THE DATASHEET OF

DMN2991UDJ-7

DUAL N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D Max T_A = +25°C
20V	0.99Ω @ V_{GS} = 4.5V	520mA
	1.2Ω @ V_{GS} = 2.5V	470mA
	1.8Ω @ V_{GS} = 1.8V	385mA
	2.4Ω @ V_{GS} = 1.5V	330mA

Features

- Dual N-Channel MOSFET
- Low On-Resistance
- Very Low Gate Threshold Voltage, 1.0V Max
- Low Input Capacitance
- Fast Switching Speed
- Ultra-Small Surface Mount Package 1mm x 1mm
- Low Package Profile, 0.45mm Maximum Package Height
- ESD Protected Gate
- **Totally Lead-Free & Fully 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

This 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.

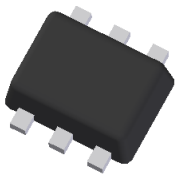
Applications

- General Purpose Interfacing Switch
- Power Management Functions
- DC-DC Converters
- Analog Switch

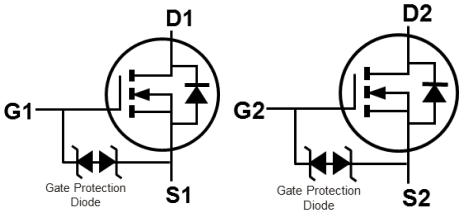
Mechanical Data

- Package: SOT963
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.027 grams (Approximate)

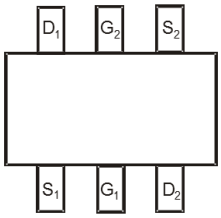
SOT963



Top View



Equivalent Circuit



Top View

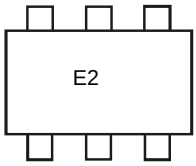
Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2991UDJ-7	SOT963	10K/Tape & Reel
DMN2991UDJ-7A	SOT963	10K/Tape & Reel

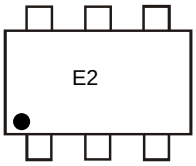
Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- 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 (Notes 5 & 6)

DMN2991UDJ-7



DMN2991UDJ-7A



E2 = Product Type Marking Code

Notes:
5. Package is non-polarized. Parts may be on reel in orientation illustrated, 180° rotated, or mixed (both ways).
6. Part number with suffix 7A designates devices marked with a Pin 1 indicator. There is no other difference between both devices.

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	20	V
Gate-Source Voltage			V_{GSS}	±8	V
Continuous Drain Current (Note 7) V_{GS} = 4.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	520 415	mA
Continuous Drain Current (Note 7) V_{GS} = 1.8V	Steady State	T_A = +25°C T_A = +70°C	I_D	385 308	mA
Pulsed Drain Current (Note 8)			I_{DM}	1.4	A

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

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 7)	P_D	0.4	W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	312	°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}	20	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current @T_C = +25°C	I_{DSS}	—	—	1	µA	V_{DS} = 16V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±10	µA	V_{GS} = ±5V, V_{DS} = 0V
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.4	—	1.0	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	0.48	0.99	Ω	V_{GS} = 4.5V, I_D = 100mA
		—	0.6	1.2		V_{GS} = 2.5V, I_D = 50mA
		—	0.78	1.8		V_{GS} = 1.8V, I_D = 20mA
		—	0.97	2.4		V_{GS} = 1.5V, I_D = 10mA
Diode Forward Voltage	V_{SD}	—	0.77	1.0	V	V_{GS} = 0V, I_S = 150mA
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{iss}	—	21.5	—	pF	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	4.9	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	3.7	—	pF	
Total Gate Charge	Q_g	—	0.35	—	nC	V_{GS} = 4.5V, V_{DS} = 10V, I_D = 250mA
Gate-Source Charge	Q_{gs}	—	0.07	—	nC	
Gate-Drain Charge	Q_{gd}	—	0.08	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	5.6	—	ns	V_{DD} = 10V, V_{GS} = 4.5V, R_L = 47Ω, R_g = 10Ω, I_D = 200mA
Turn-On Rise Time	t_R	—	4.9	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	60.6	—	ns	
Turn-Off Fall Time	t_F	—	27.6	—	ns	
Reverse Recovery Time	t_{RR}	—	12.3	—	ns	I_F = 1.0A, di/dt = 100A/µs
Reverse Recovery Charge	Q_{RR}	—	1.1	—	nC	I_F = 1.0A, di/dt = 100A/µs

Notes: 7. Device mounted on FR-4 PCB, with minimum recommended pad layout.
8. Device mounted on minimum recommended pad layout test board, 10µs pulse duty cycle = 1%.
9. Short duration pulse test used to minimize self-heating effect.
10. Guaranteed by design. Not subject to product testing.

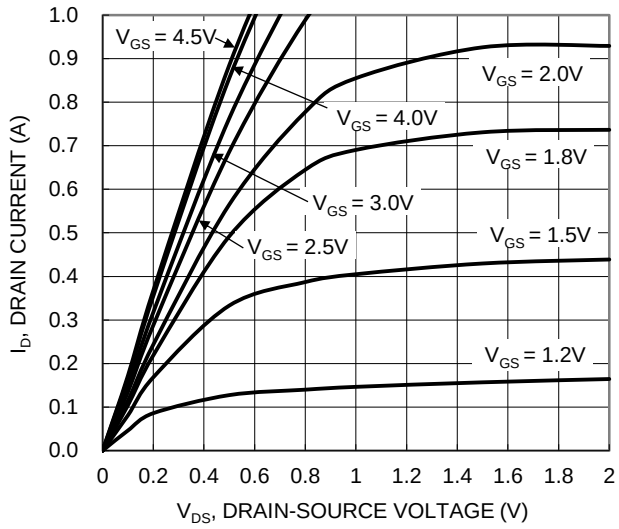


Figure 1. Typical Output Characteristic

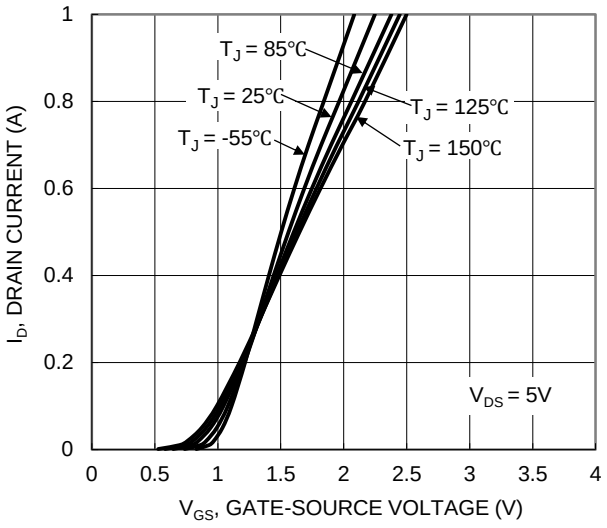


Figure 2. Typical Transfer Characteristic

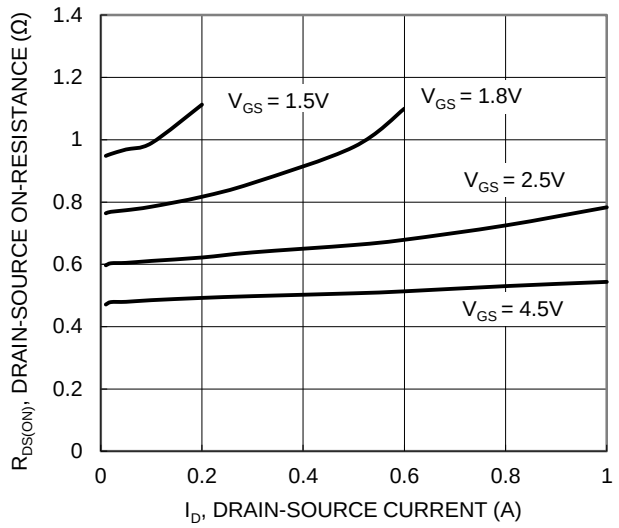


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

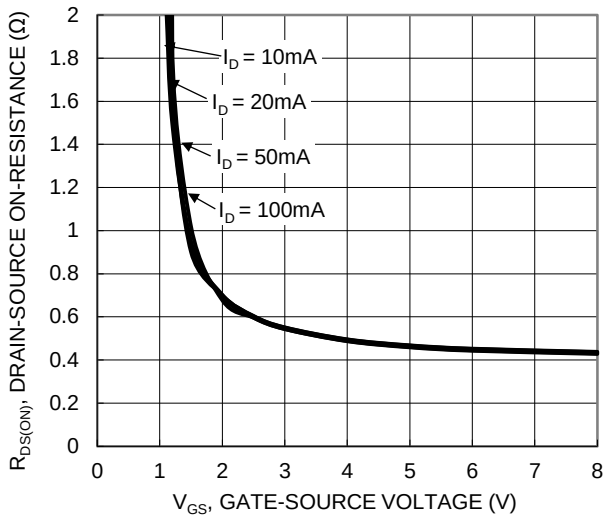


Figure 4. Typical Transfer Characteristic

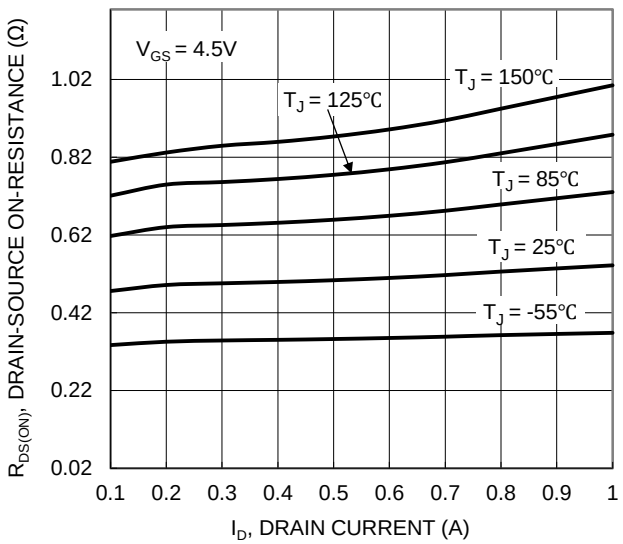


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

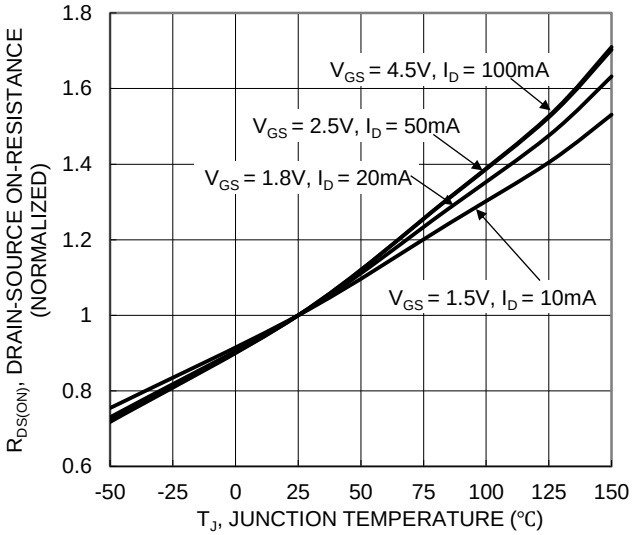


Figure 6. On-Resistance Variation with Temperature

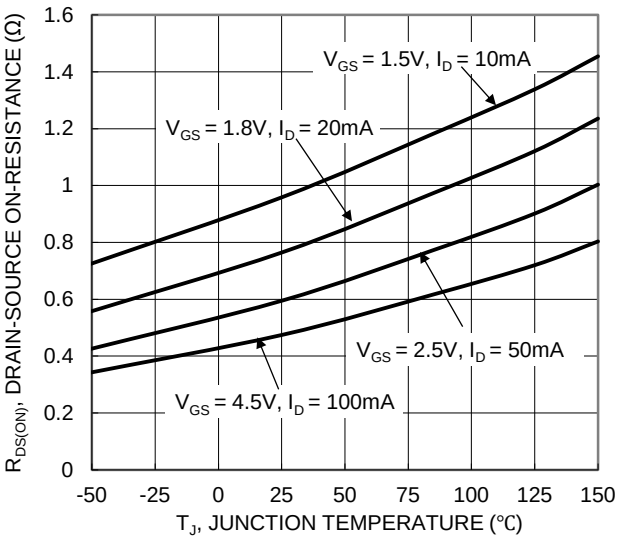


Figure 7. On-Resistance Variation with Temperature

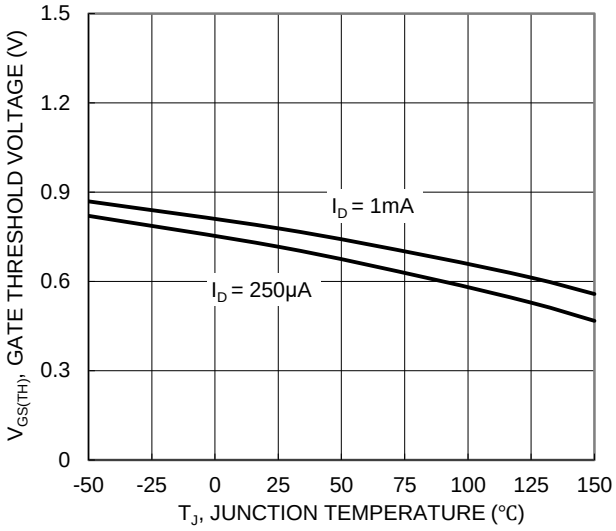


Figure 8. Gate Threshold Variation vs. Junction Temperature

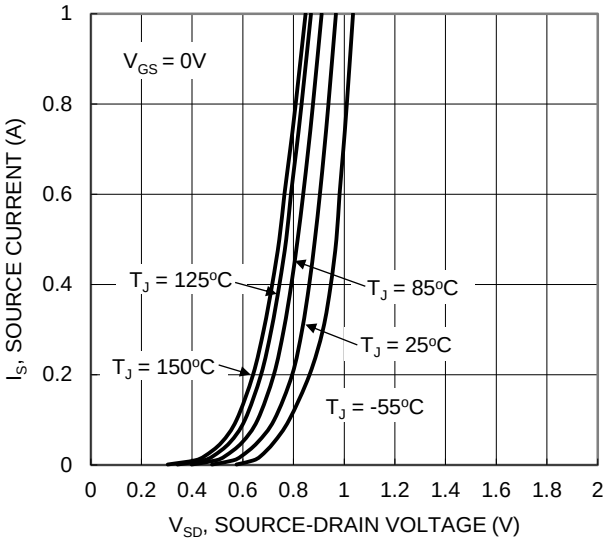


Figure 9. Diode Forward Voltage vs. Current

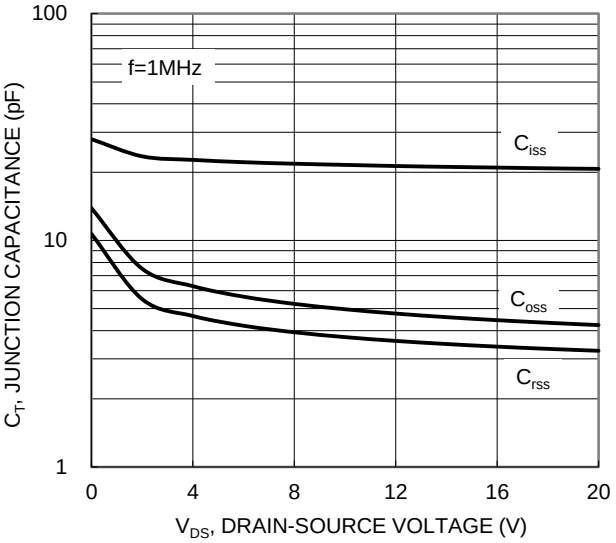


Figure 10. Typical Junction Capacitance

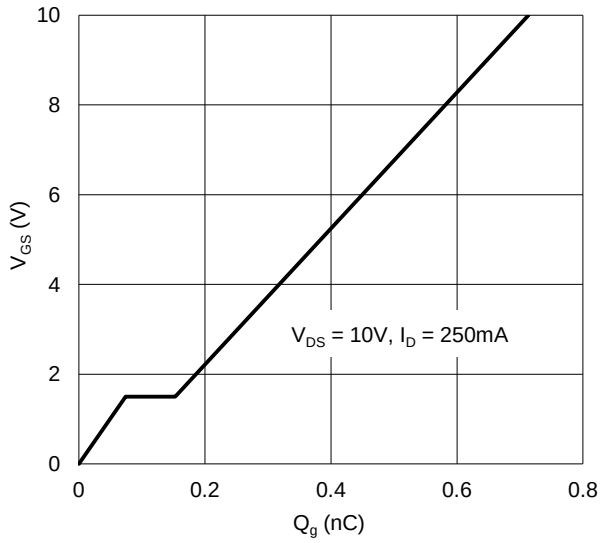


Figure 11. Gate Charge

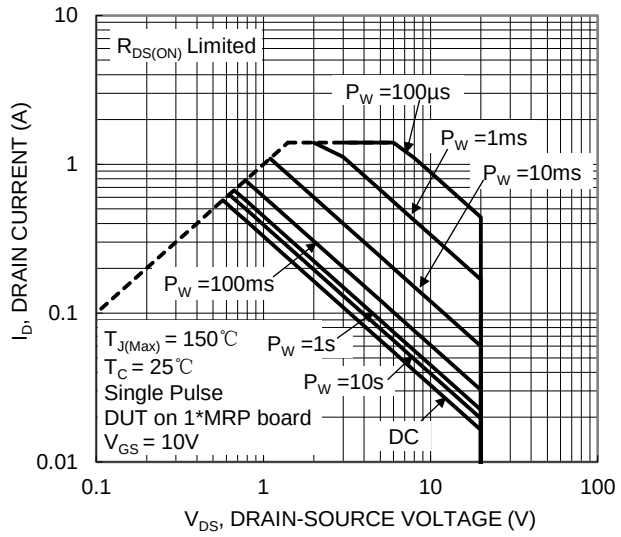


Figure 12. SOA, Safe Operation Area

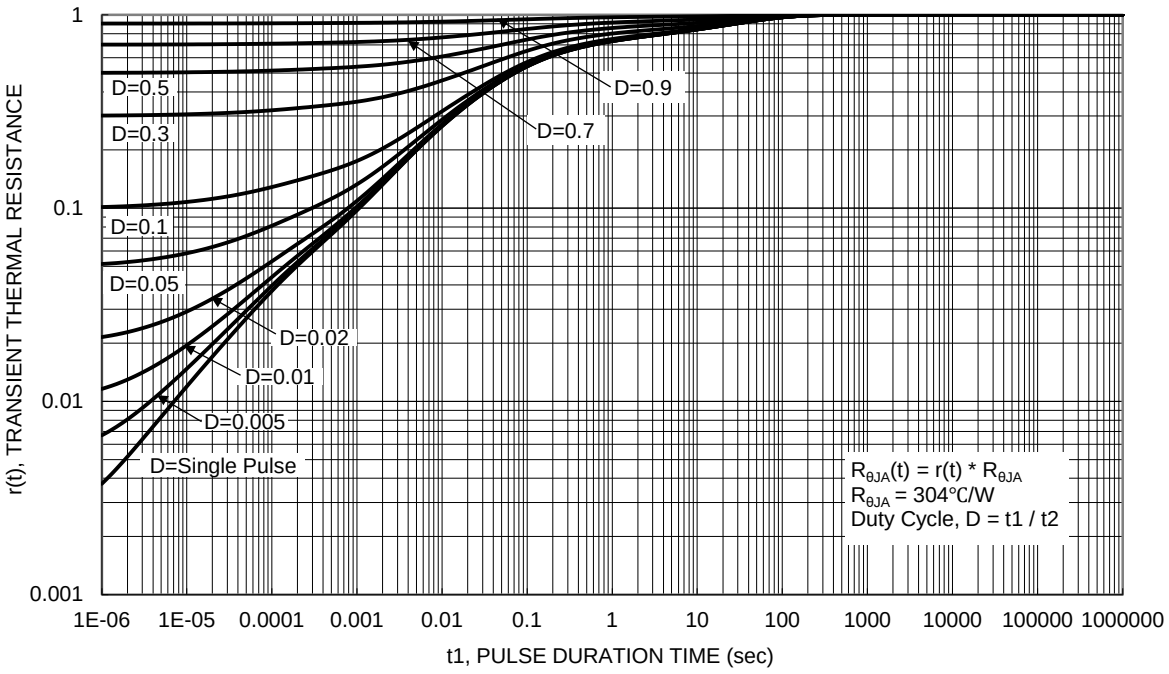
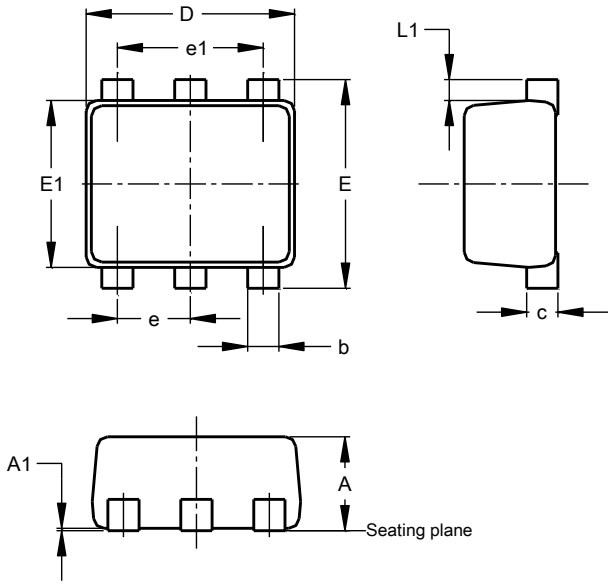


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

SOT963

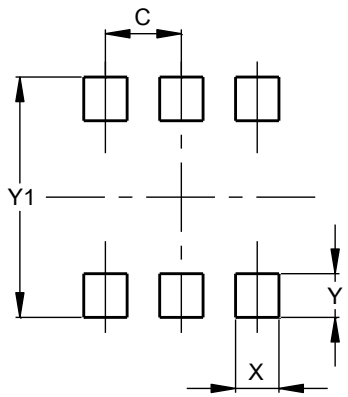


SOT963			
Dim	**Min**	**Max**	**Typ**
A	0.40	0.50	0.45
A1	0.00	0.05	--
b	0.10	0.20	0.15
c	0.120	0.180	0.150
D	0.95	1.05	1.00
E	0.95	1.05	1.00
E1	0.75	0.85	0.80
e	--	--	0.35
e1	--	--	0.70
L1	0.05	0.15	0.10
All Dimensions in mm			

Suggested Pad Layout

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

SOT963



Dimensions	Value (in mm)
C	0.350
X	0.200
Y	0.200
Y1	1.100

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