

## Product Summary

$BV_{DSS}$	$R_{DS(ON)} \text{ Max}$	$I_D$ $T_c = +25^\circ\text{C}$
650V	1.4Ω @ $V_{GS} = 10\text{V}$	5.5A

## Description and Applications

This 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.

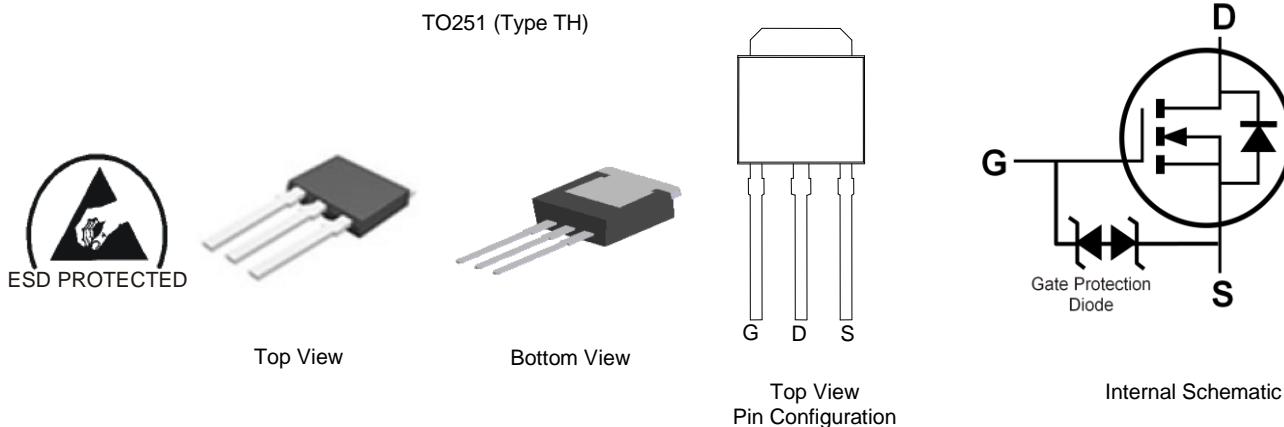
- Motor Control
- Backlighting
- DC-DC Converters
- Power Management Functions

## Features and Benefits

- Low On-Resistance
- High  $BV_{DSS}$  Rating for Power Application
- Low Input Capacitance
- 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 (e3)
- Weight: 0.33 grams (Approximate)



## Ordering Information (Note 4)

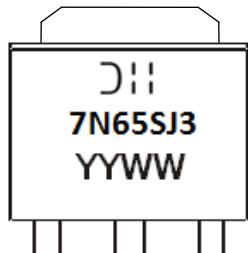
Part Number	Case	Packaging
DMG7N65SJ3	TO251 (Type TH)	75 pieces / Tube

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 <http://www.diodes.com/products/packages.html>.

## Marking Information

TO251 (Type TH)



DII = Manufacturer's Marking  
 7N65SJ3 = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY or YY = Last Two Digits of Year (ex: 16 = 2016)  
 WW or WW = Week Code (01 to 53)

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

Characteristic	Symbol	Value	Unit	
Drain-Source Voltage	$V_{DSS}$	650	V	
Gate-Source Voltage	$V_{GSS}$	$\pm 30$	V	
Continuous Drain Current (Note 5) $V_{GS} = 10\text{V}$	$T_C = +25^\circ\text{C}$ $T_C = +100^\circ\text{C}$	$I_D$	5.5 3.7	A
Maximum Body Diode Forward Current (Note 5)	$I_S$	10	A	
Pulsed Drain Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%)	$I_{DM}$	10	A	
Avalanche Current (Note 6)	$I_{AS}$	1.7	A	
Avalanche Energy (Note 6)	$E_{AS}$	87	mJ	
Peak Diode Recovery dv/dt (Note 6)	dv/dt	3	V/ns	

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

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	$P_D$	125	W
		50	
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	70	°C/W
		1	
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	650	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 650\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	—	—	10	$\mu\text{A}$	$V_{GS} = \pm 24\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	2	3	4	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	1.1	1.4	$\Omega$	$V_{GS} = 10\text{V}, I_D = 2.5\text{A}$
Diode Forward Voltage	$V_{SD}$	—	0.84	1.5	V	$V_{GS} = 0\text{V}, I_S = 5\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 6)</b>						
Input Capacitance	$C_{iss}$	—	886	—	pF	$V_{DS} = 50\text{V}, f = 1\text{MHz}, V_{GS} = 0\text{V}$
Output Capacitance	$C_{oss}$	—	62	—		
Reverse Transfer Capacitance	$C_{rss}$	—	8.8	—		
Gate Resistance	$R_G$	—	1.36	—	$\Omega$	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge	$Q_g$	—	25	—	nC	$V_{DS} = 480\text{V}, I_D = 5\text{A}, V_{GS} = 10\text{V}$
Gate-Source Charge	$Q_{gs}$	—	3.5	—		
Gate-Drain Charge	$Q_{gd}$	—	12.4	—		
Turn-On Delay Time	$t_{D(ON)}$	—	10	—	ns	$V_{DS} = 300\text{V}, V_{GS} = 10\text{V}, R_G = 4.7\Omega, I_D = 2.5\text{A}$
Turn-On Rise Time	$t_R$	—	11	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	36	—		
Turn-Off Fall Time	$t_F$	—	15	—		
Body Diode Reverse Recovery Time	$t_{RR}$	—	245	—	ns	$V_{DS} = 100\text{V}, I_F = 5\text{A}, \frac{dI}{dt} = 100\text{A}/\mu\text{s}$
Body Diode Reverse Recovery Charge	$Q_{RR}$	—	1.89	—	$\mu\text{C}$	

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

6. Guaranteed by design. Not subject to production testing.

7. Short duration pulse test used to minimize self-heating effect.

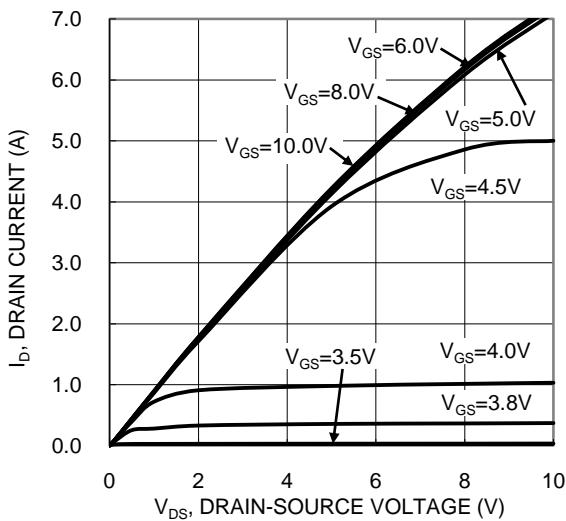


Figure 1. Typical Output Characteristic

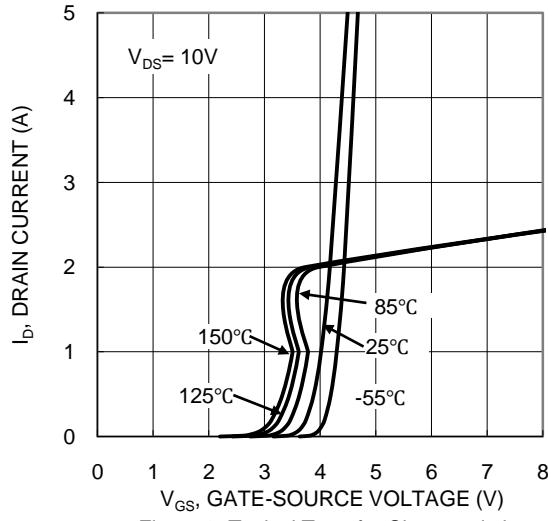


Figure 2. Typical Transfer Characteristic

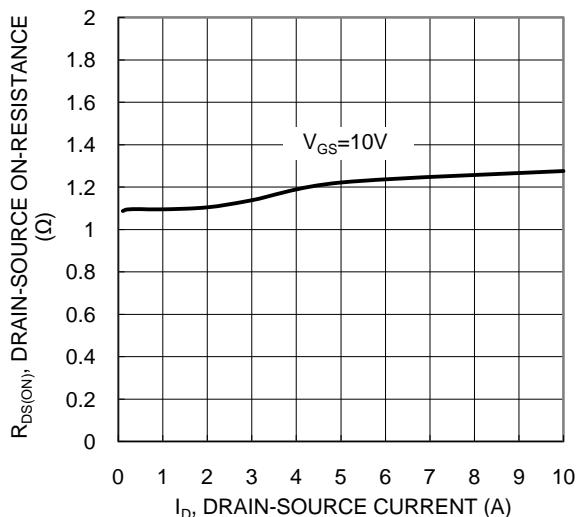


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

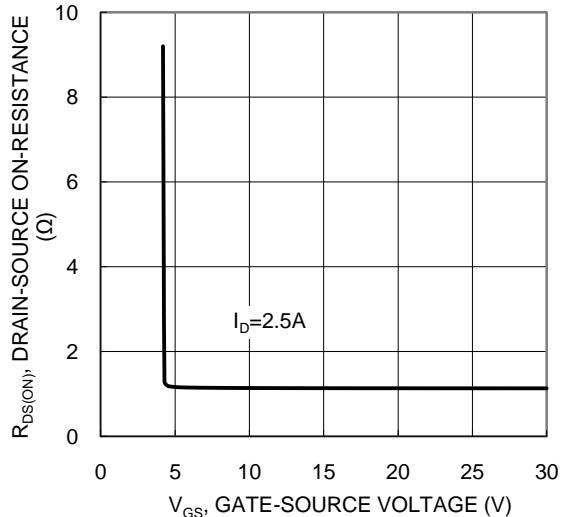


Figure 4. Typical Transfer Characteristic

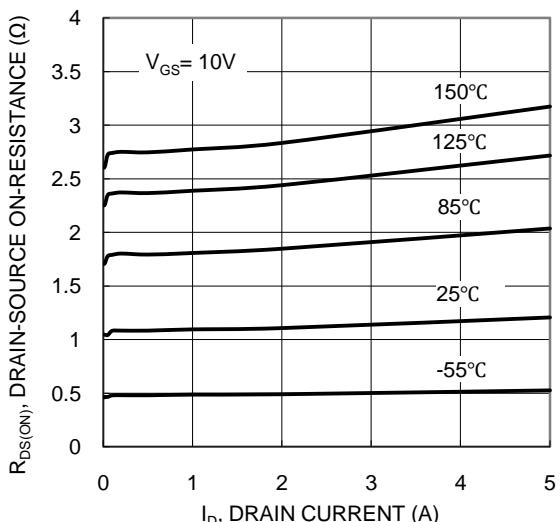


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

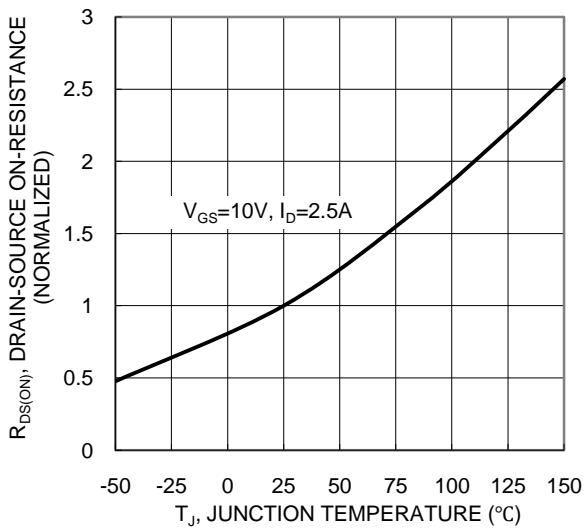


Figure 6. On-Resistance Variation with Junction Temperature

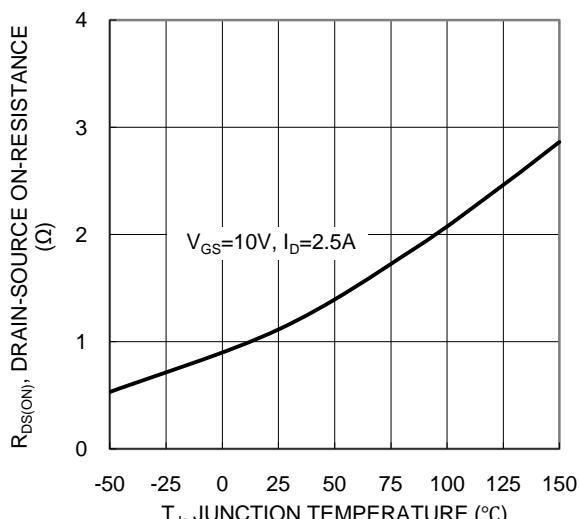


Figure 7. On-Resistance Variation with Junction Temperature

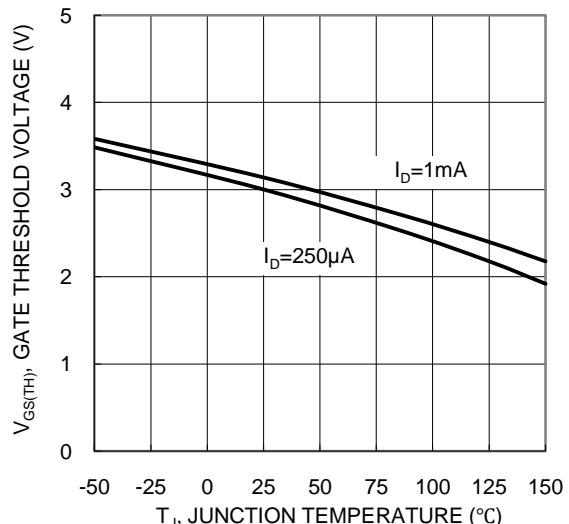


Figure 8. Gate Threshold Variation vs. Junction Temperature

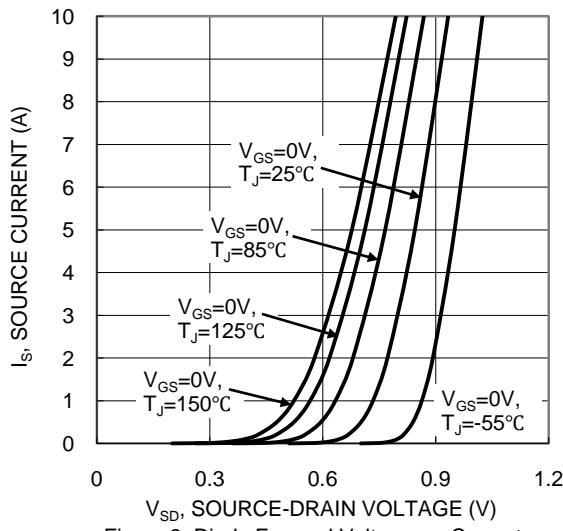


Figure 9. Diode Forward Voltage vs. Current

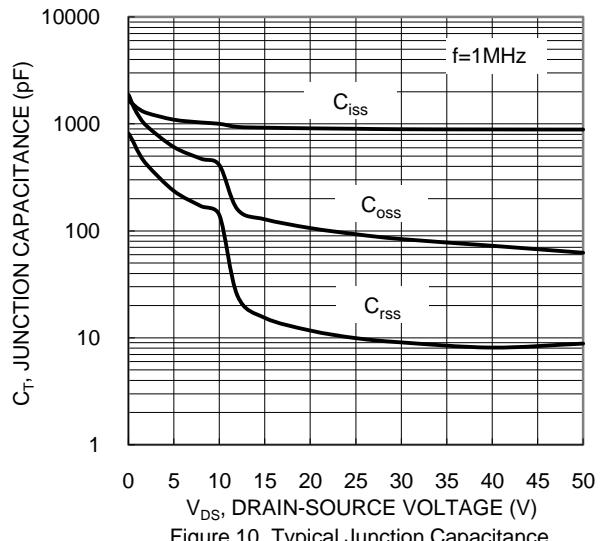


Figure 10. Typical Junction Capacitance

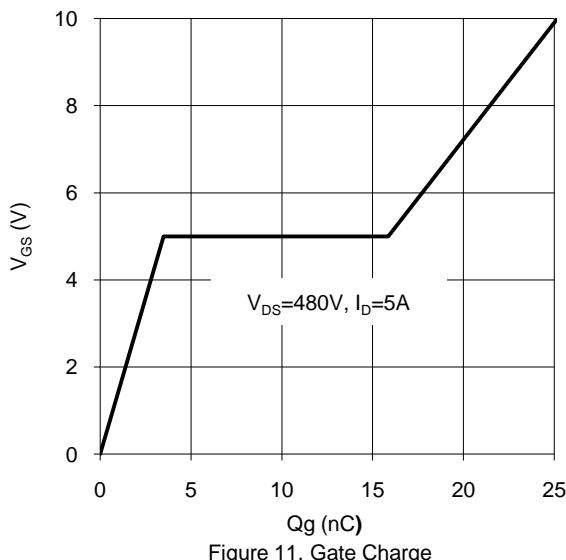


Figure 11. Gate Charge

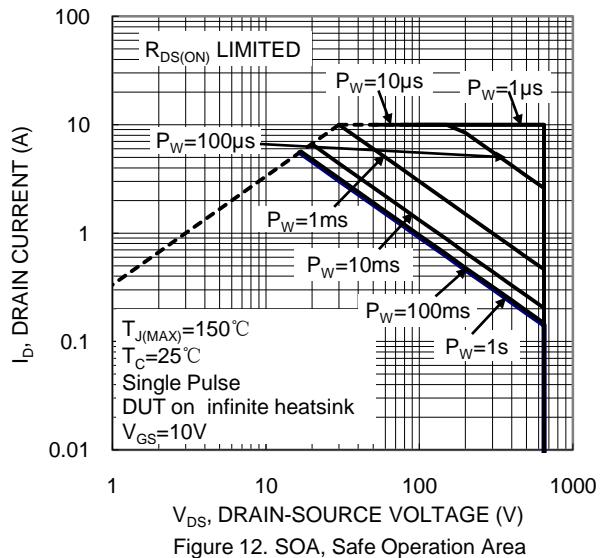


Figure 12. SOA, Safe Operation Area

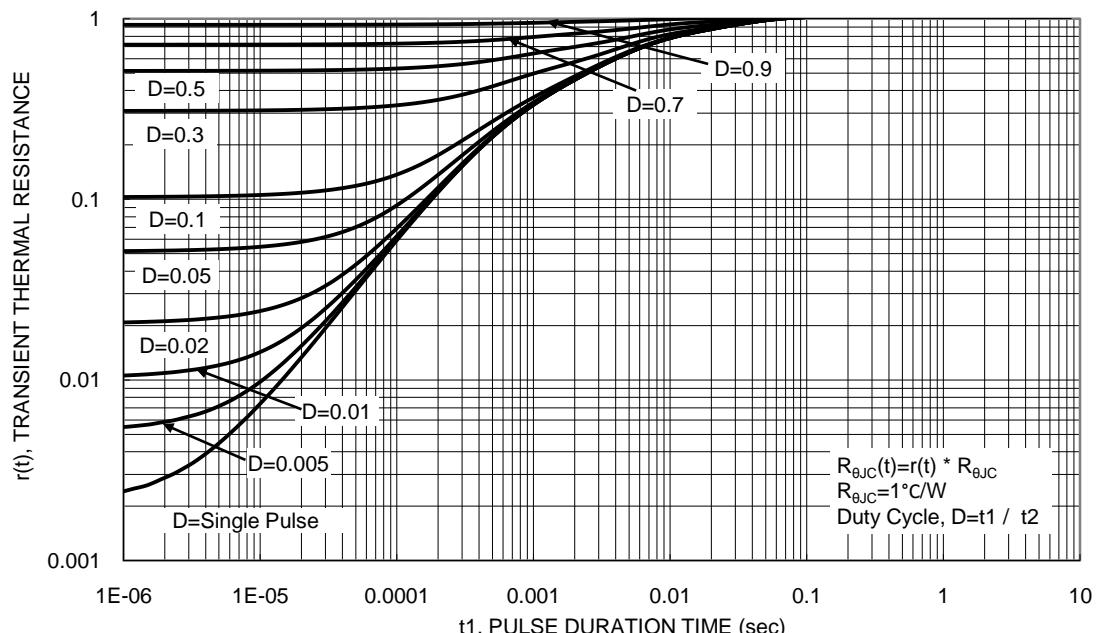
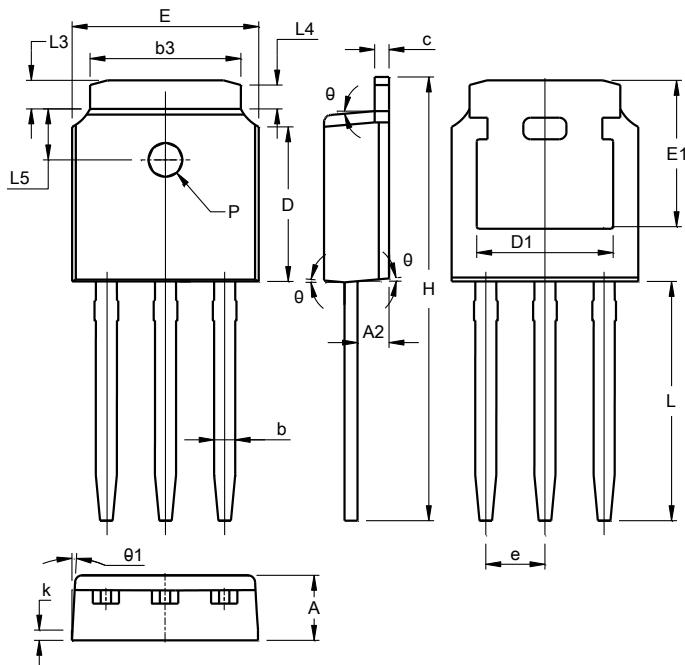


Figure 13. Transient Thermal Resistance

## Package Outline Dimensions

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

TO251 (Type TH)



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Dim	Min	Max	Typ
<b>A</b>	2.20	2.40	2.30
<b>A2</b>	0.97	1.17	1.07
<b>b</b>	0.68	0.90	0.78
<b>b3</b>	5.20	5.50	5.33
<b>c</b>	0.43	0.63	0.53
<b>D</b>	5.98	6.22	6.10
<b>D1</b>	5.30 REF		
<b>e</b>	2.286 BSC		
<b>E</b>	6.40	6.80	6.60
<b>E1</b>	4.63	5.03	4.83
<b>H</b>	16.22	16.82	16.52
<b>k</b>	0.40REF		
<b>L</b>	9.15	9.65	9.40
<b>L3</b>	0.88	1.28	1.02
<b>L4</b>	0.75 REF		
<b>L5</b>	1.65	1.95	1.80
<b>PØ</b>	1.20		
<b>θ</b>	5°	9°	7°
<b>θ1</b>	5°	9°	7°

All Dimensions in mm

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