

Product Summary

BV_{DSS}	$R_{DS(ON)} \text{ Max}$	$I_D \text{ Max}$ $T_C = +25^\circ\text{C}$
40V	7.3m Ω @ $V_{GS} = 10\text{V}$	70A
	9.8m Ω @ $V_{GS} = 4.5\text{V}$	44A

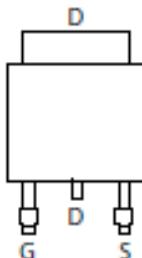
Description and Applications

This new generation 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.

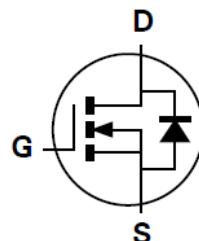
- Power Management Functions
- DC-DC Converters
- Backlighting



Top View



Pin Out Top View



Equivalent Circuit

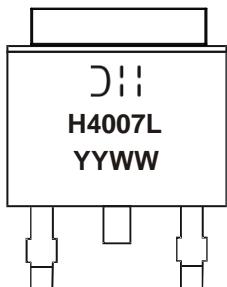
Ordering Information (Note 4)

Part Number	Case	Packaging
DMTH4007LK3-13	TO252	2,500/Tape & Reel

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 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
H4007L = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 15 = 2015)
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}	40	V
Gate-Source Voltage	V_{GSS}	± 20	V
Continuous Drain Current, $V_{GS} = 10\text{V}$ (Note 5)	I_D	16.8 13.9	A
Continuous Drain Current, $V_{GS} = 10\text{V}$ (Note 6)	I_D	70 51	A
Maximum Continuous Body Diode Forward Current (Note 6)	I_S	80	A
Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%)	I_{DM}	80	A
Avalanche Current, $L = 0.1\text{mH}$	I_{AS}	20	A
Avalanche Energy, $L = 0.1\text{mH}$	E_{AS}	20	mJ

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

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	$^\circ\text{C}/\text{W}$
Total Power Dissipation (Note 6)	P_D	59	W
Thermal Resistance, Junction to Case (Note 6)	$R_{\theta JC}$	2.5	$^\circ\text{C}/\text{W}$
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
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	40	-	-	V	$V_{GS} = 0\text{V}, I_D = 1\text{mA}$
Zero Gate Voltage Drain Current	I_{DSS}	-	-	1	μA	$V_{DS} = 32\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GS}	-	-	± 100	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(\text{TH})}$	1	-	3	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(\text{ON})}$	-	5	7.3	$\text{m}\Omega$	$V_{GS} = 10\text{V}, I_D = 20\text{A}$
		-	7	9.8		$V_{GS} = 4.5\text{V}, I_D = 20\text{A}$
Diode Forward Voltage	V_{SD}	-	-	1.2	V	$V_{GS} = 0\text{V}, I_S = 20\text{A}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	-	1895	-	pF	$V_{DS} = 30\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Output Capacitance	C_{oss}	-	485	-		
Reverse Transfer Capacitance	C_{rss}	-	20.9	-		
Gate Resistance	R_g	-	0.62	-	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge ($V_{GS} = 4.5\text{V}$)	Q_g	-	12.4	-	nC	$V_{DS} = 30\text{V}, I_D = 20\text{A}$
Total Gate Charge ($V_{GS} = 10\text{V}$)	Q_g	-	29.1	-		
Gate-Source Charge	Q_{gs}	-	5.9	-		
Gate-Drain Charge	Q_{gd}	-	3.5	-		
Turn-On Delay Time	$t_{D(\text{ON})}$	-	5.4	-	ns	$V_{DD} = 30\text{V}, V_{GS} = 10\text{V}, I_D = 20\text{A}, R_G = 3\Omega$
Turn-On Rise Time	t_R	-	4.5	-		
Turn-Off Delay Time	$t_{D(\text{OFF})}$	-	16.2	-		
Turn-Off Fall Time	t_F	-	3.5	-		
Body Diode Reverse Recovery Time	t_{RR}	-	30.6	-	ns	$I_F = 20\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Body Diode Reverse Recovery Charge	Q_{RR}	-	28.1	-	nC	

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 6. Thermal resistance from junction to soldering point (on the exposed drain pad).
 7. Short duration pulse test used to minimize self-heating effect.
 8. Guaranteed by design. Not subject to product testing.

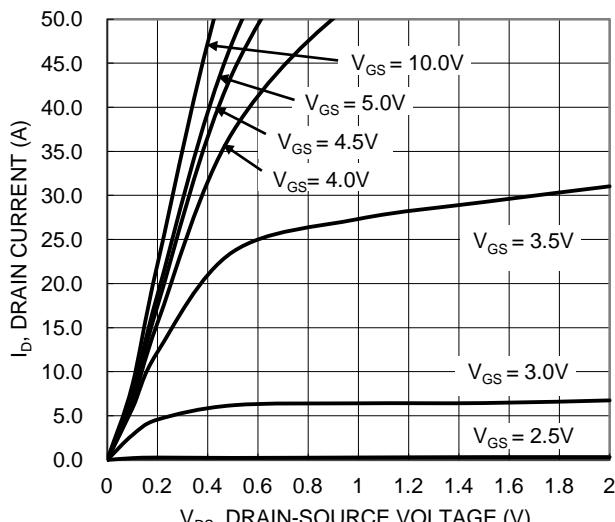


Figure 1. Typical Output Characteristic

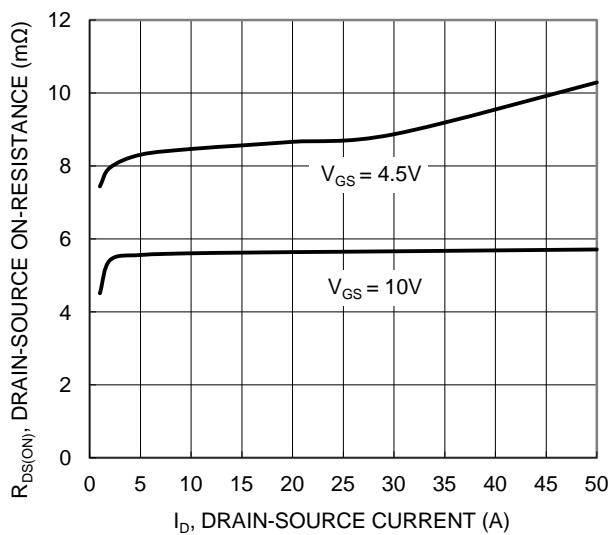


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

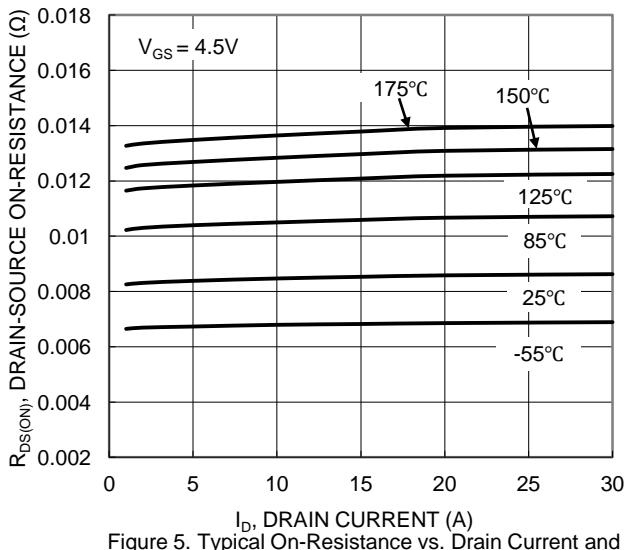


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

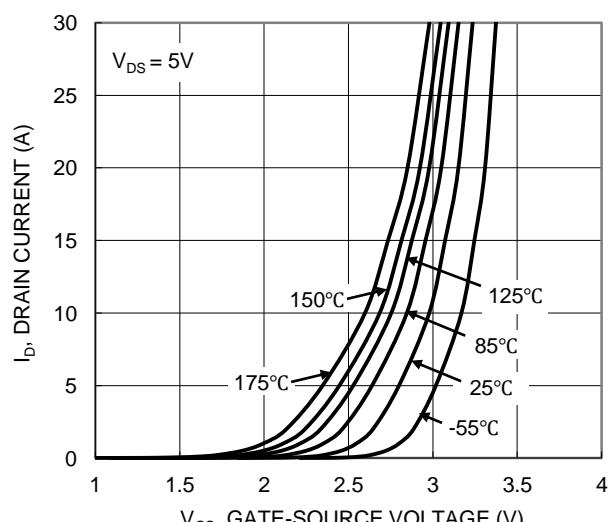


Figure 2. Typical Transfer Characteristic

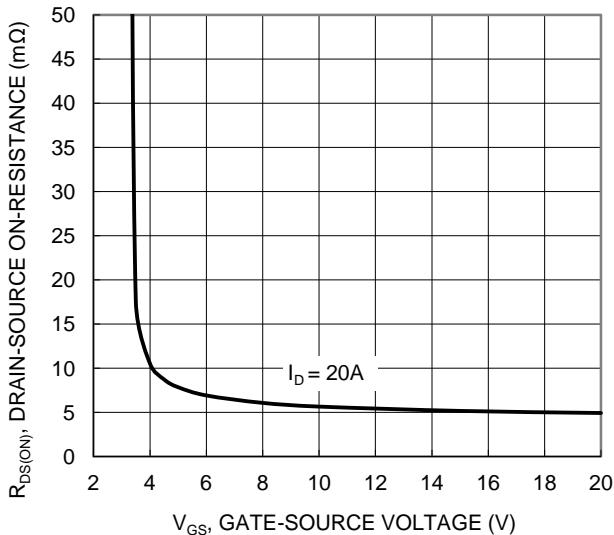


Figure 4. Typical Transfer Characteristic

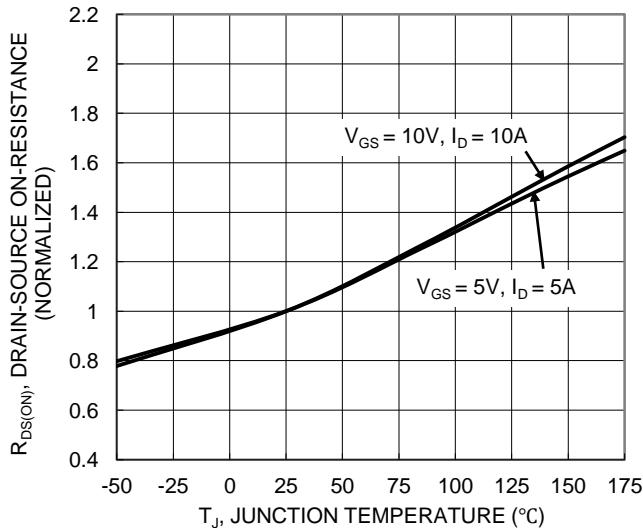
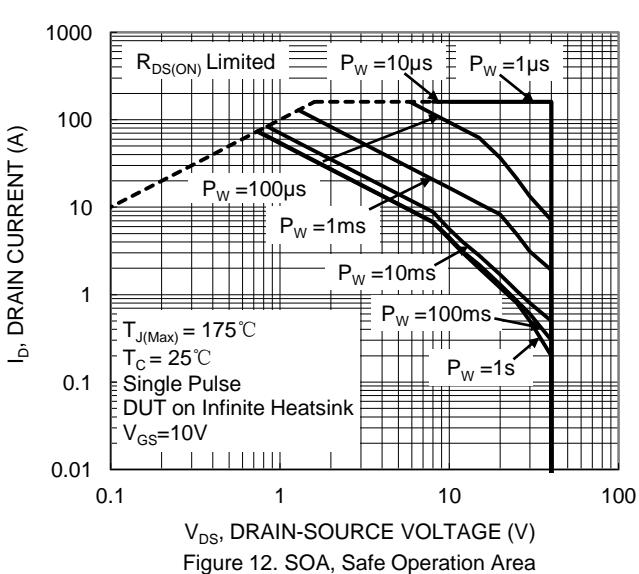
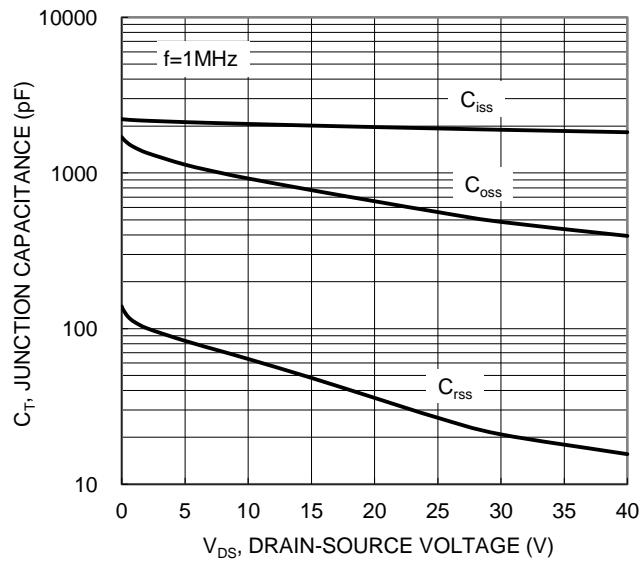
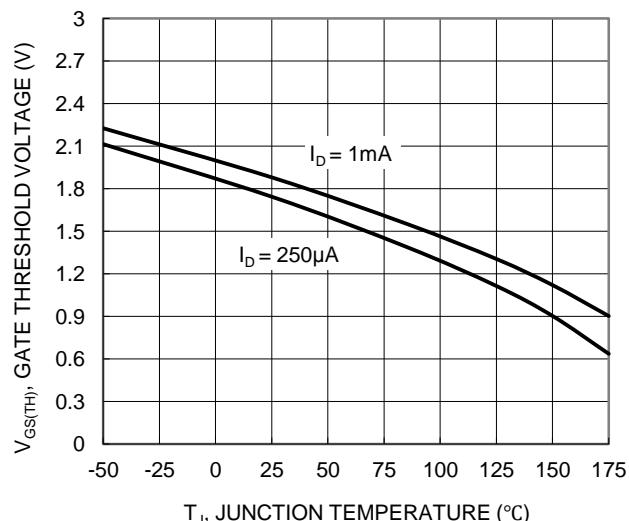
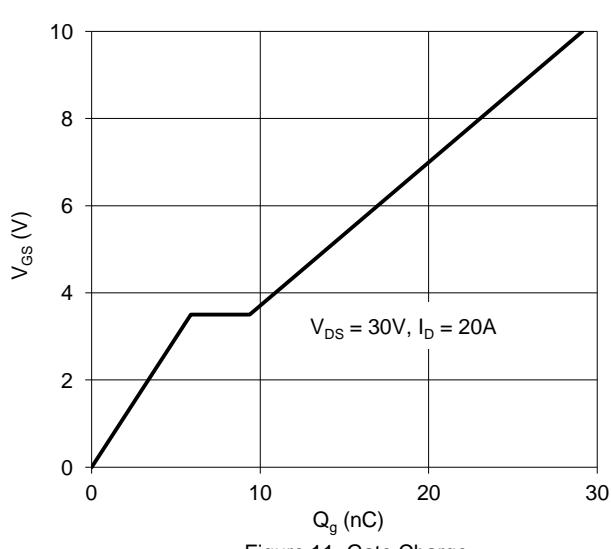
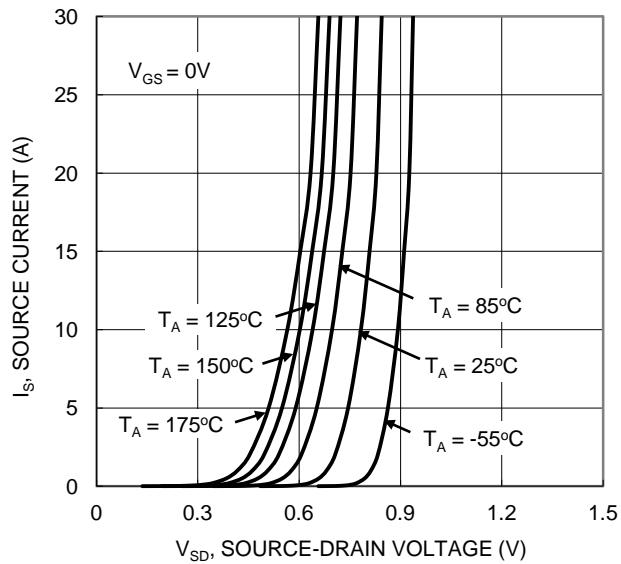
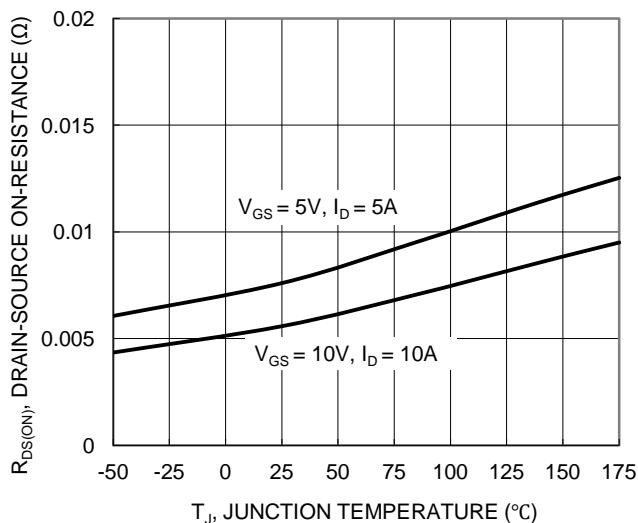


Figure 6. On-Resistance Variation with Temperature



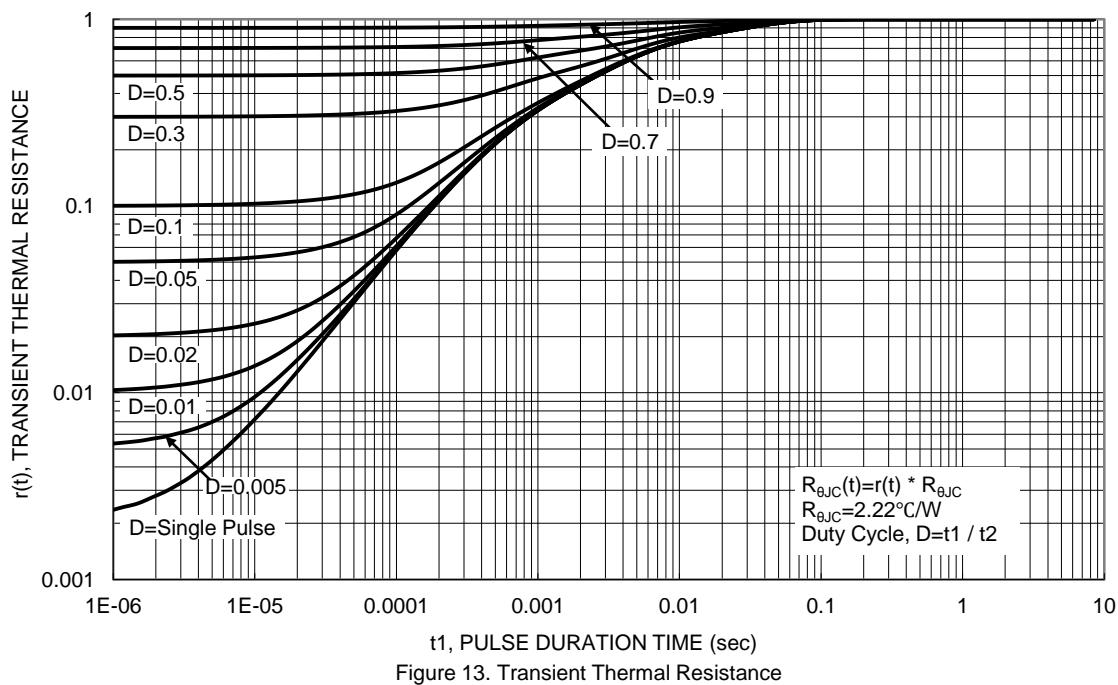
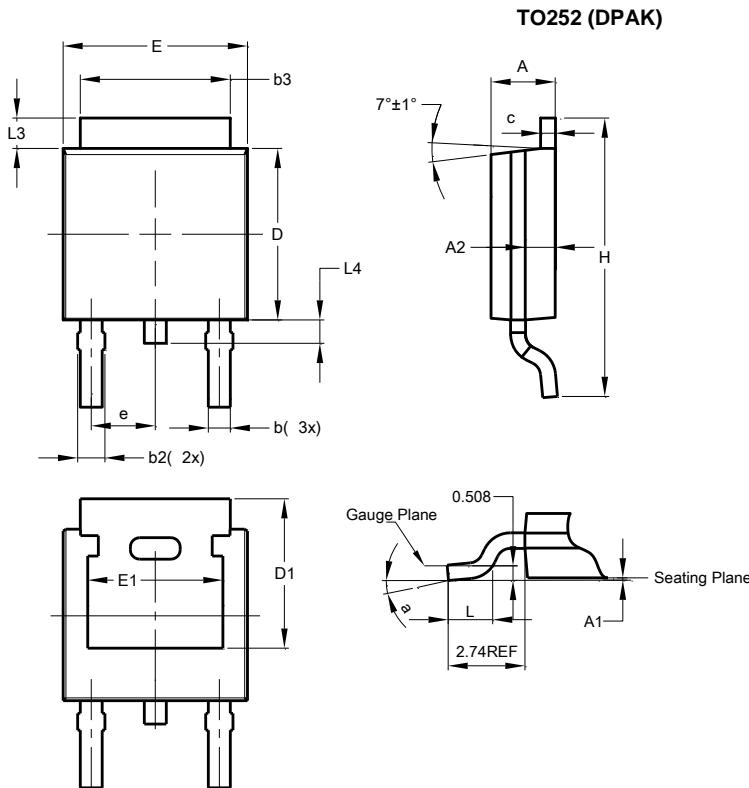


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

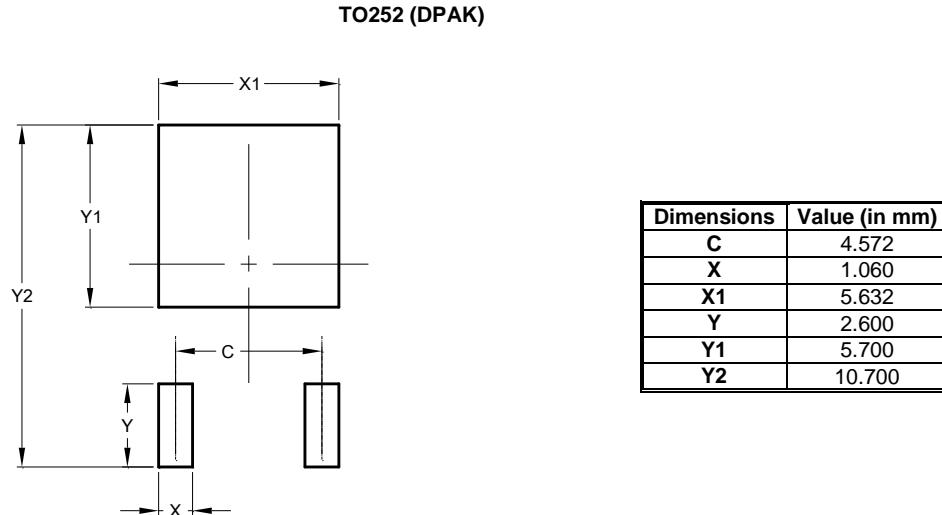


TO252 (DPAK)			
Dim	Min	Max	Typ
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.46	5.33
c	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	-	-
e	-	-	2.286
E	6.45	6.70	6.58
E1	4.32	-	-
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02	0.83
a	0°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

All Dimensions in mm

Suggested Pad Layout

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



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