450V P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D T_C = +25°C
-450V	4.9Ω @ V_{GS} = -10V	-4.7A

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)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**

Description and Applications

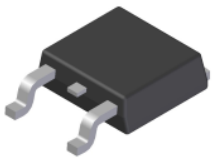
This MOSFET is designed to minimize the on-state resistance yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- Motor Control
- DC-DC Converters
- Power Management Functions
- Uninterrupted Power Supply

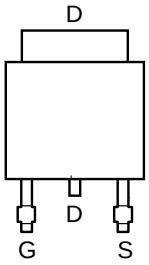
Mechanical Data

- Package: TO252
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- 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)

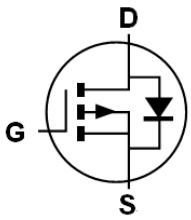
TO252 (DPAK)



Top View



Top View



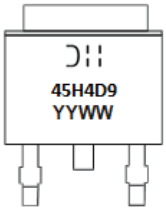
Internal Schematic

Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMP45H4D9HK3-13	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



= Manufacturer's Marking
45H4D9 = Product Type Marking Code
YYWW = Date Code Marking
YY or YY = Last Two Digits of Year (ex: 21 = 2021)
WW or WW = Week Code (01 to 53)

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	-450	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	-4.7 -3.0	A
Maximum Body Diode Forward Current (Note 5)			I_S	-1.5	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I_{DM}	-12	A
Avalanche Current, L = 60mH (Note 7)			I_{AS}	-2.5	A
Avalanche Energy, L = 60mH (Note 7)			E_{AS}	187	mJ

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T_C = +25°C	P_D	104	W
	T_C = +100°C		41	
Thermal Resistance, Junction to Ambient (Note 6)		$R_{\theta JA}$	41	°C/W
Thermal Resistance, Junction to Case (Note 5)		$R_{\theta JC}$	1.2	
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}	-450	—	—	V	V_{GS} = 0V, I_D = -250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	µA	V_{DS} = -450V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±30V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	-3.0	-4.0	-5.0	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	3.1	4.9	Ω	V_{GS} = -10V, I_D = -1.05A
Diode Forward Voltage	V_{SD}	—	—	-1.4	V	V_{GS} = 0V, I_S = -2.1A
Forward Transconductance	gfs	—	1.4	—	S	V_{DS} = -50.0V, I_D = -1.05A
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C_{iss}	—	564	—	pF	V_{DS} = -25V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	70	—		
Reverse Transfer Capacitance	C_{rss}	—	3.3	—		
Total Gate Charge (V_{GS} = -10V)	Q_g	—	13.7	—	nC	V_{DS} = -360V, I_D = -2.7A, V_{GS} = -10V
Gate-Source Charge	Q_{gs}	—	3.4	—		
Gate-Drain Charge	Q_{gd}	—	6.0	—		
Turn-On Delay Time	$t_{D(ON)}$	—	21	—	ns	V_{DD} = -225V, R_G = 3.0Ω, I_D = -2.7A
Turn-On Rise Time	t_R	—	54	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	34	—		
Turn-Off Fall Time	t_F	—	34	—		
Body Diode Reverse Recovery Time	t_{RR}	—	168	—	ns	V_{GS} = 0V, V_{DD} = -200V, I_S = -2.7A, dI/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q_{RR}	—	1.3	—	µC	

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.

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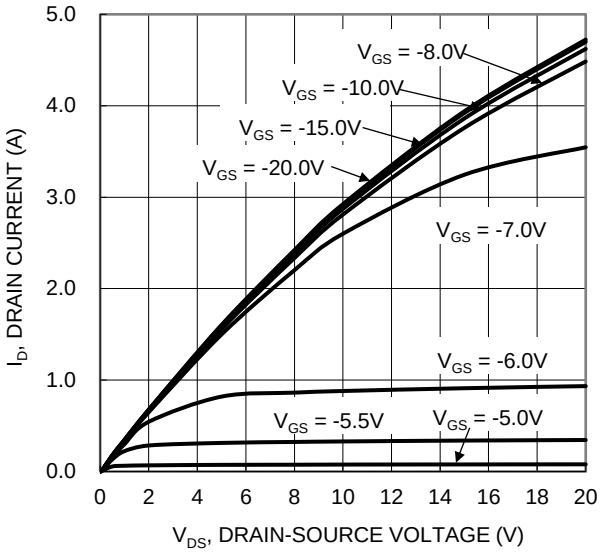


Figure 1. Typical Output Characteristic

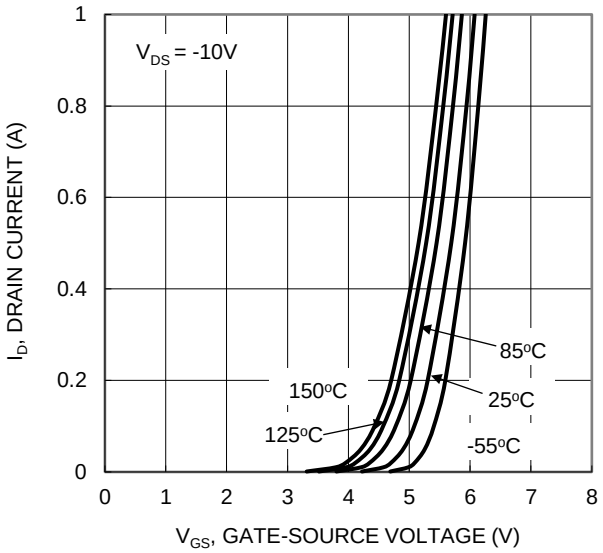


Figure 2. Typical Transfer Characteristic

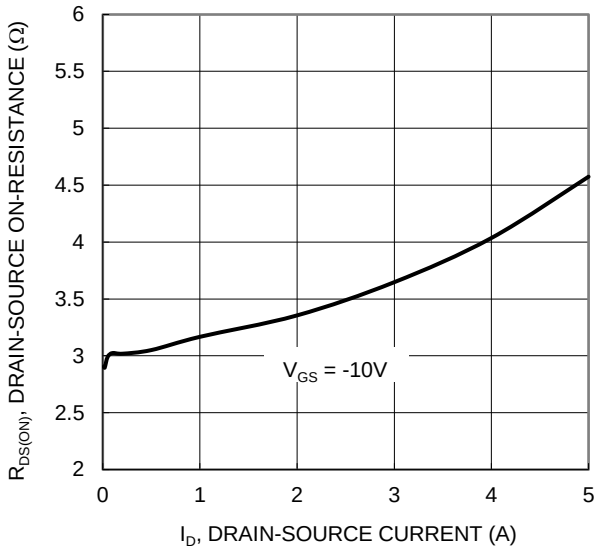


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

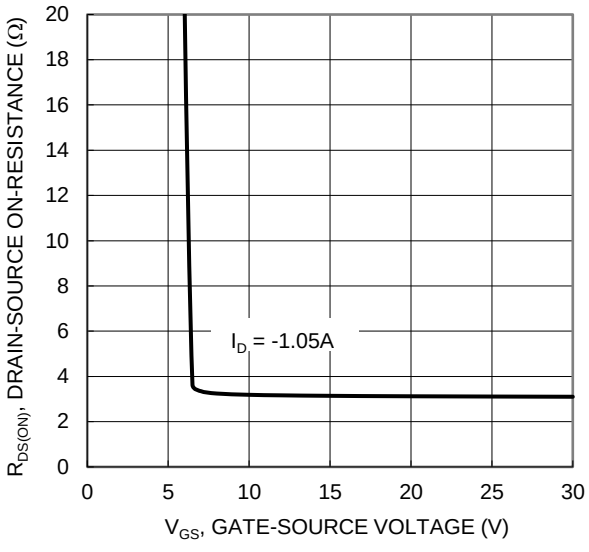


Figure 4. Typical Transfer Characteristic

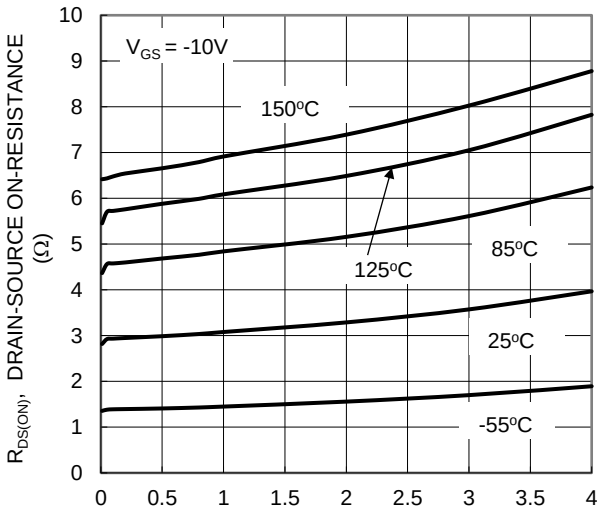


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

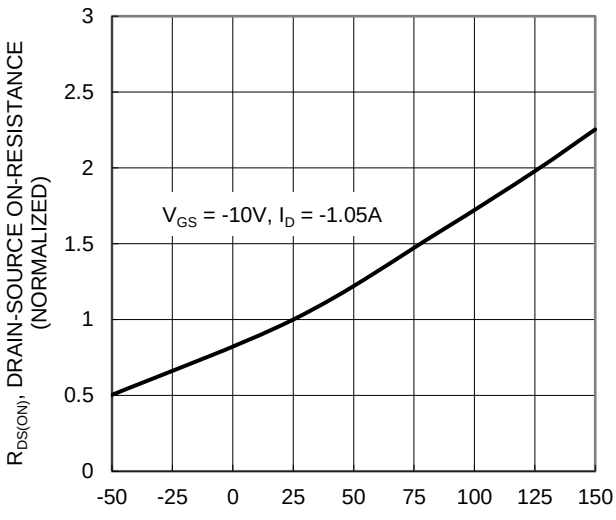


Figure 6. On-Resistance Variation with Temperature

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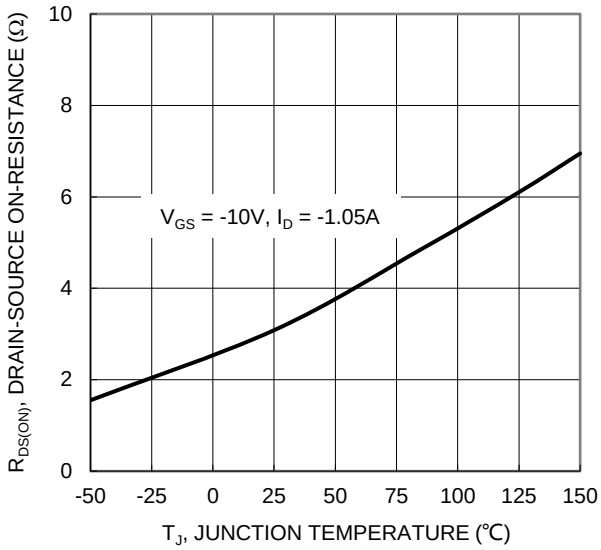


Figure 7. On-Resistance Variation with Temperature

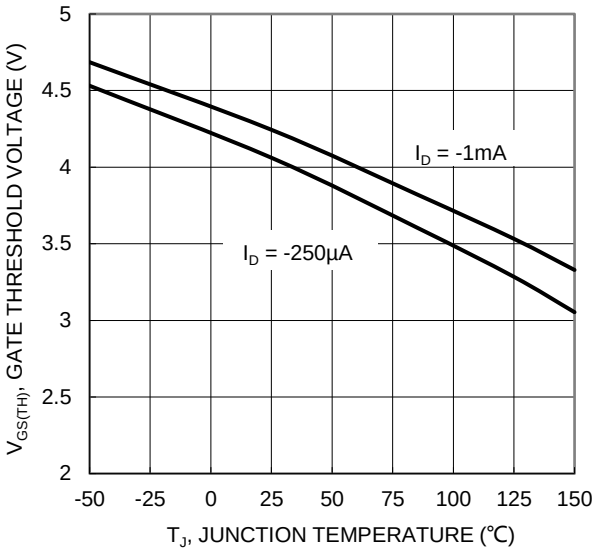


Figure 8. Gate Threshold Variation vs. Junction Temperature

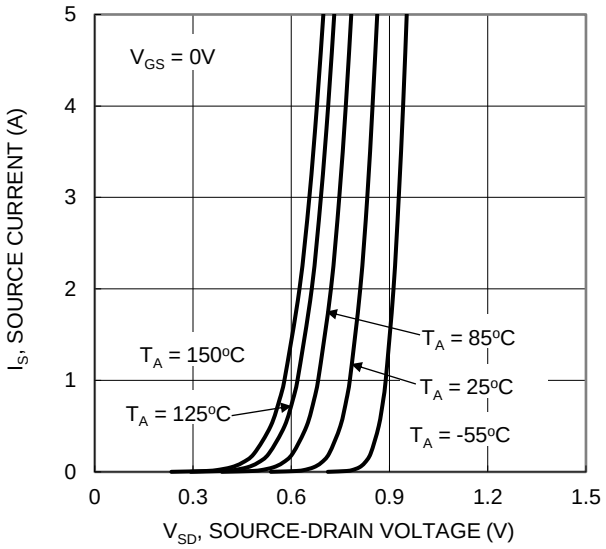


Figure 9. Diode Forward Voltage vs. Current

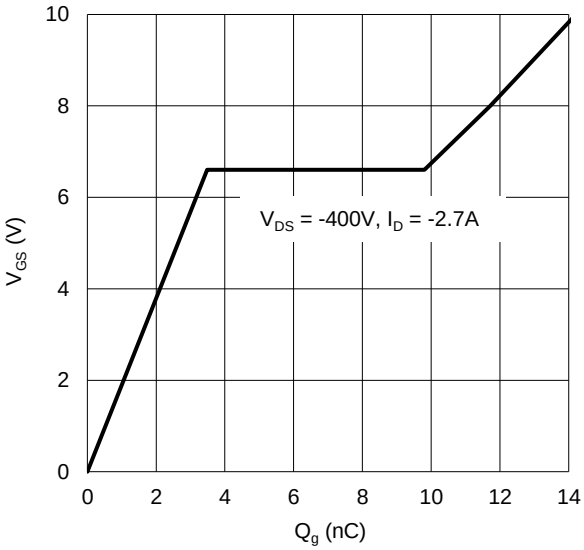


Figure 10. Gate Charge

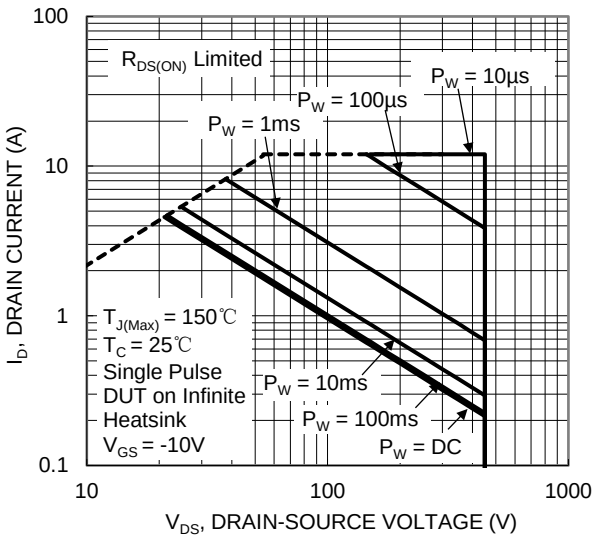


Figure 11. SOA, Safe Operation Area

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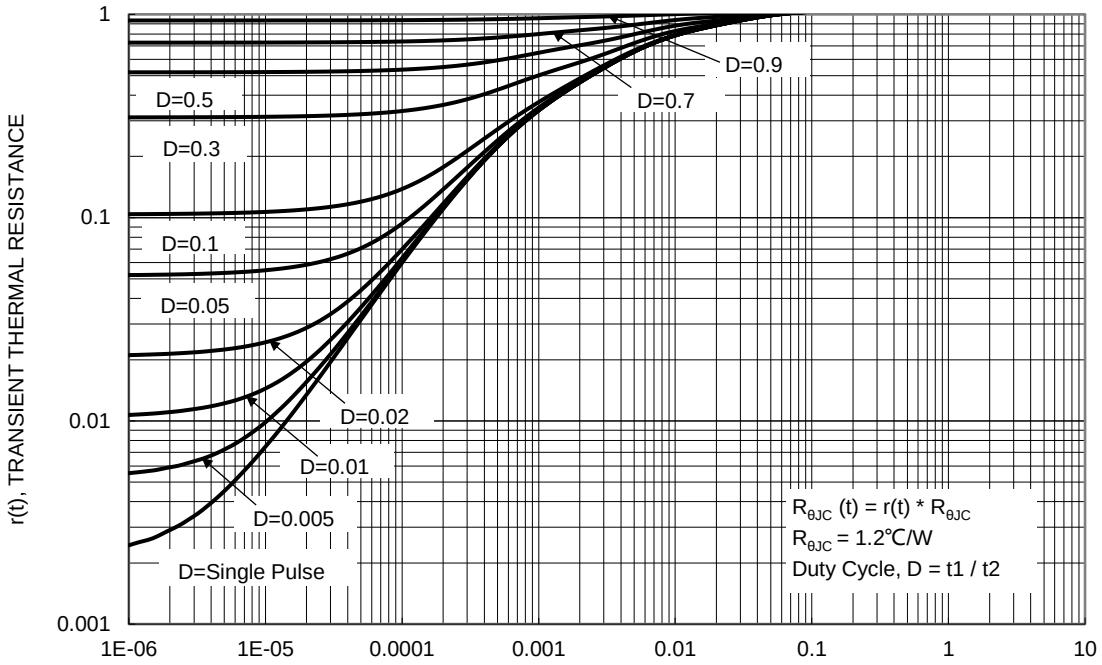


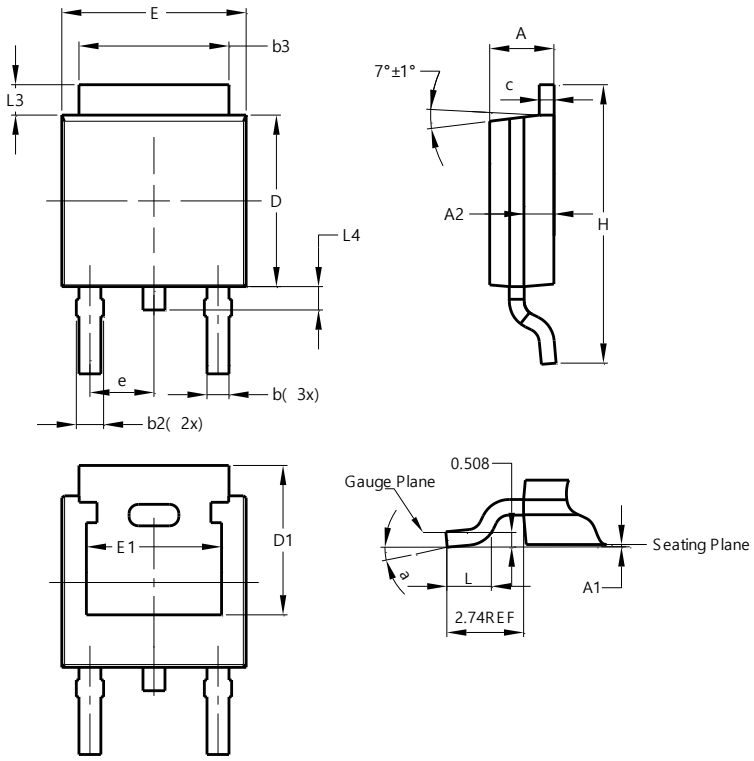
Figure 12. Transient Thermal Resistance

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Package Outline Dimensions

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

TO252 (DPAK)

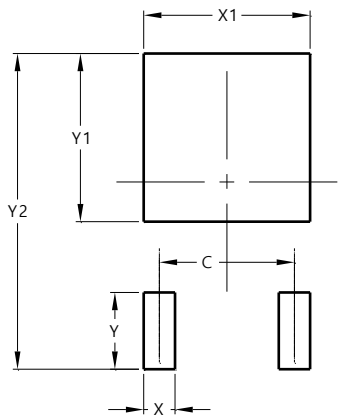


TO252 (DPAK)			
Dim	**Min**	**Max**	**Typ**
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.46	5.33
c	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	-	-
e	-	-	2.286
E	6.45	6.70	6.58
E1	4.32	-	-
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02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