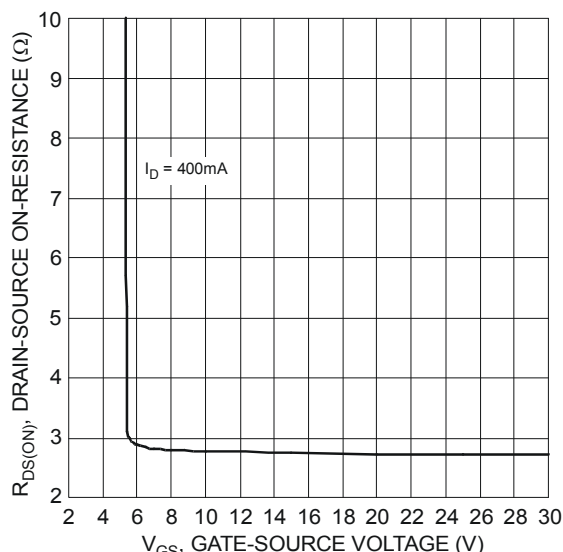


Figure 4 Typical Transfer Characteristic

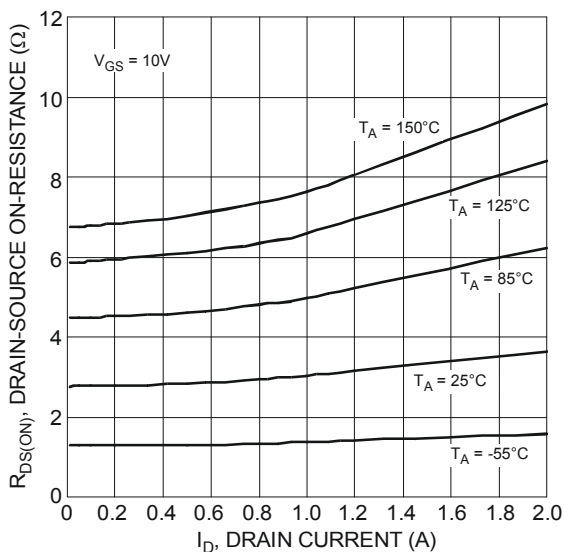


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

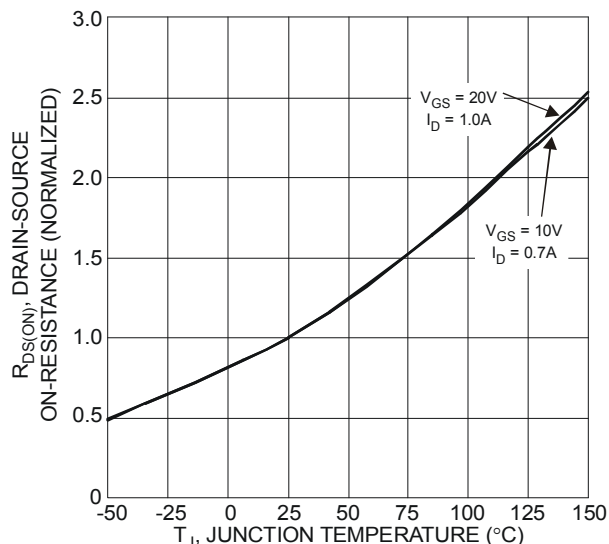


Figure 6 On-Resistance Variation with Temperature

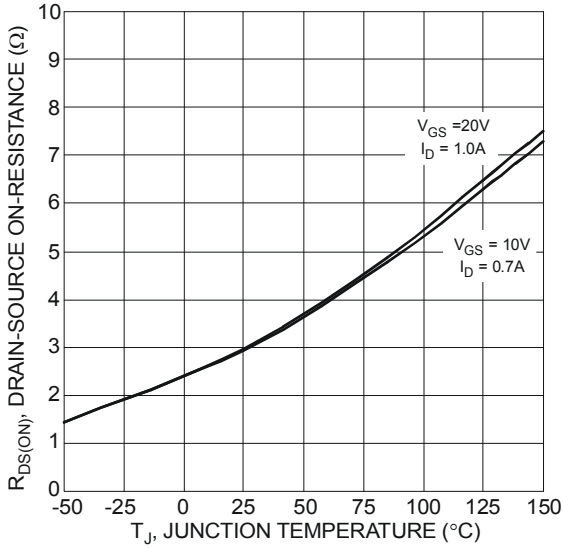


Figure 7 On-Resistance Variation with Temperature

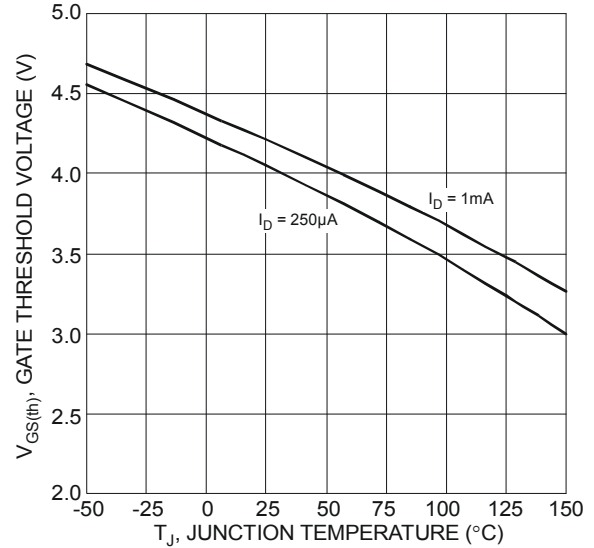


Figure 8 Gate Threshold Variation vs. Ambient Temperature

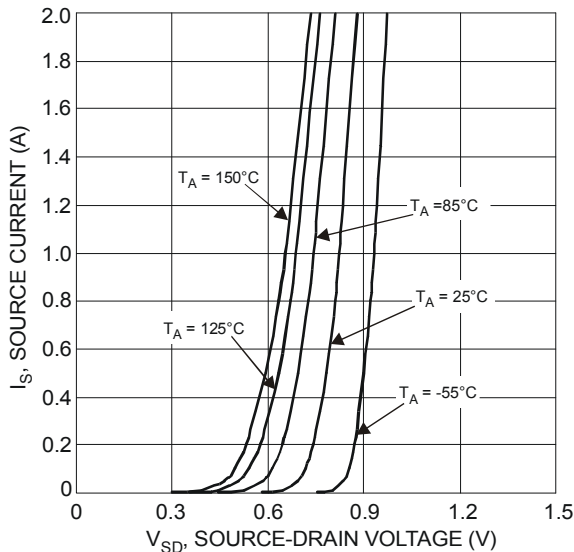


Figure 9 Diode Forward Voltage vs. Current

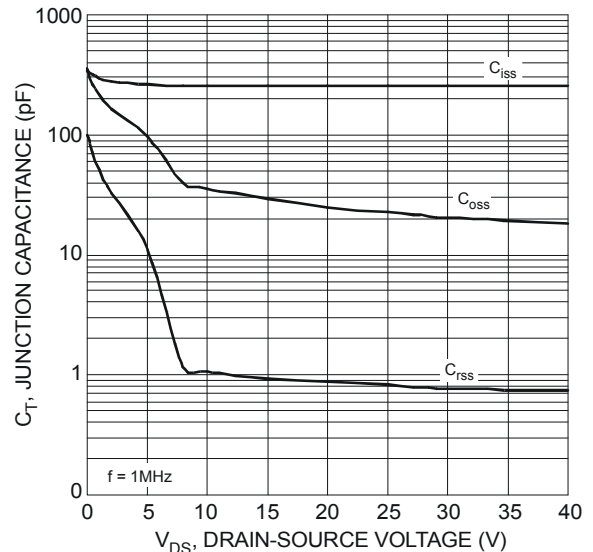


Figure 10 Typical Junction Capacitance

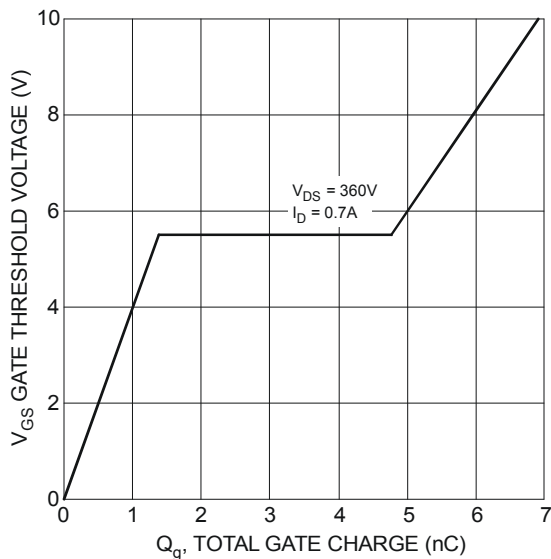


Figure 11 Gate Charge

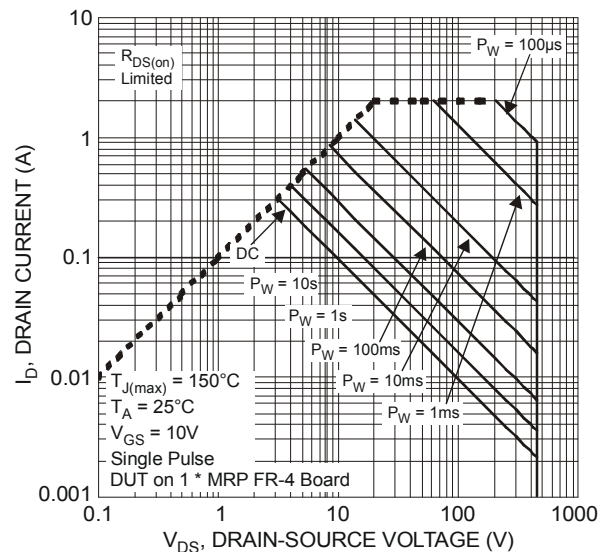
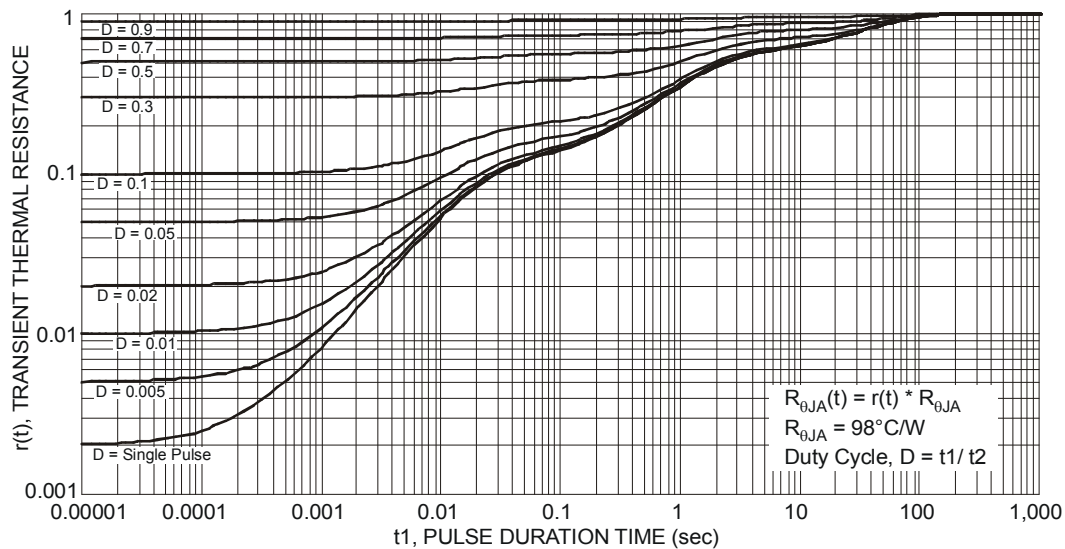
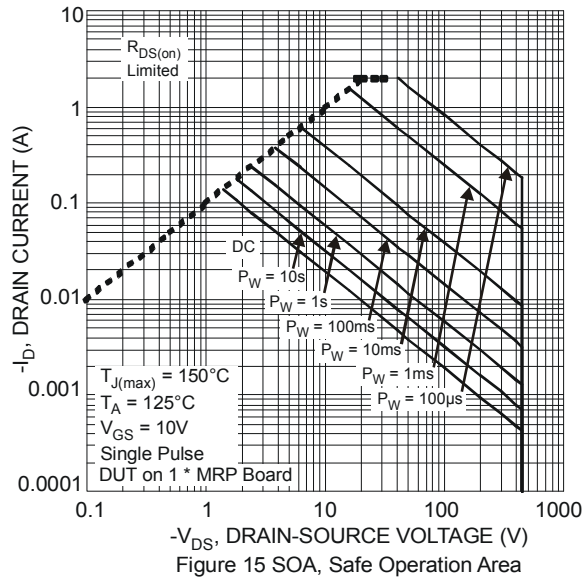
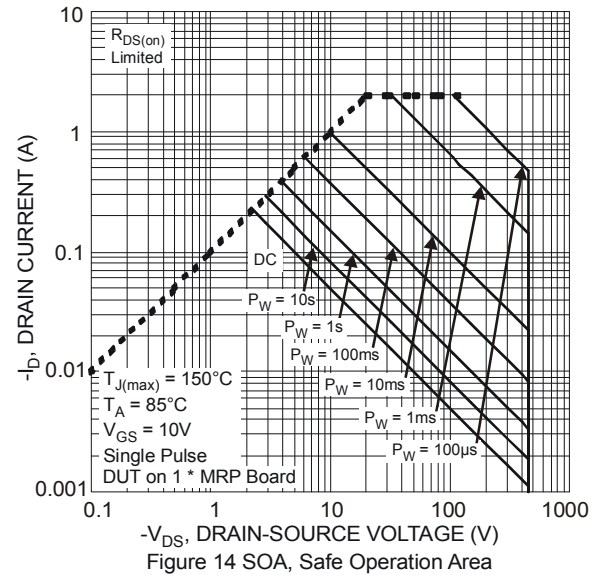
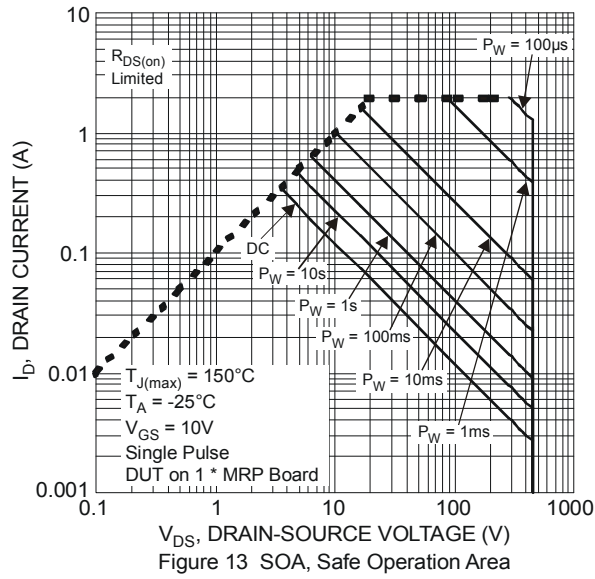
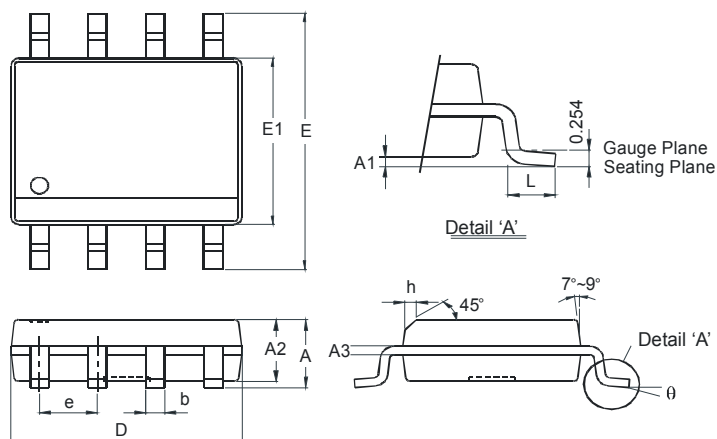


Figure 12 SOA, Safe Operation Area



Package Outline Dimensions

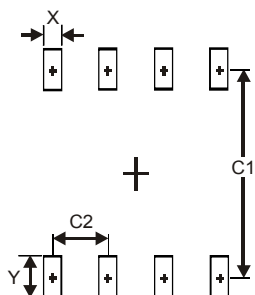
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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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