

## Product Summary

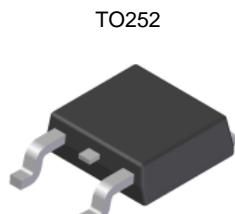
$V_{(BR)DSS}$	$R_{DS(on)}$	$I_D$ $T_C = +25^\circ\text{C}$
30V	12mΩ @ $V_{GS} = 10\text{V}$	37.8A
	16mΩ @ $V_{GS} = 4.5\text{V}$	32.8A

## Description

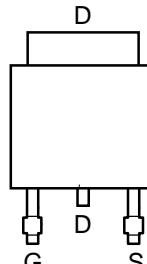
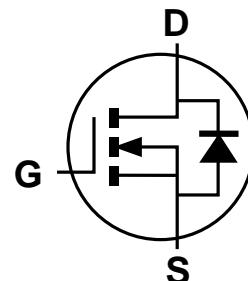
This MOSFET is designed to minimize the on-state resistance ( $R_{DS(ON)}$ ) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

## Applications

- Backlighting
- DC-DC Converters
- Power Management Functions



Top View

Top View  
Pin-Out

Equivalent Circuit

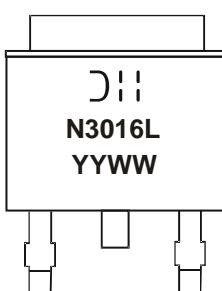
## Ordering Information (Notes 4)

Product	Case	Packaging
DMN3016LK3-13	TO252	2,500/Tape & Reel

## Notes:

1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
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



DII = Manufacturer's Marking  
N3016L = Product Type Marking Code  
YYWW = Date Code Marking  
YY = Year (ex: 14 = 2014)  
WW = Week (01 - 53)

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

Characteristic			Symbol	Value	Units
Drain-Source Voltage			$V_{DSS}$	30	V
Gate-Source Voltage			$V_{GSS}$	$\pm 20$	V
Continuous Drain Current (Note 6) $V_{GS} = 10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	12.4 10	A
	Steady State	$T_C = +25^\circ\text{C}$ $T_C = +70^\circ\text{C}$	$I_D$	37.8 30.3	A
	$t < 10\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	17 13.6	A
Maximum Body Diode Continuous Current			$I_S$	2	A
Pulsed Drain Current (10 $\mu\text{s}$ pulse, duty cycle = 1%)			$I_{DM}$	90	A
Avalanche Current (Note 7) $L = 0.1\text{mH}$			$I_{AS}$	22	A
Avalanche Energy (Note 7) $L = 0.1\text{mH}$			$E_{AS}$	24	mJ

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

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	$T_A = +25^\circ\text{C}$	$P_D$	1.6	W
	$T_A = +70^\circ\text{C}$		1.0	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	75	°C/W
	$t < 10\text{s}$		34	
Total Power Dissipation (Note 6)	$T_A = +25^\circ\text{C}$	$P_D$	2.8	W
	$T_A = +70^\circ\text{C}$		1.8	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	46	°C/W
	$t < 10\text{s}$		24	
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	3.1	
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</b> (Note 8)						
Drain-Source Breakdown Voltage	$\text{BV}_{\text{DSS}}$	30	—	—	V	$\text{V}_{\text{GS}} = 0\text{V}$ , $\text{I}_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current $T_A = +25^\circ\text{C}$	$\text{I}_{\text{DSS}}$	—	—	1	$\mu\text{A}$	$\text{V}_{\text{DS}} = 30\text{V}$ , $\text{V}_{\text{GS}} = 0\text{V}$
Gate-Source Leakage	$\text{I}_{\text{GSS}}$	—	—	$\pm 100$	nA	$\text{V}_{\text{GS}} = \pm 20\text{V}$ , $\text{V}_{\text{DS}} = 0\text{V}$
<b>ON CHARACTERISTICS</b> (Note 8)						
Gate Threshold Voltage	$\text{V}_{\text{GS}(\text{th})}$	1.3	—	2.3	V	$\text{V}_{\text{DS}} = \text{V}_{\text{GS}}$ , $\text{I}_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$\text{R}_{\text{DS}(\text{ON})}$	—	8	12	$\text{m}\Omega$	$\text{V}_{\text{GS}} = 10\text{V}$ , $\text{I}_D = 11\text{A}$
		—	12	16		$\text{V}_{\text{GS}} = 4.5\text{V}$ , $\text{I}_D = 9\text{A}$
Diode Forward Voltage	$\text{V}_{\text{SD}}$	—	0.70	1.0	V	$\text{V}_{\text{GS}} = 0\text{V}$ , $\text{I}_S = 1\text{A}$
<b>DYNAMIC CHARACTERISTICS</b> (Note 9)						
Input Capacitance	$\text{C}_{\text{iss}}$	—	1415	—	pF	$\text{V}_{\text{DS}} = 15\text{V}$ , $\text{V}_{\text{GS}} = 0\text{V}$ , $f = 1.0\text{MHz}$
Output Capacitance	$\text{C}_{\text{oss}}$	—	119	—	pF	
Reverse Transfer Capacitance	$\text{C}_{\text{rss}}$	—	82	—	pF	
Gate Resistance	$\text{R}_{\text{G}}$	—	2.2	—	$\Omega$	$\text{V}_{\text{DS}} = 0\text{V}$ , $\text{V}_{\text{GS}} = 0\text{V}$ , $f = 1.0\text{MHz}$
Total Gate Charge ( $\text{V}_{\text{GS}} = -10\text{V}$ )	$\text{Q}_{\text{g}}$	—	25.1	—	nC	$\text{V}_{\text{DS}} = 15\text{V}$ , $\text{I}_D = 12\text{A}$
Total Gate Charge ( $\text{V}_{\text{GS}} = -4.5\text{V}$ )	$\text{Q}_{\text{g}}$	—	11.3	—	nC	
Gate-Source Charge	$\text{Q}_{\text{gs}}$	—	3.5	—	nC	
Gate-Drain Charge	$\text{Q}_{\text{gd}}$	—	3.6	—	nC	
Turn-On Delay Time	$\text{t}_{\text{D}(\text{on})}$	—	4.8	—	ns	$\text{V}_{\text{DD}} = 15\text{V}$ , $\text{V}_{\text{GS}} = 10\text{V}$ , $\text{R}_{\text{L}} = 1.25\Omega$ , $\text{R}_{\text{G}} = 3\Omega$
Turn-On Rise Time	$\text{t}_{\text{r}}$	—	16.5	—	ns	
Turn-Off Delay Time	$\text{t}_{\text{D}(\text{off})}$	—	26.1	—	ns	
Turn-Off Fall Time	$\text{t}_{\text{f}}$	—	5.6	—	ns	
Body Diode Reverse Recovery Time	$\text{t}_{\text{rr}}$	—	12.3	—	ns	$\text{I}_{\text{F}} = 12\text{A}$ , $\text{di/dt} = 500\text{A}/\mu\text{s}$
Body Diode Reverse Recovery Charge	$\text{Q}_{\text{rr}}$	—	10.4	—	nC	

Notes:

5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
7. UIS in production with  $L = 0.1\text{mH}$ , starting  $T_A = +25^\circ\text{C}$ .
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

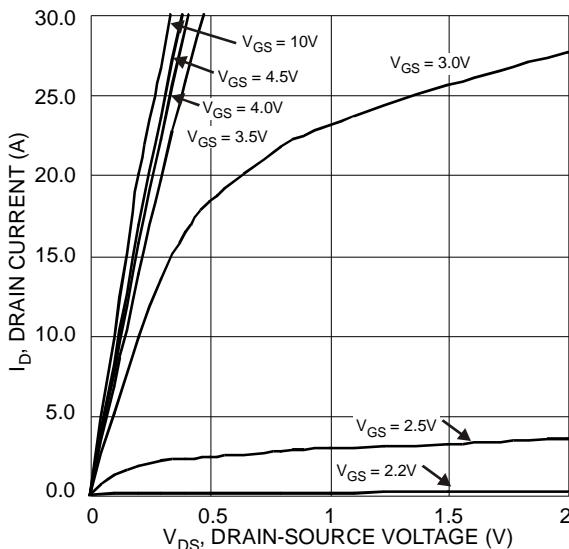


Figure 1 Typical Output Characteristic

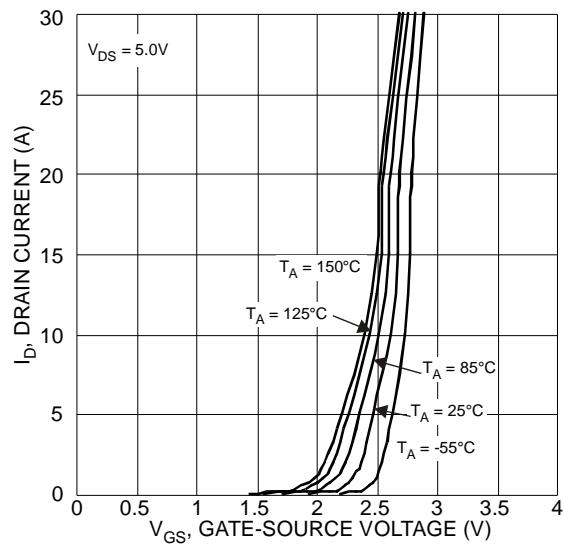


Figure 2 Typical Transfer Characteristics

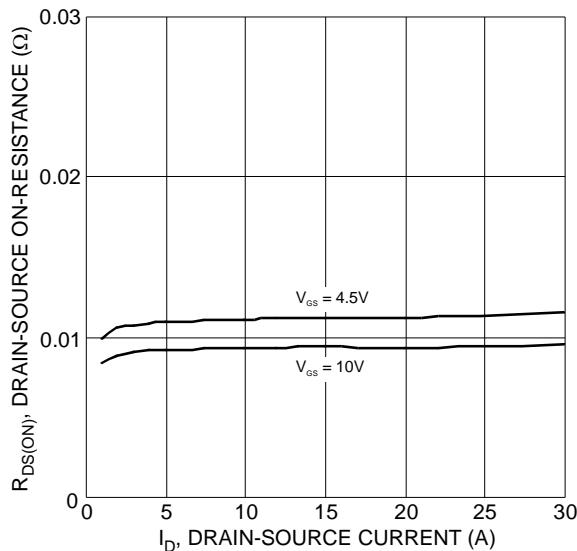


Figure 3 Typical On-Resistance vs.  
Drain Current and Gate Voltage

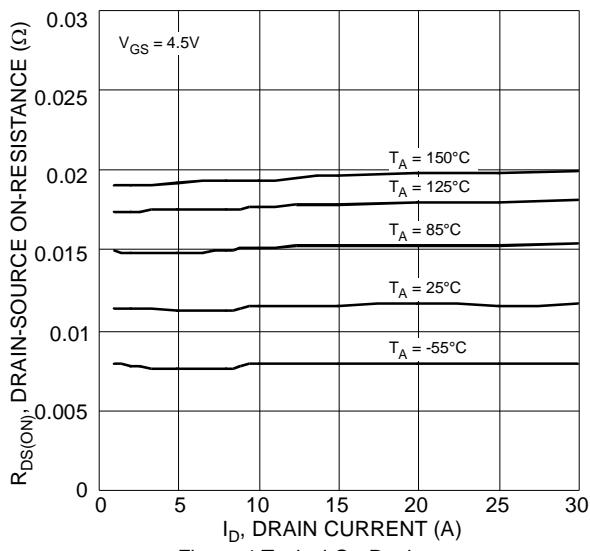


Figure 4 Typical On-Resistance vs.  
Drain Current and Temperature

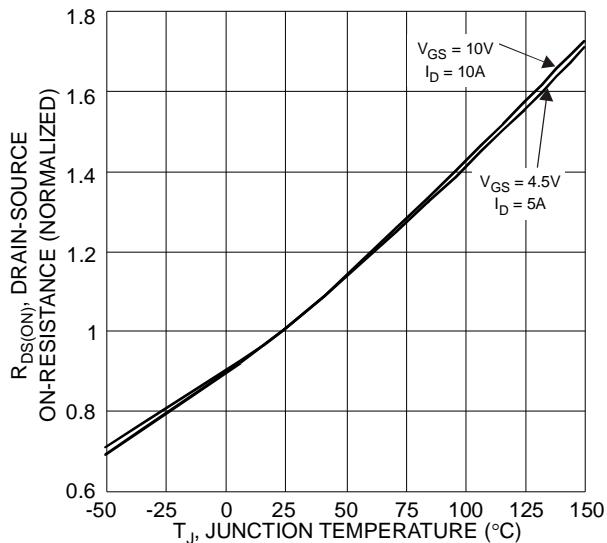


Figure 5 On-Resistance Variation with Temperature

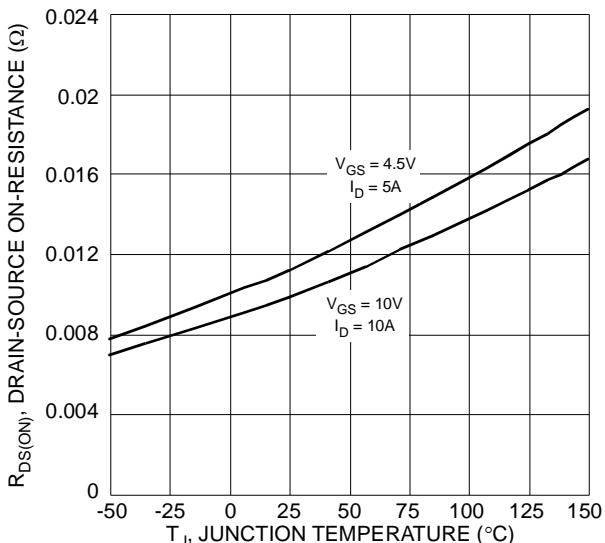


Figure 6 On-Resistance Variation with Temperature

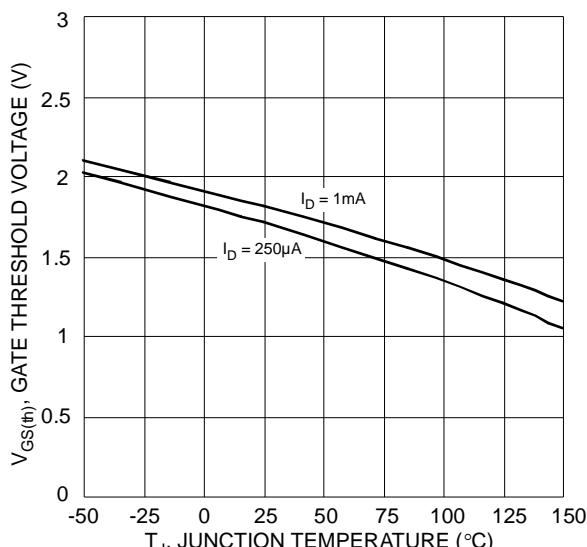


Figure 7 Gate Threshold Variation vs. Ambient Temperature

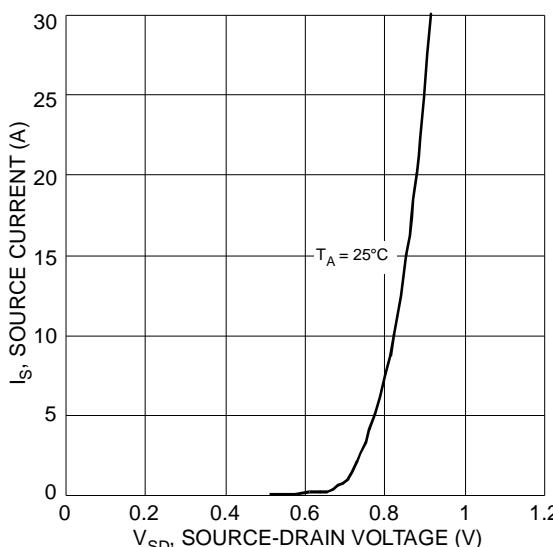
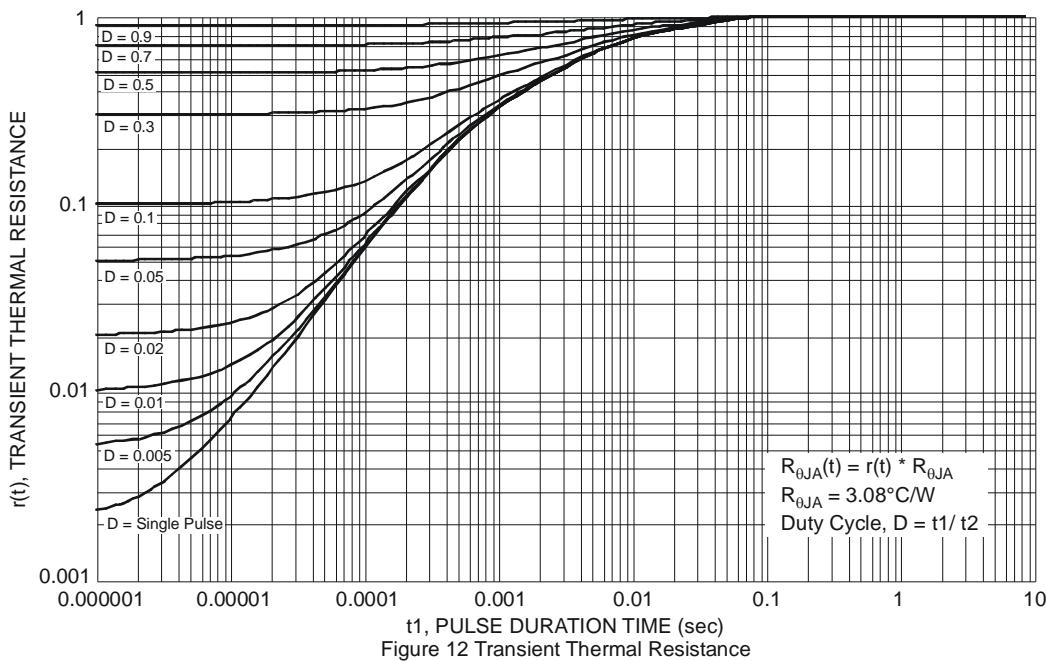
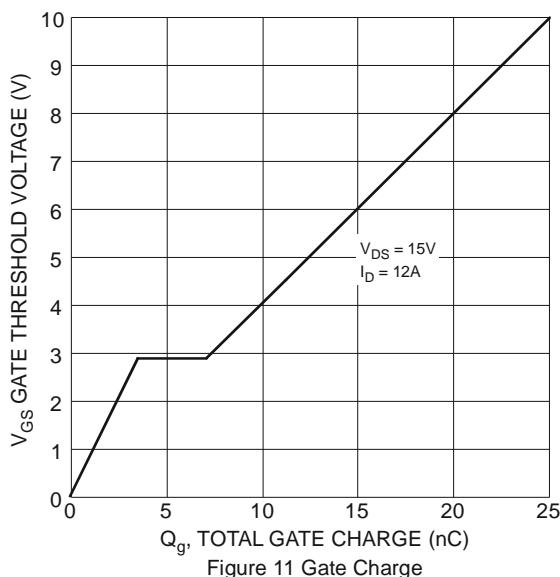
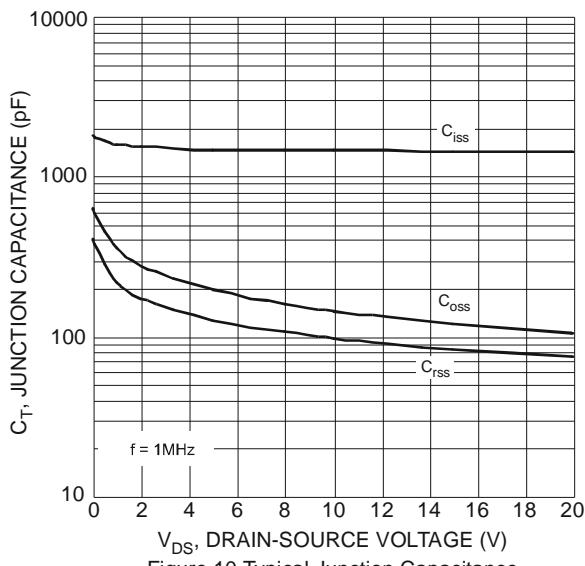
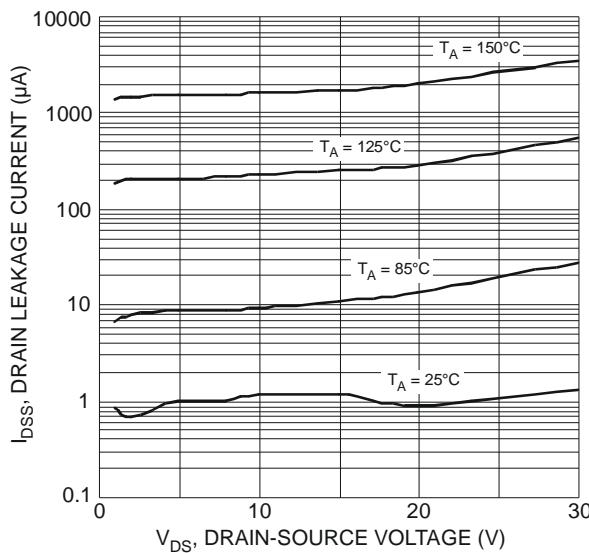
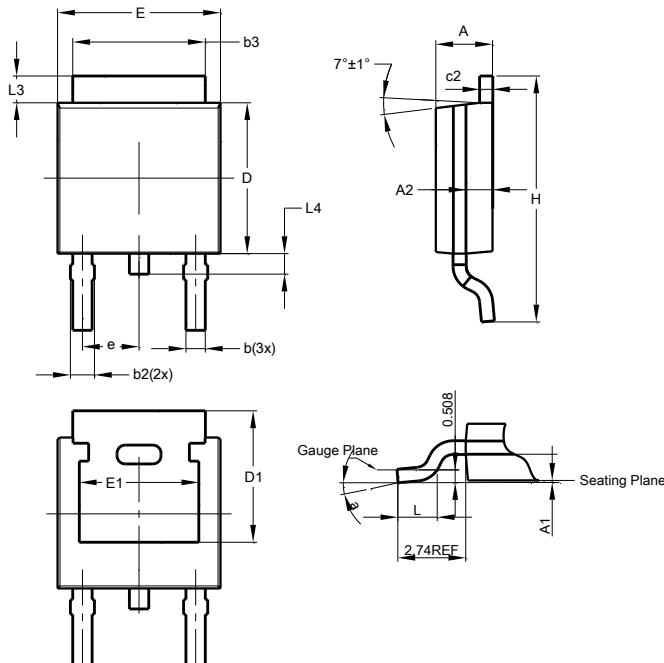


Figure 8 Diode Forward Voltage vs. Current



## Package Outline Dimensions

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.

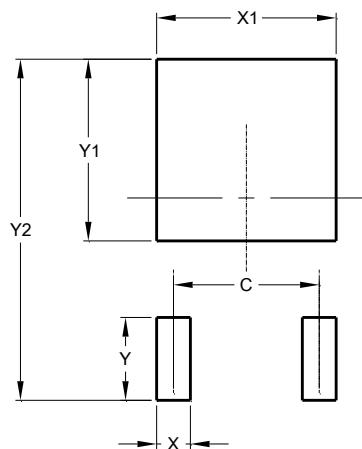


TO252			
Dim	Min	Max	Typ
<b>A</b>	2.19	2.39	2.29
<b>A1</b>	0.00	0.13	0.08
<b>A2</b>	0.97	1.17	1.07
<b>b</b>	0.64	0.88	0.783
<b>b2</b>	0.76	1.14	0.95
<b>b3</b>	5.21	5.46	5.33
<b>c2</b>	0.45	0.58	0.531
<b>D</b>	6.00	6.20	6.10
<b>D1</b>	5.21	—	—
<b>e</b>	—	—	2.286
<b>E</b>	6.45	6.70	6.58
<b>E1</b>	4.32	—	—
<b>H</b>	9.40	10.41	9.91
<b>L</b>	1.40	1.78	1.59
<b>L3</b>	0.88	1.27	1.08
<b>L4</b>	0.64	1.02	0.83
<b>a</b>	0°	10°	—

All Dimensions in mm

## Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
<b>C</b>	4.572
<b>X</b>	1.060
<b>X1</b>	5.632
<b>Y</b>	2.600
<b>Y1</b>	5.700
<b>Y2</b>	10.700

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