

## Product Summary

<b>BV<sub>DSS</sub></b>	<b>R<sub>DS(ON)</sub> Max</b>	<b>I<sub>D</sub> T<sub>C</sub> = +25°C</b>
700V	1.3Ω @ V <sub>GS</sub> = 10V	4.6A

## Features and Benefits

- Low On-Resistance
- High BV<sub>DSS</sub> Rating for Power Application
- Low Input Capacitance
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

## Description and Applications

This MOSFET is designed to minimize the on-state resistance (R<sub>DS(ON)</sub>), yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

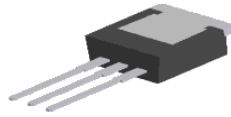
- Motor Control
- Backlighting
- DC-DC Converters
- Power Management Functions

## Mechanical Data

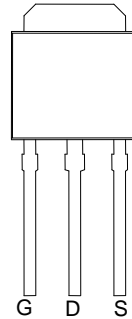
- Case: TO251
- Case Material: Molded Plastic, "Green" Molding Compound.  
UL Flammability Classification Rating 94V-0
- Terminal Connections: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe.  
Solderable per MIL-STD-202, Method 208
- Weight: 0.33 grams (Approximate)



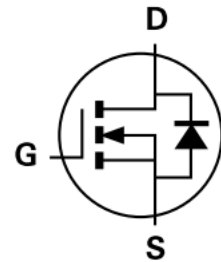
TO251  
Top View



TO251  
Bottom View



Top View  
Pin Configuration



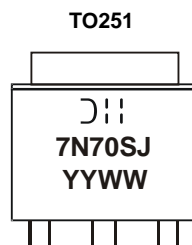
Internal Schematic

## Ordering Information (Note 4)

Part Number	Case	Packaging
DMJ70H1D3SJ3	TO251	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



= Manufacturer's Marking  
 7N70SJ = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY or YY = Last Digit of Year (ex: 16 = 2016)  
 WW or WW = Week Code (01 to 53)

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

Characteristic	Symbol	Value	Units
Drain-Source Voltage	V <sub>DSS</sub>	700	V
Gate-Source Voltage	V <sub>GSS</sub>	±30	V
Continuous Drain Current (Note 5) V <sub>GS</sub> = 10V	I <sub>D</sub>	T <sub>C</sub> = +25°C	4.6
		T <sub>C</sub> = +100°C	2.9
Maximum Body Diode Forward Current (Note 6)	I <sub>S</sub>	3.0	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I <sub>DM</sub>	5.4	A
Avalanche Current (Note 7)	I <sub>AS</sub>	1.1	A
Avalanche Energy (Note 7)	E <sub>AS</sub>	40	mJ
Peak Diode Recovery dv/dt (Note 7)	dv/dt	5	V/ns

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

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	P <sub>D</sub>	T <sub>C</sub> = +25°C	41
		T <sub>C</sub> = +100°C	16
Thermal Resistance, Junction to Ambient (Note 6)	R <sub>ΘJA</sub>	79	°C/W
Thermal Resistance, Junction to Case (Note 5)	R <sub>ΘJC</sub>	3.0	
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</b> (Note 8)						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	700	—	—	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> = 700V, 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</b> (Note 8)						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	2	2.9	4	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	1.0	1.3	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 2.5A
Diode Forward Voltage	V <sub>SD</sub>	—	0.9	1.3	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 5A
<b>DYNAMIC CHARACTERISTICS</b> (Note 7)						
Input Capacitance	C <sub>ISS</sub>	—	351	—	pF	V <sub>DS</sub> = 50V, f = 1MHz, V <sub>GS</sub> = 0V
Output Capacitance	C <sub>OSS</sub>	—	66	—		
Reverse Transfer Capacitance	C <sub>RSS</sub>	—	1.1	—		
Gate Resistance	R <sub>G</sub>	—	3.5	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge	Q <sub>G</sub>	—	13.9	—	nC	V <sub>DD</sub> = 560V, I <sub>D</sub> = 5A, V <sub>GS</sub> = 10V
Gate-Source Charge	Q <sub>GS</sub>	—	1.9	—		
Gate-Drain Charge	Q <sub>GD</sub>	—	8.5	—		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	8.5	—	ns	V <sub>DD</sub> = 350V, V <sub>GS</sub> = 10V, R <sub>G</sub> = 4.7Ω, I <sub>D</sub> = 2.5A
Turn-On Rise Time	t <sub>R</sub>	—	11.6	—		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	24.5	—		
Turn-Off Fall Time	t <sub>F</sub>	—	10	—		
Body Diode Reverse Recovery Time	t <sub>RR</sub>	—	212	—	ns	I <sub>S</sub> = 5A, di/dt = 100A/µs
Body Diode Reverse Recovery Time (T <sub>J</sub> = +150°C)	t <sub>RR</sub>	—	251	—	ns	
Body Diode Reverse Recovery Charge	Q <sub>RR</sub>	—	1.8	—	µC	
Body Diode Reverse Recovery Charge (T <sub>J</sub> = +150°C)	Q <sub>RR</sub>	—	2.3	—	µC	

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

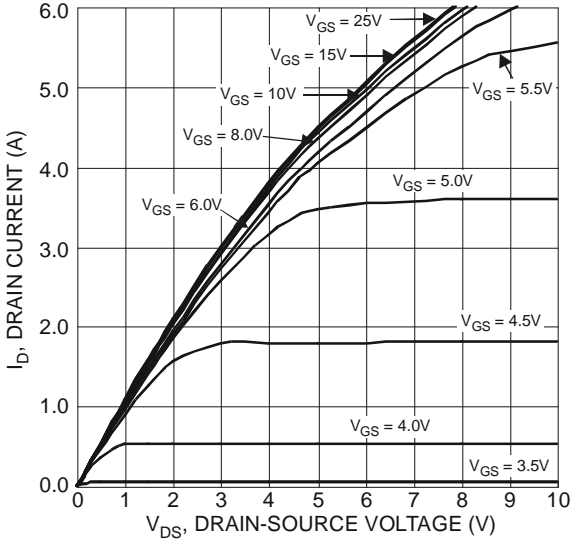


Figure 1 Typical Output Characteristics

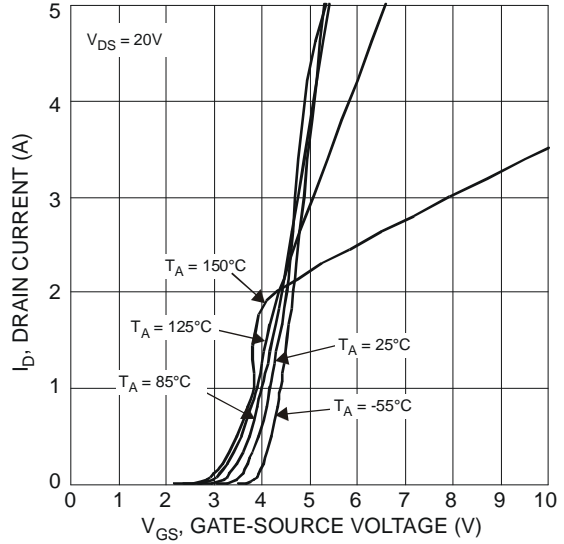


Figure 2 Typical Transfer Characteristics

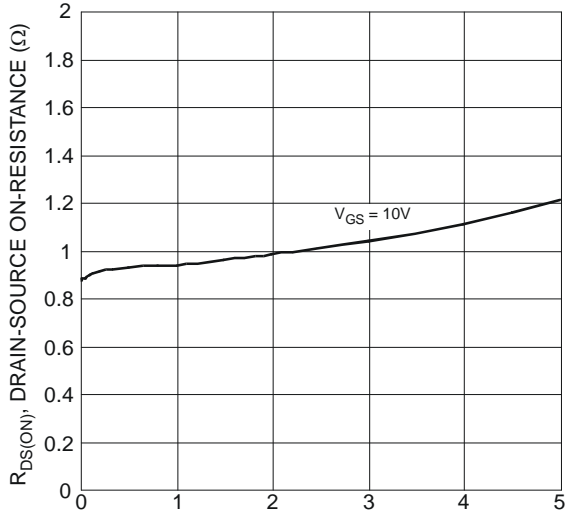


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

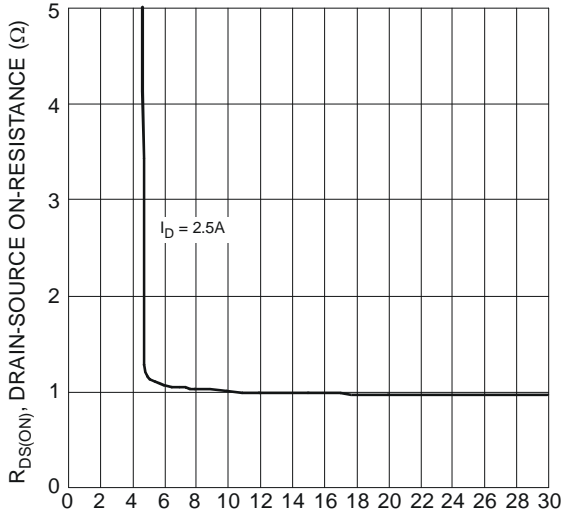


Figure 4 Typical Transfer Characteristics

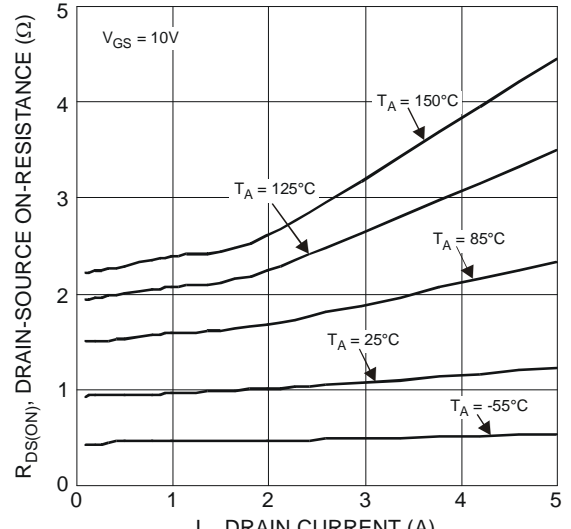


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

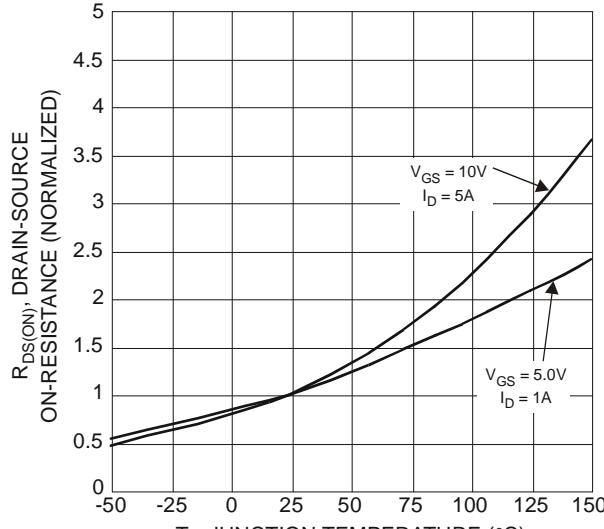


Figure 6 On-Resistance Variation with Temperature

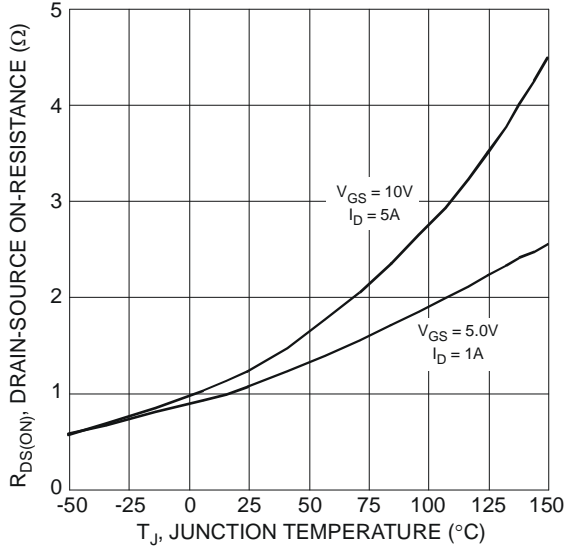


Figure 7 On-Resistance Variation with Temperature

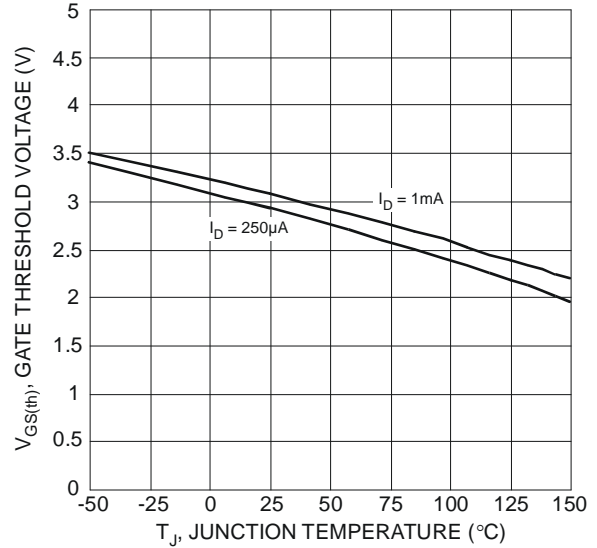


Figure 8 Gate Threshold Variation vs. Ambient Temperature

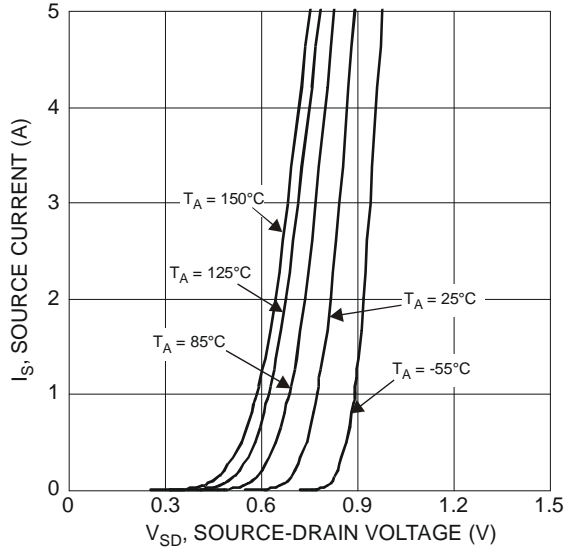


Figure 9 Diode Forward Voltage vs. Current

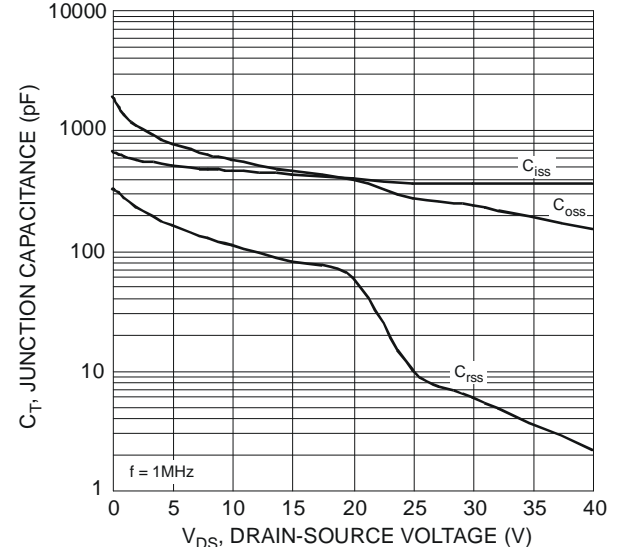


Figure 10 Typical Junction Capacitance

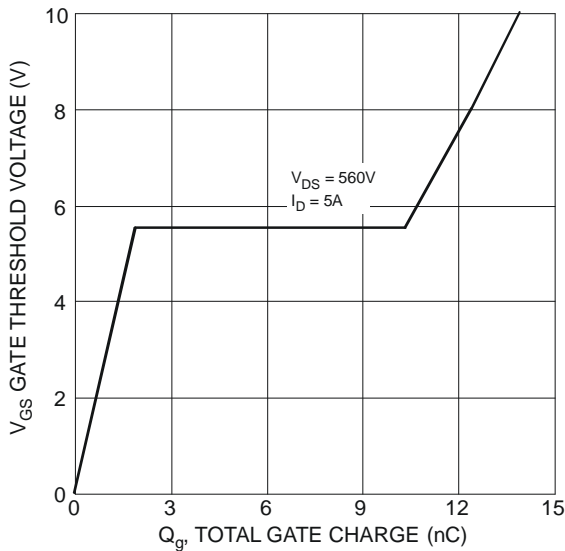


Figure 11 Gate Charge

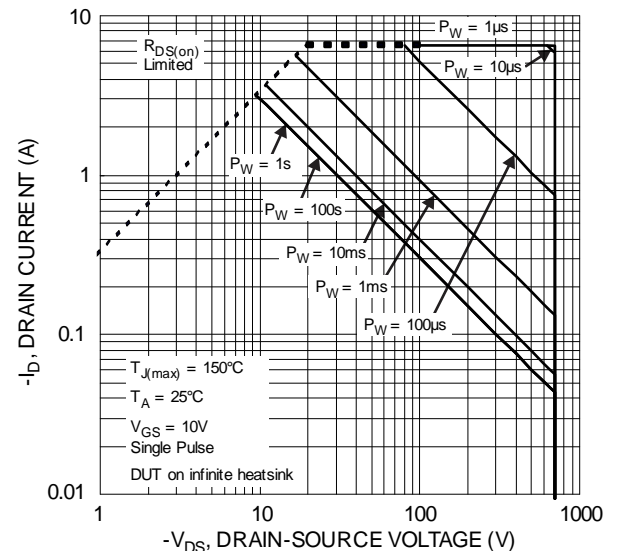
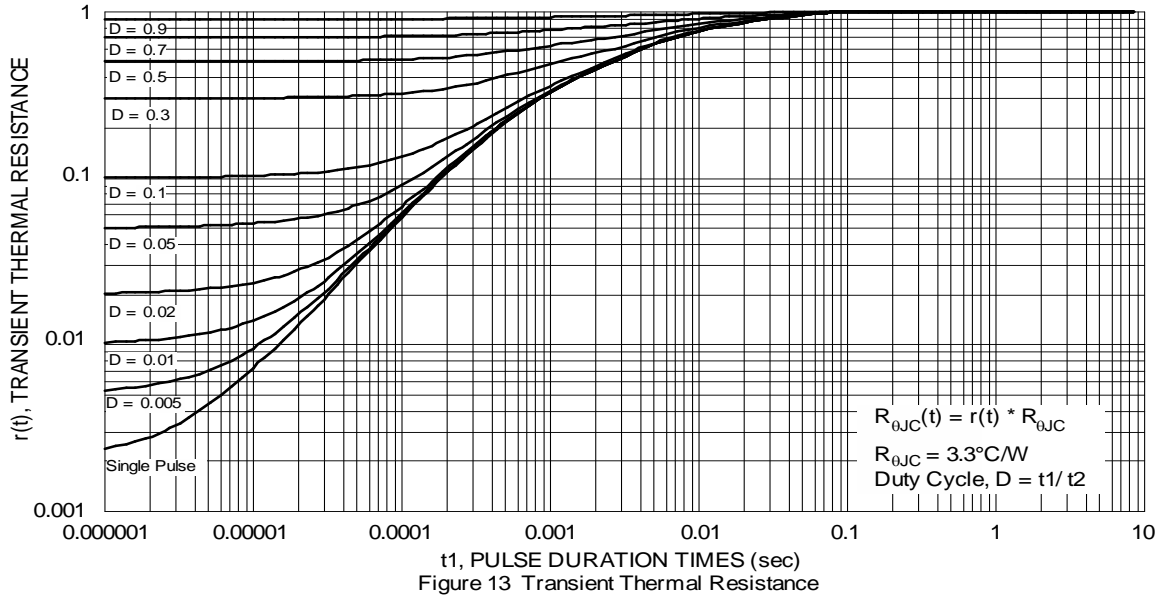


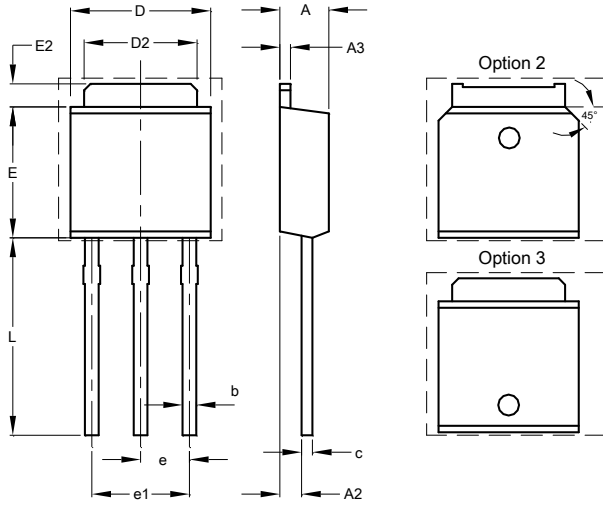
Figure 12 SOA, Safe Operation Area



**Package Outline Dimensions**

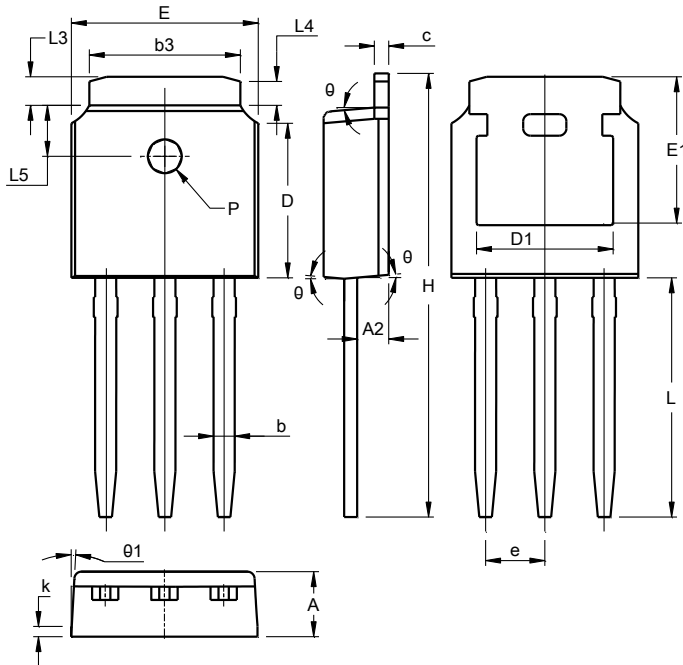
Please see AP02001 at [http://www.diodes.com/\\_files/datasheets/ap02001.pdf](http://www.diodes.com/_files/datasheets/ap02001.pdf) for the latest version.

**TO251**



TO251		
Dim	Min	Max
A	2.200	2.400
A2	0.890	1.150
A3	0.450	0.550
B	0.550	0.740
C	0.450	0.570
D	6.400	6.750
D2	5.200	5.400
E	5.950	6.250
E2	0.900	1.250
E	2.240	2.340
e1	4.430	4.730
L	8.900	9.500
All Dimensions in mm		

**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		
θ	5°	9°	7°
θ1	5°	9°	7°
All Dimensions in mm			

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