40V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV_{DSS}	$R_{DS(ON)}$	I_D T_A = +25°C
40V	30mΩ @V_{GS} = 10V	9.6A
	50mΩ @V_{GS} = 4.5V	7.4A

Features and Benefits

- Low On-Resistance
- Fast Switching Speed
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DMN4030LK3Q is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**
  https://www.diodes.com/quality/product-definitions/

Description and Applications

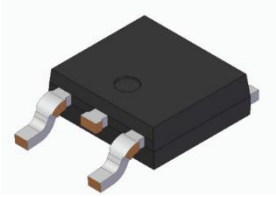
This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

- Backlighting
- DC-DC converters
- Power-management functions

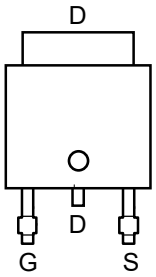
Mechanical Data

- Package: TO252
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.33 grams (Approximate)

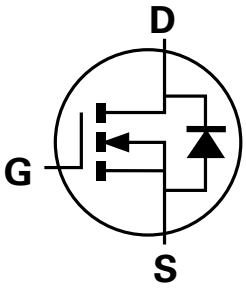
TO252 (DPAK)



Top View



Top View
Pinout



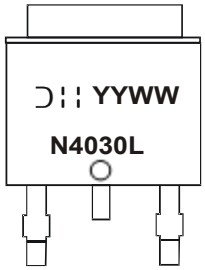
Equivalent Circuit

Ordering Information (Note 4)

Orderable Part Number	Package	Packing	
		Qty.	Carrier
DMN4030LK3Q-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
N4030L = Product Type Marking Code
YYWW = Date Code Marking
YY = Year (ex: 26 = 2026)
WW = Week (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}	40	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current (Note 5) V_{GS} = 10V	Steady State	T_A = +25°C T_A = +70°C	I_D	9.6 7.7	A
Maximum Body Diode Continuous Current (Note 5)			I_S	9.6	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%) (Note 6)			I_{DM}	37.7	A
Pulsed Source Current (10µs Pulse, Duty Cycle = 1%) (Note 6)			I_{SM}	37.7	A

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

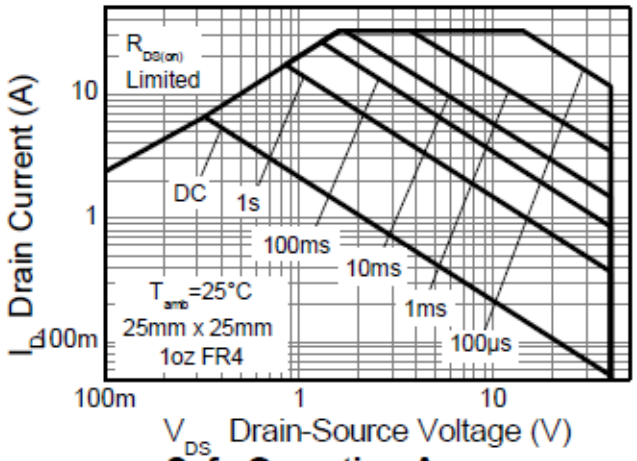
Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T_A = +25°C	P_D	4.18	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	29.9	°C/W
Total Power Dissipation (Note 7)	T_A = +25°C	P_D	2.14	W
Thermal Resistance, Junction to Ambient (Note 7)	Steady State	$R_{\theta JA}$	58.4	°C/W
Thermal Resistance, Junction to Case (Note 8)		$R_{\theta JC}$	2.46	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

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

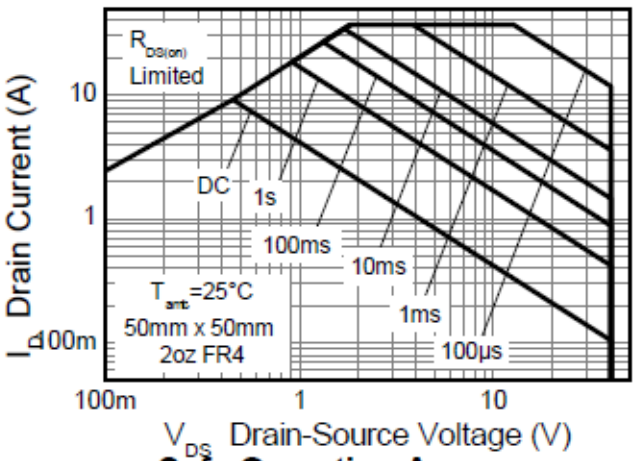
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 9)						
Drain-Source Breakdown Voltage	BV_{DSS}	40	—	—	V	V_{GS} = 0, I_D = 250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	µA	V_{DS} = 40V, V_{GS} = 0
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	$V_{GS(TH)}$	1	—	3	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	21	30	mΩ	V_{GS} = 10V, I_D = 12A
		—	37	50		V_{GS} = 4.5V, I_D = 6A
Diode Forward Voltage	V_{SD}	—	0.95	1.1	V	V_{GS} = 0, I_S = 12A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{iss}	—	604	—	pF	V_{DS} = 20V, V_{GS} = 0, f = 1.0MHz
Output Capacitance	C_{oss}	—	106	—		
Reverse Transfer Capacitance	C_{rss}	—	59.6	—		
Total Gate Charge (V_{GS} = 4.5V)	Q_g	—	6.5	—	nC	V_{DS} = 20V, I_D = 12A
Total Gate Charge (V_{GS} = 10V)	Q_g	—	12.9	—		
Gate-Source Charge	Q_{gs}	—	2.3	—		
Gate-Drain Charge	Q_{gd}	—	3.6	—		
Turn-On Delay Time	$t_{D(ON)}$	—	4.2	—	ns	V_{DD} = 20V, I_D = 12A V_{GS} = 10V, R_G = 6Ω
Turn-On Rise Time	t_R	—	12.4	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	13.8	—		
Turn-Off Fall Time	t_F	—	10.7	—		
Body Diode Reverse-Recovery Time	t_{RR}	—	135	—	ns	I_F = 12A, di/dt = 100A/µs
Body Diode Reverse-Recovery Charge	Q_{RR}	—	799	—	nC	I_F = 12A, di/dt = 100A/µs

Notes:
5. For a device surface mounted on 50mm x 50mm x 1.6mm FR-4 PCB with high coverage of single sided 2oz copper, in still air condition; the device is measured when operating in a steady-state condition.
6. Same as note 5, except the device is pulsed with D = 0.02 and pulse width 300µs. The pulse current is limited by the maximum junction temperature.
7. For a device surface mounted on 25mm x 25mm x 1.6mm FR-4 PCB with high coverage of single sided 1oz copper, in still air condition; the device is measured when operating in a steady-state condition.
8. Thermal resistance from junction to solder-point (at the end of the drain lead).
9. Short duration pulse test used to minimize self-heating effect.
10. Guaranteed by design. Not subject to product testing.

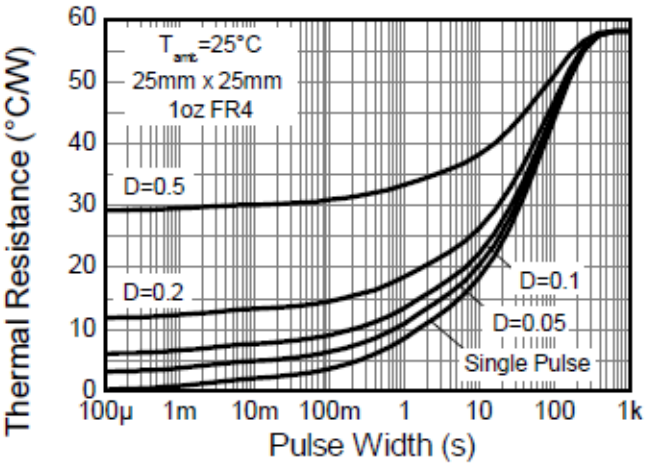
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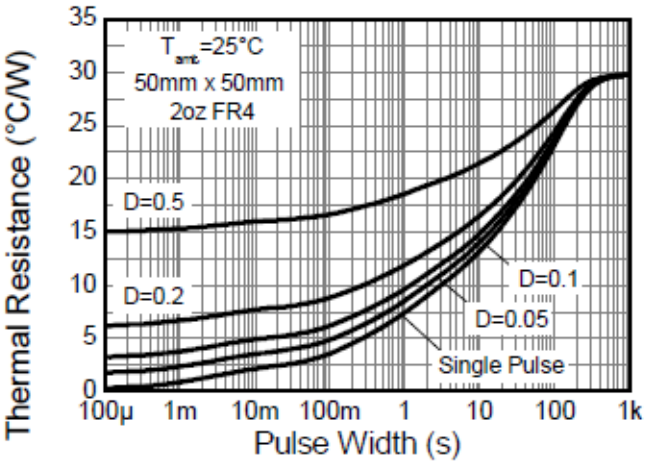
Safe Operating Area



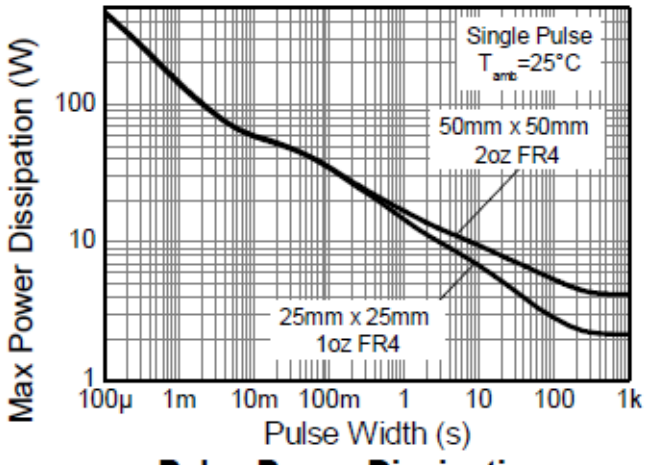
Safe Operating Area



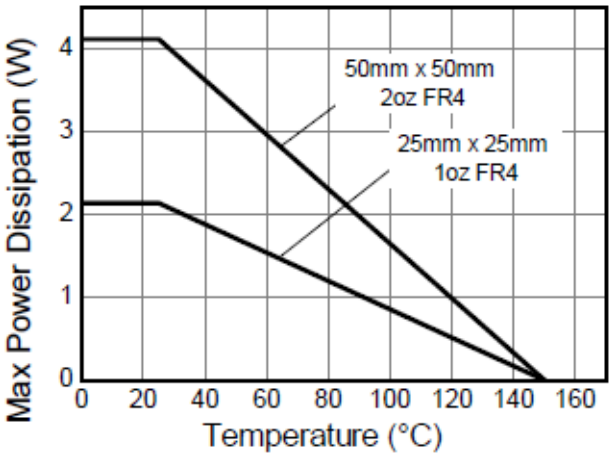
Transient Thermal Impedance



Transient Thermal Impedance

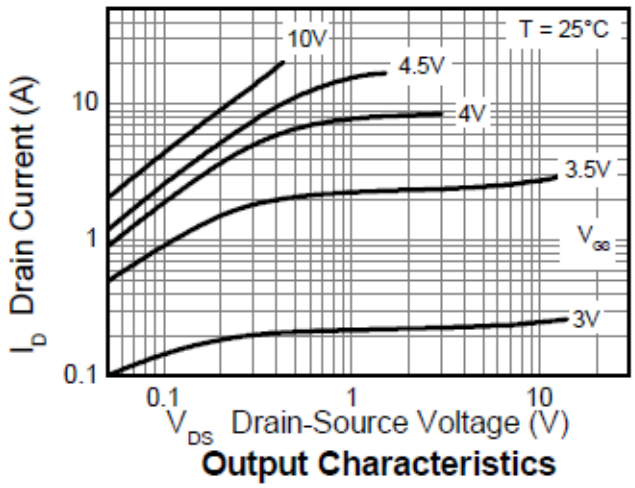


Pulse Power Dissipation

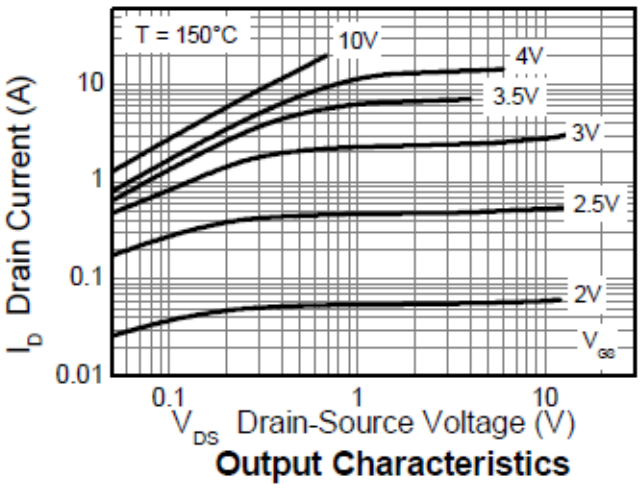


Derating Curve

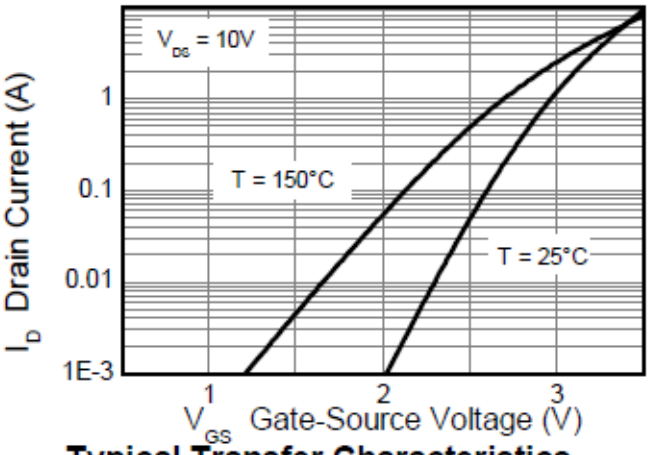
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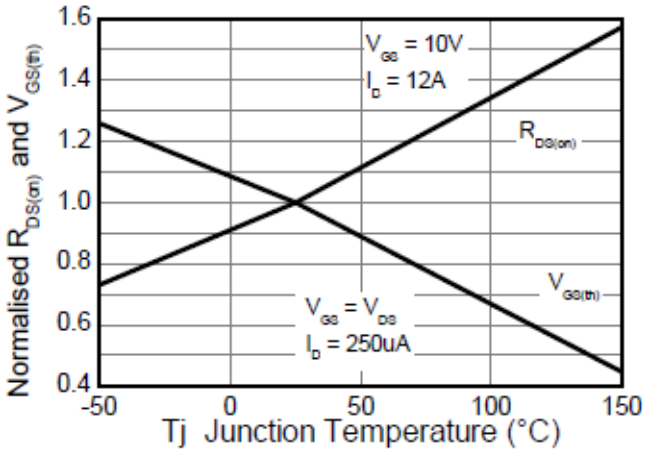
Output Characteristics



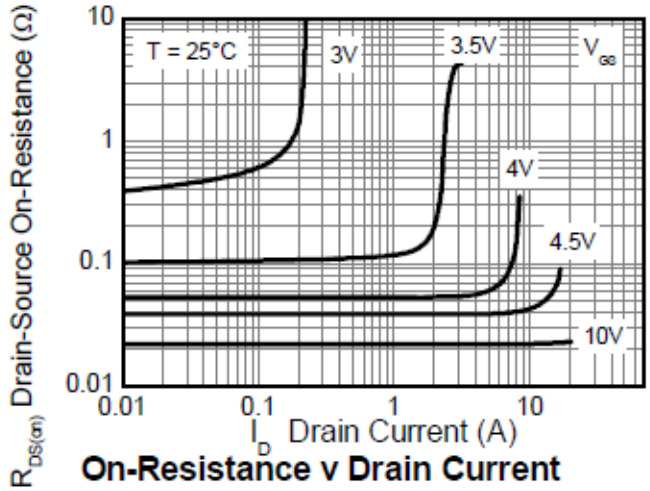
Output Characteristics



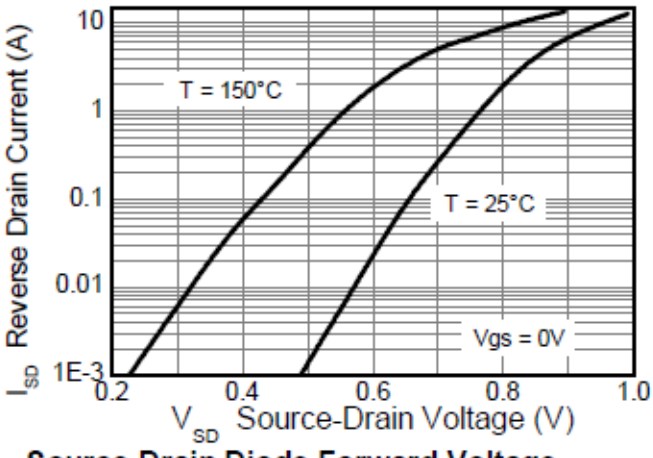
Typical Transfer Characteristics



Normalised Curves v Temperature

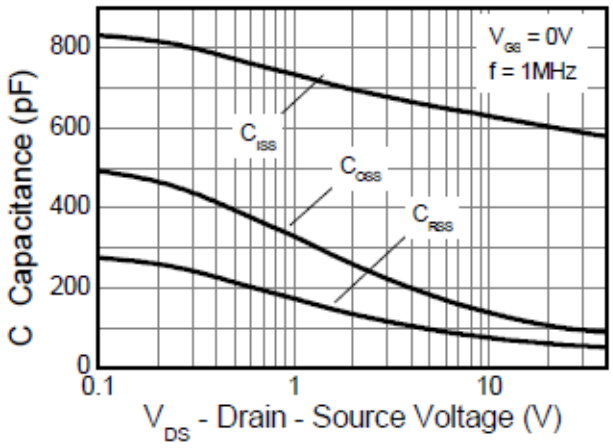


On-Resistance v Drain Current

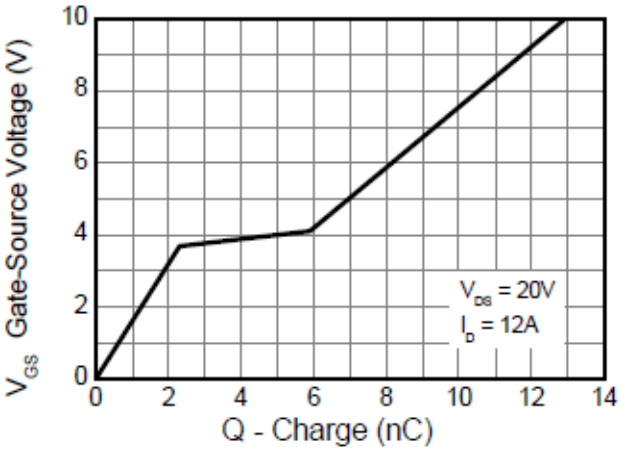


Source-Drain Diode Forward Voltage

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Capacitance v Drain-Source Voltage



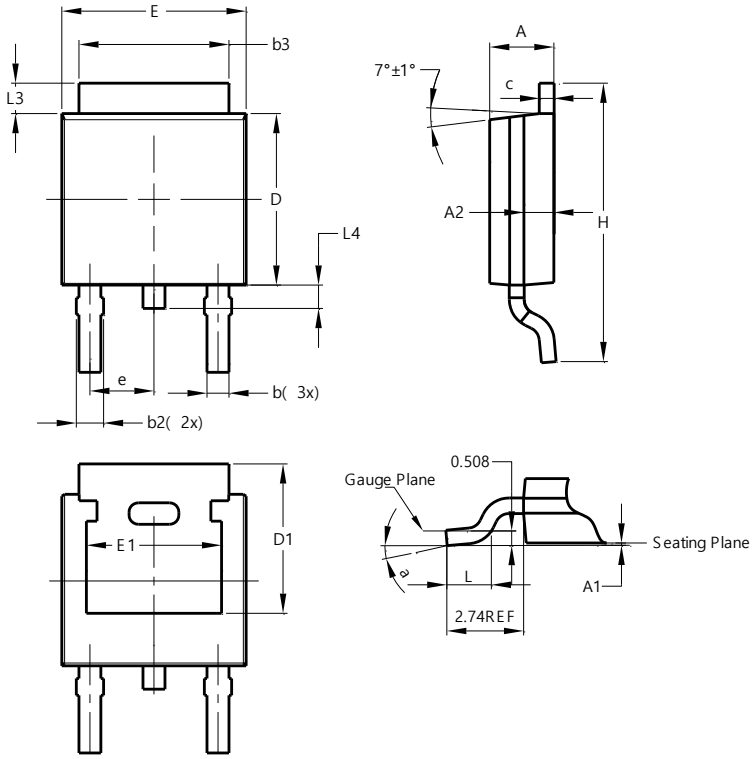
Gate-Source Voltage v Gate Charge

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Package Outline Dimensions

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

TO252 (DPAK)

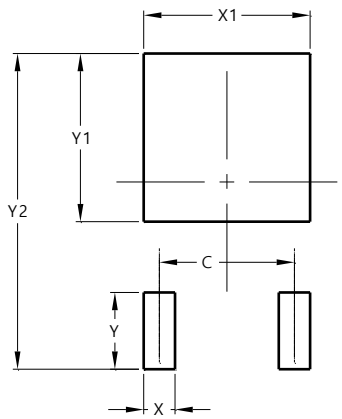


TO252 (DPAK)			
Dim	**Min**	**Max**	**Typ**
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.50	5.33
c	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	--	--
e	2.286 BSC		
E	6.45	6.70	6.58
E1	4.32	--	--
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	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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