

Product Summary

BV _{DSS}	R _{DS(ON)}	I _D T _A = +25°C
60V	68mΩ @ V _{GS} = 10V	8.5A
	100mΩ @ V _{GS} = 4.5V	7.0A

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:

- Motor control
- Transformer driving switches
- DC-DC converters
- Power-management functions
- Uninterrupted power supplies

Features and Benefits

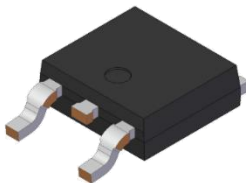
- 100% Unclamped Inductive Switch (UIS) Test in Production
- Low On-Resistance
- Fast Switching Speed
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DMN6068LK3Q is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**

<https://www.diodes.com/quality/product-definitions/>

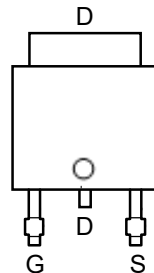
Mechanical Data

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

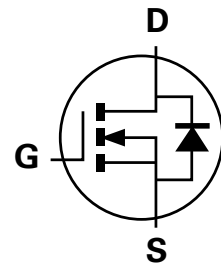
TO252 (DPAK)



Top View



Pin Out — Top View



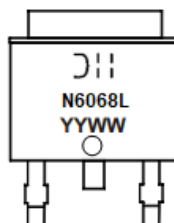
Equivalent Circuit

Ordering Information (Note 4)

Orderable Part Number	Package	Packing	
		Qty.	Carrier
DMN6068LK3Q-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



DII = Manufacturer's Marking
N6068L = Product Type Marking Code
YYWW = Date Code Marking
YY = Year (ex: 25 = 2025)
WW = Week (01 to 52)

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

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V _{DSS}	60	V
Gate-Source Voltage	(Note 5)	V _{GS}	±20	V
Single Pulsed Avalanche Energy	(Note 11)	E _{AS}	37.5	mJ
Single Pulsed Avalanche Current	(Note 11)	I _{AS}	5.0	A
Continuous Drain Current	V _{GS} = 10V	I _D	(Note 7)	A
			T _A = +70°C (Note 7)	
			(Note 6)	
			T _C = +25°C (Note 12)	
Pulsed Drain Current	V _{GS} = 10V	I _{DM}	22.2	A
Continuous Source Current (Body Diode)	(Note 7)	I _S	10.2	A
Pulsed Source Current (Body Diode)	(Note 8)	I _{SM}	22.2	A

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

Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Note 6)	P _D Linear Derating Factor	4.12	W
			33	mW/°C
	(Note 7)		8.49	W
	(Note 9)		67.9	mW/°C
Power Dissipation	T _C = +25°C (Note 12)	P _D	2.12	W
			16.9	mW/°C
Thermal Resistance, Junction to Ambient	(Note 6)	R _{θJA}	41	W
	(Note 7)		30.3	°C/W
	(Note 9)		14.7	
Thermal Resistance, Junction to Lead	(Note 10)	R _{θJL}	59.0	
Thermal Resistance, Junction to Case	(Note 12)	R _{θJC}	3.09	°C
Operating and Storage Temperature Range		T _J , T _{STG}	3.03	
			-55 to +150	

Notes: 5. AEC-Q101 V_{GS} maximum is ±16V.

6. For a device surface mounted on 50mm × 50mm × 1.6mm FR4 PCB with high coverage of single-sided 2oz copper, in still air conditions; the device is measured when operating in a steady-state condition.

7. Same as note 6 except the device is measured at t ≤ 10 sec.

8. Same as note 6 except the device is pulsed with D = 0.02 and pulse width 300μs. The pulse current is limited by the maximum junction temperature.

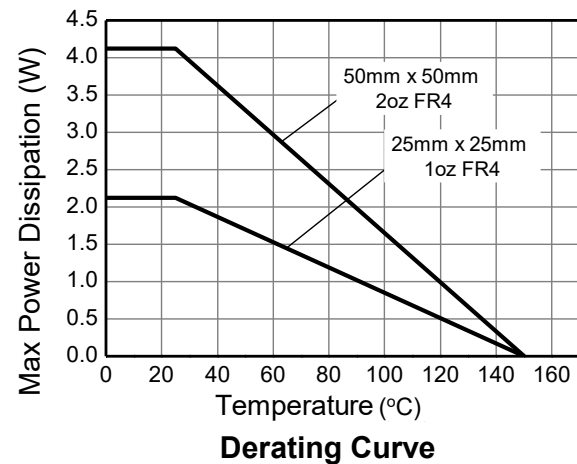
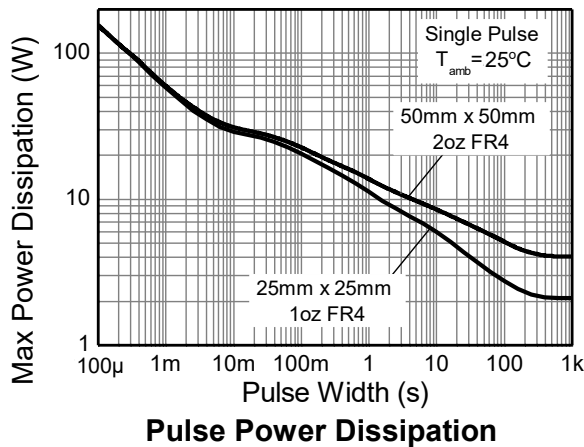
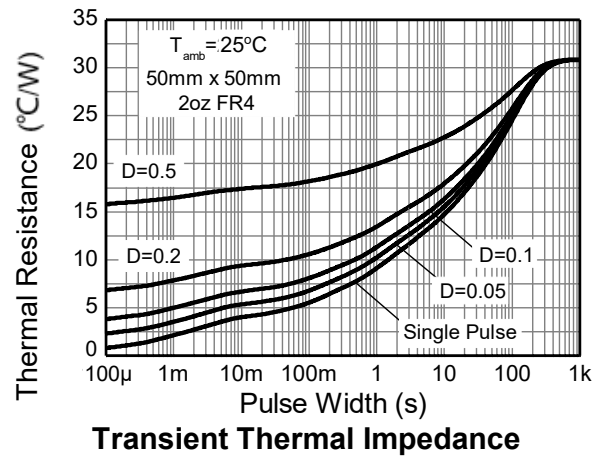
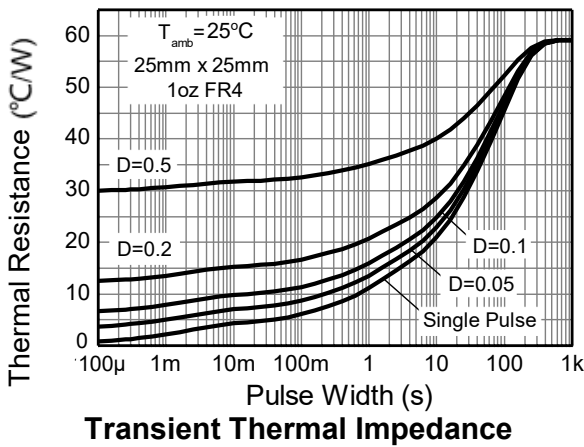
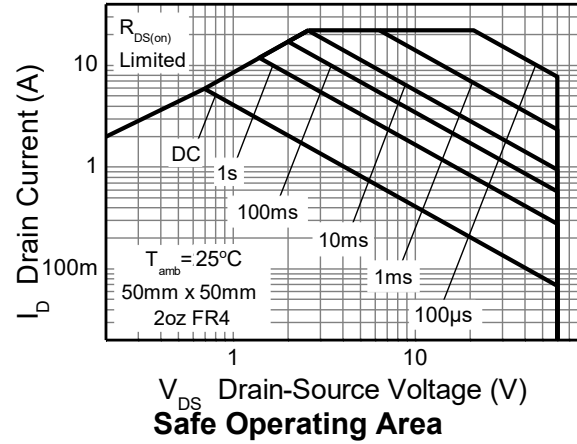
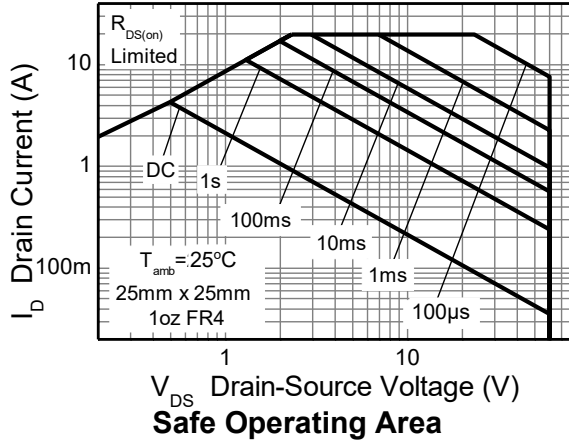
9. For a device surface mounted on 25mm × 25mm × 1.6mm FR4 PCB with high coverage of single-sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.

10. Thermal resistance from junction to solder-point (at the end of the drain lead).

11. UIS in production with L = 3.0mH, I_{AS} = 5.0A, R_G = 25Ω, V_{DD} = 50V, starting T_J = +25°C.

12. Thermal resistance from junction to soldering point (on the exposed drain pad).

Thermal Characteristics

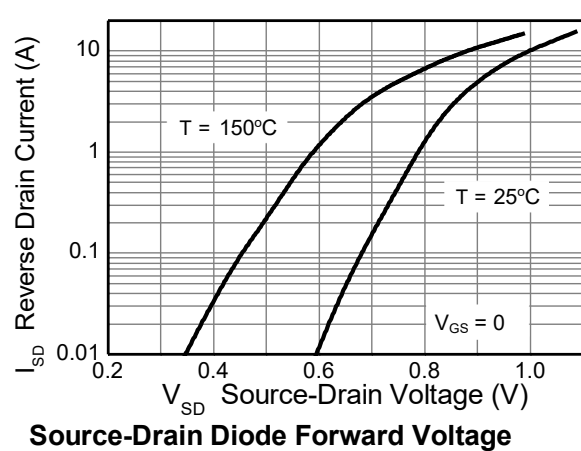
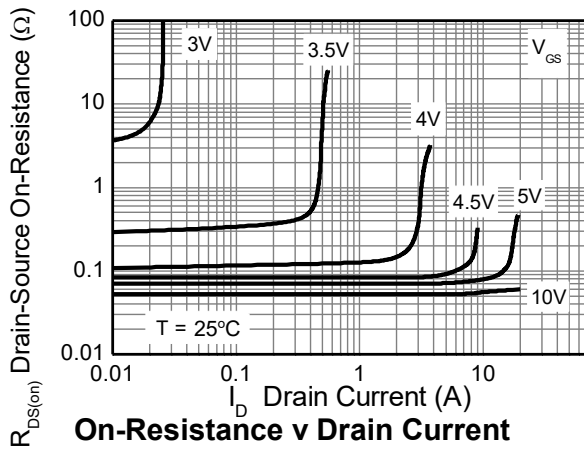
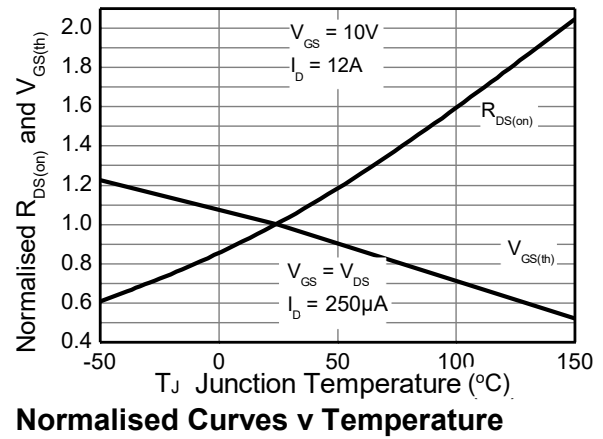
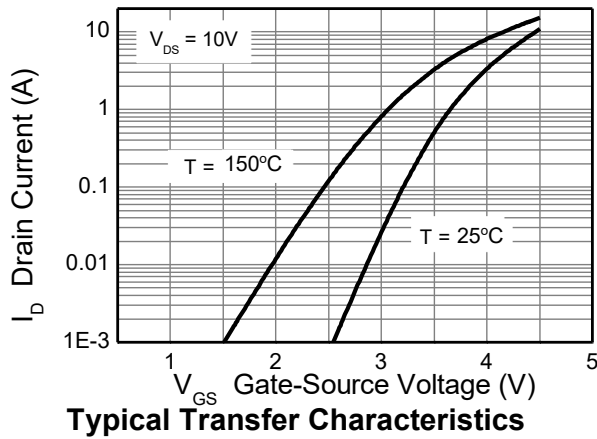
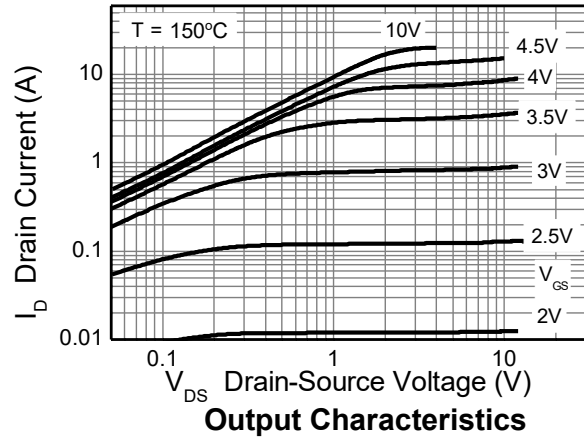
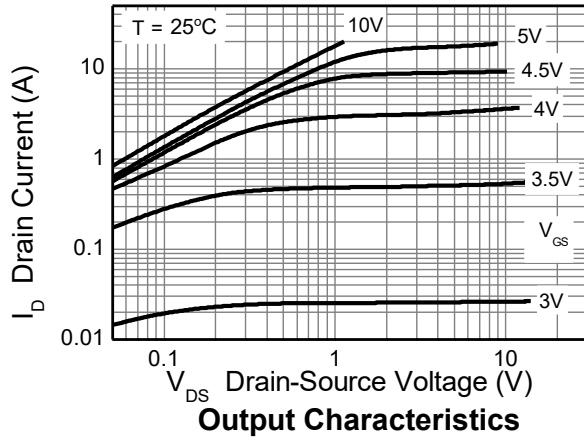


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

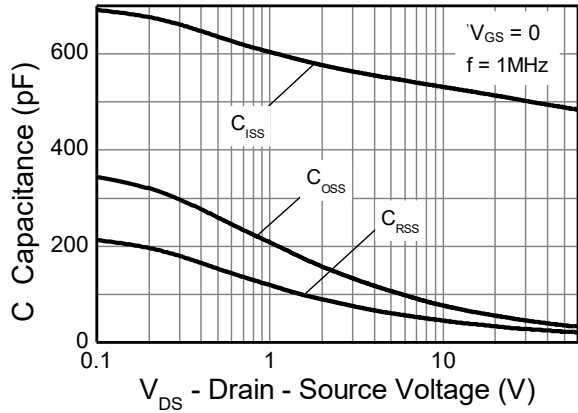
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition	
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	BV _{DSS}	60	—	—	V	I _D = 250μA, V _{GS} = 0	
Zero Gate Voltage Drain Current	I _{DSS}	—	—	0.5	μA	V _{DS} = 60V, V _{GS} = 0	
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0	
ON CHARACTERISTICS							
Gate Threshold Voltage	V _{GS(TH)}	1.0	—	3.0	V	I _D = 250μA, V _{DS} = V _{GS}	
Static Drain-Source On-Resistance (Note 13)	R _{DS (ON)}	—	—	0.068	Ω	V _{GS} = 10V, I _D = 12A	
				0.100		V _{GS} = 4.5V, I _D = 6A	
Forward Transconductance (Notes 13 & 14)	g _{fs}	—	19.7	—	S	V _{DS} = 15V, I _D = 12A	
Diode Forward Voltage (Note 13)	V _{SD}	—	0.98	1.15	V	I _S = 12A, V _{GS} = 0	
Reverse-Recovery Time (Note 14)	t _{RR}	—	145	—	ns	I _S = 12A, di/dt = 100A/μs	
Reverse-Recovery Charge (Note 14)	Q _{RR}	—	929	—	nC		
DYNAMIC CHARACTERISTICS (Note 14)							
Input Capacitance	C _{iss}	—	502	—	pF	V _{DS} = 30V, V _{GS} = 0 f = 1MHz	
Output Capacitance	C _{oss}	—	45.7	—	pF		
Reverse Transfer Capacitance	C _{rss}	—	27.1	—	pF		
Total Gate Charge	Q _g	—	5.55	—	nC	V _{GS} = 4.5V	V _{DS} = 30V I _D = 12A
Total Gate Charge	Q _g	—	10.3	—	nC	V _{GS} = 10V	
Gate-Source Charge	Q _{gs}	—	1.6	—	nC		
Gate-Drain Charge	Q _{gd}	—	3.5	—	nC		
Turn-On Delay Time (Note 15)	t _{D(ON)}	—	3.6	—	ns	V _{DD} = 30V, V _{GS} = 10V I _D = 12A, R _G ≅ 6.0Ω	
Turn-On Rise Time (Note 15)	t _R	—	10.8	—	ns		
Turn-Off Delay Time (Note 15)	t _{D(OFF)}	—	11.9	—	ns		
Turn-Off Fall Time (Note 15)	t _F	—	8.7	—	ns		

Notes: 13. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%.
14. For design aid only, not subject to production testing.
15. Switching characteristics are independent of operating junction temperatures.

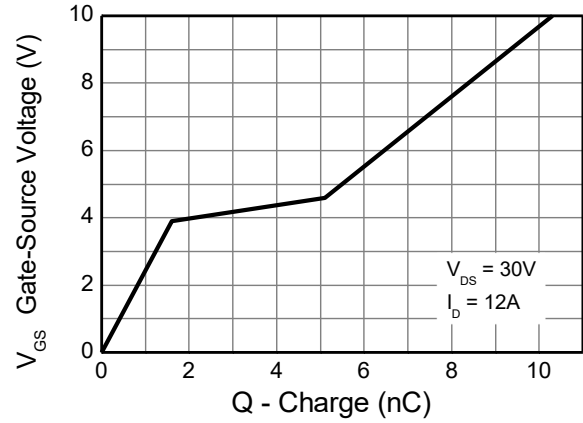
Typical Characteristics



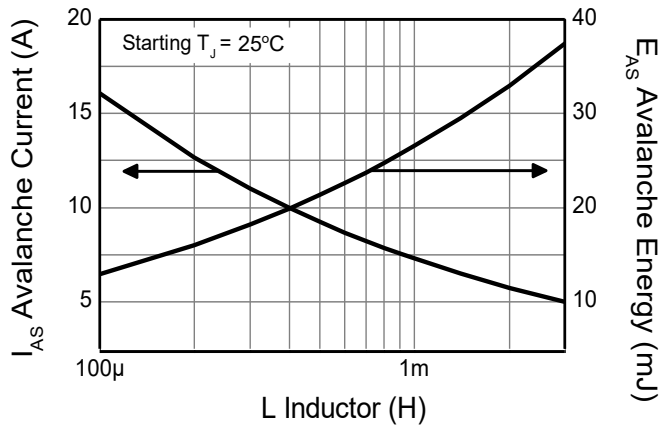
Typical Characteristics (continued)



Capacitance v Drain-Source Voltage

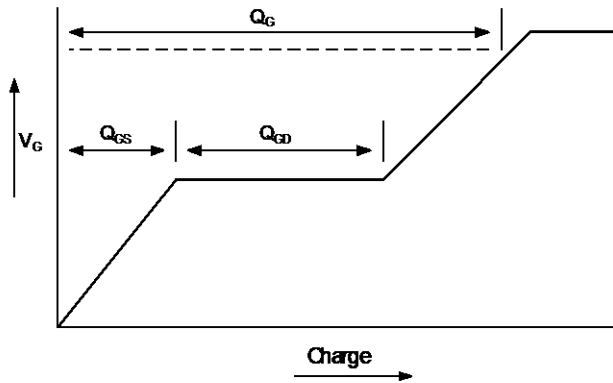


Gate-Source Voltage v Gate Charge

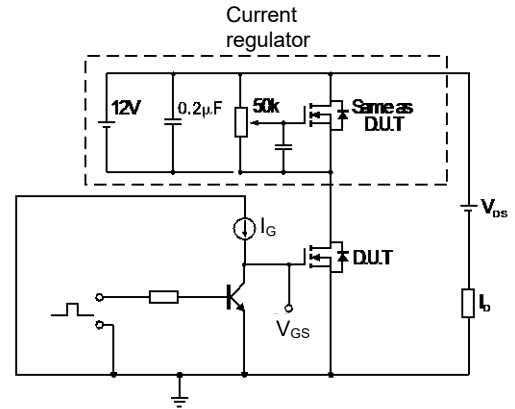


Single-Pulsed Avalanche Rating

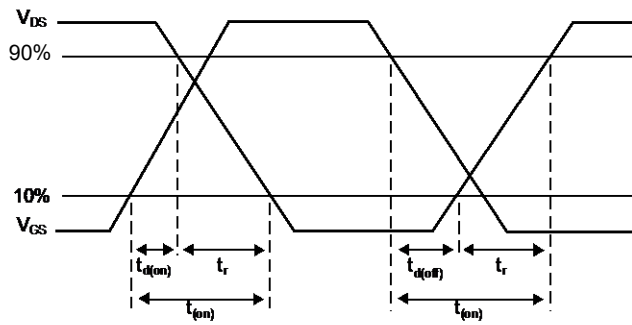
Test Circuits



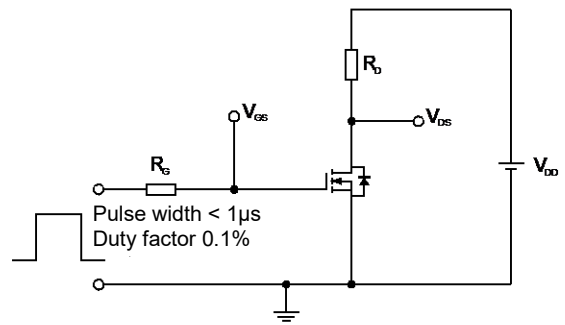
Basic Gate Charge Waveform



Gate Charge Test Circuit



Switching Time Waveforms

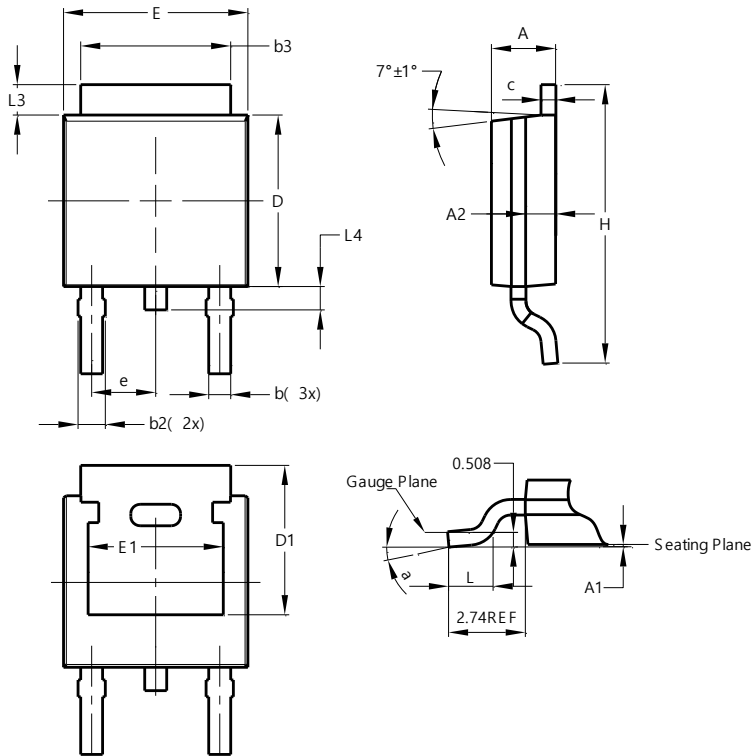


Switching Time Test Circuit

Package Outline Dimensions

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

TO252 (DPAK)

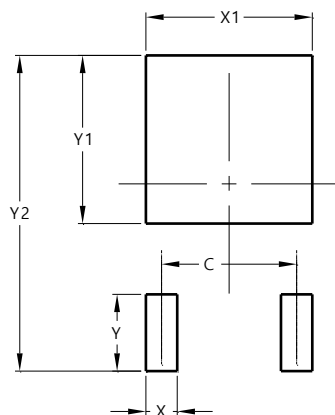


TO252 (DPAK)			
Dim	Min	Max	Typ
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.50	5.33
c	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	--	--
e	2.286 BSC		
E	6.45	6.70	6.58
E1	4.32	--	--
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02	0.83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