

700V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV_{DSS}	R_{DS(ON)} Max	I_D T _C = +25°C
700V	1.25Ω @ V _{GS} = 10V	3.9A

Description

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.

Applications

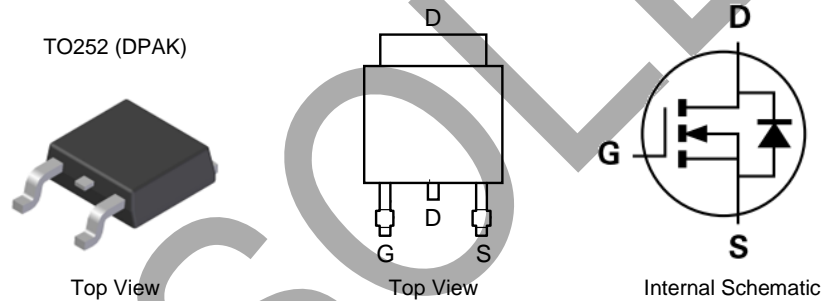
- Switching

Features

- 100% Unclamped Inductive Switch (UIS) Test in Production
- Low Gate Input Resistance
- Low Input Capacitance
- 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-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](#) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

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 Ⓜ3
- Weight: 0.33 grams (Approximate)

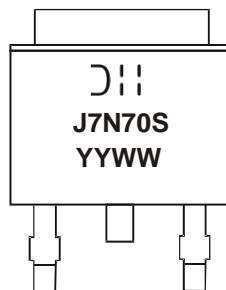


Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMJ7N70SK3-13	TO252 (DPAK)	2,500	Tape & Reel

- Notes:
- EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
 - 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.
 - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 - For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



= Manufacturer's Marking
 J7N70S = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 21 = 2021)
 WW = Week Code (01 to 53)

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

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V _{DSS}	700	V
Gate-Source Voltage	V _{GSS}	±30	V
Continuous Drain Current (Note 5) V _{GS} = 10V	I _D	T _C = +25°C	3.9
		T _C = +100°C	2.5
Maximum Body Diode Forward Current (Note 5)	I _S	3.0	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I _{DM}	8.0	A
Avalanche Current (Note 6)	I _{AR}	1.5	A
Avalanche Energy (Note 6)	E _{AR}	67	mJ
Peak Diode Recovery dv/dt	dv/dt	11.8	V/ns

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

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P _D	T _C = +25°C	28
		T _C = +100°C	11
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	38	°C/W
Thermal Resistance, Junction to Case (Note 5)	R _{θJC}	2.1	
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 7)						
Drain-Source Breakdown Voltage	BV _{DSS}	700	—	—	V	V _{GS} = 0V, I _D = 250µA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	µA	V _{DS} = 700V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	100	nA	V _{GS} = ±30V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(TH)}	2	2.9	4	V	V _{DS} = V _{GS} , I _D = 250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	1	1.25	Ω	V _{GS} = 10V, I _D = 2.5A
Diode Forward Voltage	V _{SD}	—	0.9	1.3	V	V _{GS} = 0V, I _S = 5A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	351	—	pF	V _{DS} = 50V, f = 1MHz, V _{GS} = 0V
Output Capacitance	C _{oss}	—	66	—		
Reverse Transfer Capacitance	C _{rss}	—	1.1	—		
Gate Resistance	R _G	—	3.5	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge	Q _g	—	13.9	—	nC	V _{DD} = 560V, I _D = 5A, V _{GS} = 10V
Gate-Source Charge	Q _{gs}	—	1.9	—		
Gate-Drain Charge	Q _{gd}	—	8.5	—		
Turn-On Delay Time	t _{D(ON)}	—	8.5	—	ns	V _{DD} = 350V, V _{GS} = 10V, R _G = 4.7Ω, I _D = 2.5A
Turn-On Rise Time	t _r	—	11.6	—		
Turn-Off Delay Time	t _{D(OFF)}	—	24.5	—		
Turn-Off Fall Time	t _f	—	10	—		
Body Diode Reverse Recovery Time	t _{RR}	—	212	—	ns	V _{DD} = 100V, I _S = 5A, di/dt = 100A/µs
Body Diode Reverse Recovery Time (T _J = +150°C)	t _{RR}	—	251	—	ns	
Body Diode Reverse Recovery Charge	Q _{RR}	—	1.8	—	µC	
Body Diode Reverse Recovery Charge (T _J = +150°C)	Q _{RR}	—	2.3	—	µC	

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout.
 - UIS in production with V_{DD} = 50V, V_{GS} = 10V, L = 60mH, T_J = +25°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to production testing.

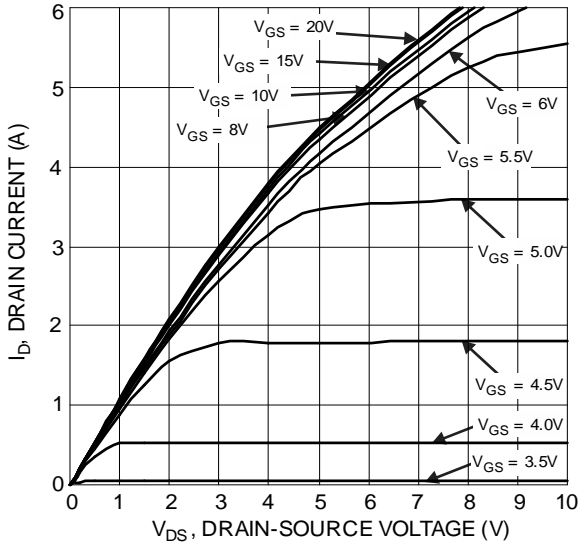


Figure 1 Typical Output Characteristics

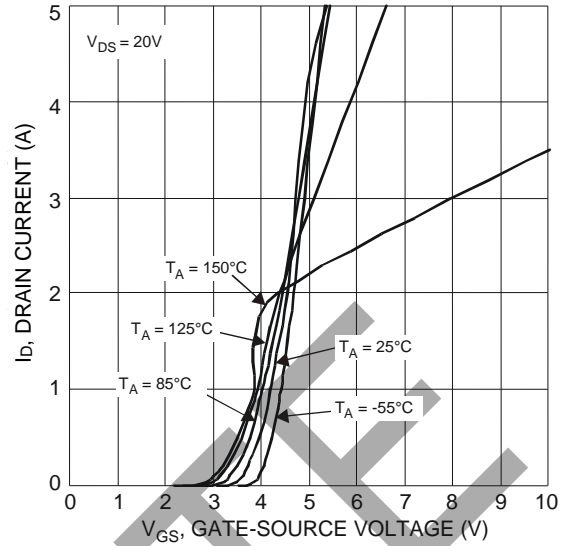


Figure 2 Typical Transfer Characteristics

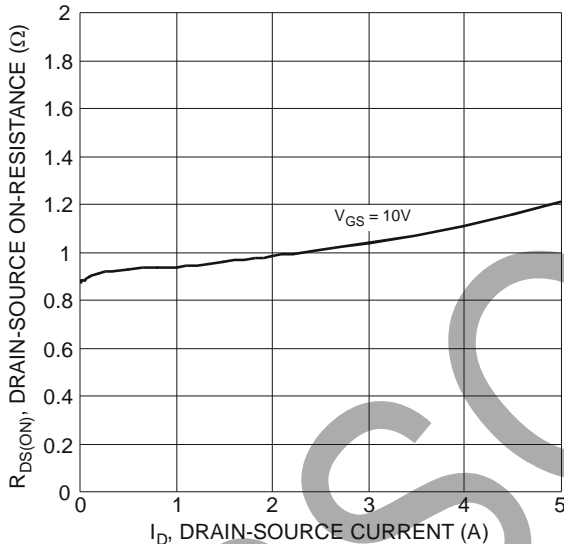


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

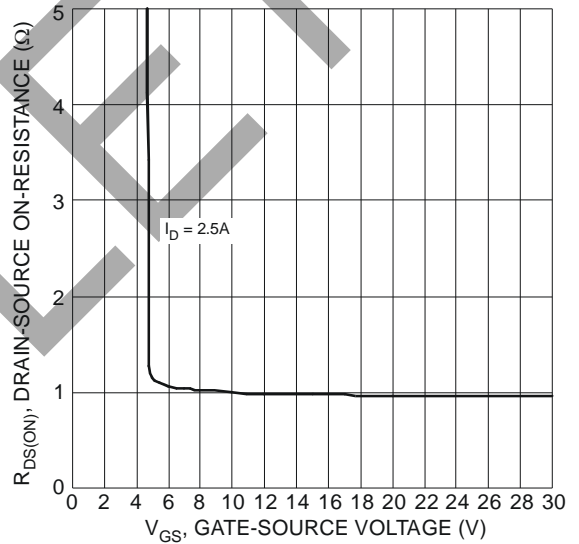


Figure 4 Typical Transfer Characteristics

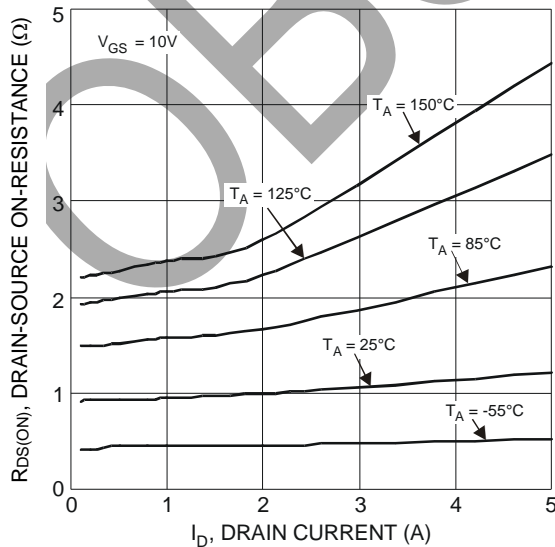


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

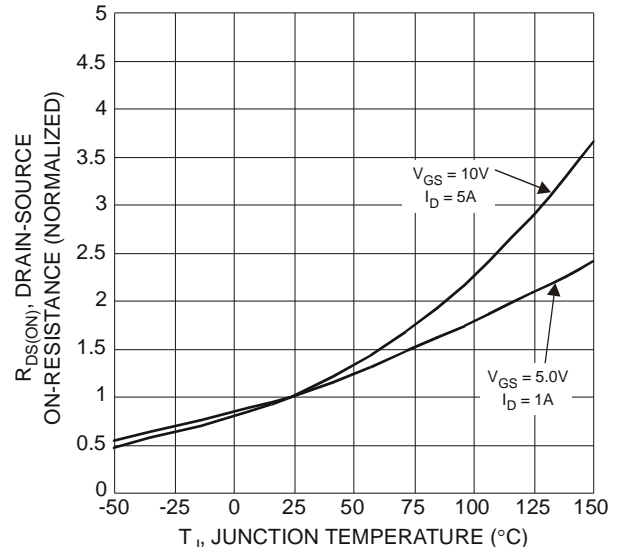


Figure 6 On-Resistance Variation with Temperature

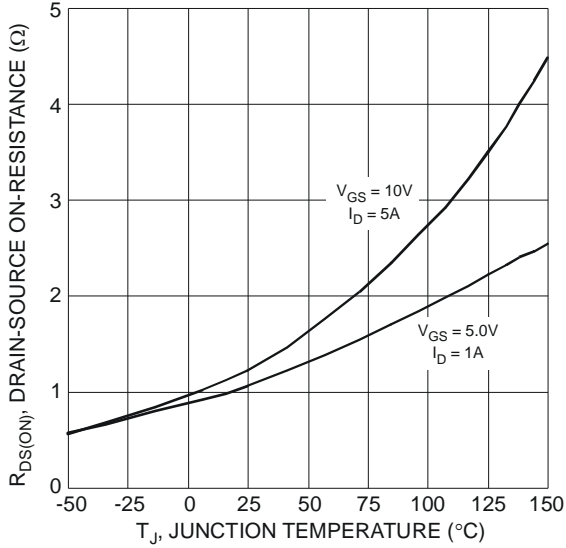


Figure 7 On-Resistance Variation with Temperature

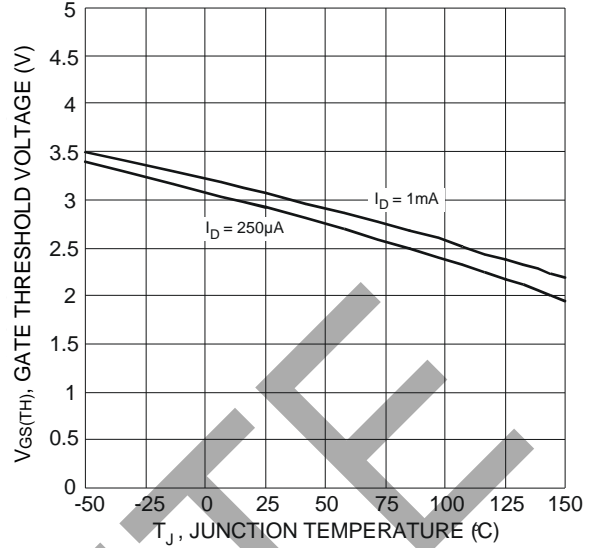


Figure 8 Gate Threshold Variation vs. Junction Temperature

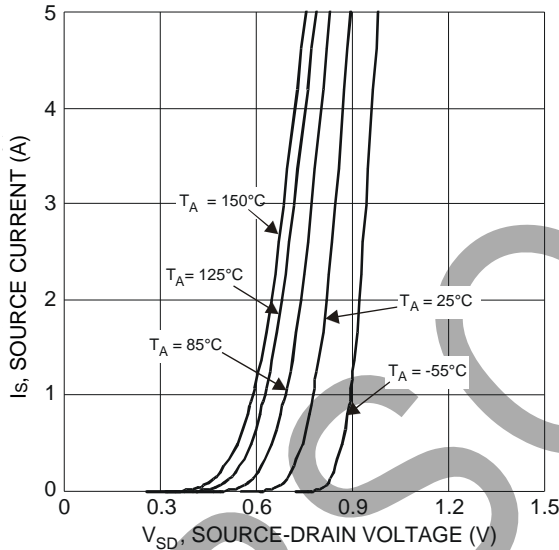


Figure 9 Diode Forward Voltage vs. Current

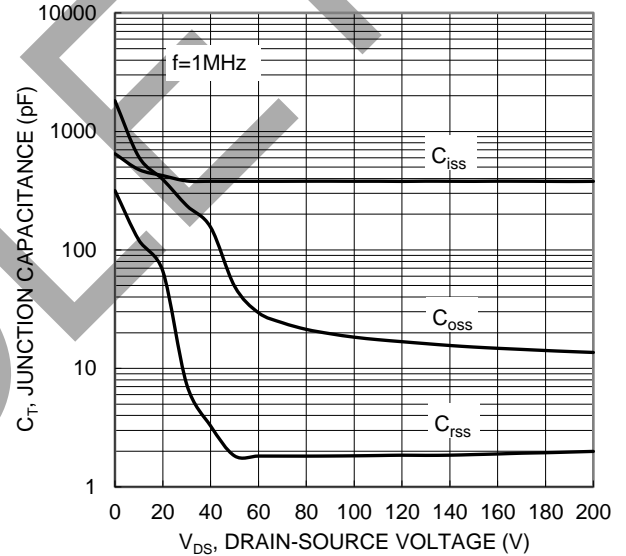


Figure 10. Typical Junction Capacitance

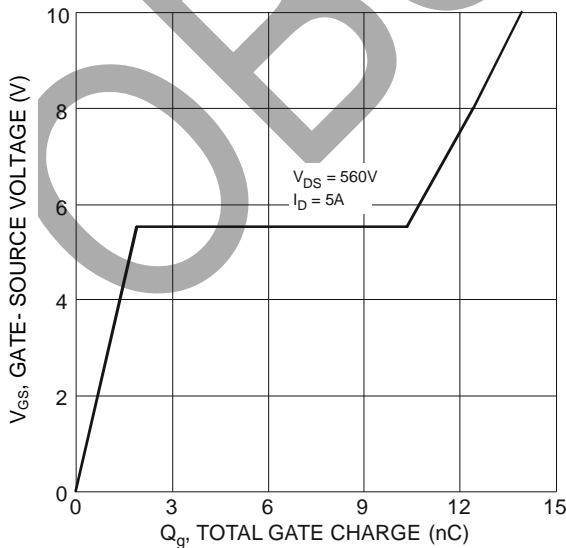


Figure 11 Gate Charge

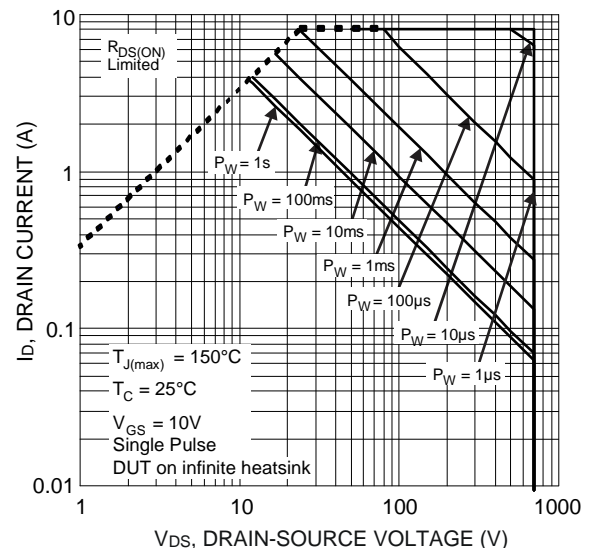
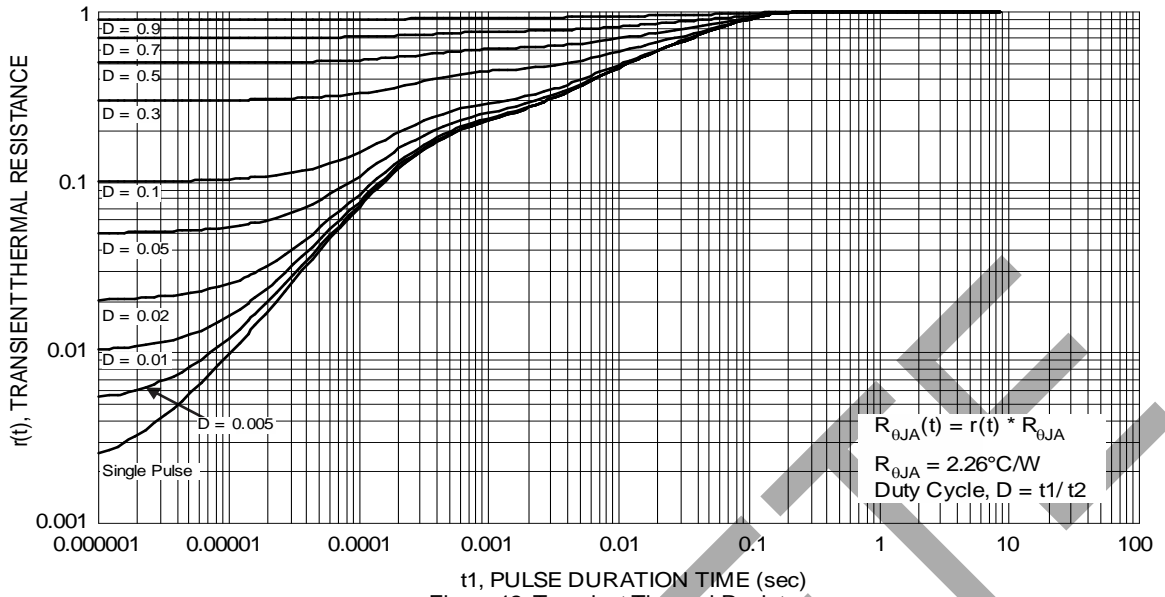


Figure 12 SOA, Safe Operation Area

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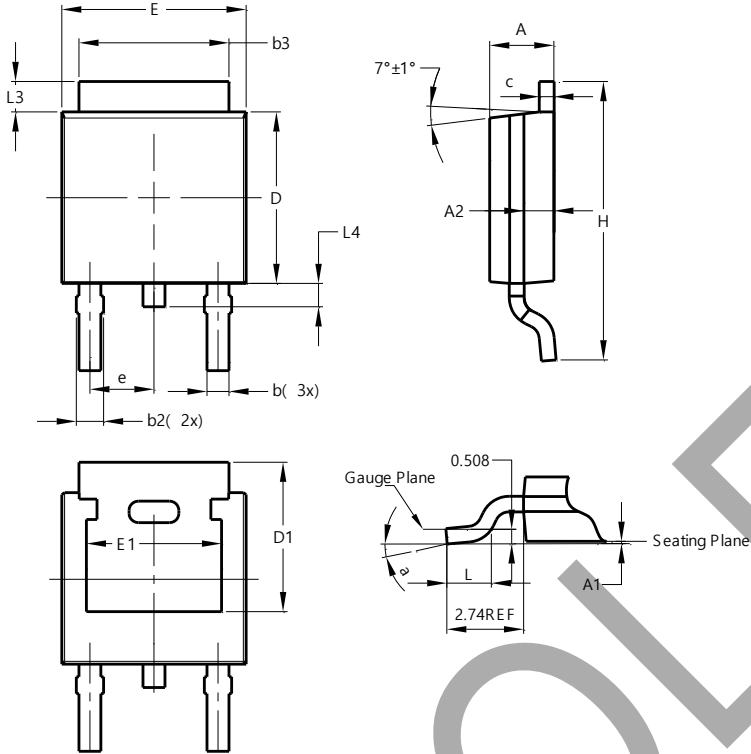


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Package Outline Dimensions

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

TO252 (DPAK)

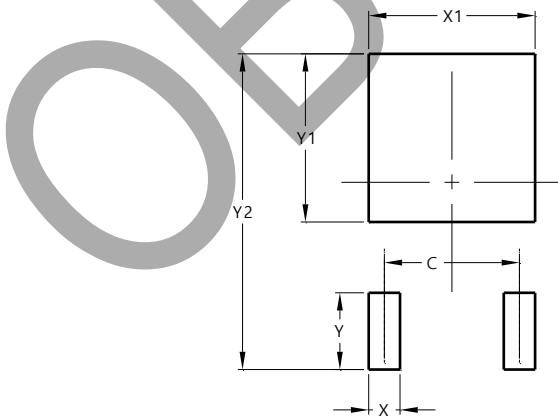


TO252 (DPAK)			
Dim	Min	Max	Typ
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.50	5.33
c	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	--	--
e	2.286 BSC		
E	6.45	6.70	6.58
E1	4.32	--	--
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02	0.83
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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