

Product Summary

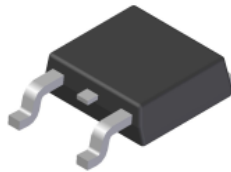
BV_{DSS}	$R_{DS(ON) MAX}$	I_D $T_C = +25^\circ C$
-40V	11m Ω @ $V_{GS} = -10V$	-74A
	19m Ω @ $V_{GS} = -4.5V$	-55A

Description

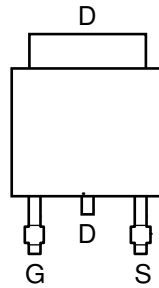
This new generation MOSFET is designed to minimize the on-state resistance ($R_{DS(ON)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- DC-DC Converters
- Power Management Functions
- Backlighting

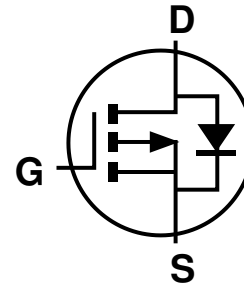
TO252 (DPAK)



Top View



Top View
Pin-Out



Equivalent Circuit

Features and Benefits

- 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)**
- **An Automotive-Compliant Part is Available Under Separate Datasheet ([DMP4011SK3Q](#))**

Mechanical Data

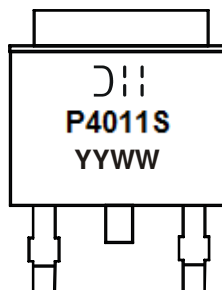
- Case: TO252
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – Matte Tin Finish Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.33 grams (Approximate)

Ordering Information (Note 4)

Part Number	Case	Packaging
DMP4011SK3-13	TO252 (DPAK)	2,500/Tape & Reel

- Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
 2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



= Manufacturer's Marking
 P4011S = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Year (ex: 19 = 2019)
 WW = Week (01 to 53)

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	-40	V
Gate-Source Voltage			V_{GSS}	± 20	V
Continuous Drain Current (Note 6) $V_{GS} = -10\text{V}$	Steady State	$T_C = +25^\circ\text{C}$ $T_C = +70^\circ\text{C}$	I_D	-74 -59	A
	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	-14 -11	A
Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%)			I_{DM}	-200	A
Maximum Body Diode Forward Current (Note 6)			I_S	-70	A
Pulsed Source Current (10 μs Pulse, Duty Cycle = 1%)			I_{SM}	-200	A
Avalanche Current, L = 1mH (Note 7)			I_{AS}	-22	A
Avalanche Energy, L = 1mH (Note 7)			E_{AS}	250	mJ

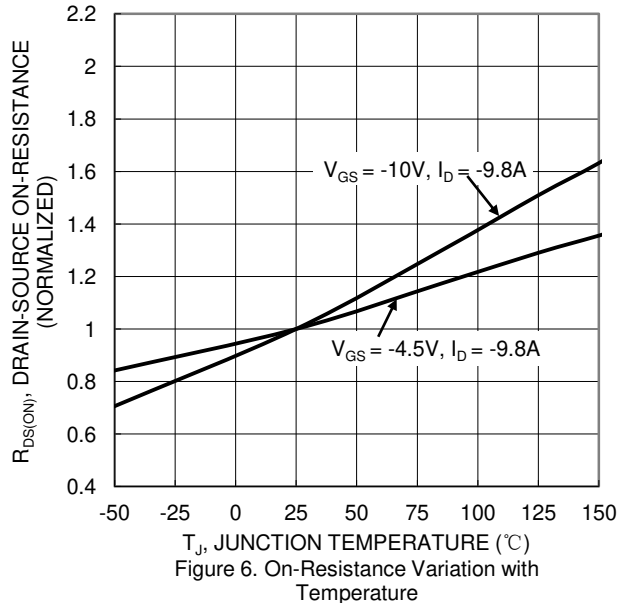
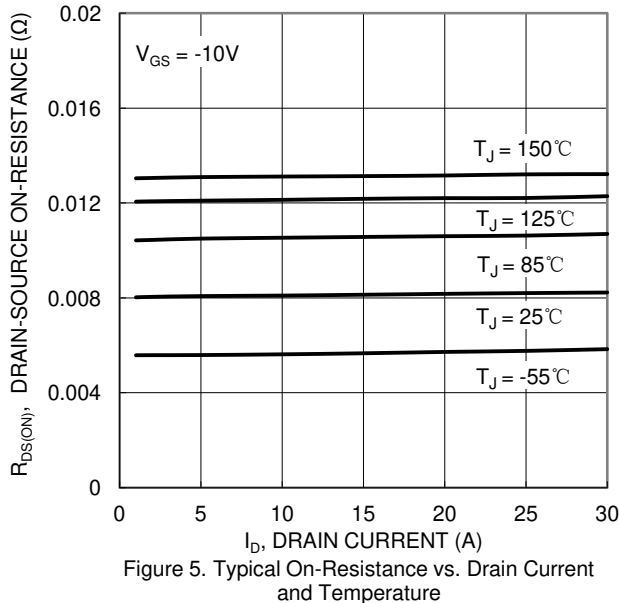
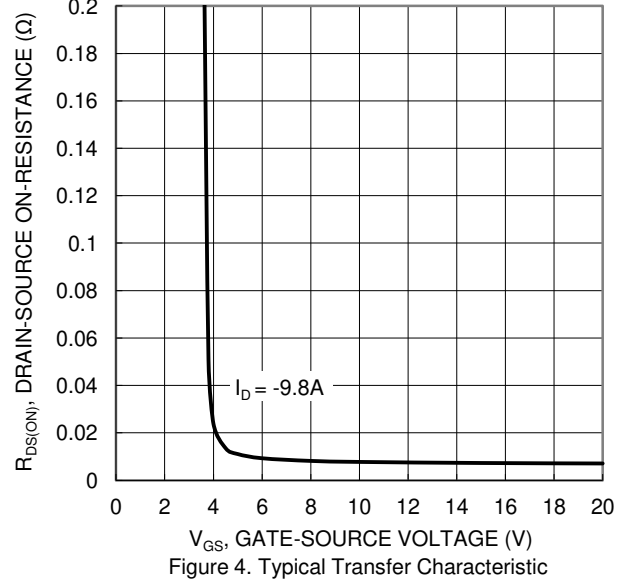
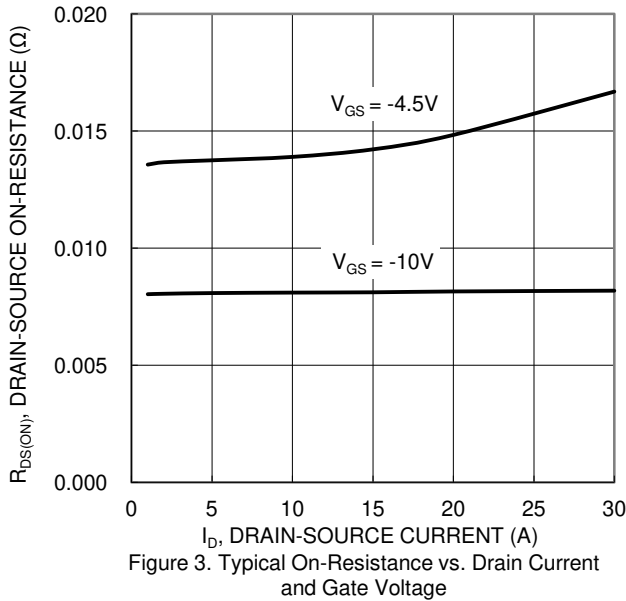
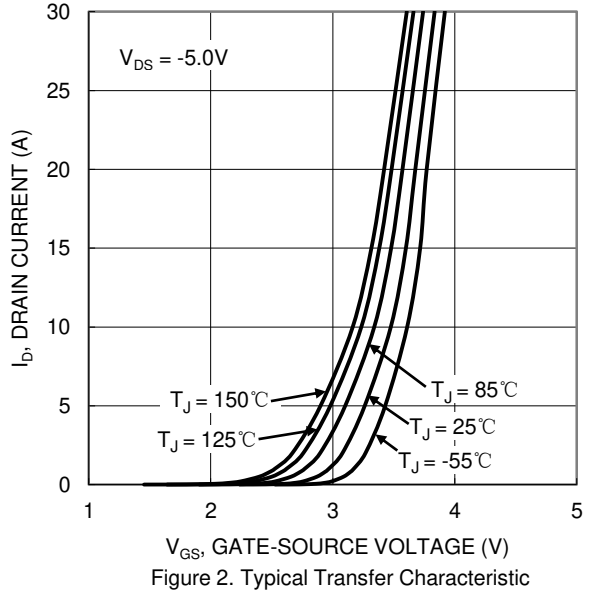
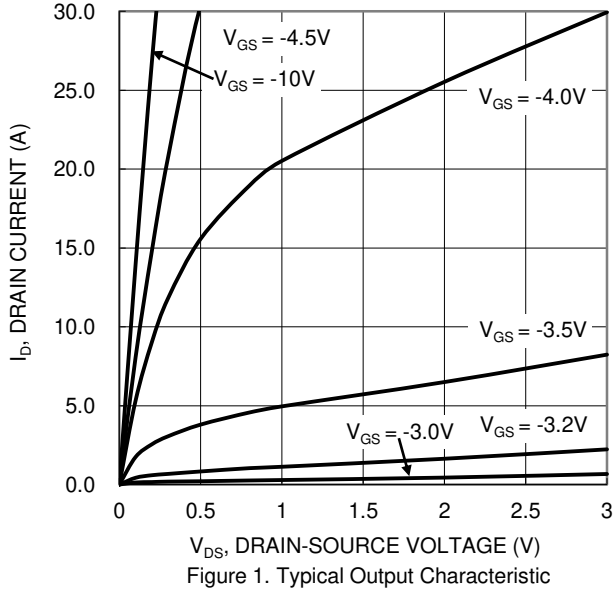
Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

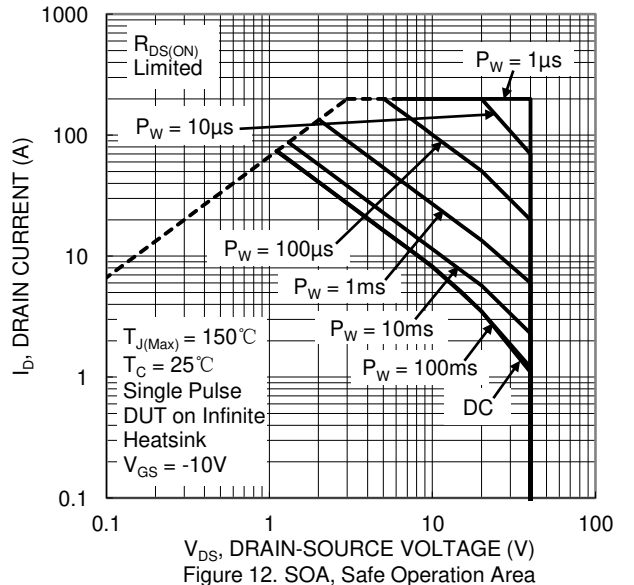
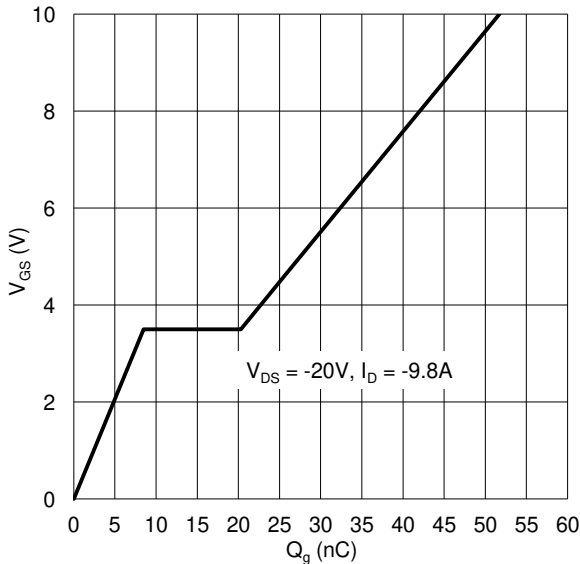
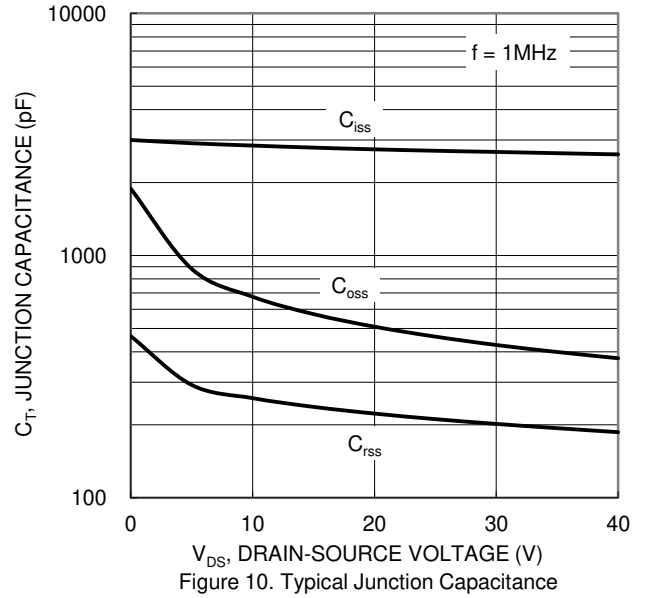
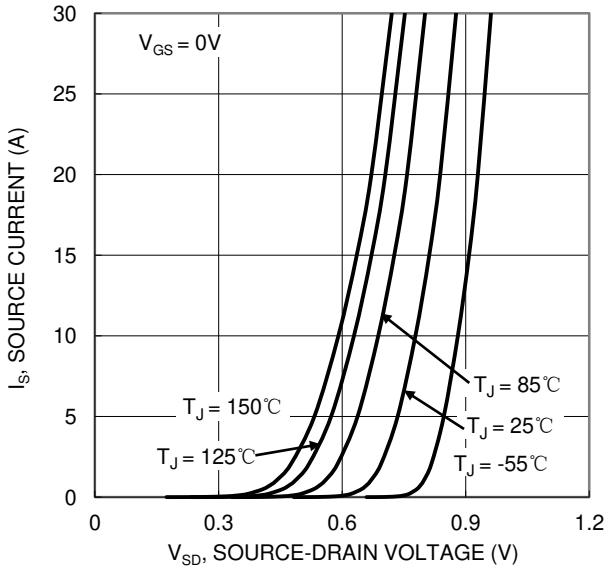
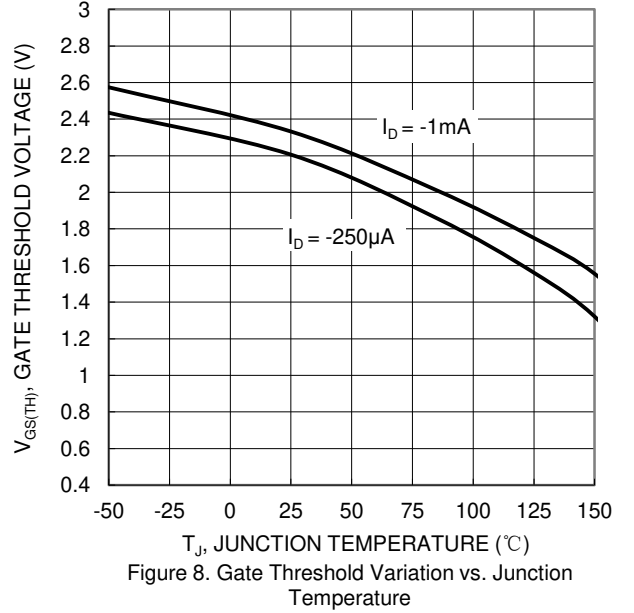
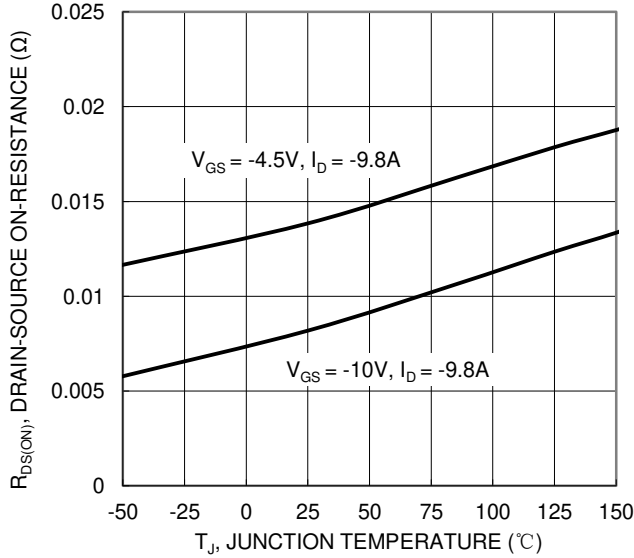
Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)		P_D	1.8	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	84	$^\circ\text{C/W}$
Total Power Dissipation (Note 6)		P_D	3.1	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	41	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case		$R_{\theta JC}$	1.4	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	-40	—	—	V	$V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	μA	$V_{DS} = -32\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	-1.0	-2.0	-2.5	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	6.5	11	m Ω	$V_{GS} = -10\text{V}, I_D = -9.8\text{A}$
		—	10.8	19		$V_{GS} = -4.5\text{V}, I_D = -9.8\text{A}$
Diode Forward Voltage	V_{SD}	—	-0.7	-1	V	$V_{GS} = 0\text{V}, I_S = -1\text{A}$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{ISS}	—	2747	—	pF	$V_{DS} = -20\text{V}, V_{GS} = 0\text{V}$ $f = 1\text{MHz}$
Output Capacitance	C_{OSS}	—	508	—		
Reverse Transfer Capacitance	C_{RSS}	—	222	—		
Gate Resistance	R_g	—	21.4	—	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	—	25	—	nC	$V_{DS} = -20\text{V},$ $I_D = -9.8\text{A}$
Total Gate Charge ($V_{GS} = -10\text{V}$)	Q_g	—	52	—		
Gate-Source Charge	Q_{gs}	—	8.5	—		
Gate-Drain Charge	Q_{gd}	—	11.8	—		
Turn-On Delay Time	$t_{D(ON)}$	—	6.6	—	ns	$V_{GS} = -10\text{V}, V_{DD} = -20\text{V},$ $R_G = 6\Omega, I_D = -1\text{A}$
Turn-On Rise Time	t_R	—	6.5	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	222	—		
Turn-Off Fall Time	t_F	—	138	—		
Reverse Recovery Time	t_{RR}	—	25	—	ns	$I_F = -9.8\text{A}, di/dt = -100\text{A}/\mu\text{s}$
Reverse Recovery Charge	Q_{RR}	—	17	—	nC	$I_F = -9.8\text{A}, di/dt = -100\text{A}/\mu\text{s}$

- 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 1inch square copper plate.
 - I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep $T_J = +25^\circ\text{C}$.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.





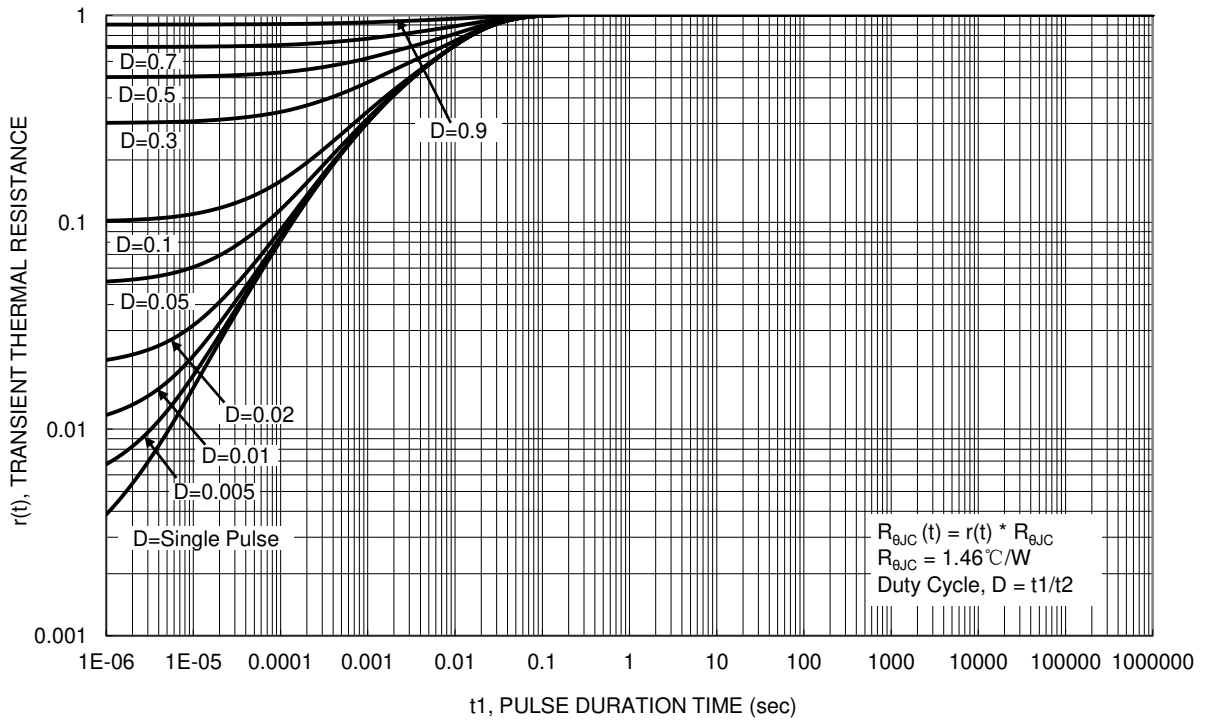
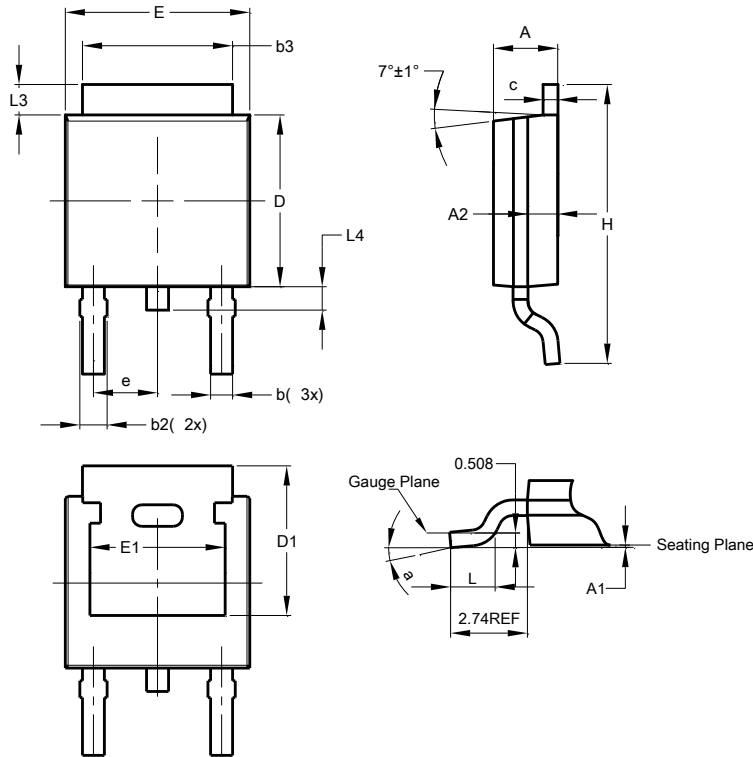


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

TO252 (DPAK)

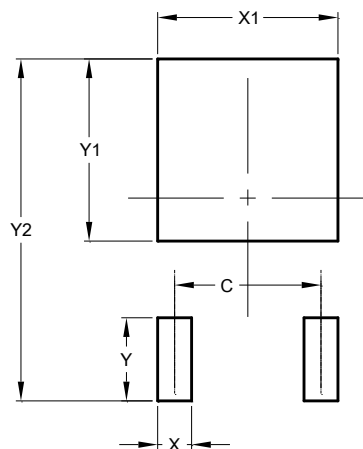


TO252 (DPAK)			
Dim	Min	Max	Typ
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.46	5.33
c	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	-	-
e	-	-	2.286
E	6.45	6.70	6.58
E1	4.32	-	-
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02	0.83
a	0°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