

Product Summary

BV _{DSS}	R _{DS(ON)} max	I _D T _C = +25°C
-30V	7.5mΩ @ V _{GS} = -10V	-50A
	10mΩ @ V _{GS} = -4.5V	-45A

Description and Applications

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

- DC-DC Converters
- Power Management Functions
- Reverse Polarity Protection

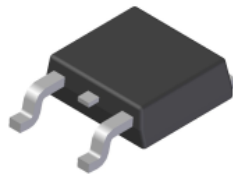
Features and Benefits

- Rated to +175°C – Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switch (UIS) Test in Production
- Low On-resistance
- Fast Switching Speed
- **Lead-Free Finish; 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)**

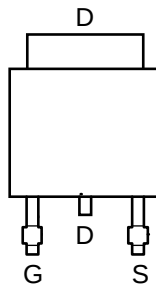
Mechanical Data

- Case: TO252 (DPAK)
- 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 Finish Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208③
- Weight: 0.33 grams (Approximate)

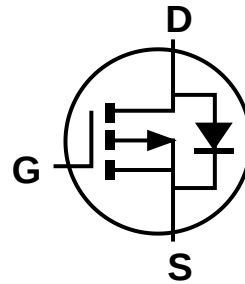
TO252 (DPAK)



Top View



Top View
Pin-Out



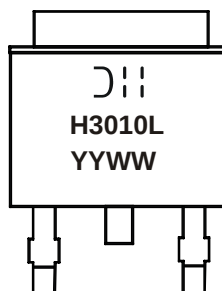
Equivalent Circuit

Ordering Information (Note 5)

Part Number	Case	Packaging
DMPH3010LK3Q-13	TO252 (DPAK)	2,500/Tape & Reel

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
 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
 H3010L = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Year (ex: 16 = 2016)
 WW = Week (01 to 53)

Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{DSS}	-30	V
Gate-Source Voltage			V_{GSS}	± 20	V
Continuous Drain Current (Note 8) $V_{GS} = -10V$	Steady State	$T_C = +25^{\circ}C$ $T_C = +100^{\circ}C$	I_D	-50 -40	A
Continuous Drain Current (Note 7) $V_{GS} = -10V$	Steady State	$T_A = +25^{\circ}C$ $T_A = +100^{\circ}C$	I_D	-16 -11	A
Pulsed Drain Current (10 μs pulse, duty cycle = 1%)			I_{DM}	-100	A
Maximum Body Diode Continuous Current (Note 7)			I_S	-3.5	A
Avalanche Current (Note 9) $L = 0.1mH$			I_{AS}	-47	A
Avalanche Energy (Note 9) $L = 0.1mH$			E_{AS}	113	mJ

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 6)		P_D	2.0	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	73	$^\circ\text{C/W}$
Total Power Dissipation (Note 7)		P_D	3.9	W
Thermal Resistance, Junction to Ambient (Note 7)	Steady State	$R_{\theta JA}$	38	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case (Note 8)		$R_{\theta JC}$	1.0	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +175	$^\circ\text{C}$

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 10)						
Drain-Source Breakdown Voltage	BV_{DSS}	-30	—	—	V	$V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1.0	μA	$V_{DS} = -30\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 10)						
Gate Threshold Voltage	$V_{GS(TH)}$	-1.1	-1.6	-2.1	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	6.2	7.5	m Ω	$V_{GS} = -10\text{V}, I_D = -10\text{A}$
		—	7.8	10		$V_{GS} = -4.5\text{V}, I_D = -10\text{A}$
Diode Forward Voltage	V_{SD}	—	-0.65	-1.0	V	$V_{GS} = 0\text{V}, I_S = -1\text{A}$
DYNAMIC CHARACTERISTICS (Note 11)						
Input Capacitance	C_{iss}	—	6807	—	pF	$V_{DS} = -15\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	988	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	647	—	pF	
Gate Resistance	R_g	—	6.2	—	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge ($V_{GS} = -4.5\text{V}$)	Q_g	—	66	—	nC	$V_{DS} = -15\text{V}, I_D = -10\text{A}$
Total Gate Charge ($V_{GS} = -10\text{V}$)	Q_g	—	139	—	nC	
Gate-Source Charge	Q_{gs}	—	19.1	—	nC	
Gate-Drain Charge	Q_{gd}	—	21.7	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	9.0	—	ns	$V_{DS} = -15\text{V}, V_{GEN} = -10\text{V}, R_G = 6\Omega, I_D = -1\text{A}$
Turn-On Rise Time	t_F	—	10.5	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	255	—	ns	
Turn-Off Fall Time	t_F	—	95	—	ns	
Body Diode Reverse Recovery Time	t_{RR}	—	27	—	ns	$I_F = -10\text{A}, di/dt = -100\text{A}/\mu\text{s}$
Body Diode Reverse Recovery Charge	Q_{RR}	—	21	—	nC	$I_F = -10\text{A}, di/dt = -100\text{A}/\mu\text{s}$

- Notes:
6. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
 7. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
 8. Thermal resistance from junction to soldering point (on the exposed drain pad).
 9. I_{AS} and E_{AS} rating are based on low frequency and duty cycles to keep $T_J = +25^\circ\text{C}$.
 10. Short duration pulse test used to minimize self-heating effect.
 11. Guaranteed by design. Not subject to product testing.

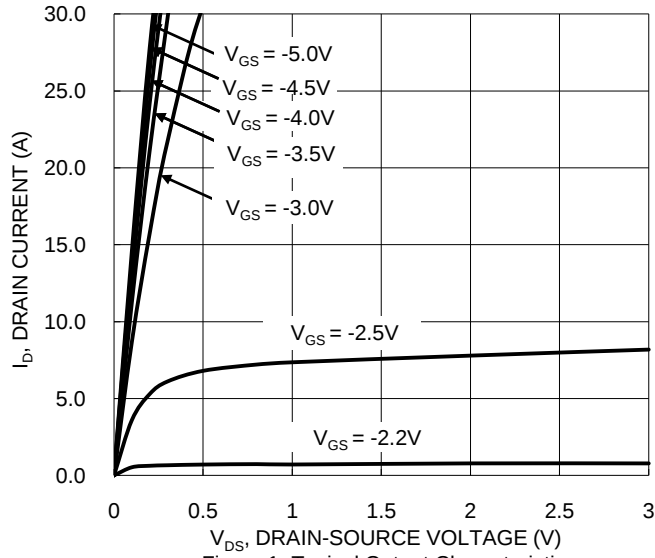


Figure 1. Typical Output Characteristic

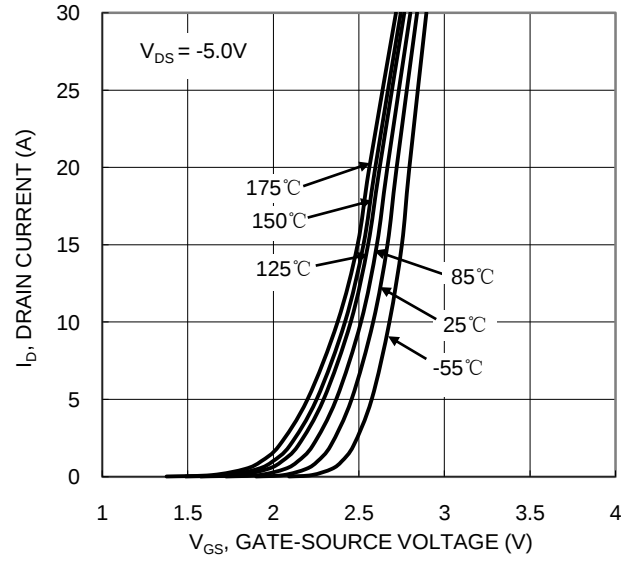


Figure 2. Typical Transfer Characteristic

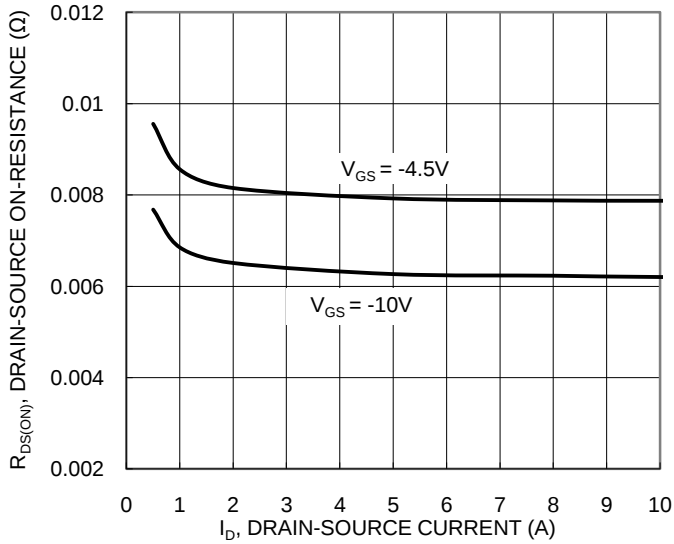


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

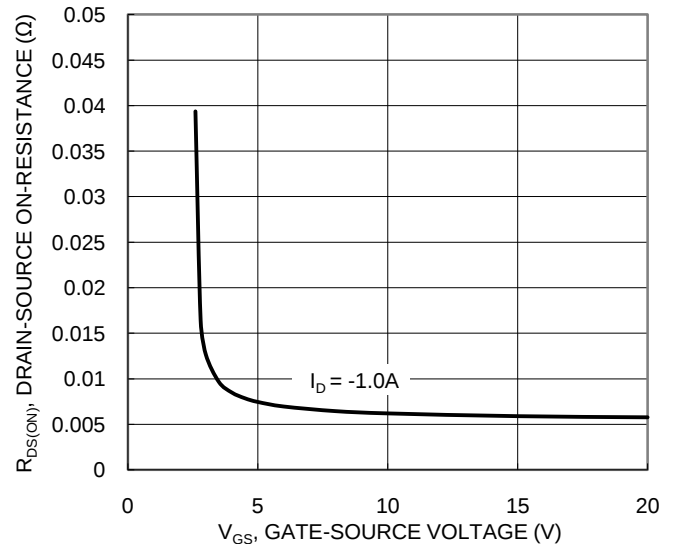


Figure 4. Typical Transfer Characteristic

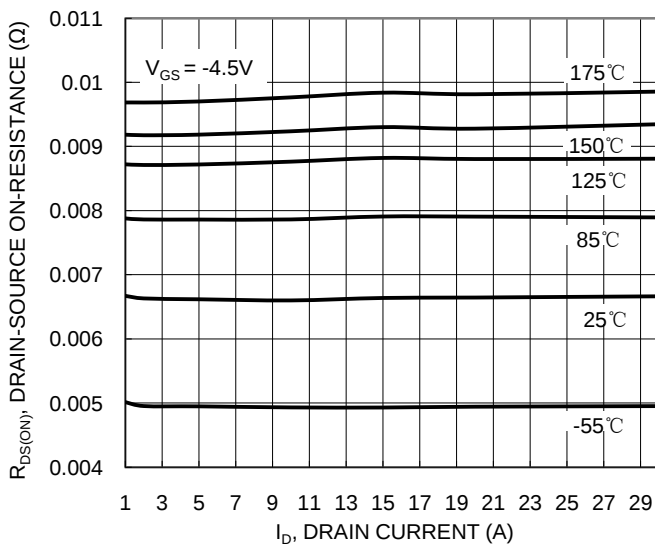


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

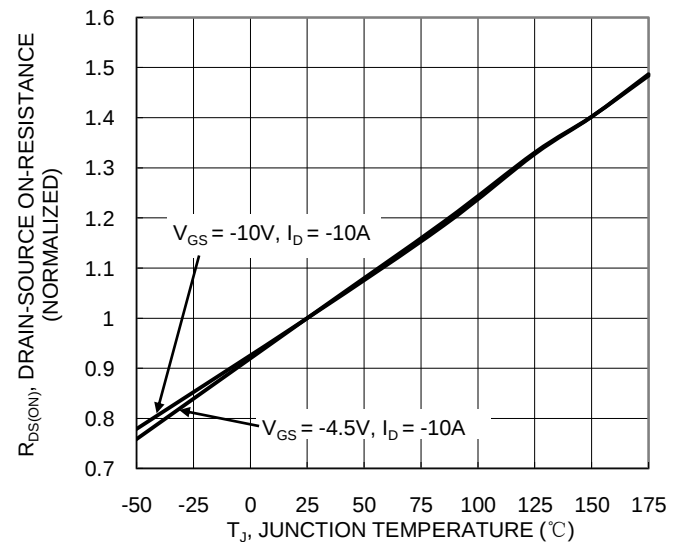
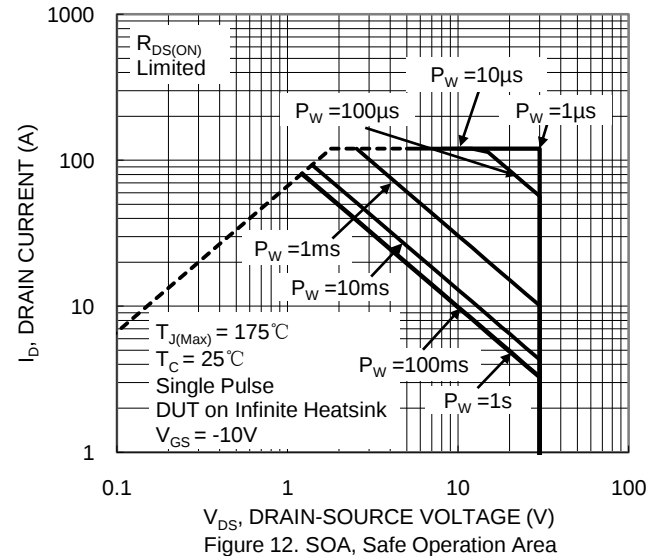
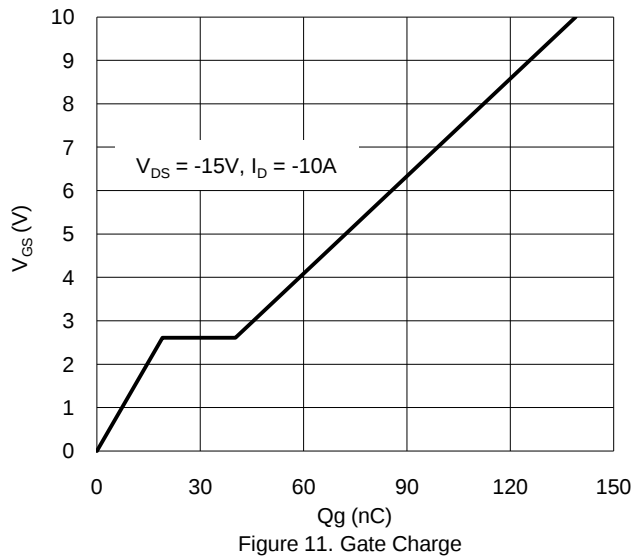
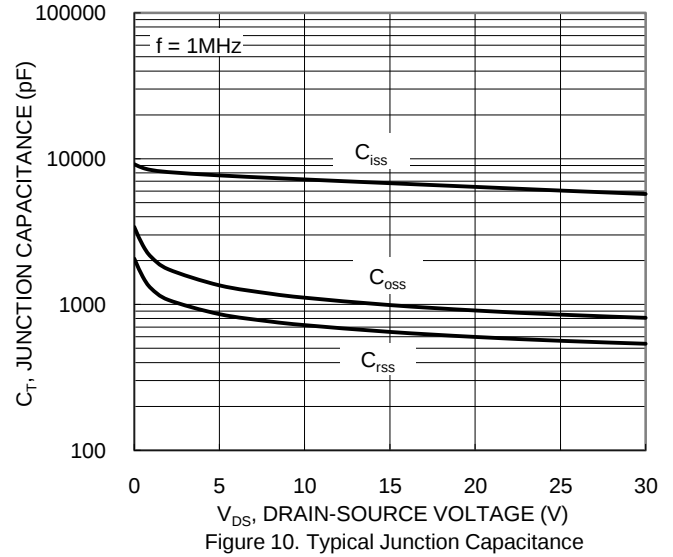
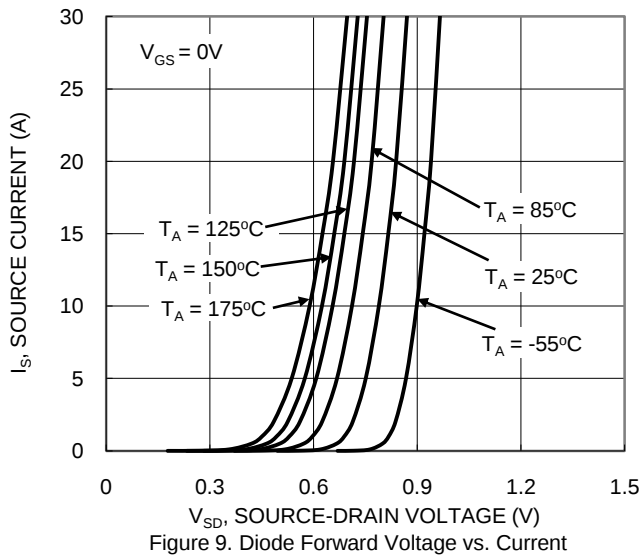
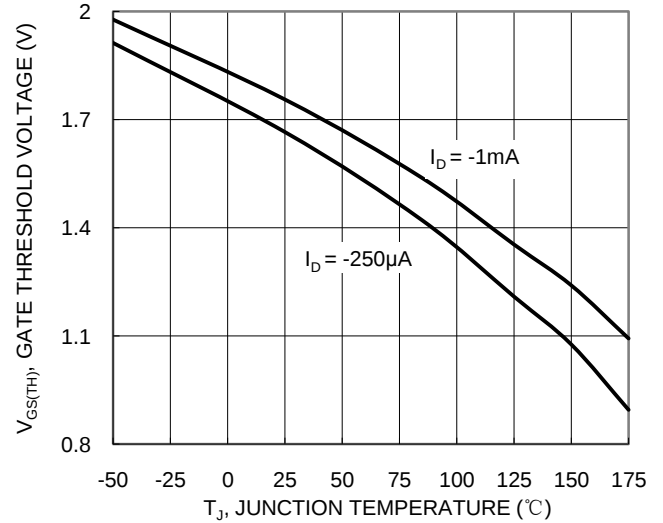
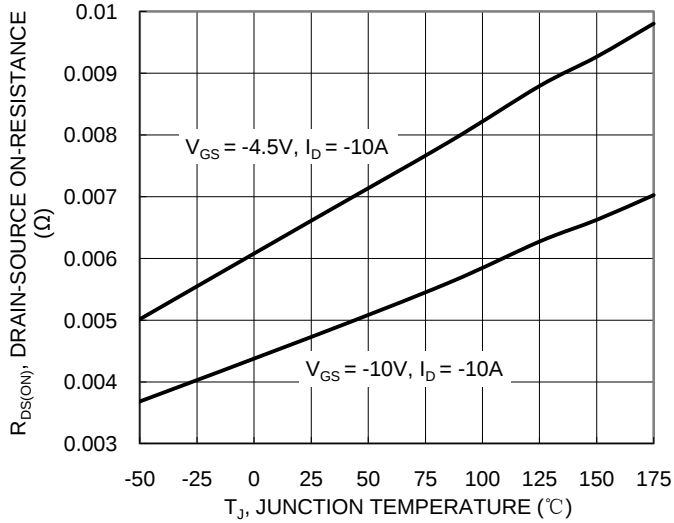


Figure 6. On-Resistance Variation with Temperature



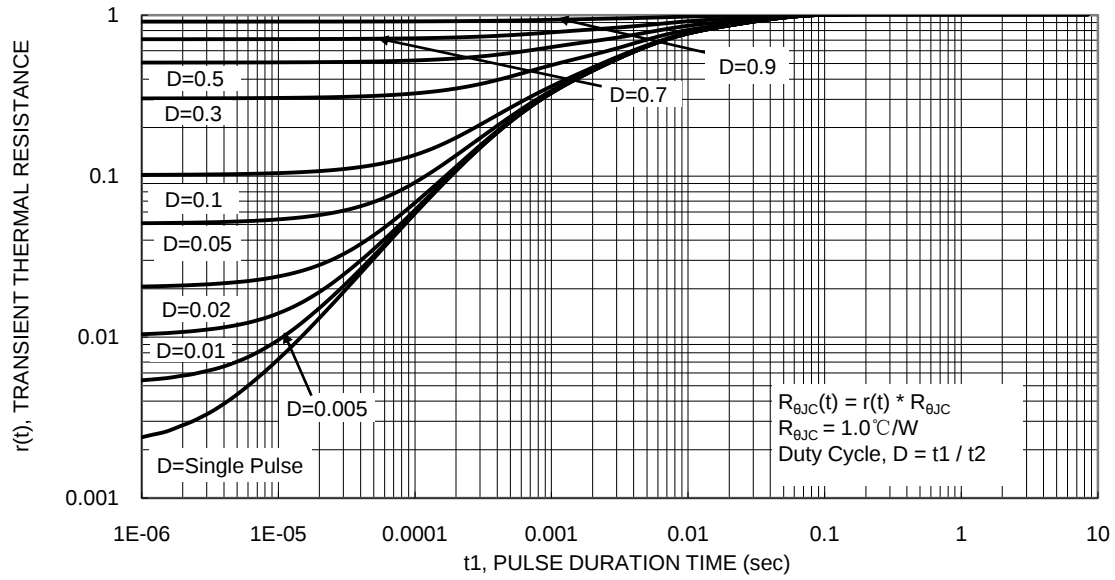
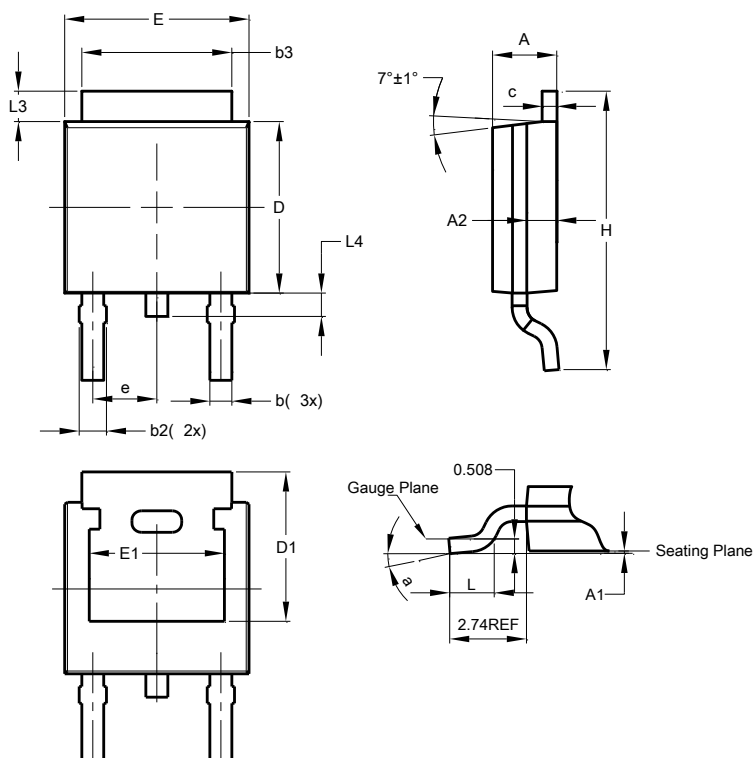


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

TO252 (DPAK)

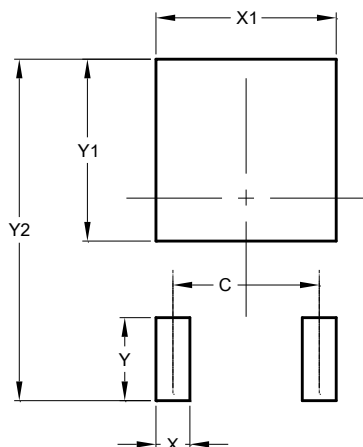


TO252 (DPAK)			
Dim	Min	Max	Typ
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.46	5.33
c	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	-	-
e	-	-	2.286
E	6.45	6.70	6.58
E1	4.32	-	-
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02	0.83
a	0°	10°	-
All Dimensions in mm			

Suggested Pad Layout

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

TO252 (DPAK)



Dimensions	Value (in mm)
C	4.572
X	1.060
X1	5.632
Y	2.600
Y1	5.700
Y2	10.700

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