

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _C = +25°C
55V	12mΩ @ V _{GS} = 10V	80A
	18mΩ @ V _{GS} = 4.5V	65A

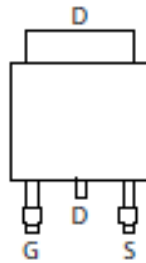
Description and Applications

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

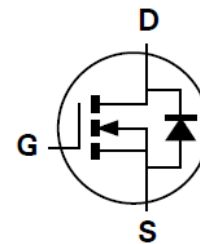
- Engine Management Systems
- Body Control Electronics
- DC/DC Converters



Top View



Pin Out Top View



Equivalent Circuit

Features

- Rated to +175°C – Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switching – Ensures more Reliable and Robust End Application
- Low On-Resistance
- Low Input Capacitance
- **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

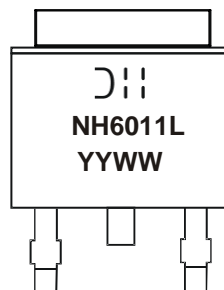
- Case: TO252 (DPAK)
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – Matte Tin Finish Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.33 grams (Approximate)

Ordering Information (Note 5)

Part Number	Case	Packaging
DMNH6011LK3Q-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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to <https://www.diodes.com/quality/>.
 5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



- DII = Manufacturer's Marking
 NH6011L = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 18= 2018)
 WW = Week Code (01 to 53)

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V _{DSS}	55	V
Gate-Source Voltage	V _{GSS}	±12	V
Continuous Drain Current (Note 8), V _{GS} = 10V	I _D	T _C = +25°C	80
		T _C = +100°C	50
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I _{DM}	180	A
Maximum Continuous Body Diode Forward Current (Note 8)	I _S	80	A
Avalanche Current, L = 0.1mH (Note 9)	I _{AS}	54	A
Avalanche Energy, L = 0.1mH (Note 9)	E _{AS}	147	mJ

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 6)	P _D	1.6	W
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	80	°C/W
	Steady State		
Total Power Dissipation (Note 7)	P _D	3.0	W
Thermal Resistance, Junction to Ambient (Note 7)	R _{θJA}	42	°C/W
	Steady State		
Thermal Resistance, Junction to Case (Note 8)	R _{θJC}	1.1	
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +175	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 10)						
Drain-Source Breakdown Voltage	BV _{DSS}	55	—	—	V	V _{GS} = 0V, I _D = 250µA
Zero Gate Voltage Drain Current, T _J = +25°C	I _{DSS}	—	—	1	µA	V _{DS} = 55V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±12V, V _{DS} = 0V
ON CHARACTERISTICS (Note 10)						
Gate Threshold Voltage	V _{GS(TH)}	1	—	2	V	V _{DS} = V _{GS} , I _D = 250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	8.3	12	mΩ	V _{GS} = 10V, I _D = 25A
		—	9.0	18		V _{GS} = 4.5V, I _D = 25A
Diode Forward Voltage	V _{SD}	—	0.7	1.2	V	V _{GS} = 0V, I _S = 1.7A
DYNAMIC CHARACTERISTICS (Note 11)						
Input Capacitance	C _{iss}	—	3,077	—	pF	V _{DS} = 30V, V _{GS} = 0V, f = 1MHz
Output Capacitance	C _{oss}	—	331	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	127	—	pF	
Gate Resistance	R _g	—	1.7	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	23.4	—	nC	
Total Gate Charge (V _{GS} = 10V)	Q _g	—	49.1	—	nC	
Gate-Source Charge	Q _{gs}	—	5.3	—	nC	
Gate-Drain Charge	Q _{gd}	—	9.6	—	nC	V _{DS} = 30V, I _D = 25A
Turn-On Delay Time	t _{D(ON)}	—	5.9	—	ns	
Turn-On Rise Time	t _r	—	8.7	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	28.2	—	ns	
Turn-Off Fall Time	t _f	—	10.2	—	ns	
Body Diode Reverse Recovery Time	t _{RR}	—	30.1	—	ns	I _F = 25A, di/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q _{RR}	—	25.7	—	nC	I _F = 25A, di/dt = 100A/µs

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

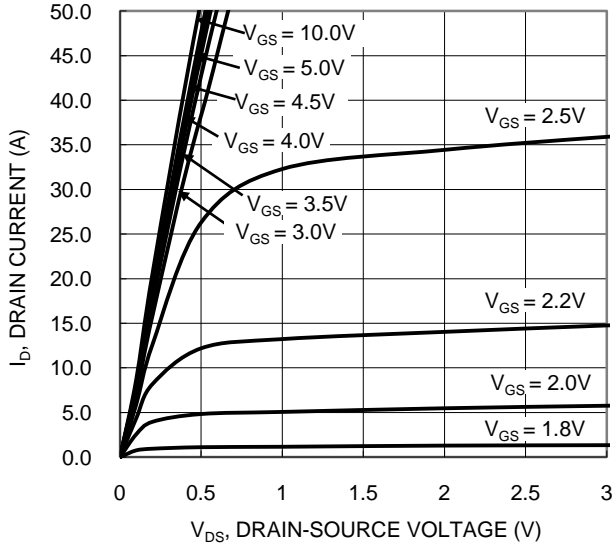


Figure 1. Typical Output Characteristic

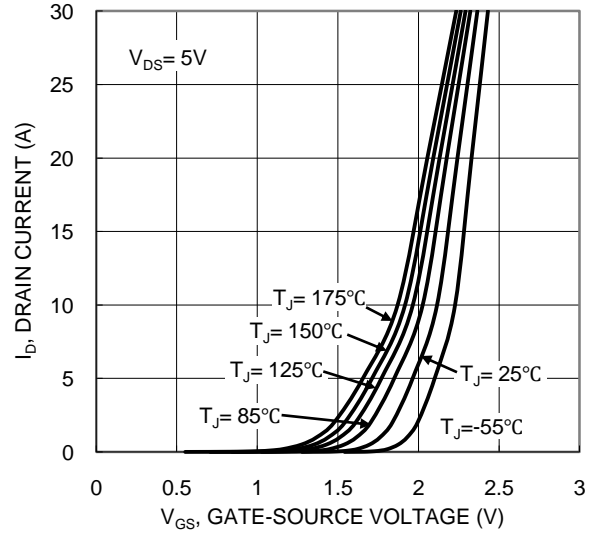


Figure 2. Typical Transfer Characteristic

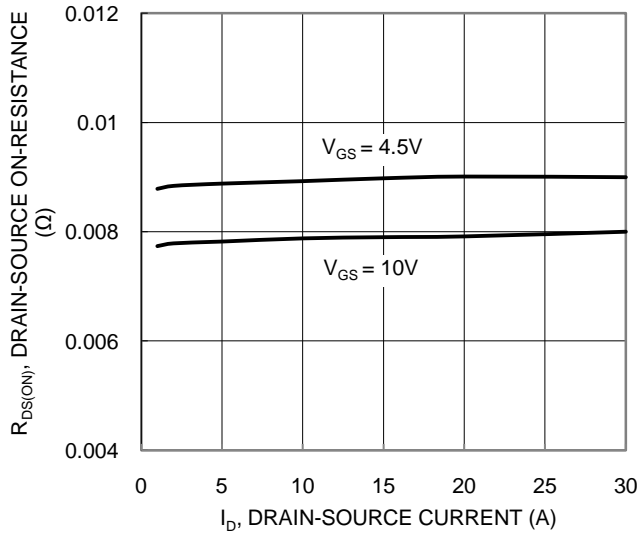


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

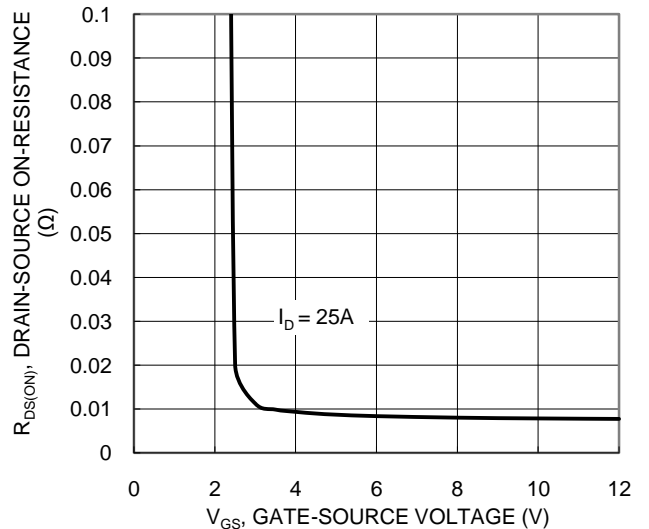


Figure 4. Typical Transfer Characteristic

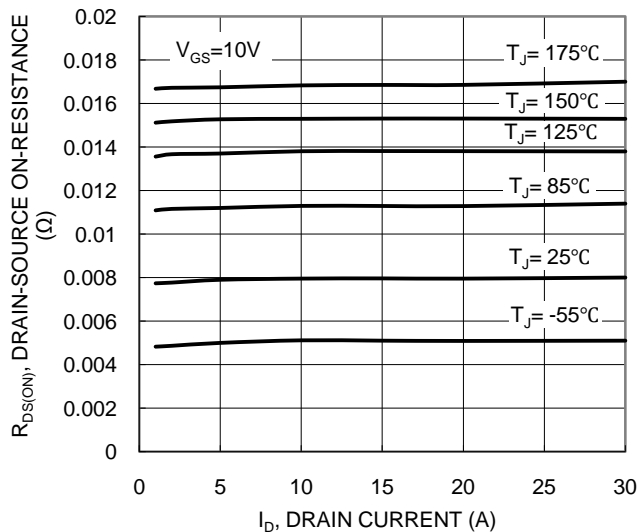


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

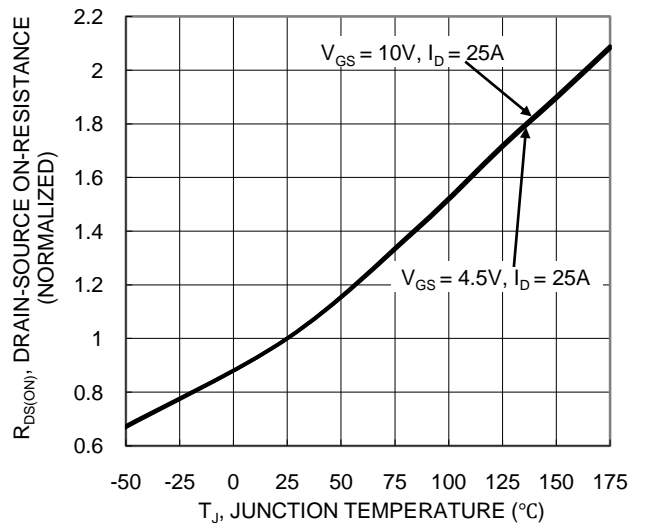


Figure 6. On-Resistance Variation with Temperature

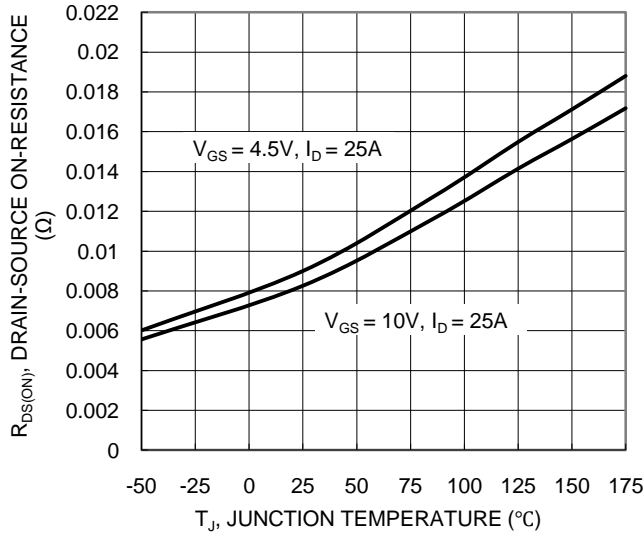


Figure 7. On-Resistance Variation with Temperature

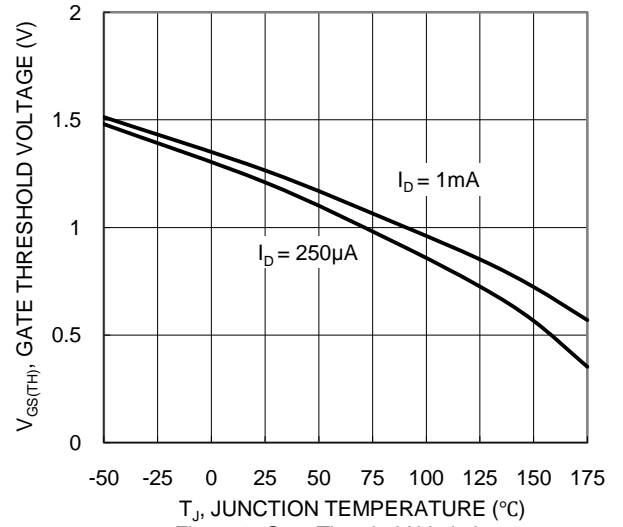


Figure 8. Gate Threshold Variation vs. Junction Temperature

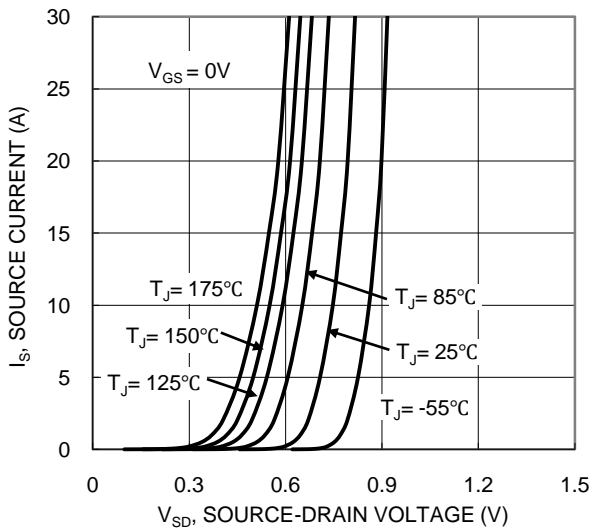


Figure 9. Diode Forward Voltage vs. Current

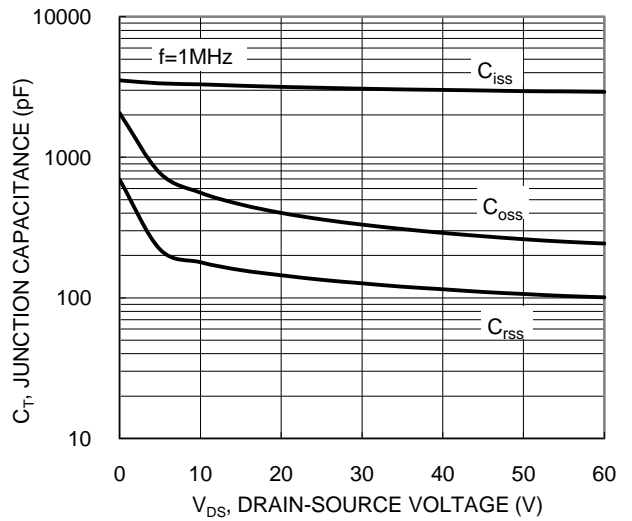


Figure 10. Typical Junction Capacitance

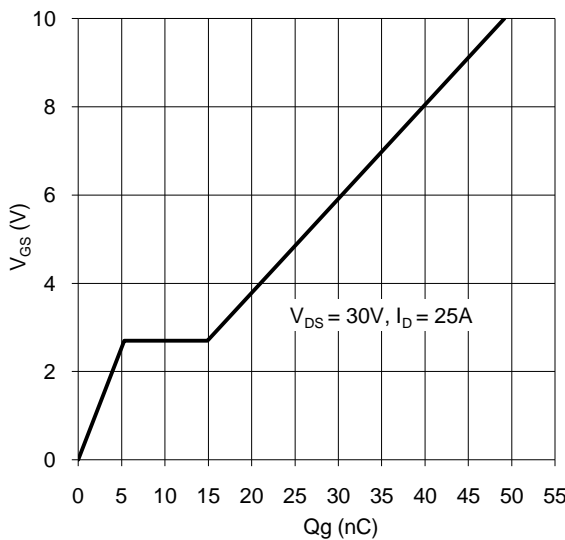


Figure 11. Gate Charge

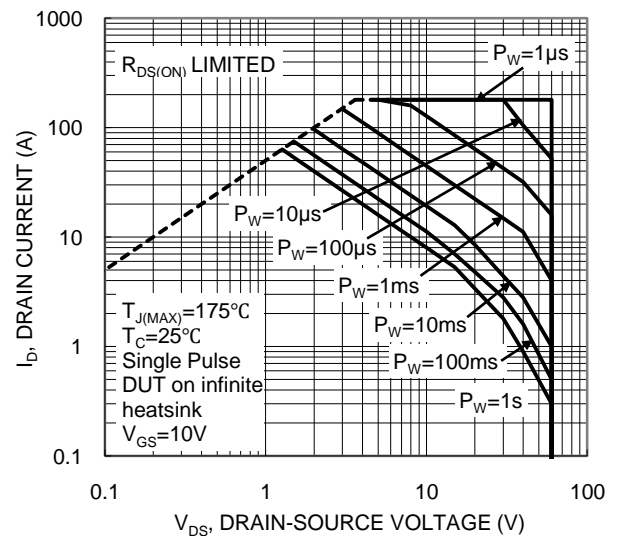
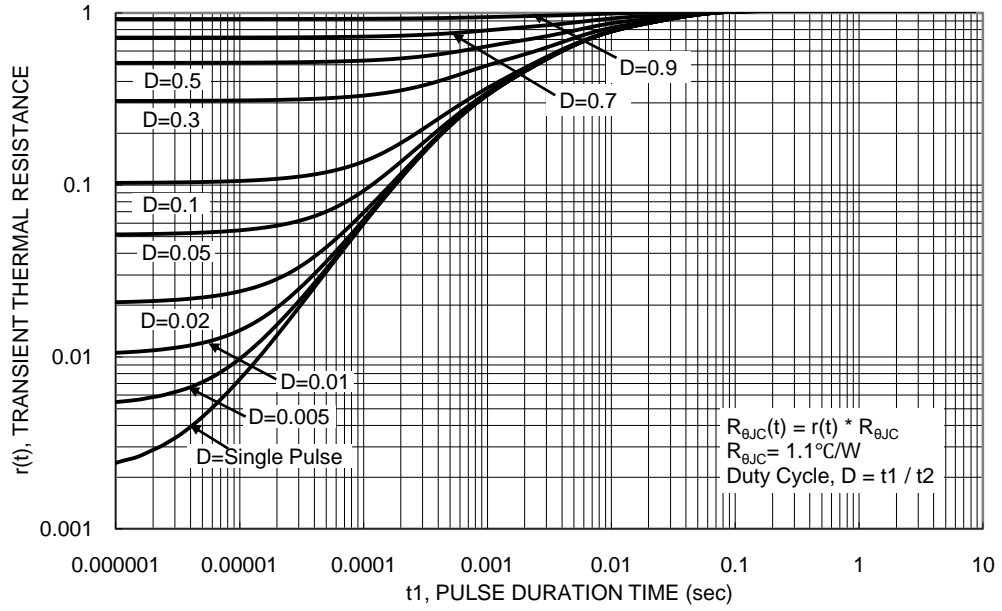


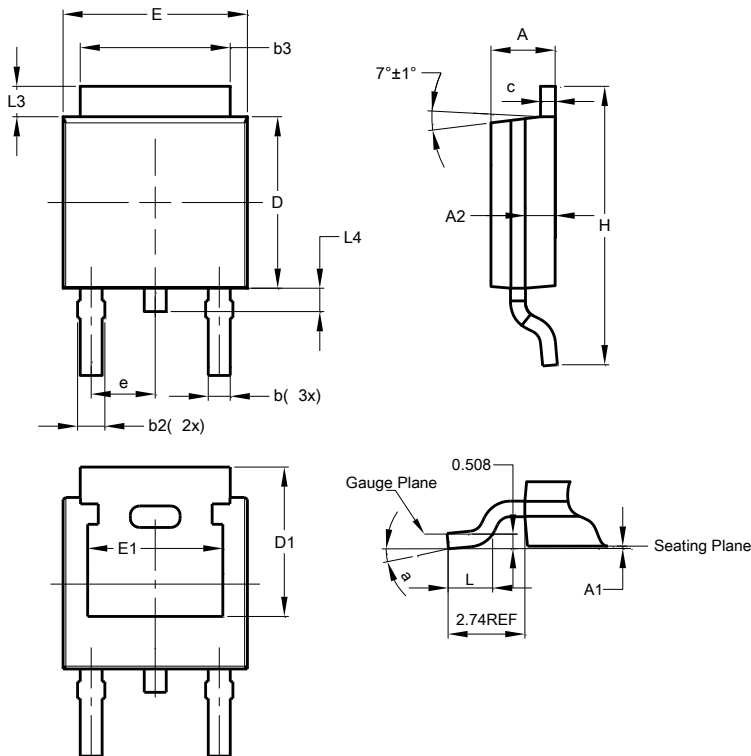
Figure 12. SOA, Safe Operation Area



Package Outline Dimensions

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

TO252 (DPAK)

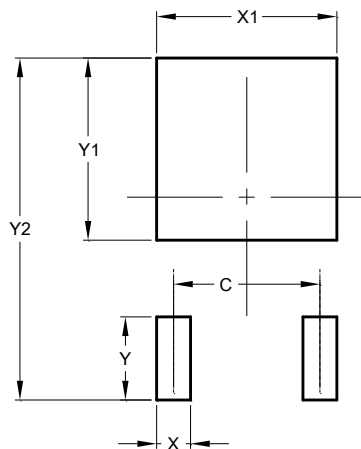


TO252 (DPAK)			
Dim	Min	Max	Typ
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.46	5.33
c	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	-	-
e	-	-	2.286
E	6.45	6.70	6.58
E1	4.32	-	-
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02	0.83
a	0°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