

OBSOLETE - PART DISCONTINUED

## Product Summary

BV <sub>DSS</sub>	R <sub>DS(ON)</sub> Max	I <sub>D</sub> T <sub>C</sub> = +25°C
40V	10mΩ @ V <sub>GS</sub> = 10V	50A

## Description and Applications

This new generation 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.

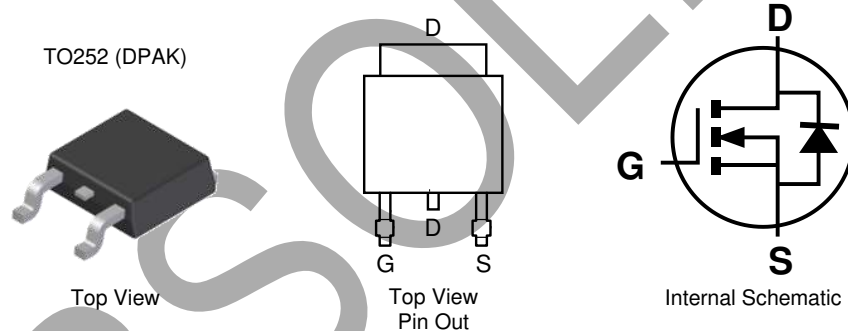
- DC-DC converters
- Power management functions
- Analog switches

## Features and Benefits

- Rated to +175°C – ideal for high ambient temperature environments
- Low On-Resistance
- Low Input Capacitance
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability.**  
<https://www.diodes.com/quality/product-definitions/>
- **An Automotive-Compliant Part is Available Under Separate Datasheet (DMNH4011SK3Q)**

## Mechanical Data

- Package: TO252
- Package Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.33 grams (Approximate)

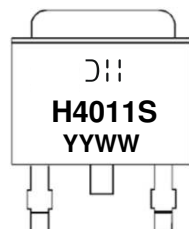


## Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMNH4011SK3-13	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



- DII = Manufacturer's Marking
- H4011S = Product Type Marking Code
- YYWW = Date Code Marking
- YY = Last Digit of Year (ex: 14 = 2014)
- WW = Week Code (01 to 53)

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

Characteristic		Symbol	Value	Unit	
Drain-Source Voltage		$V_{DS}$	40	V	
Gate-Source Voltage		$V_{GS}$	$\pm 20$	V	
Continuous Drain Current (Note 6)	Steady State	$I_D$	$T_C = +25^\circ\text{C}$	50	A
			$T_C = +100^\circ\text{C}$	27	A
Maximum Body Diode Forward Current (Note 6)		$I_S$	120	A	
Pulsed Drain Current (380 $\mu\text{s}$ Pulse, Duty Cycle = 1%)		$I_{DM}$	120	A	

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	$P_D$	2.6	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	47	$^\circ\text{C/W}$
Total Power Dissipation (Note 6)	$P_D$	50	W
Thermal Resistance, Junction to Case (Note 6)	$R_{\theta JC}$	3	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +175	$^\circ\text{C}$

**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	$BV_{DS}$	40	—	—	V	$V_{GS} = 0V, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 40V, V_{GS} = 0V$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 100$	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	2	—	4	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	—	10	m $\Omega$	$V_{GS} = 10V, I_D = 50A$
Diode Forward Voltage	$V_{SD}$	—	0.9	1.2	V	$V_{GS} = 0V, I_S = 20A$
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	$C_{iss}$	—	1,405	—	pF	$V_{DS} = 20V, V_{GS} = 0V, f = 1\text{MHz}$
Output Capacitance	$C_{oss}$	—	247	—		
Reverse Transfer Capacitance	$C_{rss}$	—	108	—	$\Omega$	$V_{DS} = 0V, V_{GS} = 0V, f = 1\text{MHz}$
Gate Resistance	$R_G$	—	2.2	—		
Total Gate Charge	$Q_g$	—	25.5	—	nC	$V_{DS} = 20V, V_{GS} = 10V, I_D = 50A$
Gate-Source Charge	$Q_{gs}$	—	4.6	—		
Gate-Drain Charge	$Q_{gd}$	—	6.9	—		
Turn-On Delay Time	$t_{D(ON)}$	—	4.6	—	ns	$V_{DD} = 20V, V_{GS} = 10V, I_D = 50A, R_G = 3.5\Omega$
Turn-On Rise Time	$t_R$	—	3.7	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	16	—		
Turn-Off Fall Time	$t_F$	—	5.1	—		
Body Diode Reverse Recovery Time	$t_{RR}$	—	22.1	—	ns	$I_F = 50A, di/dt = 100A/\mu\text{s}$
Body Diode Reverse Recovery Charge	$Q_{RR}$	—	13.4	—		

- Notes:
5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
  6. Device mounted on infinite heat sink and measured by thermal couple attached on bottom heat sink of package.
  7. Short duration pulse test used to minimize self-heating effect.
  8. Guaranteed by design. Not subject to product testing.

**OBsolete - PART DISCONTINUED**

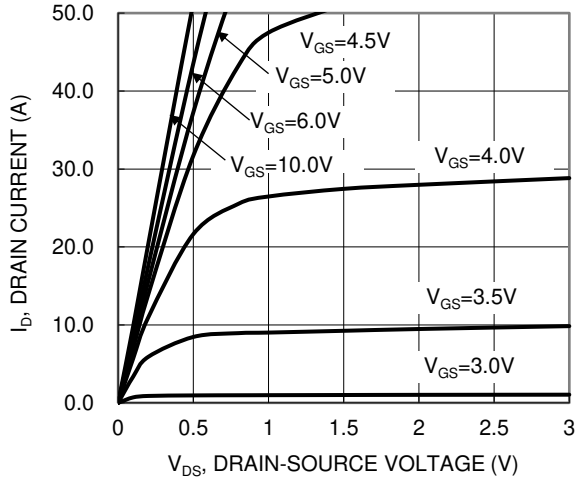


Figure 1. Typical Output Characteristic

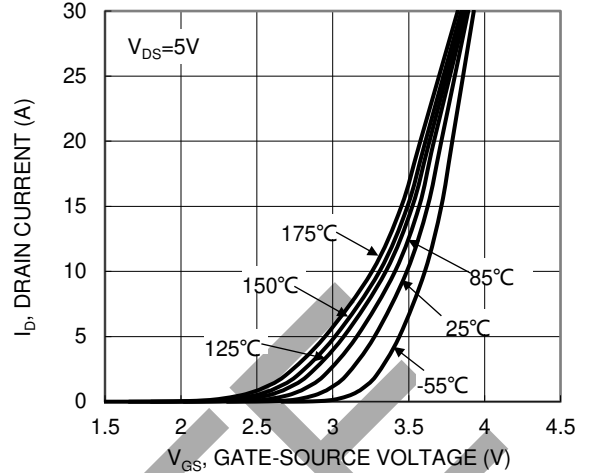


Figure 2. Typical Transfer Characteristic

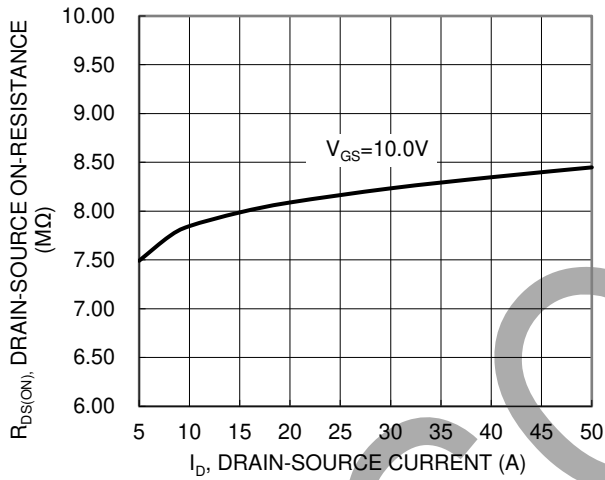


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

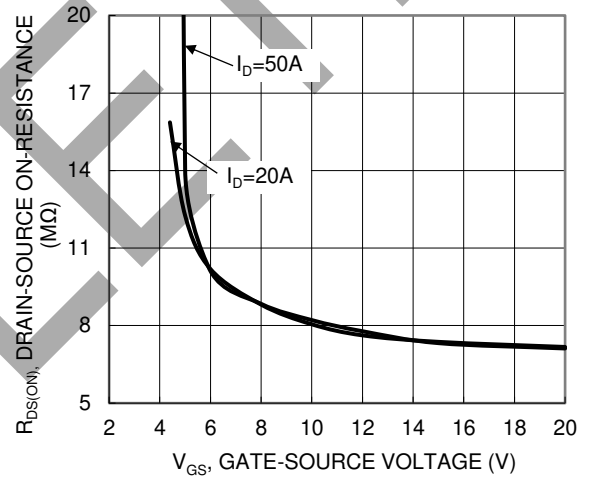


Figure 4. Typical Transfer Characteristic

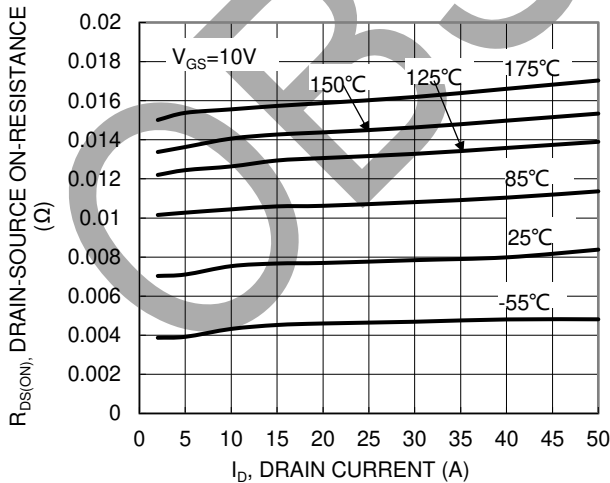


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

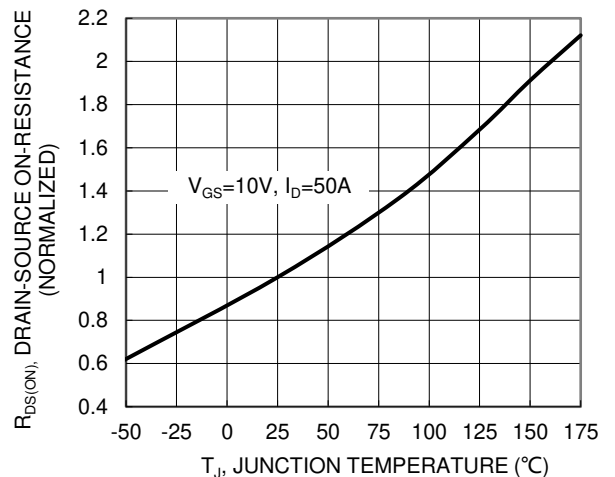


Figure 6. On-Resistance Variation with Temperature

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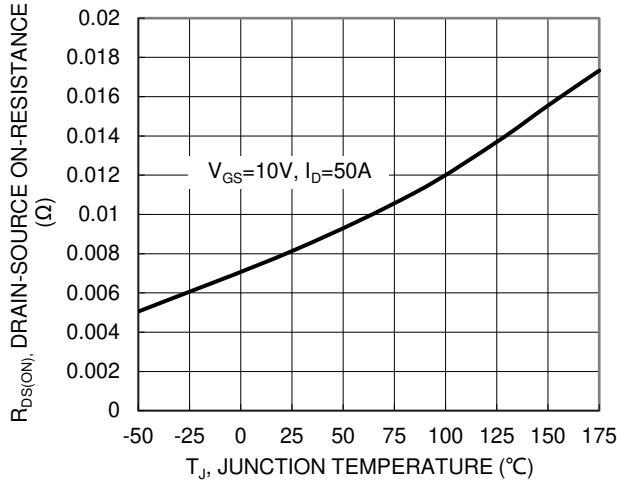


Figure 7. On-Resistance Variation with Temperature

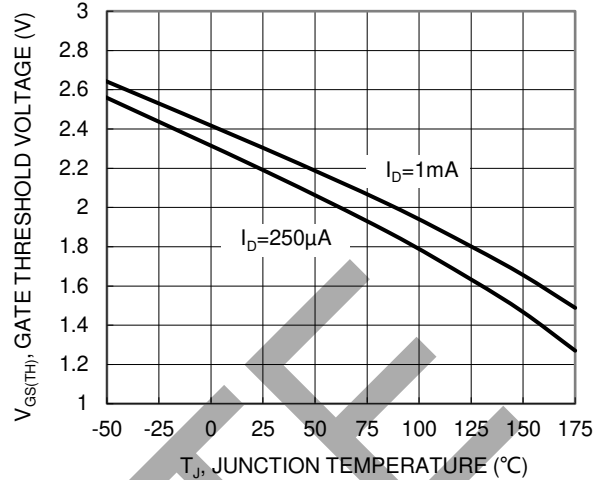


Figure 8. Gate Threshold Variation vs Temperature

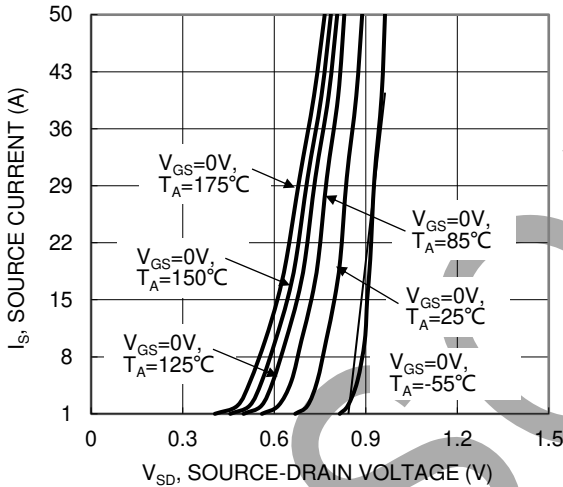


Figure 9. Diode Forward Voltage vs. Current

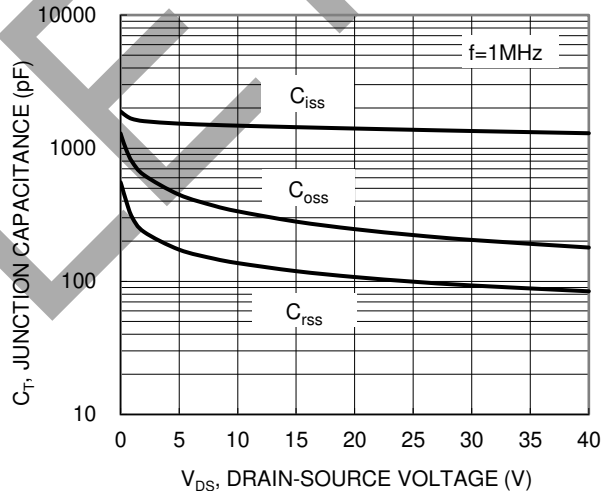


Figure 10. Typical Junction Capacitance

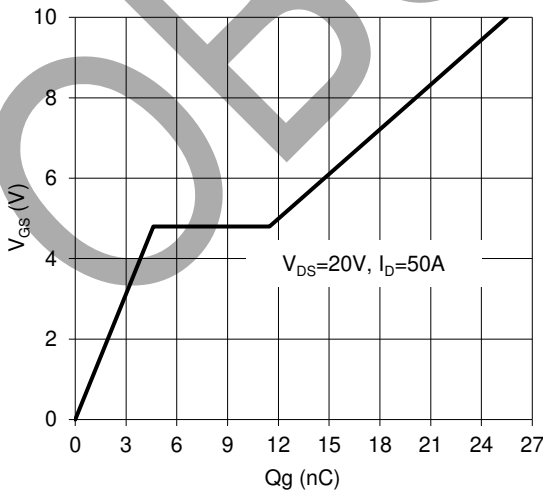


Figure 11. Gate Charge

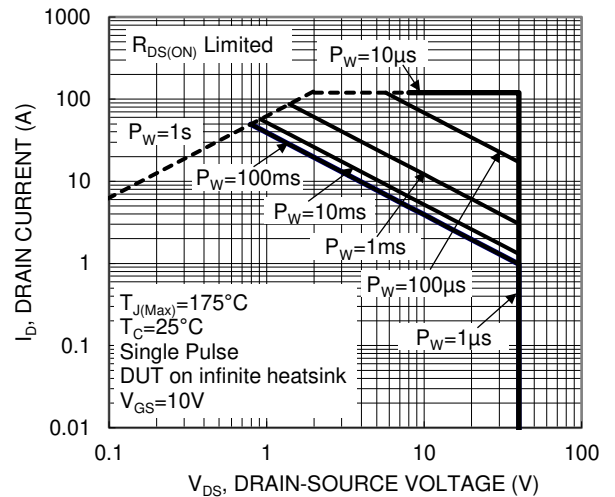


Figure 12. SOA, Safe Operation Area

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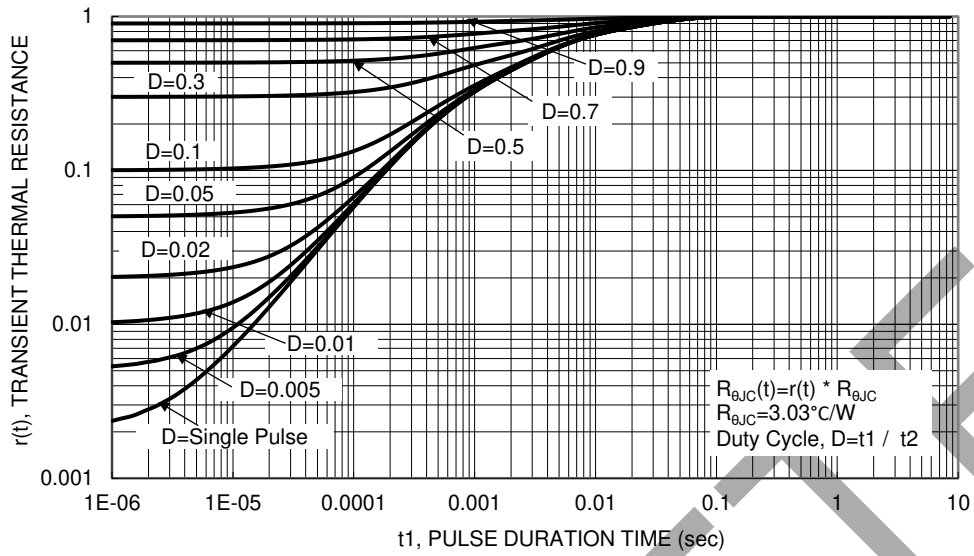


Figure 13. Transient Thermal Resistance

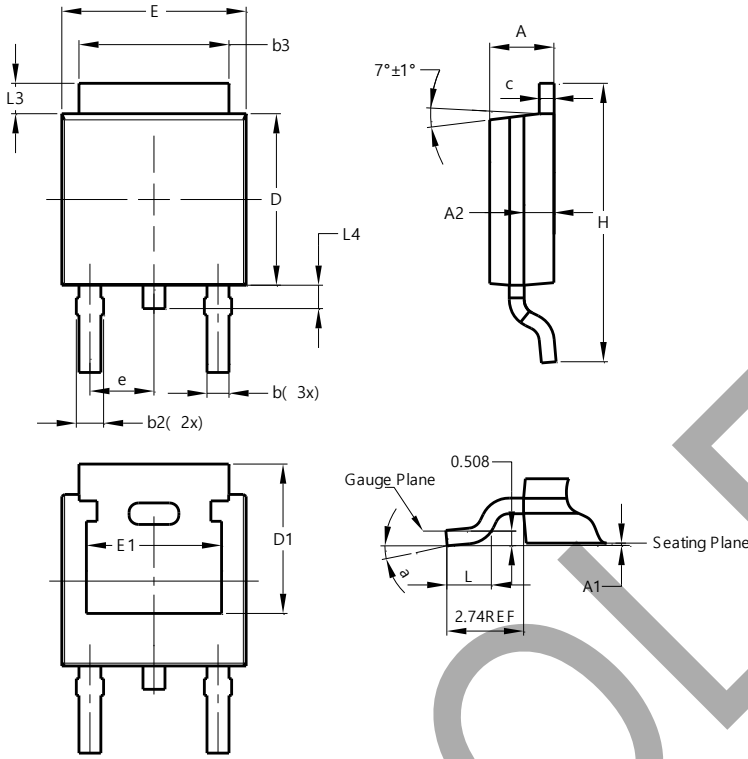
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**Package Outline Dimensions**

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

**TO252 (DPAK)**

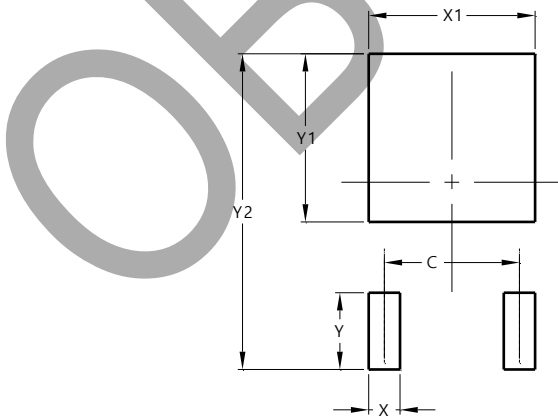


TO252 (DPAK)			
Dim	Min	Max	Typ
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.50	5.33
c	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	--	--
e	2.286 BSC		
E	6.45	6.70	6.58
E1	4.32	--	--
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02	0.83
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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