

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D T _C = +25°C
60V	27mΩ @ V _{GS} = 10V	22.6A
	30mΩ @ V _{GS} = 6V	21.5A

Description and Applications

This MOSFET is designed to meet the stringent requirements of Automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

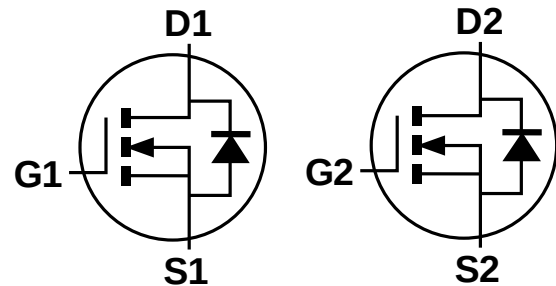
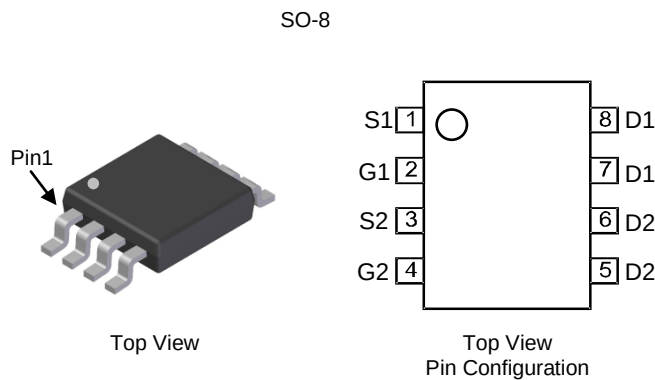
- Engine Management Systems
- Body Control Electronics
- DC-DC Converters

Features and Benefits

- Rated to +175°C – Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switching – Ensures More Reliable and Robust End Application
- Low R_{DS(ON)} – Minimizes Power Losses
- Low Q_g – Minimizes Switching Losses
- **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**
- **PPAP Capable (Note 4)**

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 
- Weight: 0.074 grams (Approximate)



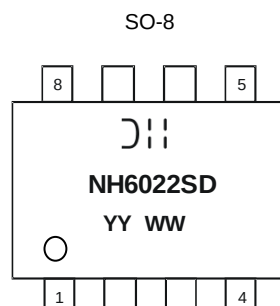
Equivalent Circuit

Ordering Information (Note 5)

Part Number	Case	Packaging
DMNH6022SSDQ-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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to http://www.diodes.com/product_compliance_definitions.html.
 5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



 = Manufacturer's Marking
 NH6022SD = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Year (ex: 16 = 2016)
 WW = Week (01 to 53)

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

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V _{DSS}	60	V
Gate-Source Voltage		V _{GSS}	±20	V
Continuous Drain Current V _{GS} = 10V (Note 7)	T _C = +25°C	I _D	22.6	A
	T _C = +100°C		16.0	
	T _A = +25°C	I _D	7.1	A
	T _A = +70°C		5.9	
Pulsed Drain Current (10μs pulse, duty cycle = 1%)		I _{DM}	45	A
Maximum Continuous Body Diode Forward Current (Note 7)		I _S	2	A
Avalanche Current L = 0.1mL (Note 8)		I _{AS}	22	A
Avalanche Energy L = 0.1mL (Note 8)		E _{AS}	24	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 6)	T _A = +25°C	P _D	1.5	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R _{θJA}	104	°C/W
	t<10s		60	
Total Power Dissipation (Note 7)	T _A = +25°C	P _D	2.1	W
Thermal Resistance, Junction to Ambient (Note 7)	Steady State	R _{θJA}	74	°C/W
	t<10s		42	
Thermal Resistance, Junction to Case (Note 7)		R _{θJC}	7.25	
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +175	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 9)						
Drain-Source Breakdown Voltage	BV _{DSS}	60	—	—	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	—	—	1	μA	V _{DS} = 60V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	V _{GS(TH)}	1.0	—	3.0	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	21	27	mΩ	V _{GS} = 10V, I _D = 5A
			24	30		V _{GS} = 6V, I _D = 5A
Diode Forward Voltage	V _{SD}	—	0.8	1.2	V	V _{GS} = 0V, I _S = 1.7A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C _{iss}	—	2127	—	pF	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	86	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	54	—	pF	
Gate Resistance	R _g	—	2.0	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge at (V _{GS} = 10V)	Q _g	—	32	—	nC	V _{DS} = 30V, I _D = 6A
Total Gate Charge at (V _{GS} = 4.5V)	Q _g	—	14	—	nC	
Gate-Source Charge	Q _{gs}	—	7	—	nC	
Gate-Drain Charge	Q _{gd}	—	4	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	5.4	—	ns	V _{GS} = 10V, V _{DS} = 30V, R _G = 6Ω, I _D = 1A
Turn-On Rise Time	t _r	—	4.4	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	30.4	—	ns	
Turn-Off Fall Time	t _f	—	8.4	—	ns	I _F = 1.7A, di/dt = 100A/μs
Body Diode Reverse Recovery Time	t _{RR}	—	18.1	—	ns	
Body Diode Reverse Recovery Charge	Q _{RR}	—	12.5	—	nC	I _F = 1.7A, di/dt = 100A/μs

- 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 1-inch 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.

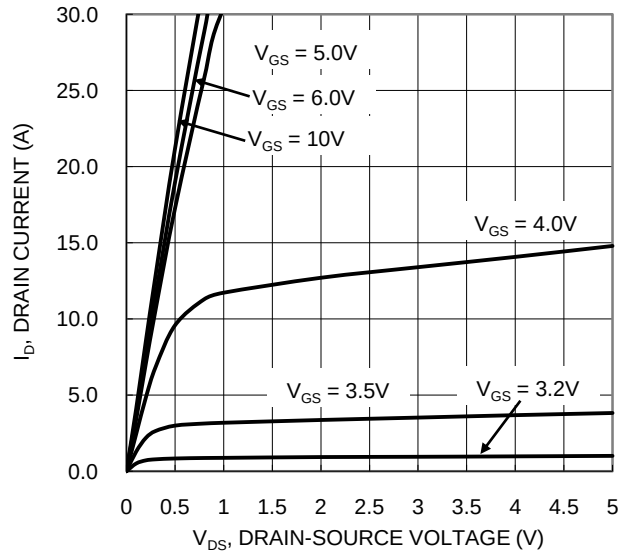


Figure 1. Typical Output Characteristic

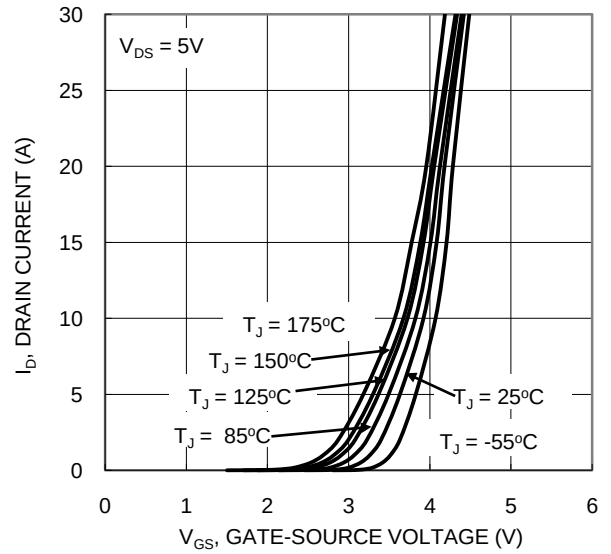


Figure 2. Typical Transfer Characteristic

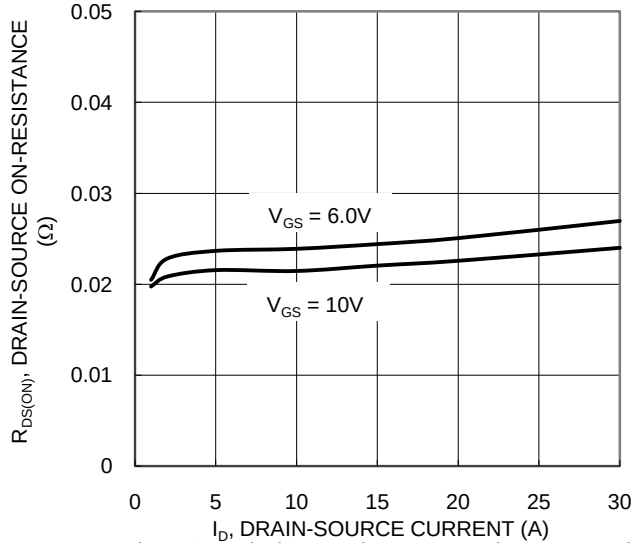


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

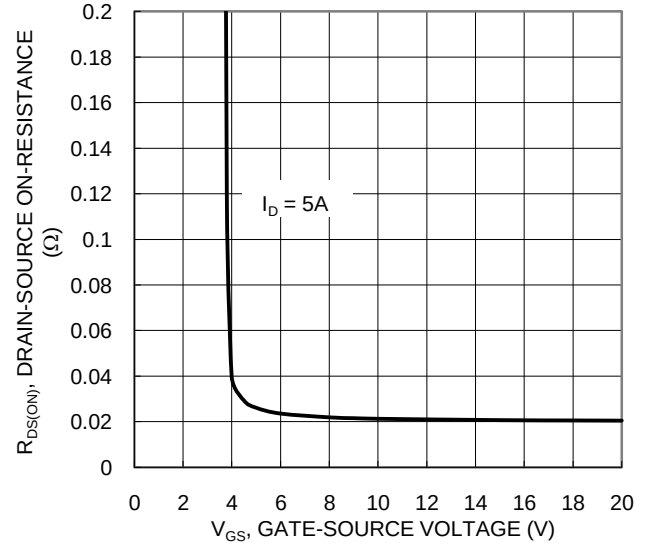


Figure 4. Typical Transfer Characteristic

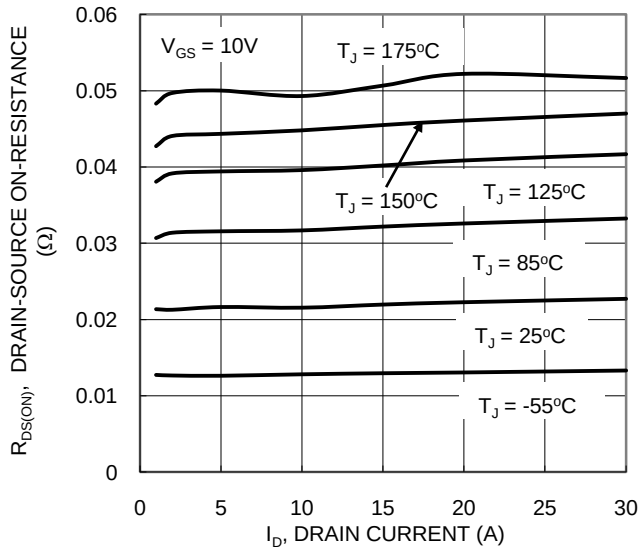


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

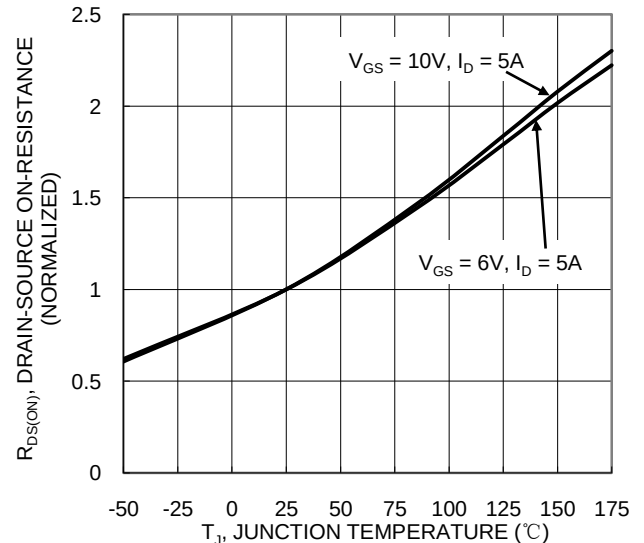
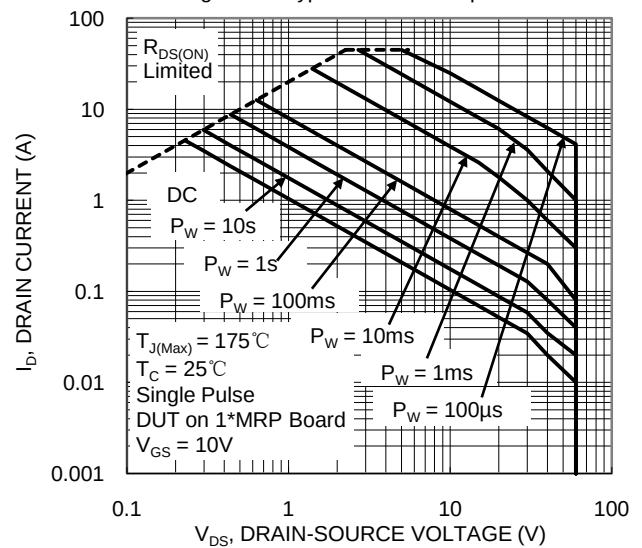
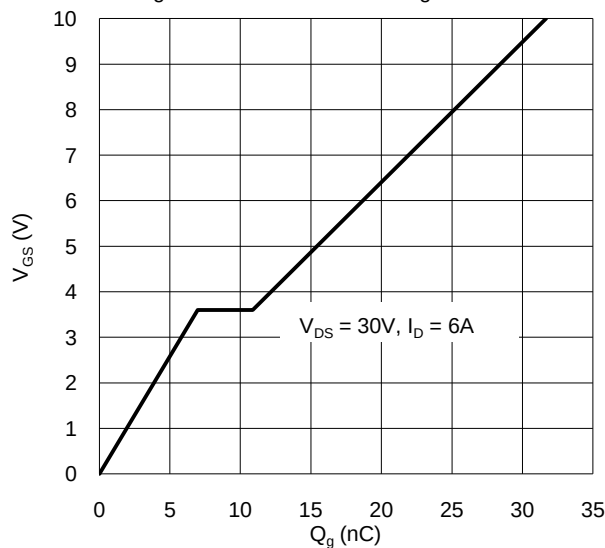
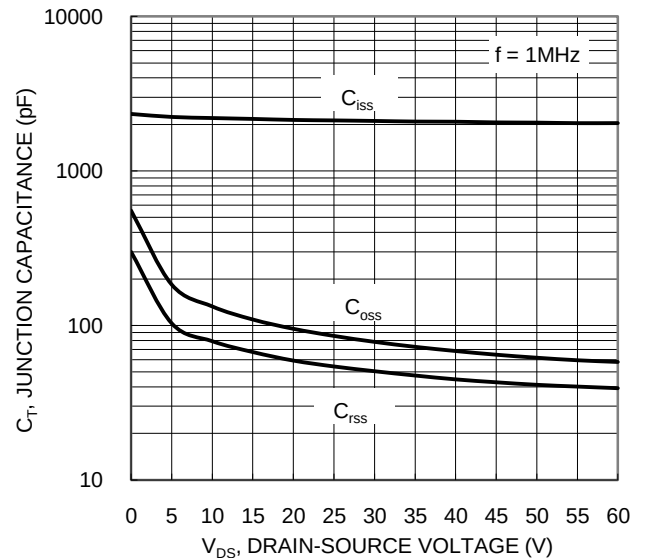
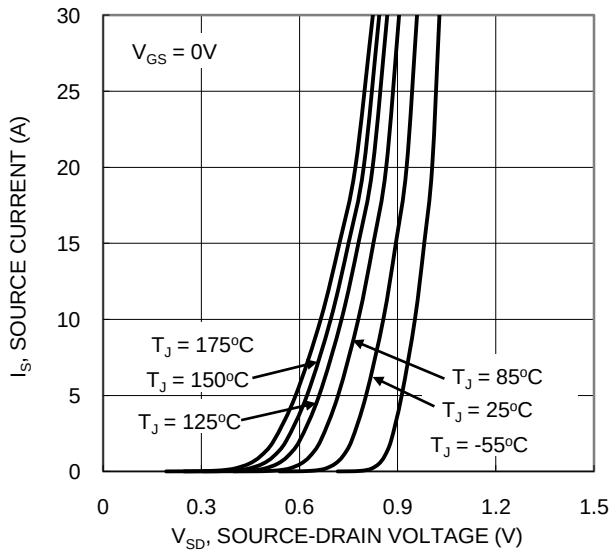
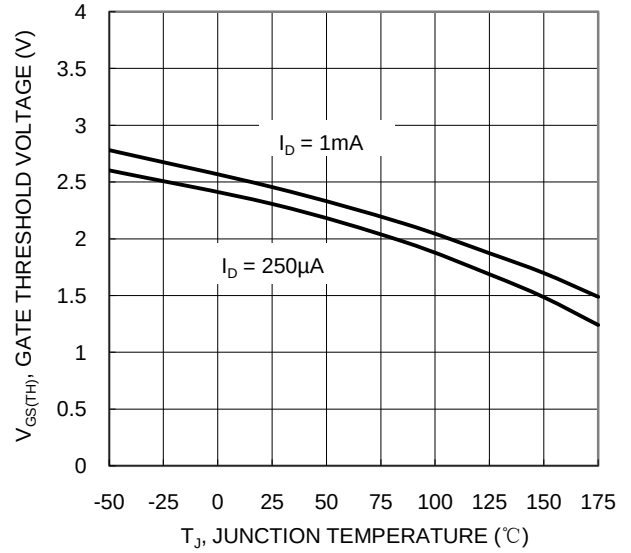
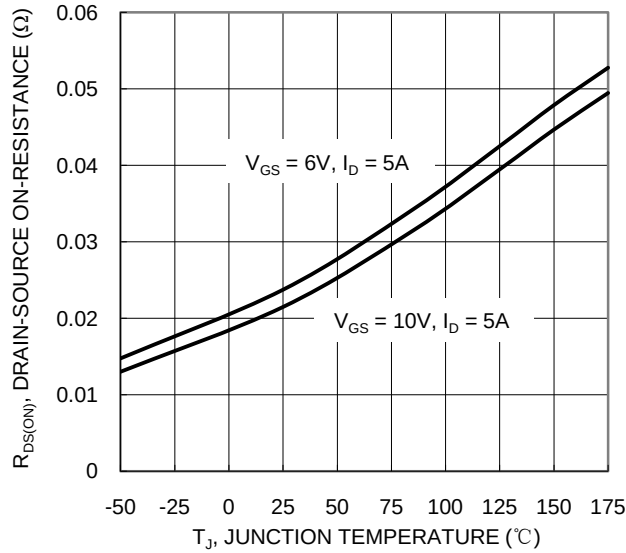


Figure 6. On-Resistance Variation with Junction Temperature



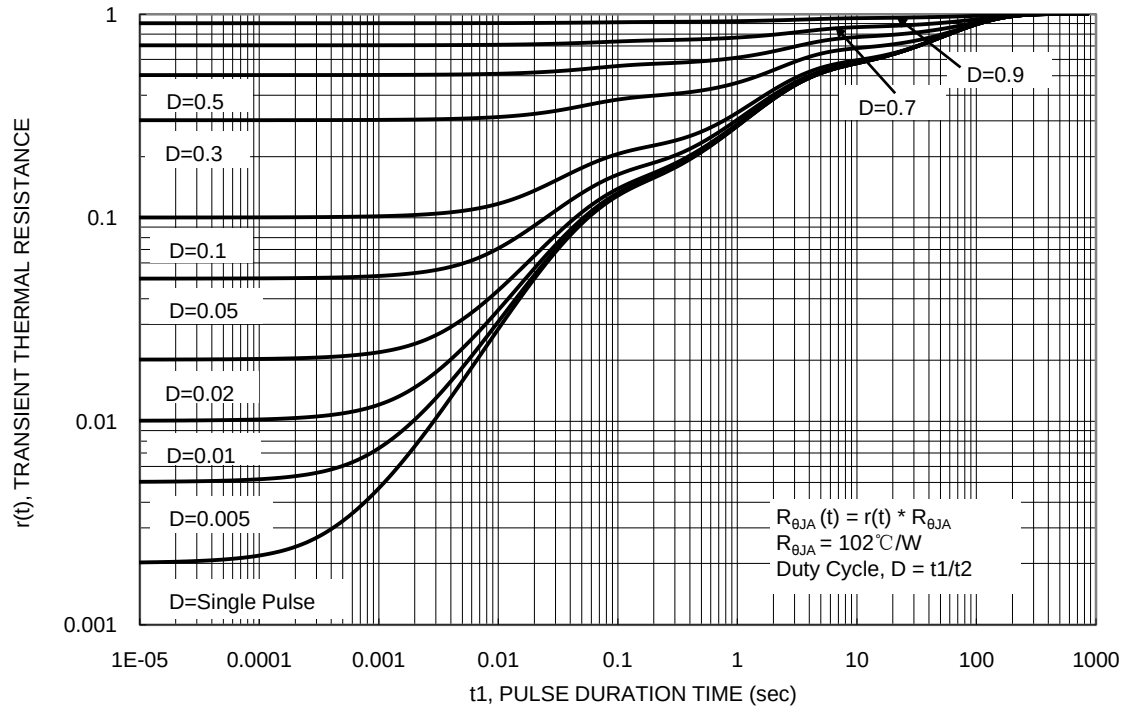
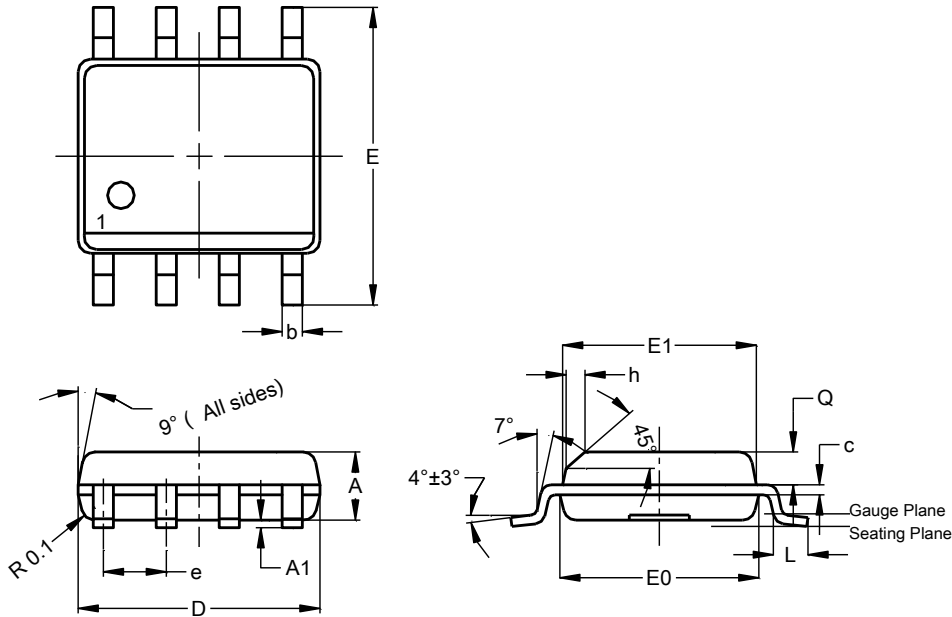


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

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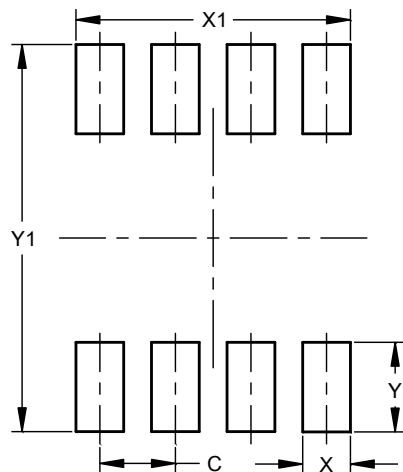


SO-8			
Dim	Min	Max	Typ
A	1.40	1.50	1.45
A1	0.10	0.20	0.15
b	0.30	0.50	0.40
c	0.15	0.25	0.20
D	4.85	4.95	4.90
E	5.90	6.10	6.00
E1	3.80	3.90	3.85
E0	3.85	3.95	3.90
e	--	--	1.27
h	-	--	0.35
L	0.62	0.82	0.72
Q	0.60	0.70	0.65
All Dimensions in mm			

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

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Dimensions	Value (in mm)
C	1.27
X	0.802
X1	4.612
Y	1.505
Y1	6.50

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