600V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D T_C = +25°C
600V	3.5Ω @ V_{GS} = 10V	2.8A

Description

This new generation complementary MOSFET features low on-resistance and fast switching, making it ideal for high efficiency power management applications.

Applications

- Motor Control
- Backlighting
- DC-DC Converters
- Power Management Functions

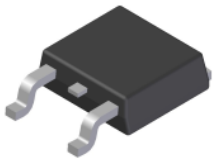
Features

- Low Input Capacitance
- High BV_{DSS} Rating for Power Application
- Low Input/Output Leakage
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

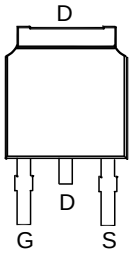
Mechanical Data

- Case: TO252 (DPAK) (Type TH)
- 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 Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.33 grams (Approximate)

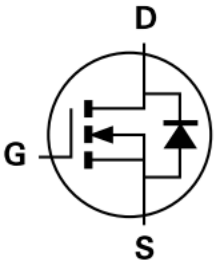
TO252 (DPAK) (Type TH)



Top View



Top View



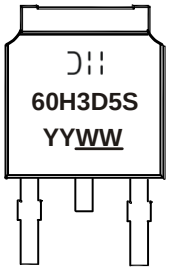
Internal Schematic

Ordering Information (Note 4)

Part Number	Case	Packaging
DMN60H3D5SK3-13	TO252 (DPAK) (Type TH)	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



=Manufacturer's Marking
60H3D5S = Product Type Marking Code
YYWW = Date Code Marking
YY or YY = Last Two Digits of Year (ex: 17 = 2017)
WW or WW = Week Code (01 to 53)

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	600	V
Gate-Source Voltage			V_{GSS}	±30	V
Continuous Drain Current (Note 5) V_{GS} = 10V	Steady State	T_C = +25°C T_C = +100°C	I_D	2.8 1.8	A
Maximum Body Diode Forward Current (Note 5)			I_S	2.5	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I_{DM}	4.4	A
Avalanche Current, L = 60mH (Note 7)			I_{AS}	1.0	A
Avalanche Energy, L = 60mH (Note 7)			E_{AS}	30	mJ
Peak Diode Recovery dv/dt (V_{DD} = 400V, I_D = 2.7A)			dv/dt	2.7	V/ns

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T_C = +25°C	P_D	41	W
	T_C = +100°C		16	
Thermal Resistance, Junction to Ambient (Note 6)		$R_{\theta JA}$	46	°C/W
Thermal Resistance, Junction to Case (Note 5)		$R_{\theta JC}$	3.0	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	600	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1.0	µA	V_{DS} = 600V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±30V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	2.0	3.1	4.0	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	2.7	3.5	Ω	V_{GS} = 10V, I_D = 1.5A
Diode Forward Voltage	V_{SD}	—	0.9	1.5	V	V_{GS} = 0V, I_S = 3.0A
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C_{iss}	—	354	—	pF	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	41	—		
Reverse Transfer Capacitance	C_{rss}	—	4	—		
Gate Resistance	R_G	—	2.6	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge (V_{GS} = 10V)	Q_g	—	12.6	—	nC	V_{DS} = 480V, I_D = 2.5A
Gate-Source Charge	Q_{gs}	—	1.7	—		
Gate-Drain Charge	Q_{gd}	—	7.1	—		
Turn-On Delay Time	$t_{D(ON)}$	—	10.6	—	ns	V_{GS} = 10V , V_{DD} = 300V, R_G = 25Ω, I_D = 2.5A
Turn-On Rise Time	t_R	—	22	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	34	—		
Turn-Off Fall Time	t_F	—	28	—		
Body Diode Reverse Recovery Time	t_{RR}	—	198	—	ns	V_{GS} = 0V, I_S = 2.5A, dI/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q_{RR}	—	952	—	nC	

Notes:
5. Device mounted on infinite heatsink.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout.
7. Guaranteed by design. Not subject to production testing.
8. Short duration pulse test used to minimize self-heating effect.

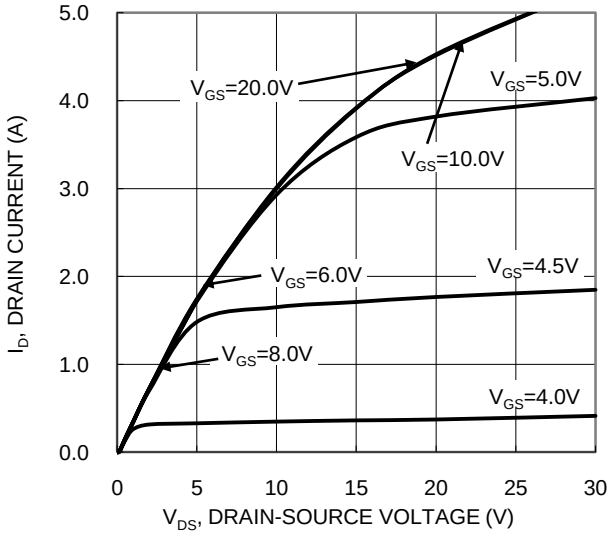


Figure 1. Typical Output Characteristic

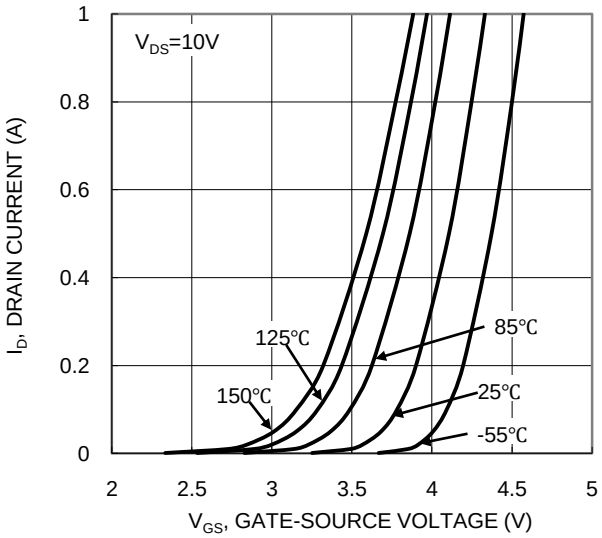


Figure 2. Typical Transfer Characteristic

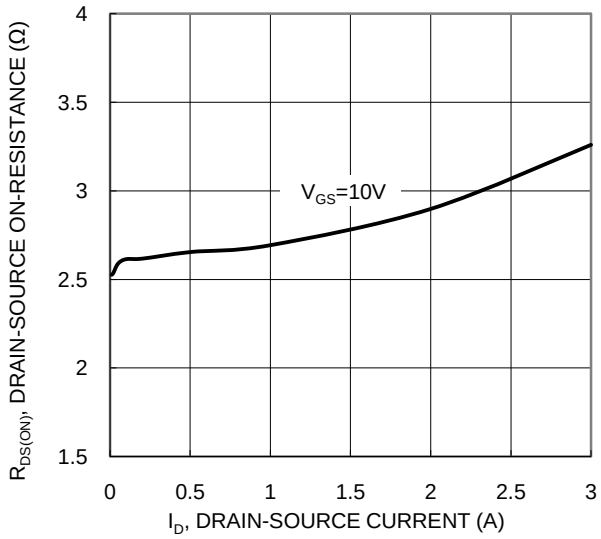


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

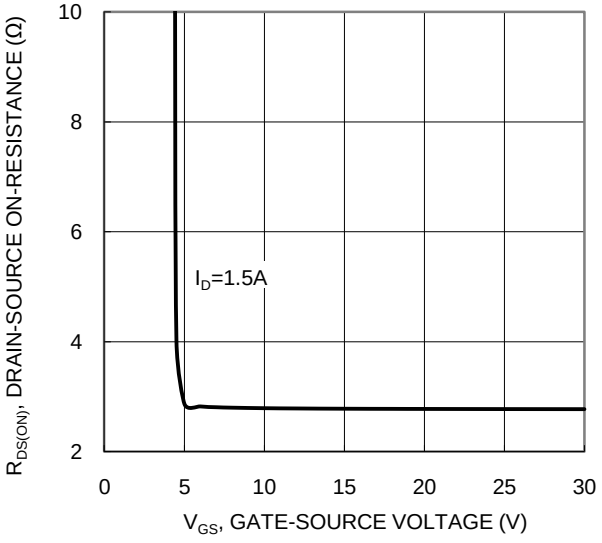


Figure 4. Typical Transfer Characteristic

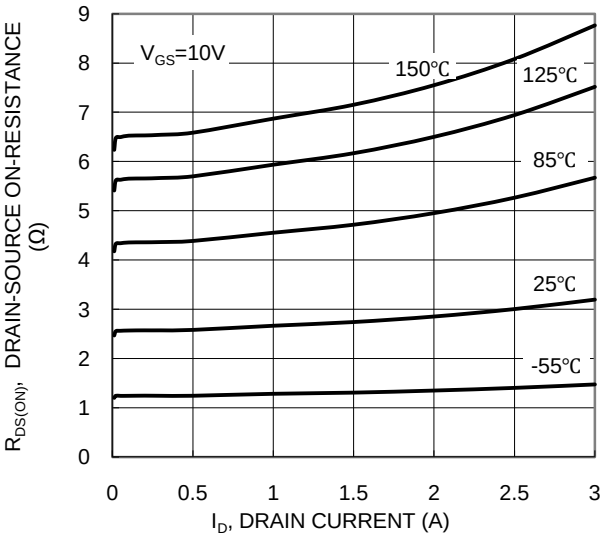


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

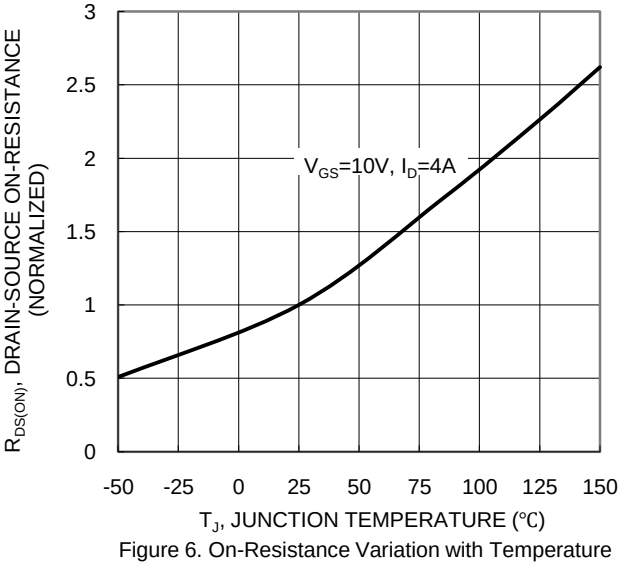


Figure 6. On-Resistance Variation with Temperature

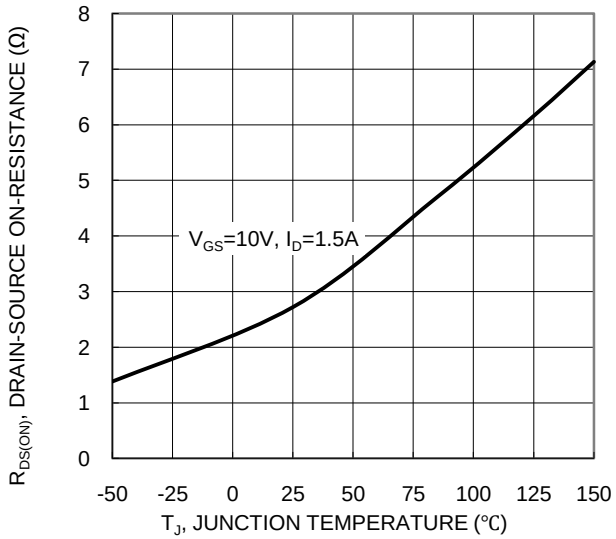


Figure 7. On-Resistance Variation with Temperature

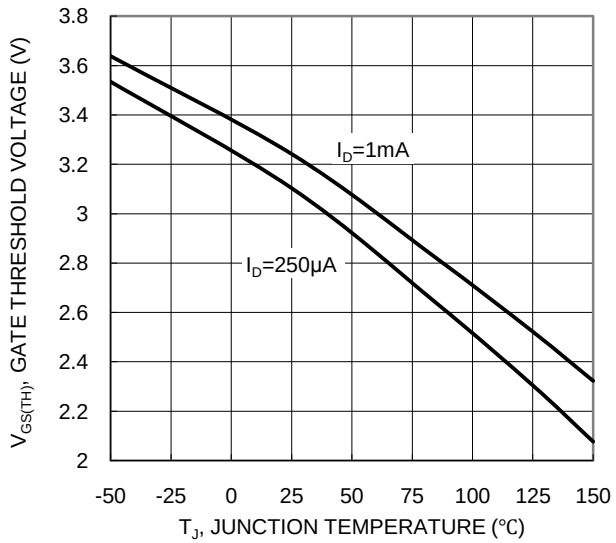


Figure 8. Gate Threshold Variation vs. Temperature

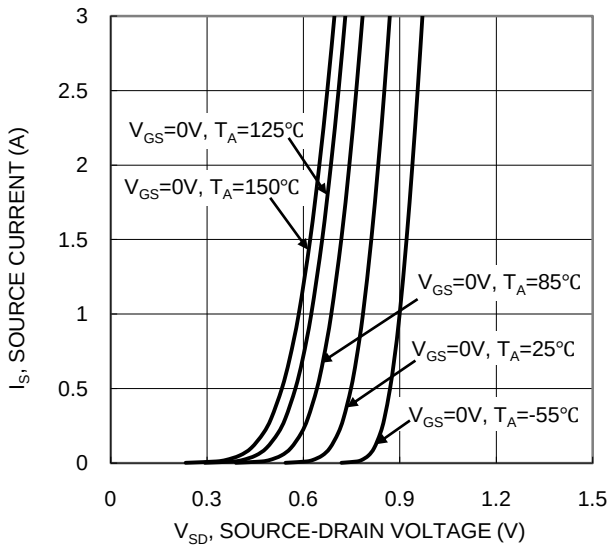


Figure 9. Diode Forward Voltage vs. Current

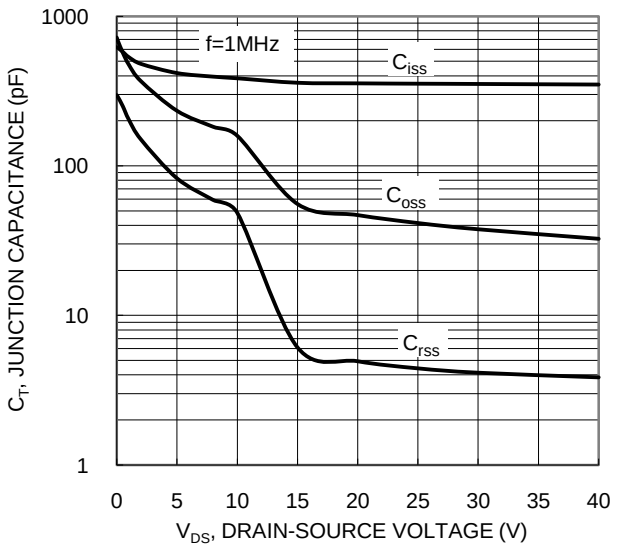


Figure 10. Typical Junction Capacitance

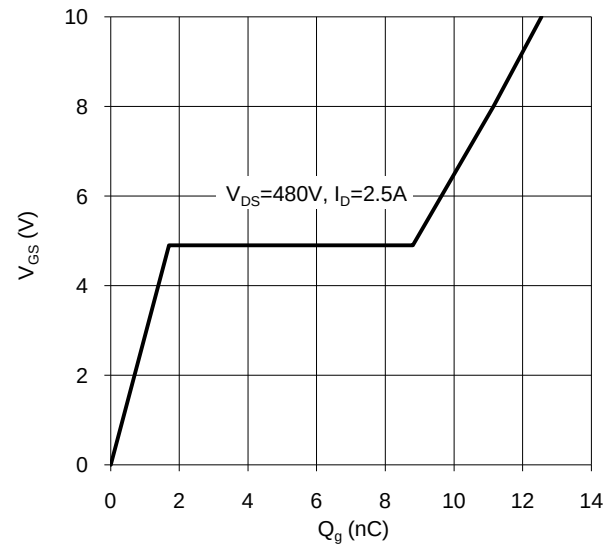


Figure 11. Gate Charge

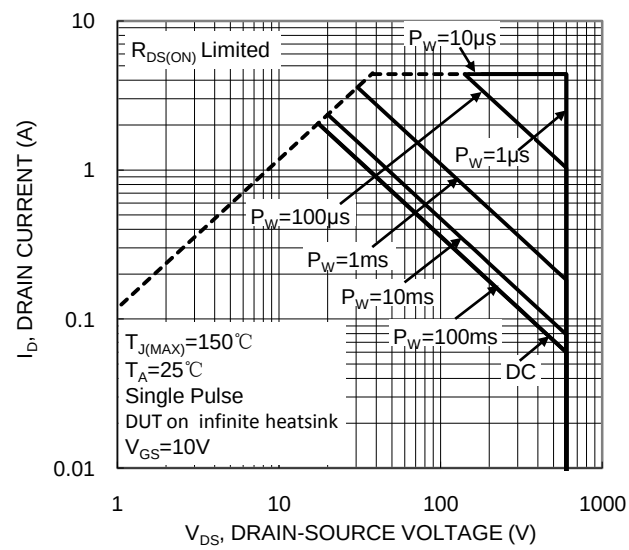


Figure 12. SOA, Safe Operation Area

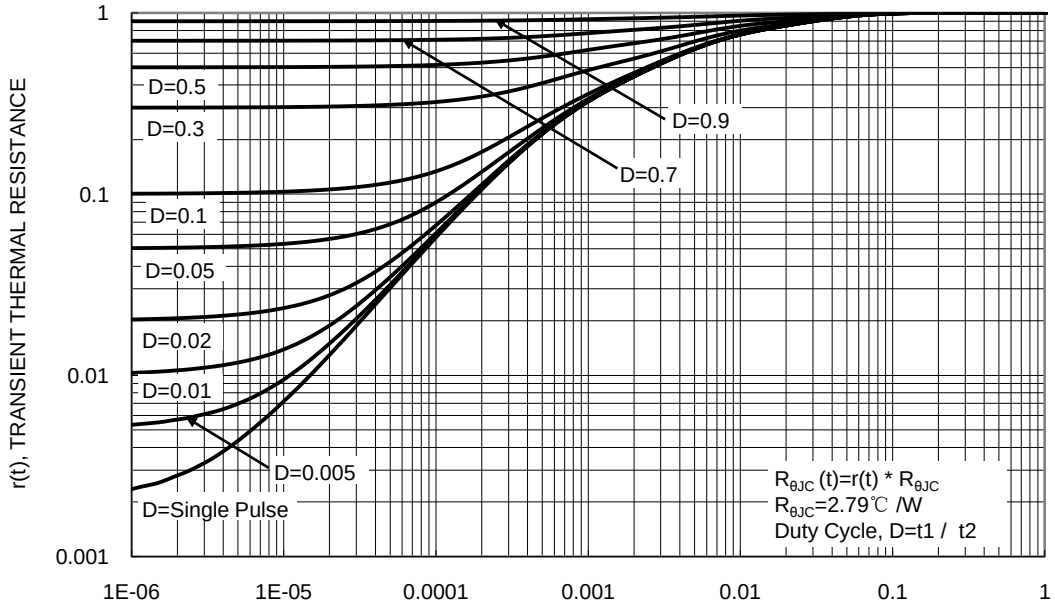
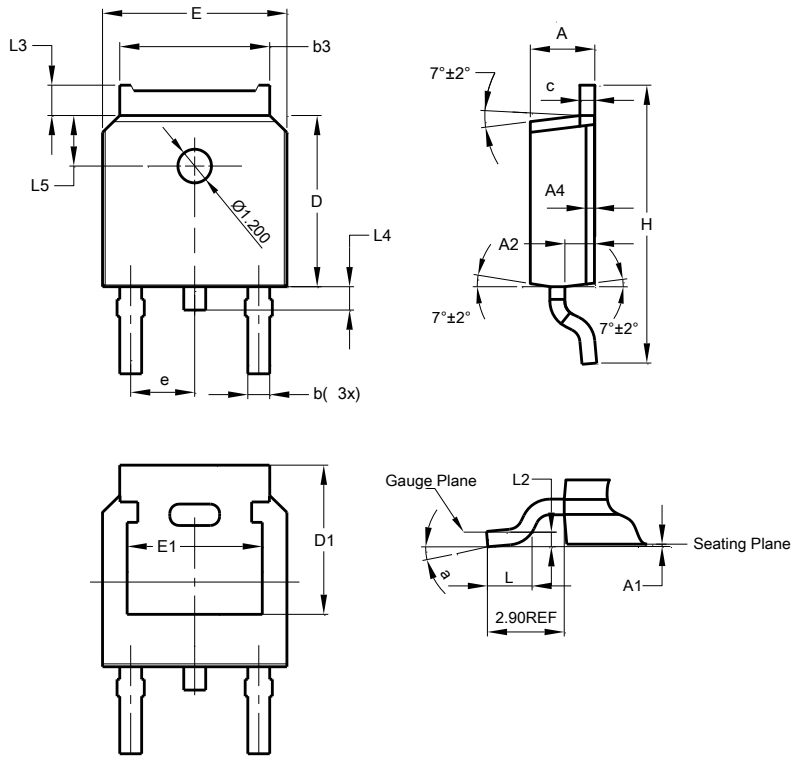


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

TO252 (DPAK) (Type TH)

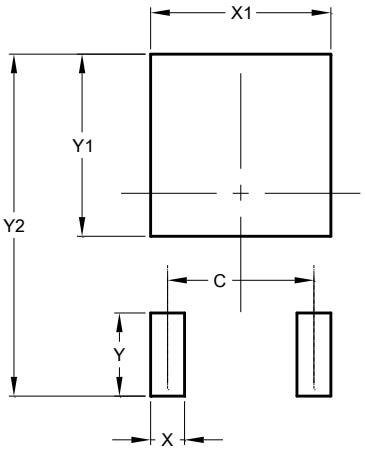


TO252 (DPAK) (Type TH)			
Dim	**Min**	**Max**	**Typ**
A	2.20	2.38	2.30
A1	0.00	0.10	-
A2	0.97	1.17	1.07
A4	0.10 REF		
b	0.72	0.85	0.78
b3	5.23	5.45	5.33
c	0.47	0.58	0.53
D	6.00	6.20	6.10
D1	5.30 REF		
e	2.286 BSC		
E	6.50	6.70	6.60
E1	4.70	4.92	4.83
H	9.90	10.10	10.30
L	1.40	1.70	1.60
L2	0.51 BSC		
L3	0.90	1.25	-
L4	0.60	1.00	0.80
L5	1.70	1.90	1.80
a	0°	8°	-
All Dimensions in mm			

Suggested Pad Layout

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

TO252 (DPAK) (Type TH)



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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