DMN61D8L-13 Datasheet

https://www.DiGi-Electronics.com

DiGi Electronics Part Number	DMN61D8L-13-DG
Manufacturer	Diodes Incorporated
Manufacturer Product Number	DMN61D8L-13
Description	MOSFET N-CH 60V 470MA SOT23
Detailed Description	N-Channel 60 V 470mA (Ta) 390mW (Ta) Surface Mount SOT-23-3

Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
DMN61D8L-13	Diodes Incorporated
Series:	Product Status:
-	Active
FET Type:	Technology:
N-Channel	MOSFET (Metal Oxide)
Drain to Source Voltage (Vdss):	Current - Continuous Drain (Id) @ 25°C:
60 V	470mA (Ta)
Drive Voltage (Max Rds On, Min Rds On):	Rds On (Max) @ Id, Vgs:
3V, 5V	1.8Ohm @ 150mA, 5V
Vgs(th) (Max) @ Id:	Gate Charge (Qg) (Max) @ Vgs:
2V @ 1mA	0.74 nC @ 5 V
Vgs (Max):	Input Capacitance (Ciss) (Max) @ Vds:
±12V	12.9 pF @ 12 V
FET Feature:	Power Dissipation (Max):
-	390mW (Ta)
Operating Temperature:	Mounting Type:
-55°C ~ 150°C (TJ)	Surface Mount
Supplier Device Package:	Package / Case:
SOT-23-3	TO-236-3, SC-59, SOT-23-3
Base Product Number:	
DMN61	

Environmental & Export classification

RoHS Status:	Moisture Sensitivity Level (MSL):
ROHS3 Compliant	1 (Unlimited)
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	
8541.21.0095	

Lead-free Green

DMN61D8L/LVT

60V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D Max T_A = +25°C, SOT23
60V	1.8Ω @ V_{GS} = 5V	470mA
	2.4Ω @ V_{GS} = 3V	

Features and Benefits

- Provides a more reliable and robust interface between sensitive logic and DC relay coils
- Replaces 3 to 4 discrete components enabling PCB footprint to be reduced
- Internal active clamp removes the need for external zener diode
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **The Automotive-Compliant Parts are Available Under Separate Datasheets (DMN61D8LQ and DMN61D8LVTQ)**

Description and Applications

DMN61D8L/LVT provides a single component solution for switching inductive loads such as relays, solenoids, and small DC motors in automotive applications, without the need of a freewheeling diode. DMN61D8L/LVT accepts logic level inputs, thus allowing it to be driven by logic gates, inverters, and microcontrollers. It is ideally suited for doors, windows, and antenna relay coils.

ESD Protected

Mechanical Data

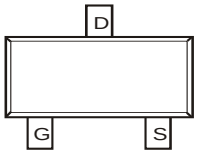
Case: SOT23

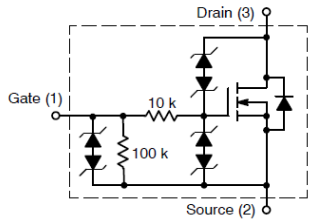
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Annealed over Alloy 42 Leadframe. (Lead-Free Plating). Solderable per MIL-STD-202, Method 208 e3
- Terminals Connections: See Diagram
- Weight: 0.008 grams (Approximate)

Case: TSOT26

- Case 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: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.013 grams (Approximate)

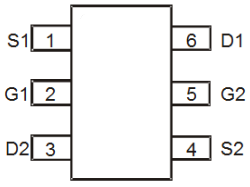
SOT23

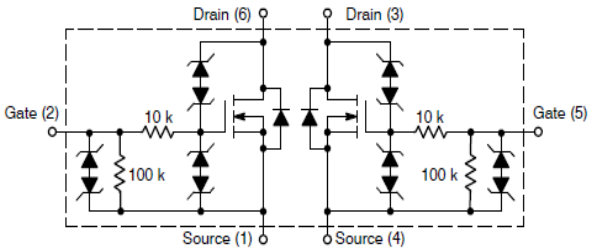




Equivalent Circuit

TSOT26





Top View

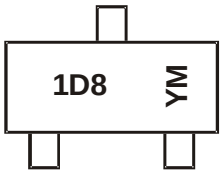
Top View
Internal Schematic

Ordering Information (Note 4)

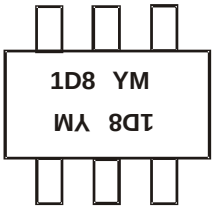
Part Number	Case	Packaging
DMN61D8L-7	SOT23	3,000/Tape & Reel
DMN61D8L-13	SOT23	10,000/Tape & Reel
DMN61D8LVT-7	TSOT26	3,000/Tape & Reel
DMN61D8LVT-13	TSOT26	10,000/Tape & Reel

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
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



SOT23



TSOT26

1D8 = Product Type Marking Code
YM = Date Code Marking
Y or $\overline{Y}$ = Year (ex: F= 2018)
M = Month (ex: 9 = September)

Date Code Key

Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Code	B	C	D	E	F	G	H	I	J	K	L	M	N

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	60	V
Gate-Source Voltage			V_{GSS}	±12	V
Continuous Drain Current (Note 6) SOT23	Steady State	T_A = +25°C T_A = +70°C	I_D	470 370	mA
Continuous Drain Current (Note 6) TSOT26	Steady State	T_A = +25°C T_A = +70°C	I_D	630 500	mA
Maximum Continuous Body Diode Forward Current (Note 6)			I_S	0.5	A
Single Pulse Drain-to-Source Avalanche Energy (for relay coils/inductive loads of 80Ω or higher) (T_J initial = +85°C)			E_Z	200	mJ
Peak Power Dissipation, Drain-to-Source (non-repetitive current square pulse 1.0ms duration) (T_J initial = +85°C)			P_{PK}	20	W
Load Dump Pulse, Drain-to-Source, R_{SOURCE} = 0.5Ω, t = 300ms) (for relay coils/inductive loads of 80Ω or higher) (T_J Initial = +85°C)			E_{LD1}	60	V
Inductive Switching Transient 1, Drain-to-Source (Waveform: R_{SOURCE} = 10Ω, t = 2.0ms) (for relay coils/inductive loads of 80Ω or higher) (T_J Initial = +85°C)			E_{LD2}	100	V
Inductive Switching Transient 2, Drain-to-Source (Waveform: R_{SOURCE} = 4.0Ω, t = 50µs) (for relay coils/inductive loads of 80Ω or higher) (T_J Initial = +85°C)			E_{LD3}	300	V
Reverse Battery, 10 Minutes (Drain-to-Source) (for relay coils/inductive loads of 80Ω or higher)			Rev−Bat	-14	V
Dual Voltage Jump Start, 10 Minutes (Drain-to-Source)			Dual−Volt	28	V
ESD Human Body Model (HBM)			ESD	4,000	V

Thermal Characteristics (SOT23) (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)		P_D	390	mW
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	321	°C/W
Total Power Dissipation (Note 6)		P_D	610	mW
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	208	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Thermal Characteristics (TSOT26) (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)		P_D	820	mW
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	154	°C/W
Total Power Dissipation (Note 6)		P_D	1090	mW
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	116	°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 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	60	—	—	V	V_{GS} = 0V, I_D = 10mA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	50 0.5	μA	V_{DS} = 60V, V_{GS} = 0V V_{DS} = 12V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±90 ±60	μA	V_{GS} = ±5V, V_{DS} = 0V V_{GS} = ±3V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	1.3	—	2.0	V	V_{DS} = V_{GS}, I_D = 1mA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	1.1 1.4	1.8 2.4	Ω	V_{GS} =5V, I_D = 0.15A V_{GS} = 3V, I_D = 0.15A
Forward Transfer Admittance	$\|Y_{fs}\|$	80	—	—	ms	V_{DS} =12V, I_D = 0.15A
Diode Forward Voltage	V_{SD}	—	—	1.2	V	V_{GS} = 0V, I_S = 0.15A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	12.9	—	pF	V_{DS} = 12V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	17	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	0.84	—	pF	
Total Gate Charge	Q_g	—	0.74	—	nC	V_{GS} = 5V, V_{DS} = 12V, I_D =150mA
Gate-Source Charge	Q_{gs}	—	0.19	—	nC	
Gate-Drain Charge	Q_{gd}	—	0.16	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	131	—	ns	V_{DD} = 12V, V_{GS} = 5V
Turn-On Rise Time	t_R	—	301	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	582	—	ns	
Turn-Off Fall Time	t_F	—	440	—	ns	

Notes: 5. Device mounted on FR-4 PCB, with minimum recommended pad layout.
6. Device mounted on 1" x 1" FR-4 PCB with high coverage 2oz. copper, single sided.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to product testing.

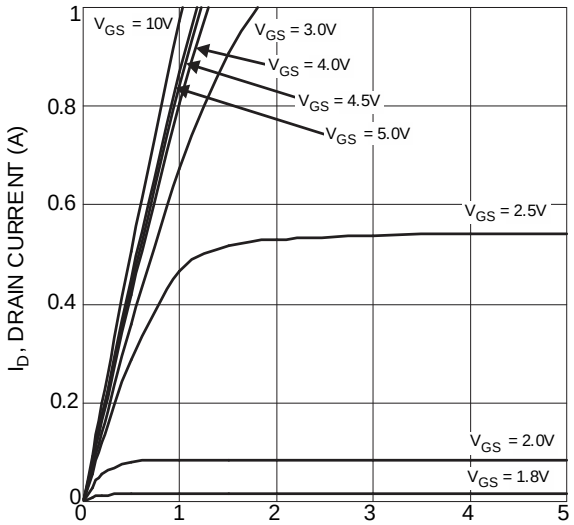


Figure 1 Typical Output Characteristic

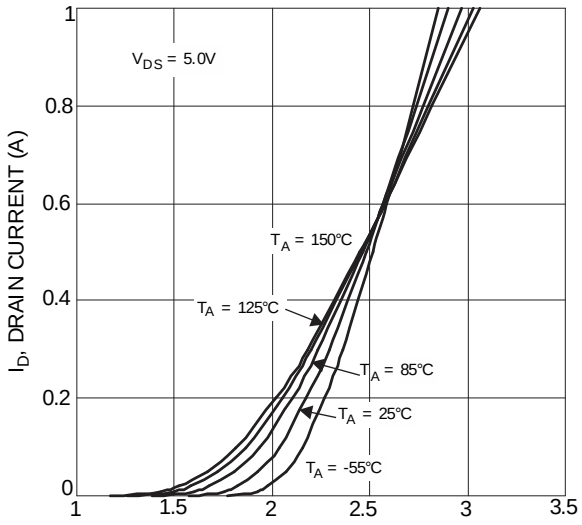


Figure 2 Typical Transfer Characteristics

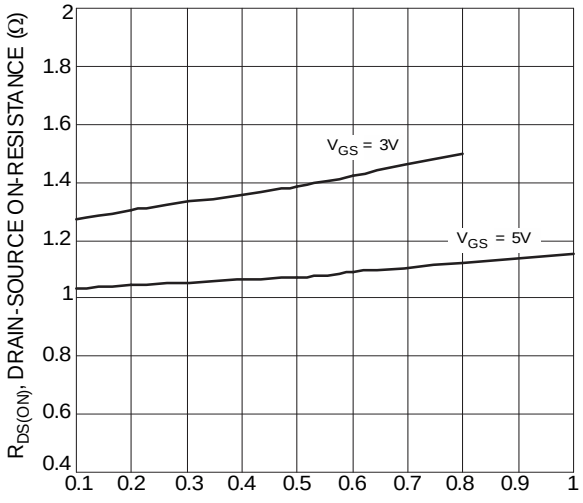


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

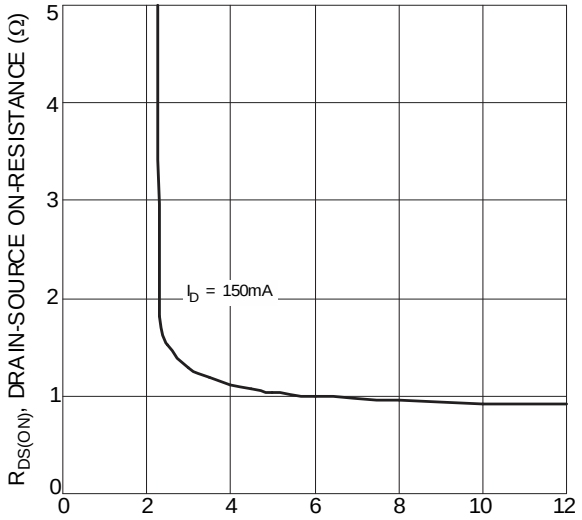


Figure 4 Typical Transfer Characteristic

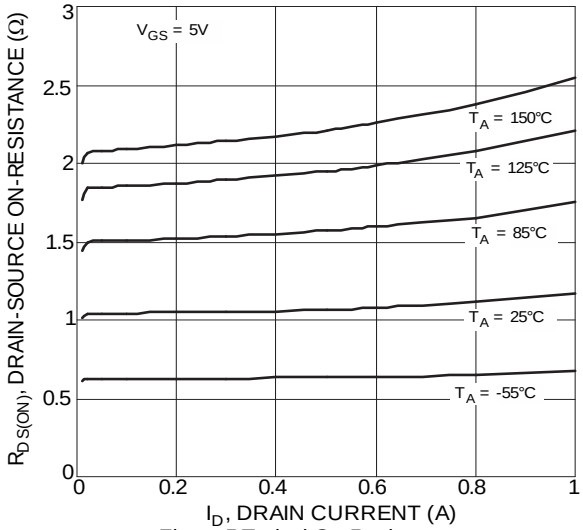


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

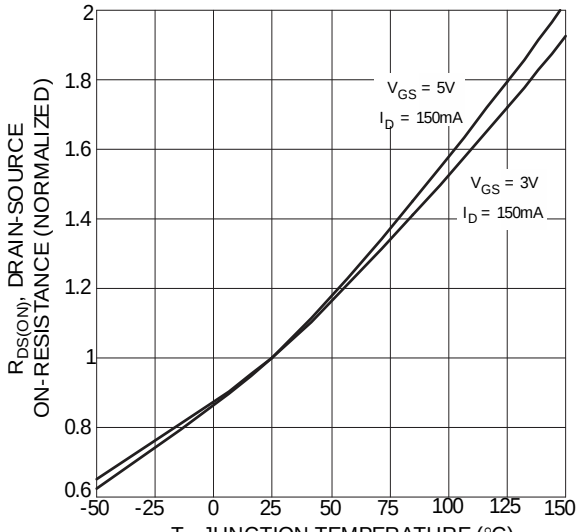


Figure 6 On-Resistance Variation with Temperature

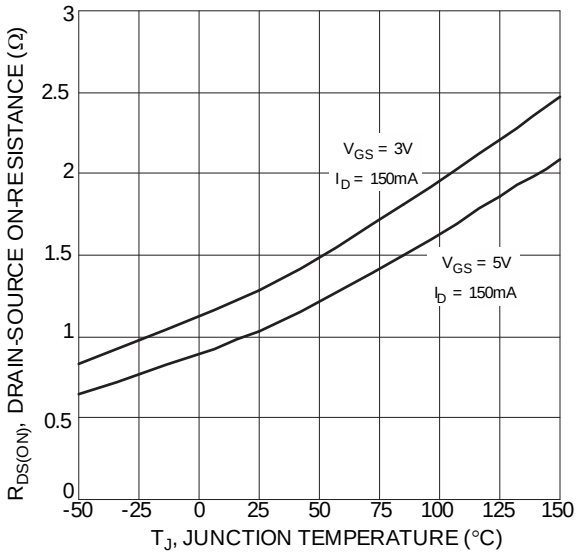


Figure 7 On-Resistance Variation with Temperature

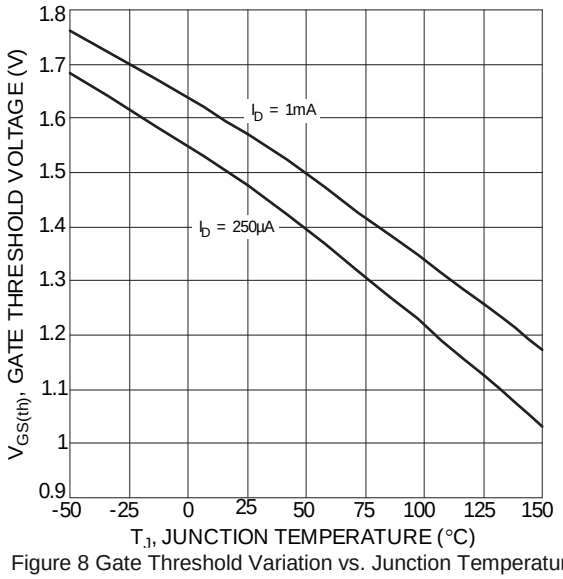


Figure 8 Gate Threshold Variation vs. Junction Temperature

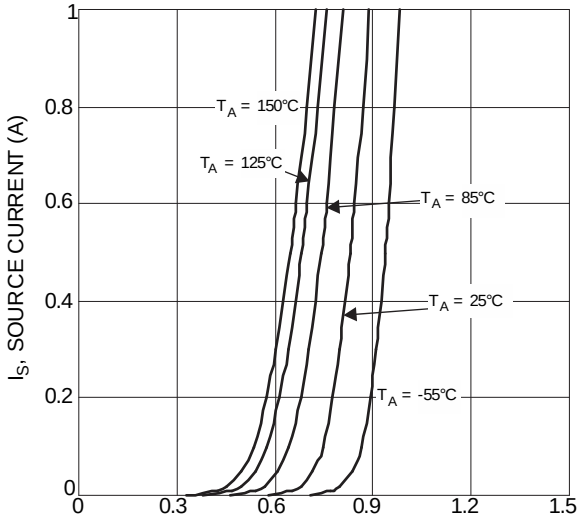


Figure 9 Diode Forward Voltage vs. Current

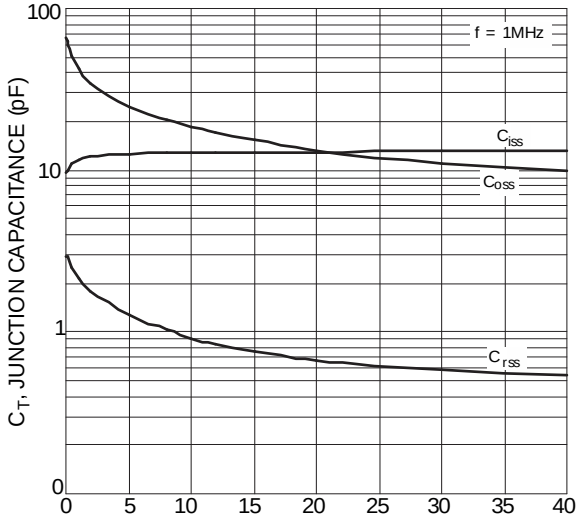


Figure 10 Typical Junction Capacitance

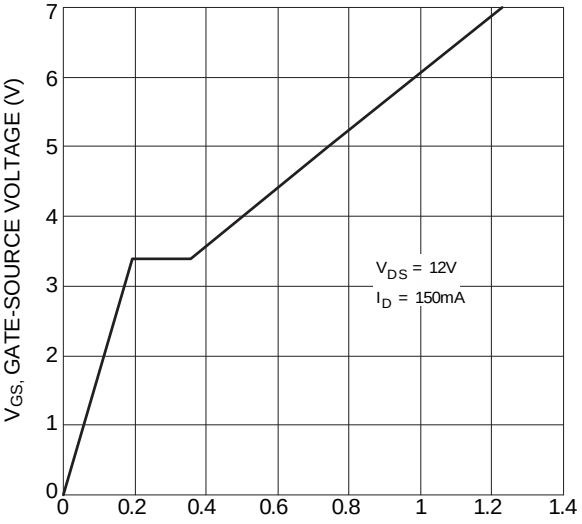


Figure 11 Gate Charge

SOT23:

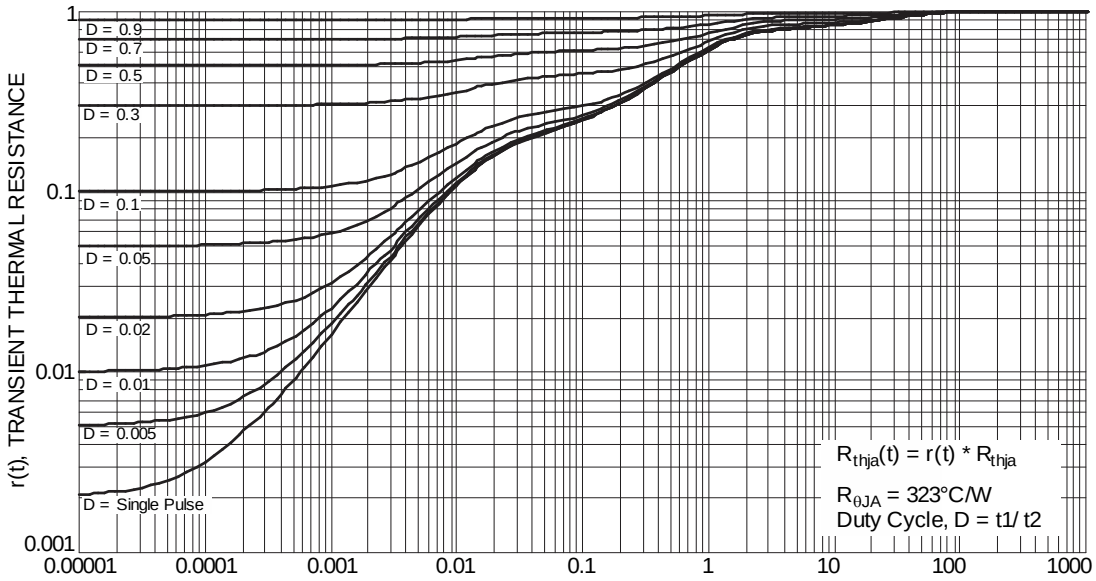


Figure 12 Transient Thermal Resistance

TSOT26:

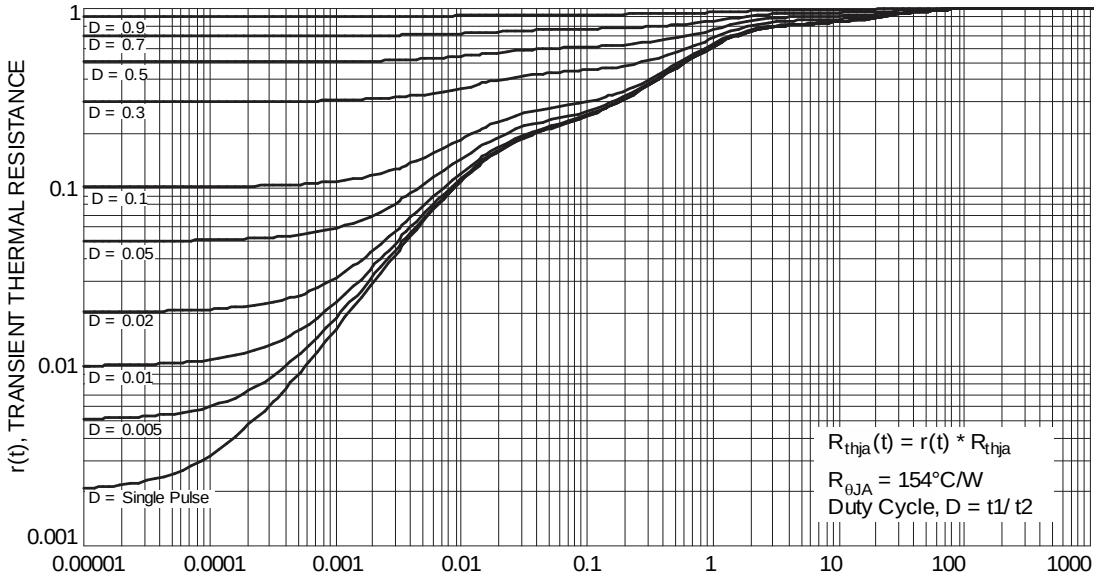
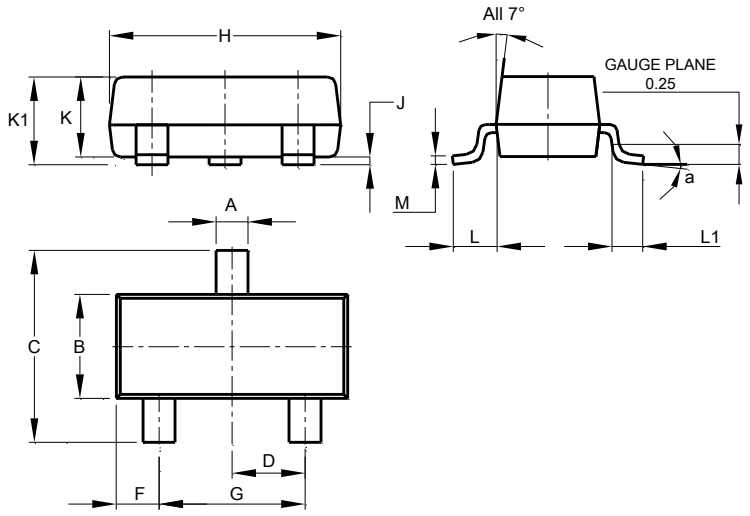


Figure 13 Transient Thermal Resistance

Package Outline Dimensions

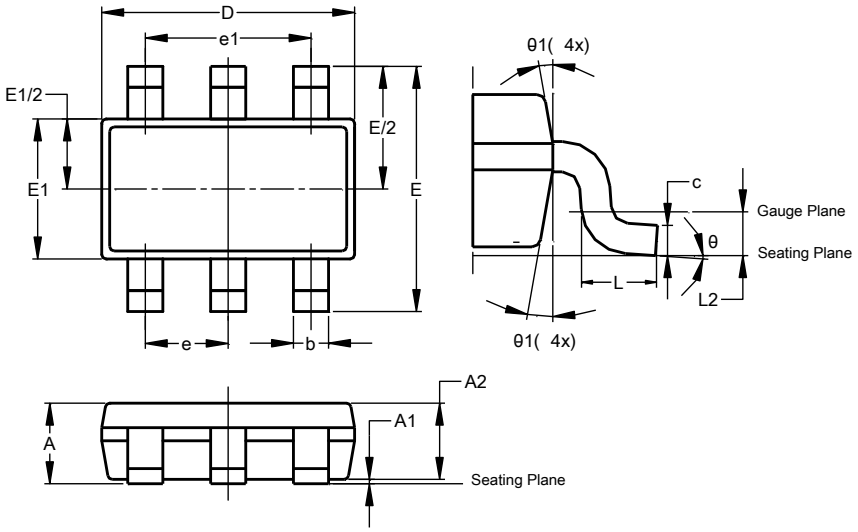
Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT23



SOT23			
Dim	**Min**	**Max**	**Typ**
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

TSOT26

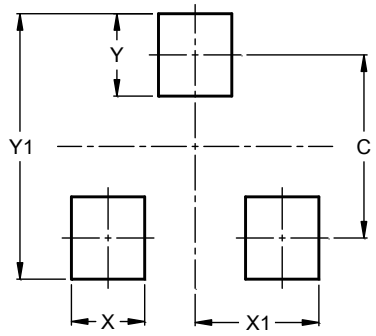


TSOT26			
Dim	**Min**	**Max**	**Typ**
A	–	1.00	–
A1	0.010	0.100	–
A2	0.840	0.900	–
D	2.800	3.000	2.900
E	2.800 BSC		
E1	1.500	1.700	1.600
b	0.300	0.450	–
c	0.120	0.200	–
e	0.950 BSC		
e1	1.900 BSC		
L	0.30	0.50	–
L2	0.250 BSC		
θ	0°	8°	4°
θ1	4°	12°	–
All Dimensions in mm			

Suggested Pad Layout

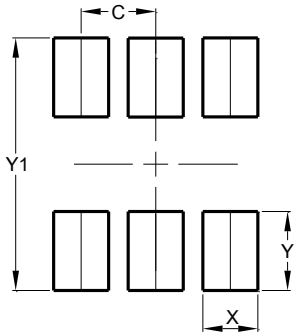
Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT23



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

TSOT26



Dimensions	Value (in mm)
C	0.950
X	0.700
Y	1.000
Y1	3.199

IMPORTANT NOTICE

DIODES INCORPORATED MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. Diodes Incorporated does not assume any liability arising out of the application or use of this document or any product described herein; neither does Diodes Incorporated convey any license under its patent or trademark rights, nor the rights of others. Any Customer or user of this document or products described herein in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on Diodes Incorporated website, harmless against all damages.

Diodes Incorporated does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel. Should Customers purchase or use Diodes Incorporated products for any unintended or unauthorized application, Customers shall indemnify and hold Diodes Incorporated and its representatives harmless against all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized application.

Products described herein may be covered by one or more United States, international or foreign patents pending. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks.

This document is written in English but may be translated into multiple languages for reference. Only the English version of this document is the final and determinative format released by Diodes Incorporated.

LIFE SUPPORT

Diodes Incorporated products are specifically not authorized for use as critical components in life support devices or systems without the express written approval of the Chief Executive Officer of Diodes Incorporated. As used herein:

A. Life support devices or systems are devices or systems which:

1. are intended to implant into the body, or

2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

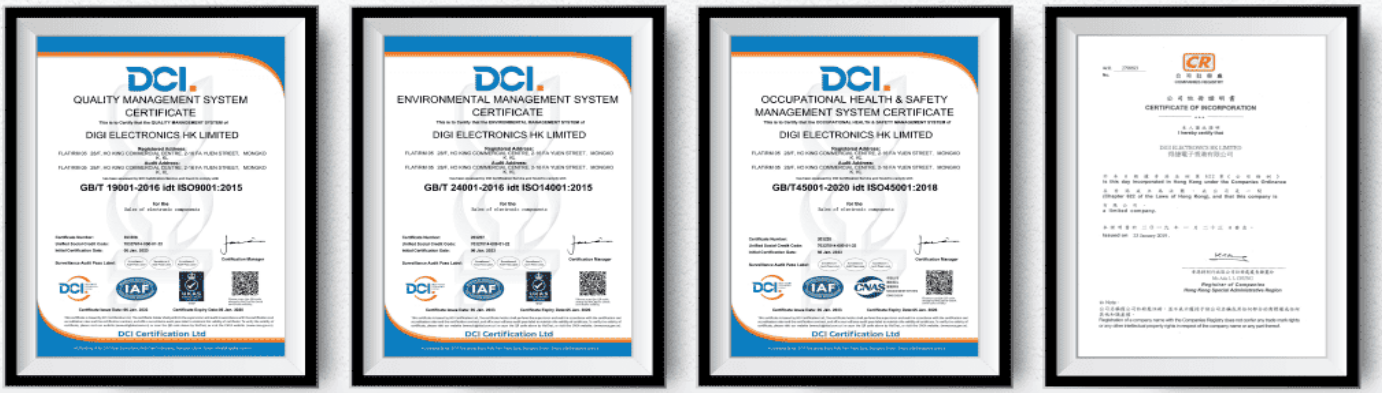
B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

Customers represent that they have all necessary expertise in the safety and regulatory ramifications of their life support devices or systems, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of Diodes Incorporated products in such safety-critical, life support devices or systems, notwithstanding any devices- or systems-related information or support that may be provided by Diodes Incorporated. Further, Customers must fully indemnify Diodes Incorporated and its representatives against any damages arising out of the use of Diodes Incorporated products in such safety-critical, life support devices or systems.

www.diodes.com

OUR CERTIFICATE

DiGi provide top-quality products and perfect service for customer worldwide through standardization, technological innovation and continuous improvement. DiGi through third-party certification, we striciy control the quality of products and services. Welcome your RFQ to Email: Info@DiGi-Electronics.com



Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

DiGi is a global authorized distributor of electronic components.