

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _C = +25°C
40V	3.6mΩ @ V _{GS} = 10V	100A
	5.2mΩ @ V _{GS} = 5V	90A

Description and Applications

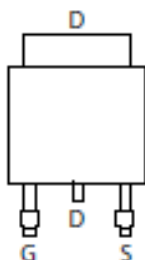
This new generation MOSFET is designed to minimize the on-state resistance (R_{DS(ON)}), yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- Power Management Functions
- DC-DC Converters
- Backlighting

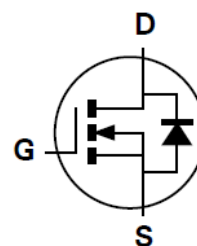
TO252 (DPAK)



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 R_{DS(ON)} – Ensures On-State Losses are Minimized
- Excellent Q_{GD} X R_{DS(ON)} Product (FOM)
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **An Automotive-Compliant Part is Available Under Separate Datasheet ([DMTH43M8LK3Q](#))**

Mechanical Data

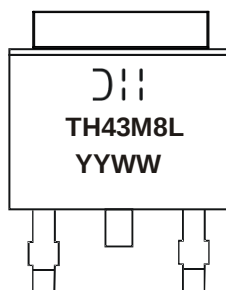
- Case: TO252 (DPAK)
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Finish - Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208@3
- Weight: 0.33 grams (Approximate)

Ordering Information (Note 4)

Part Number	Case	Packaging
DMTH43M8LK3-13	TO252 (DPAK)	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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



DII = Manufacturer's Marking
 TH43M8L = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 17 = 2017)
 WW = Week Code (01 to 53)

Maximum Ratings (@T_A = +25°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} = 10V (Note 5)	I _D	T _A = +25°C 17.6	A
		T _A = +100°C 12.5	
Continuous Drain Current, V _{GS} = 10V (Note 6)	I _D	T _C = +25°C 100	A
		T _C = +100°C 80	
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)	I _{DM}	150	A
Maximum Continuous Body Diode Forward Current (Note 6)	I _S	70	A
Pulsed Body Diode Forward Current (10μs Pulse, Duty Cycle = 1%)	I _{SM}	150	A
Avalanche Current, L=1mH	I _{AS}	13.2	A
Avalanche Energy, L=1mH	E _{AS}	87	mJ

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

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P _D	3.1	W
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	47	°C/W
Total Power Dissipation (Note 6)	P _D	88	W
Thermal Resistance, Junction to Case (Note 6)	R _{θJC}	1.7	°C/W
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 7)						
Drain-Source Breakdown Voltage	BV _{DSS}	40	—	—	V	V _{GS} = 0V, I _D = 1mA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	μA	V _{DS} = 32V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(TH)}	1	—	2.5	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	2.9	3.6	mΩ	V _{GS} = 10V, I _D = 20A
Static Drain-Source On-Resistance	R _{DS(ON)}	—	4.3	5.2	mΩ	V _{GS} = 5V, I _D = 15A
Diode Forward Voltage	V _{SD}	—	—	1.2	V	V _{GS} = 0V, I _S = 20A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{ISS}	—	2,693	—	pF	V _{DS} = 20V, V _{GS} = 0V, f = 1MHz
Output Capacitance	C _{OSS}	—	1,172	—		
Reverse Transfer Capacitance	C _{RSS}	—	52	—		
Gate Resistance	R _G	—	2.54	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 10V)	Q _G	—	38.5	—	nC	V _{DS} = 20V, I _D = 20A
Total Gate Charge (V _{GS} = 4.5V)	Q _G	—	17.6	—		
Gate-Source Charge	Q _{GS}	—	6.9	—		
Gate-Drain Charge	Q _{GD}	—	6.9	—		
Turn-On Delay Time	t _{D(ON)}	—	5.2	—	ns	V _{DD} = 20V, V _{GS} = 10V, I _D = 20A, R _G = 1.6Ω
Turn-On Rise Time	t _R	—	5.7	—		
Turn-Off Delay Time	t _{D(OFF)}	—	23.5	—		
Turn-Off Fall Time	t _F	—	11	—		
Body Diode Reverse Recovery Time	t _{RR}	—	35.4	—	ns	I _F = 15A, di/dt = 100A/μs
Body Diode Reverse Recovery Charge	Q _{RR}	—	32.9	—	nC	

- Notes:
5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch 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.

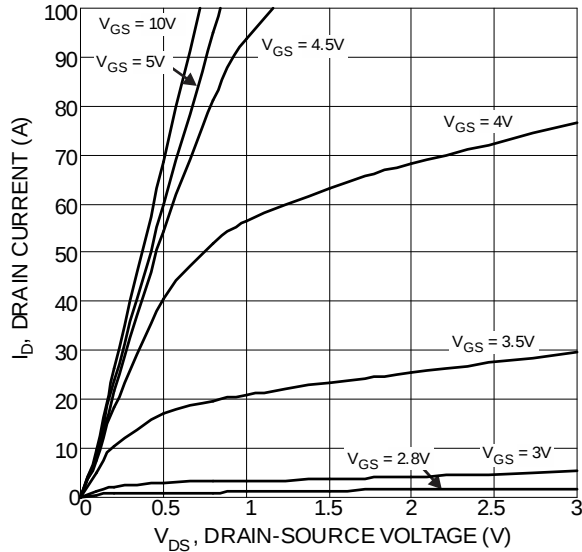


Figure 1 Typical Output Characteristic

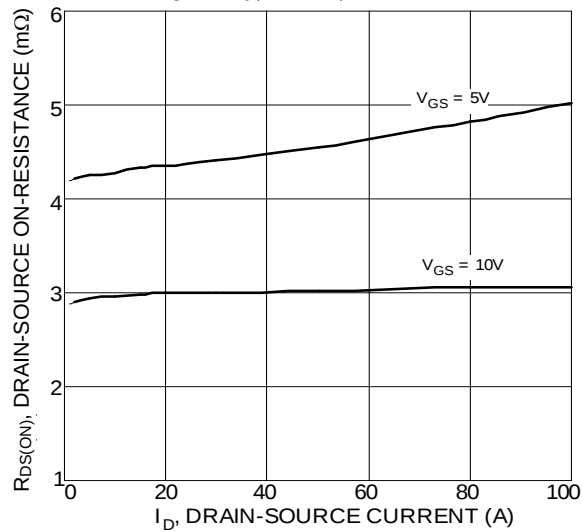


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

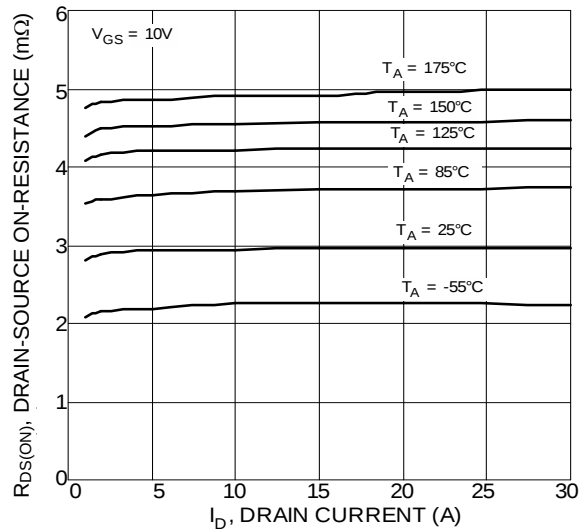


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

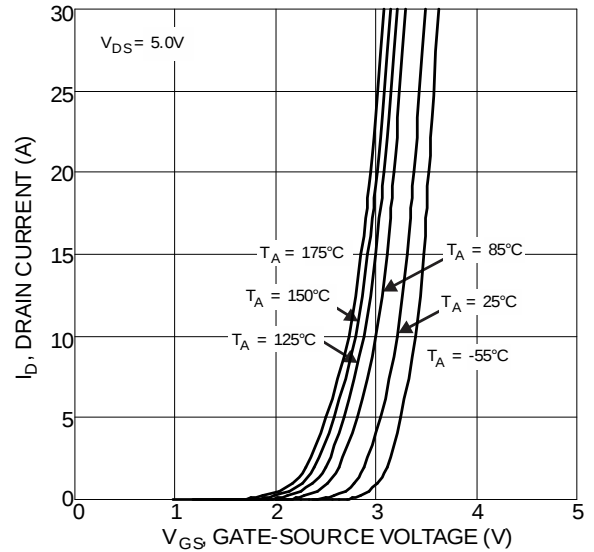


Figure 2 Typical Transfer Characteristics

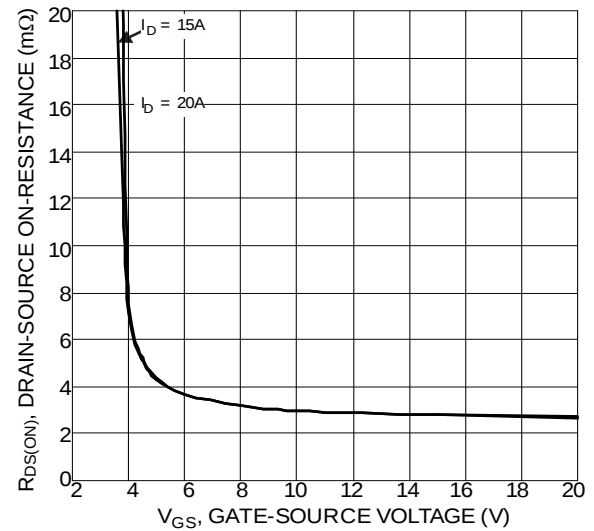


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

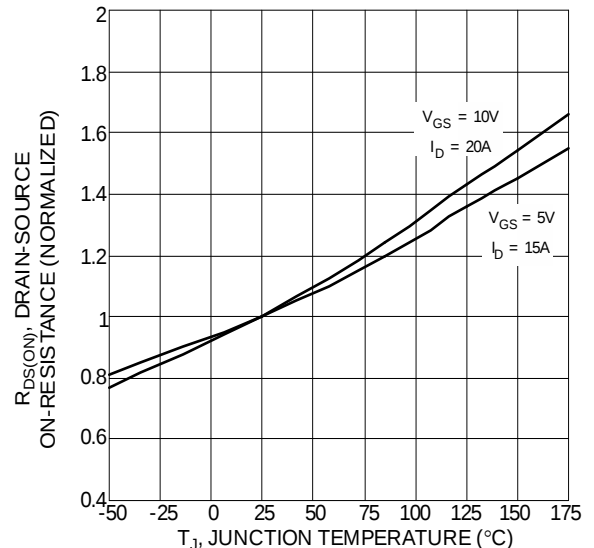


Figure 6 On-Resistance Variation with Temperature

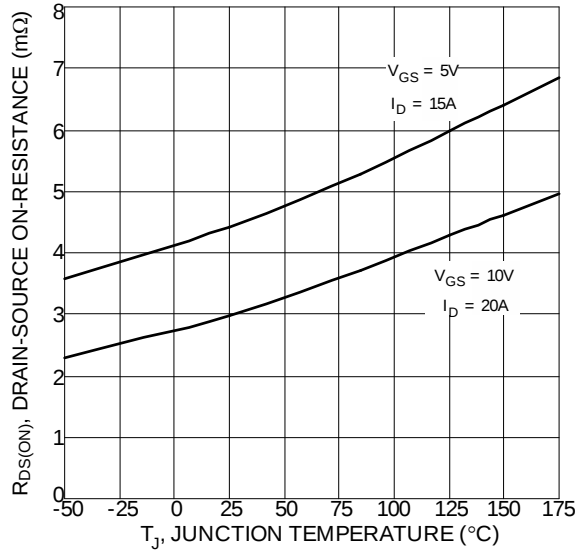


Figure 7 On-Resistance Variation with Temperature

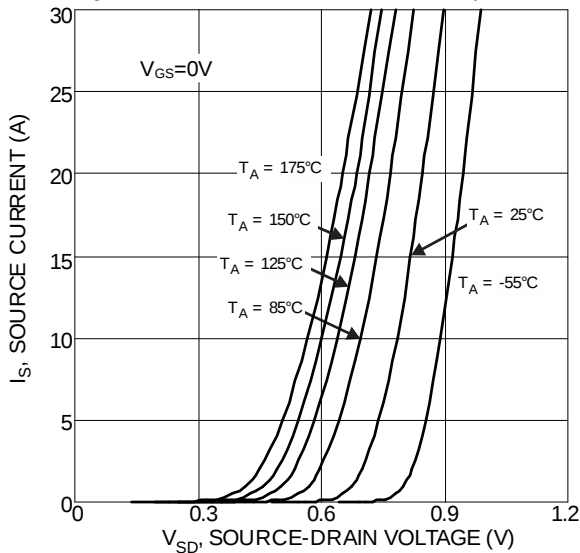


Figure 9 Diode Forward Voltage vs. Current

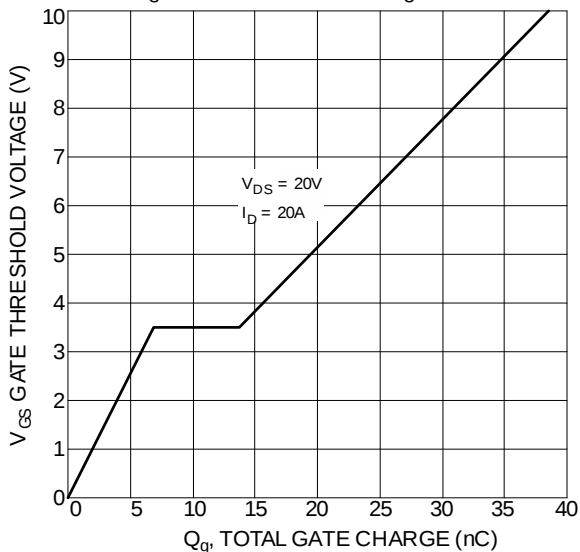


Figure 11 Gate Charge

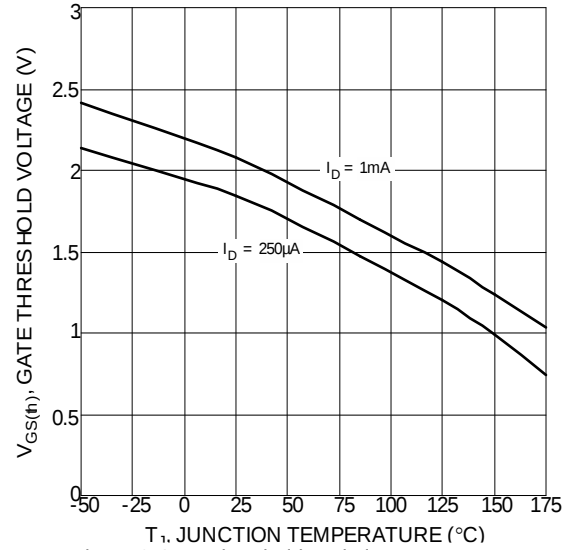


Figure 8 Gate Threshold Variation vs. Temperature

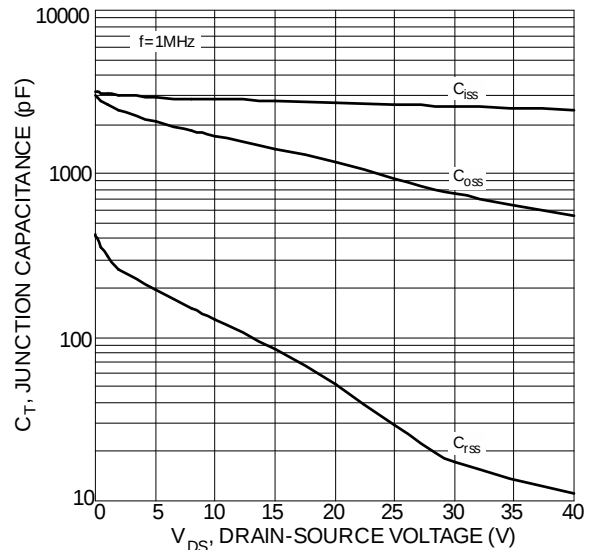


Figure 10 Typical Junction Capacitance

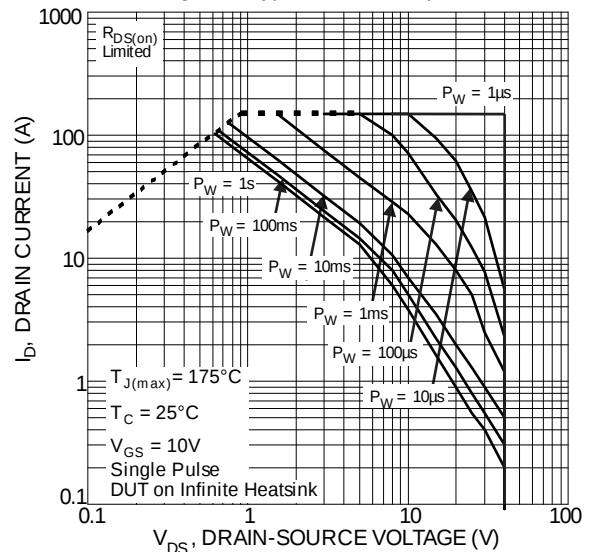
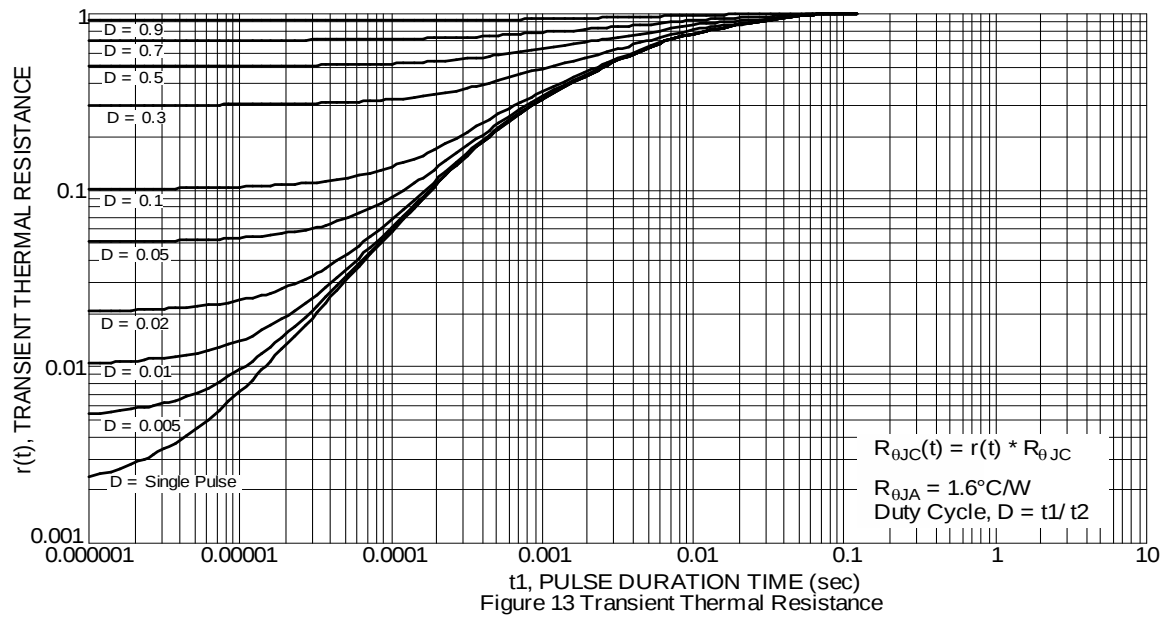


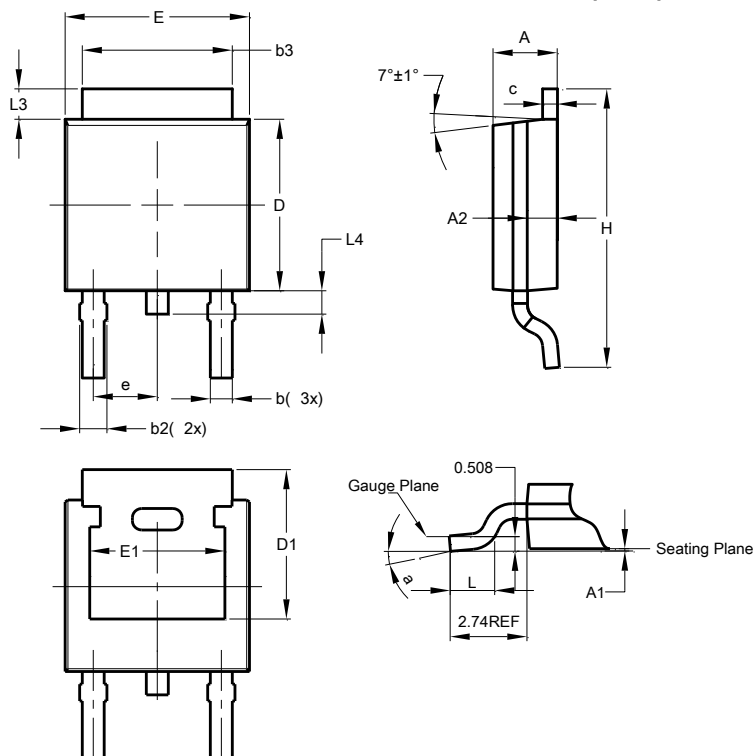
Figure 12 SOA, Safe Operation Area



Package Outline Dimensions

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

TO252 (DPAK)

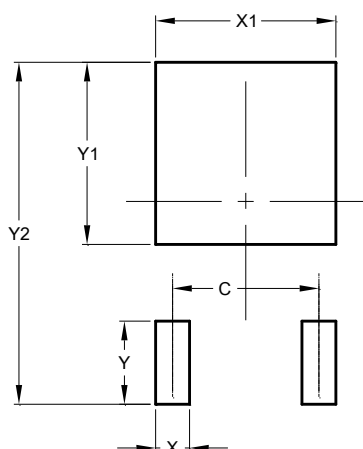


TO252 (DPAK)			
Dim	Min	Max	Typ
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.46	5.33
c	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	-	-
e	-	-	2.286
E	6.45	6.70	6.58
E1	4.32	-	-
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02	0.83
a	0°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