

## Product Summary

$BV_{DSS}$	$R_{DS(ON)}$ Max	$I_D$ $T_C = +25^\circ C$
-450V	4.9Ω @ $V_{GS} = -10V$	-4.6A

## Description

This MOSFET is designed to minimize the on-state resistance and yet maintain superior switching performance, making it ideal for high efficiency power management applications.


## Applications

- Motor Control
- DC-DC Converters
- Power Management Functions
- Uninterrupted Power Supply

## Features

- Low Input Capacitance
- High  $BV_{DSS}$  Rating for Power Application
- Low Input/Output Leakage
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

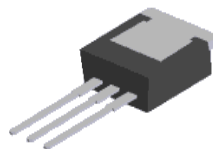
## Mechanical Data

- Case: TO251 (Type TH)
- 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: 0.33 grams (Approximate)

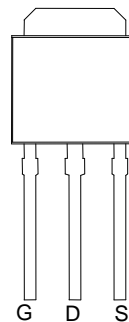
TO251 (Type TH)



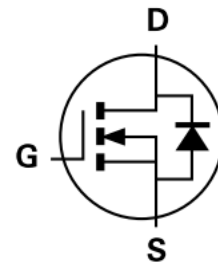
Top View



Bottom View



Top View



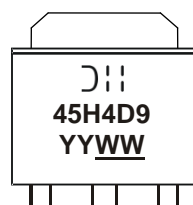
Internal Schematic


## Ordering Information (Note 4)

Part Number	Case	Packaging
DMP45H4D9HJ3	TO251 (Type TH)	75 pieces / tube

- 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](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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



 = Manufacturer's Marking  
 45H4D9 = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY or YY = Last Two Digits of Year (ex: 17 = 2017)  
 WW or WW = Week Code (01 to 53)

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V <sub>DSS</sub>	-450	V
Gate-Source Voltage			V <sub>GSS</sub>	±30	V
Continuous Drain Current (Note 5) V <sub>GS</sub> = -10V	Steady State	T <sub>C</sub> = +25°C T <sub>C</sub> = +100°C	I <sub>D</sub>	-4.6 -3.0	A
Maximum Body Diode Forward Current (Note 5)			I <sub>S</sub>	-3.0	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I <sub>DM</sub>	-22.4	A
Avalanche Current, L = 60mH (Note 7)			I <sub>AS</sub>	2.5	A
Avalanche Energy, L = 60mH (Note 7)			E <sub>AS</sub>	187	mJ
Peak Diode Recovery dv/dt (V <sub>DD</sub> = -400V, I <sub>D</sub> = -2.0A)			dv/dt	50	V/ns

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T <sub>C</sub> = +25°C	P <sub>D</sub>	104	W
	T <sub>C</sub> = +100°C		41	
Thermal Resistance, Junction to Ambient (Note 6)		R <sub>θJA</sub>	40	°C/W
Thermal Resistance, Junction to Case (Note 5)		R <sub>θJC</sub>	1.2	
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 8)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-450	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250µA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	-1	µA	V <sub>DS</sub> = -450V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±30V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	-3.0	-4.0	-5.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250µA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	3.1	4.9	Ω	V <sub>GS</sub> = -10V, I <sub>D</sub> = -1.05A
Diode Forward Voltage	V <sub>SD</sub>	—	—	-1.3	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = -2.1A
<b>DYNAMIC CHARACTERISTICS (Note 7)</b>						
Input Capacitance	C <sub>iss</sub>	—	547	—	pF	V <sub>DS</sub> = -25V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	74	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	3.1	—		
Total Gate Charge (V <sub>GS</sub> = -10V)	Q <sub>g</sub>	—	13.7	—	nC	V <sub>DS</sub> = -360V, I <sub>D</sub> = -2.7A, V <sub>GS</sub> = -10V
Gate-Source Charge	Q <sub>gs</sub>	—	3.4	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	6.0	—		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	19	—	ns	V <sub>DD</sub> = -225V, R <sub>G</sub> = 3.0Ω, I <sub>D</sub> = -2.7A
Turn-On Rise Time	t <sub>r</sub>	—	40	—		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	32	—		
Turn-Off Fall Time	t <sub>f</sub>	—	31	—		
Body Diode Reverse Recovery Time	t <sub>RR</sub>	—	164	—	ns	V <sub>GS</sub> = 0V, V <sub>DD</sub> = -200V, I <sub>S</sub> = -2.7A,
Body Diode Reverse Recovery Charge	Q <sub>RR</sub>	—	1.3	—	nC	dI/dt = 100A/µs

- Notes:
- Device mounted on infinite heatsink.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout.
  - Guaranteed by design. Not subject to production testing.
  - Short duration pulse test used to minimize self-heating effect.

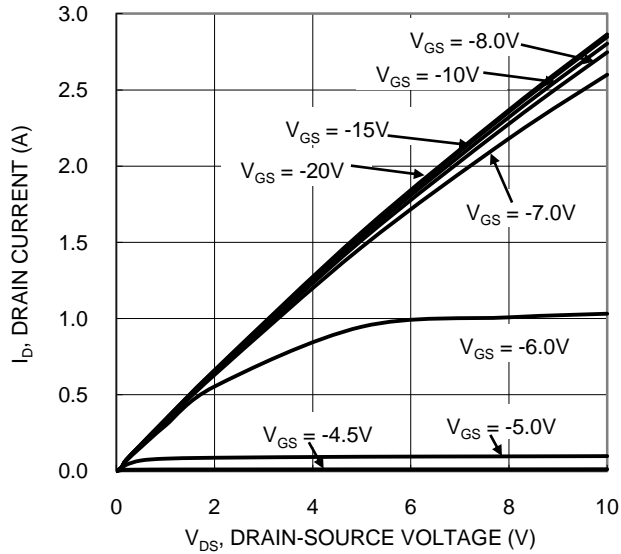


Figure 1. Typical Output Characteristic

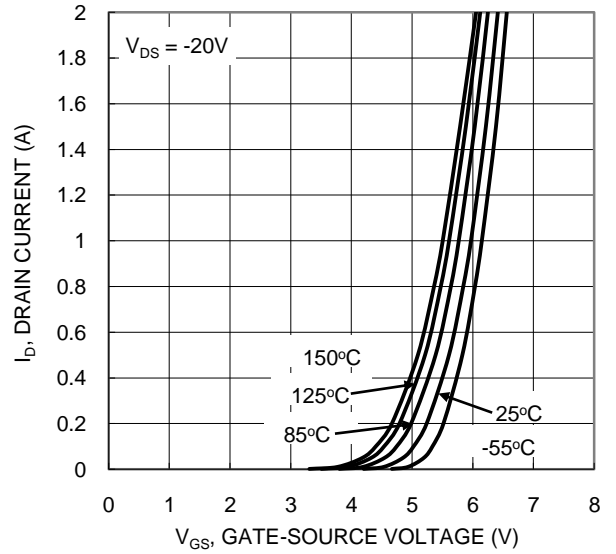


Figure 2. Typical Transfer Characteristic

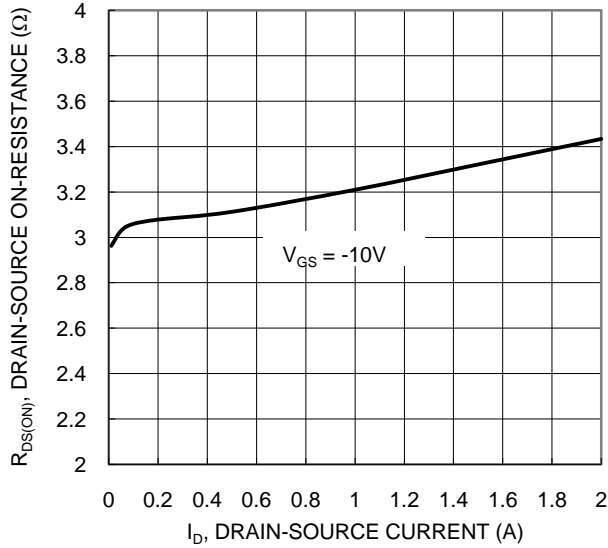


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

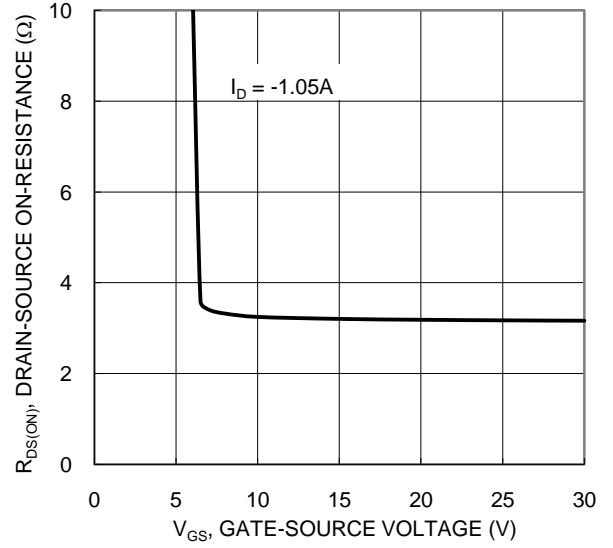


Figure 4. Typical Transfer Characteristic

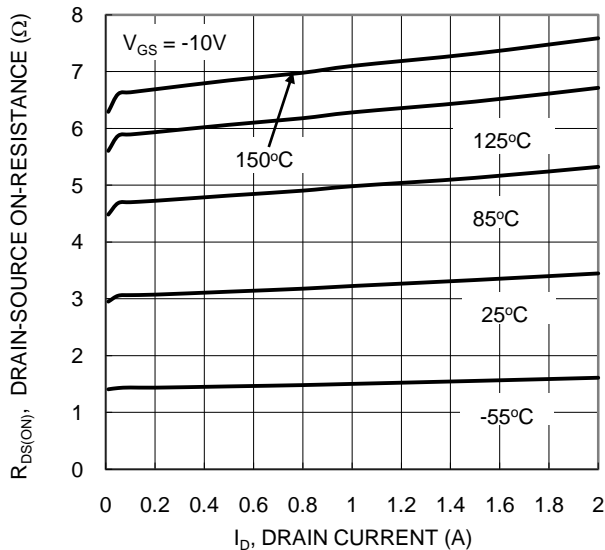


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

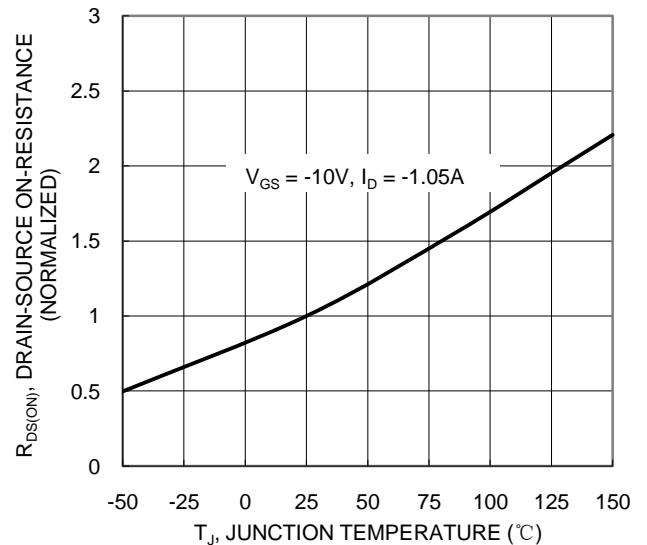
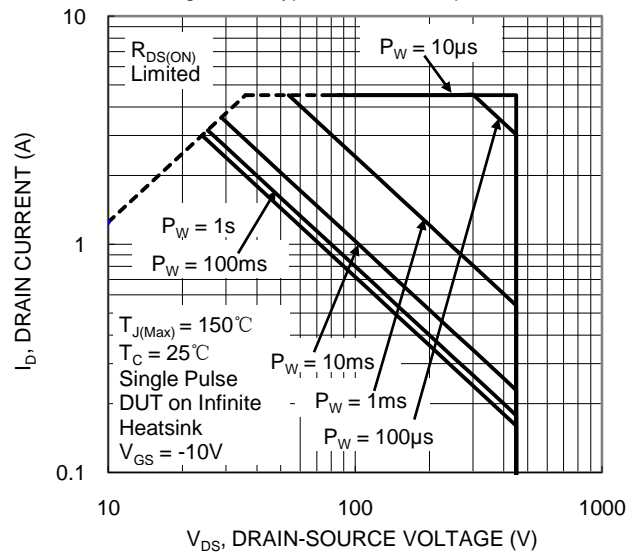
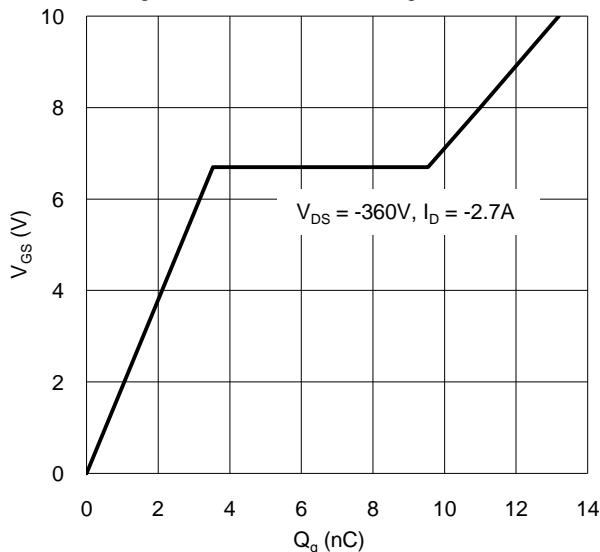
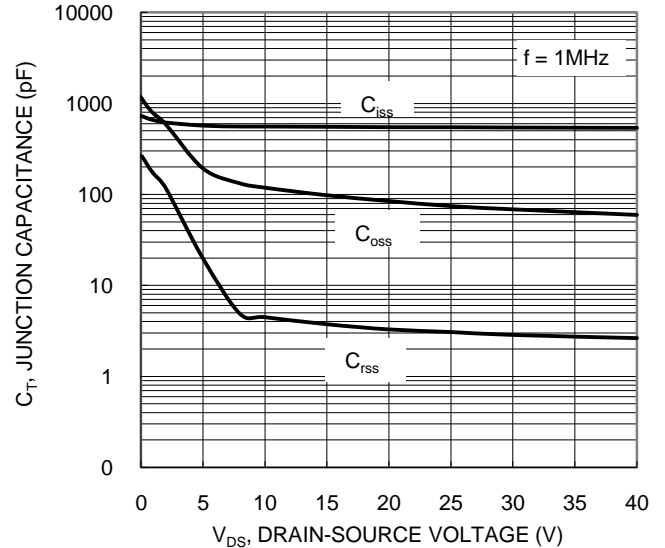
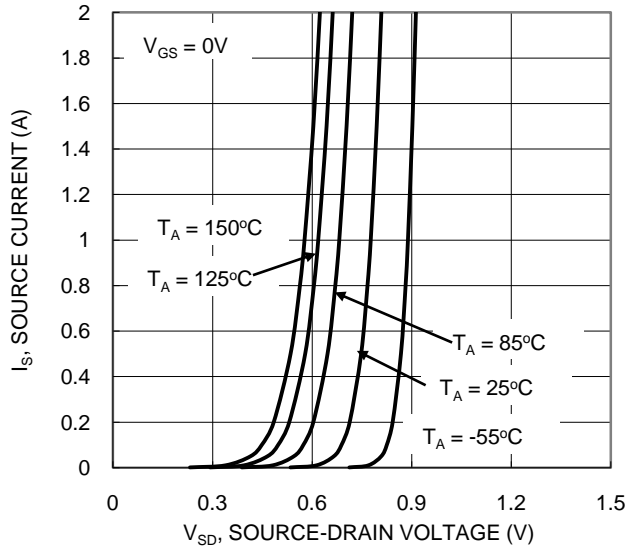
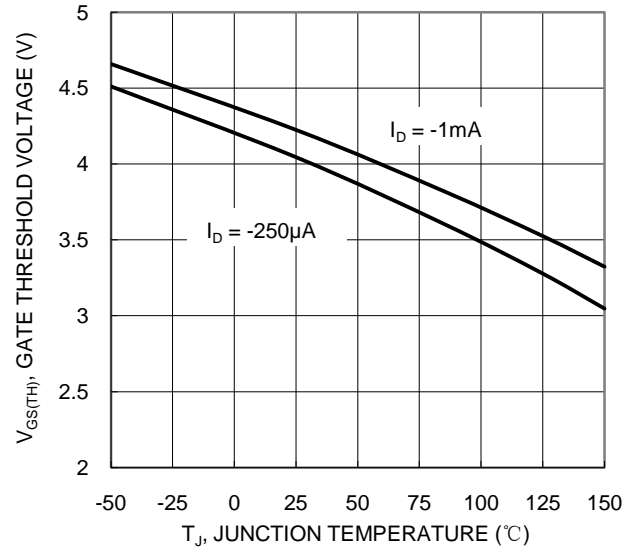
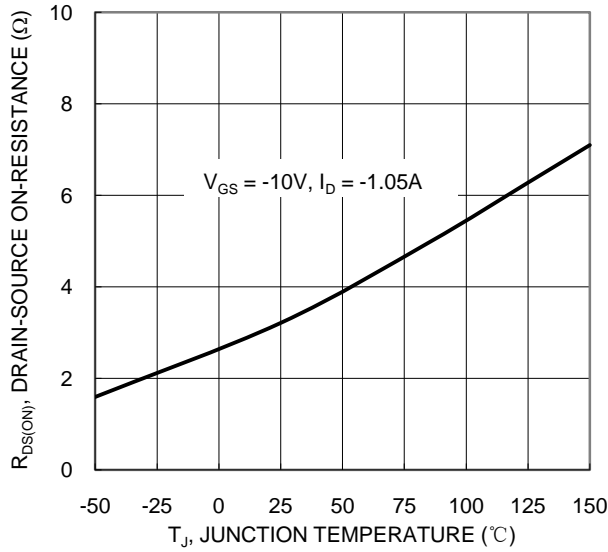


Figure 6. On-Resistance Variation with Temperature



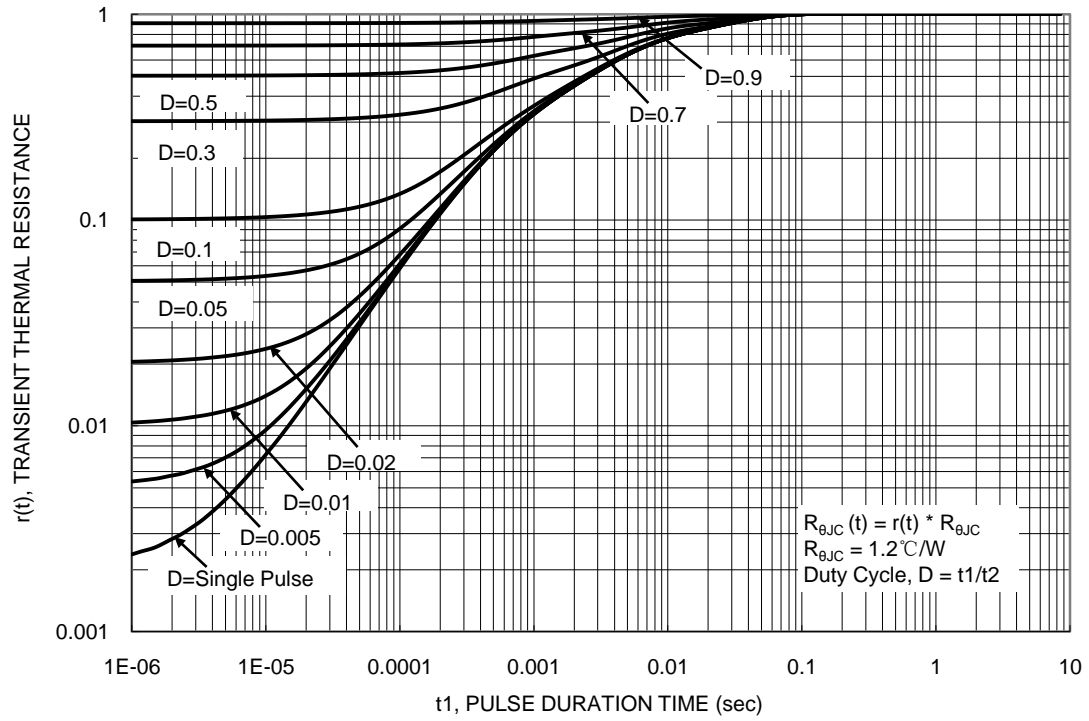
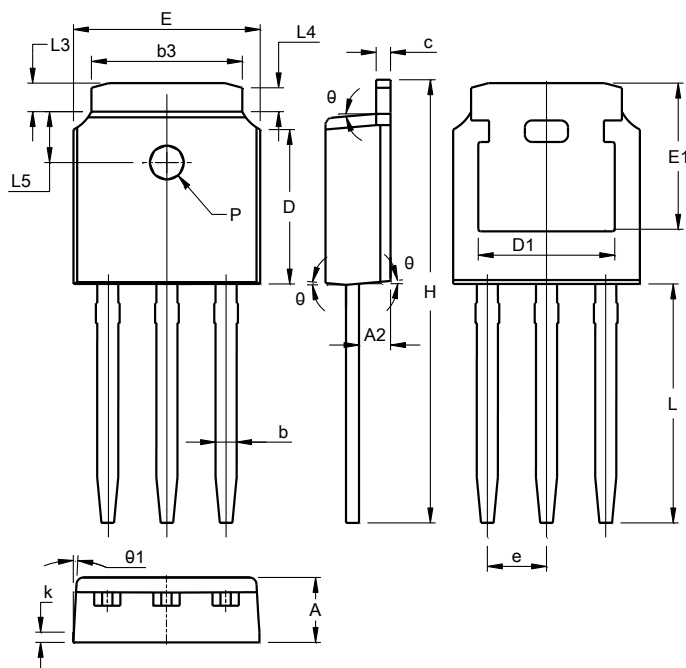


Figure 13. Transient Thermal Resistance

## Package Outline Dimensions

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

### TO251 (Type TH)



TO251 (Type TH)			
Dim	Min	Max	Typ
A	2.20	2.40	2.30
A2	0.97	1.17	1.07
b	0.68	0.90	0.78
b3	5.20	5.50	5.33
c	0.43	0.63	0.53
D	5.98	6.22	6.10
D1	5.30 REF		
e	2.286 BSC		
E	6.40	6.80	6.60
E1	4.63	5.03	4.83
H	16.22	16.82	16.52
k	0.40 REF		
L	9.15	9.65	9.40
L3	0.88	1.28	1.02
L4	0.75 REF		
L5	1.65	1.95	1.80
PØ	1.20		
$\theta$	5°	9°	7°
$\theta_1$	5°	9°	7°
All Dimensions in mm			

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