

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max @T _A = +25°C
30V	1.5Ω @ V _{GS} = 4.5V	0.43A
	2.0Ω @ V _{GS} = 2.5V	0.37A
	3.0Ω @ V _{GS} = 1.8V	0.3A
	4.5Ω @ V _{GS} = 1.5V	0.25A

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

- Battery operated systems and solid-state relays
- Drivers, relays, solenoids, lamps, hammers, displays, memories, transistors, etc.
- Power supply converter circuits

Features and Benefits

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Ultra-Small Surface-Mount Package
- ESD Protected
- 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-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](https://www.diodes.com/quality/product-definitions/) or your local Diodes representative.**

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

Mechanical Data

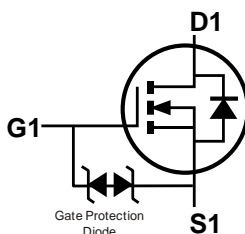
- Package: SOT363
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish Annealed over Alloy 42 Leadframe (Lead-Free Plating). Solderable per MIL-STD-202, Method 208 (E3)
- Terminal Connections: See Diagram
- Weight: 0.006 grams (Approximate)



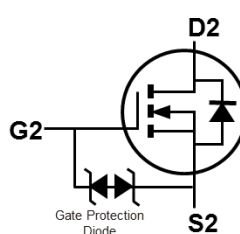
ESD PROTECTED



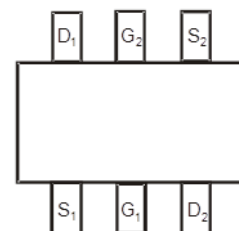
Top View



Q1 N-Channel



Q2 N-Channel



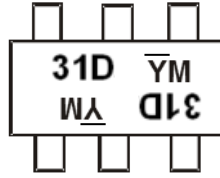
Top View
Pin-out

Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMN31D5UDW-7	SOT363	3,000	Tape & Reel
DMN31D5UDW-13	SOT363	10,000	Tape & Reel

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



31D = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: K = 2023)
 M = Month (ex: 9 = September)

Date Code Key

Year	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Code	J	K	L	M	N	O	P	R	S	T	U	V

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}	30	V
Gate-Source Voltage			V _{GSS}	±12	V
Continuous Drain Current (Note 5) V _{GS} = 4.5V	Steady State	T _A = +25°C T _A = +70°C	I _D	0.43 0.28	A
Maximum Continuous Body Diode Forward Current (Note 5)			I _S	0.37	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)			I _{DM}	0.65	A

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 6)	T _A = +25°C	P _D	0.33	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R _{θJA}	380	°C/W
Total Power Dissipation (Note 5)	T _A = +25°C	P _D	0.43	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	290	°C/W
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate
 6. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

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}	30	—	—	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current @T _C = +25°C	I _{DSS}	—	—	100	nA	V _{DS} = 24V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±10	μA	V _{GS} = ±10V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(TH)}	0.5	—	0.9	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	1.3	1.5	Ω	V _{GS} = 4.5V, I _D = 100mA
			1.4	2.0		V _{GS} = 2.5V, I _D = 50mA
			1.7	3.0		V _{GS} = 1.8V, I _D = 20mA
			1.9	4.5		V _{GS} = 1.5V, I _D = 10mA
Diode Forward Voltage (Note 7)	V _{SD}	—	0.7	1.0	mV	V _{GS} = 0V, I _S = 100mA
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	15.4	—	pF	V _{DS} = 15V, V _{GS} = 0V f = 1.0MHz
Output Capacitance	C _{oss}	—	8	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	5	—	pF	
Total Gate Charge	Q _g	—	0.3	—	nC	V _{GS} = 4.5V, V _{DS} = 15V I _D = 200mA
Gate-Source Charge	Q _{gs}	—	0.05	—	nC	
Gate-Drain Charge	Q _{gd}	—	0.1	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	5.7	—	ns	V _{DD} = 15V, V _{GS} = 4.5V R _G = 2Ω, I _D = 200mA
Turn-On Rise Time	t _R	—	9.1	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	146	—	ns	
Turn-Off Fall Time	t _F	—	48	—	ns	

Notes: 7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.

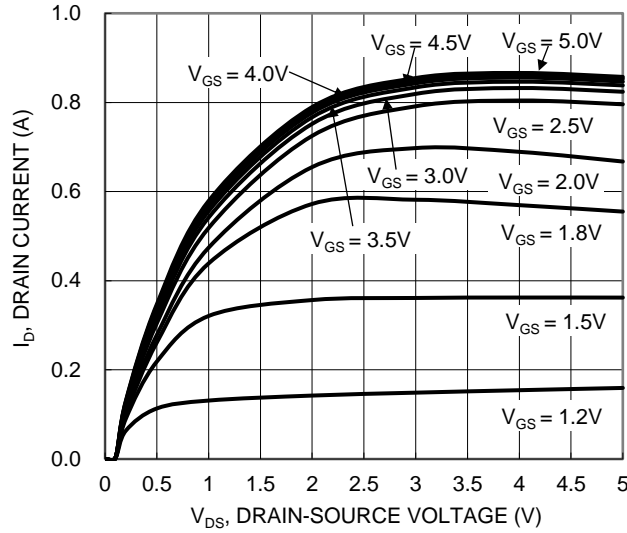


Figure 1. Typical Output Characteristic

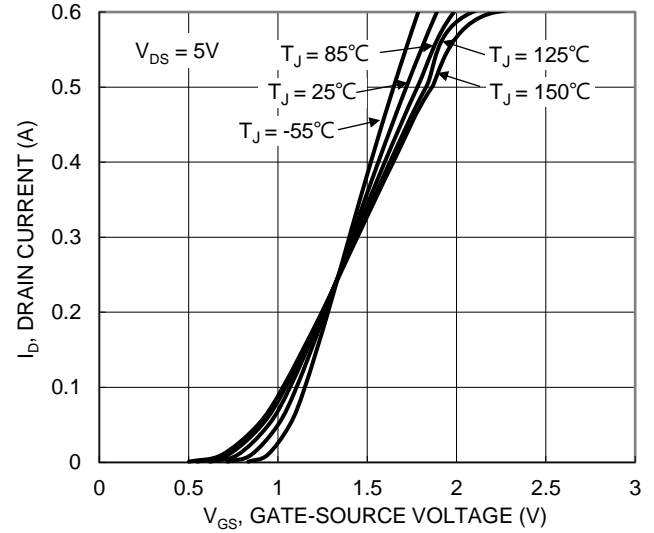


Figure 2. Typical Transfer Characteristic

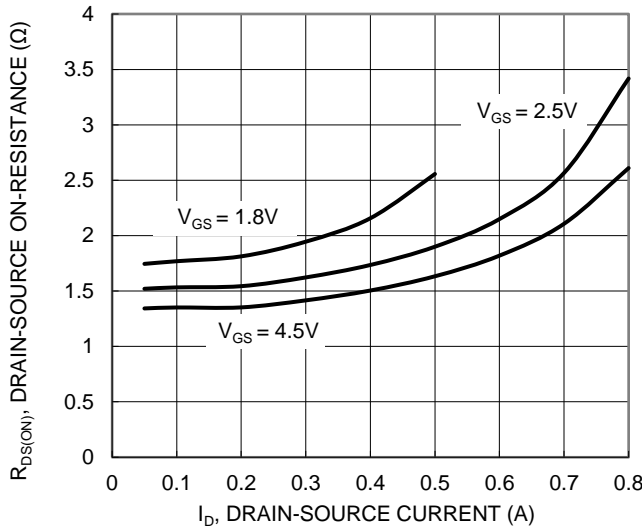


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

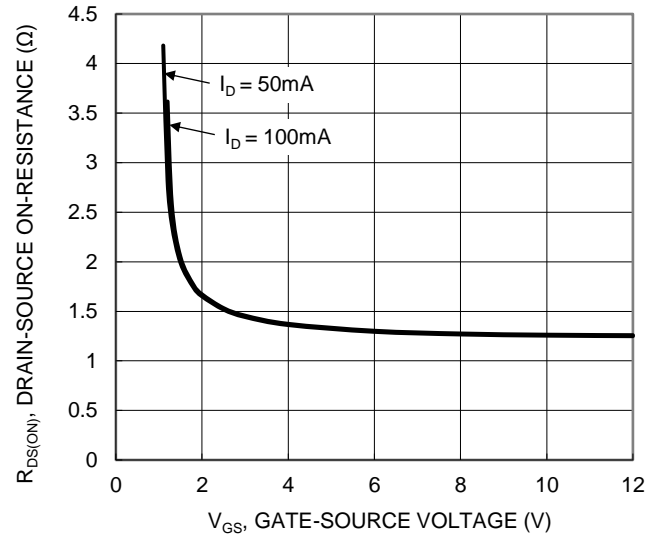


Figure 4. Typical Transfer Characteristic

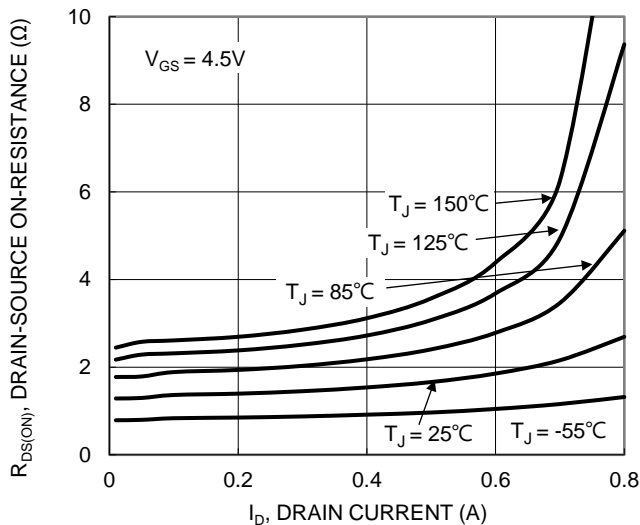


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

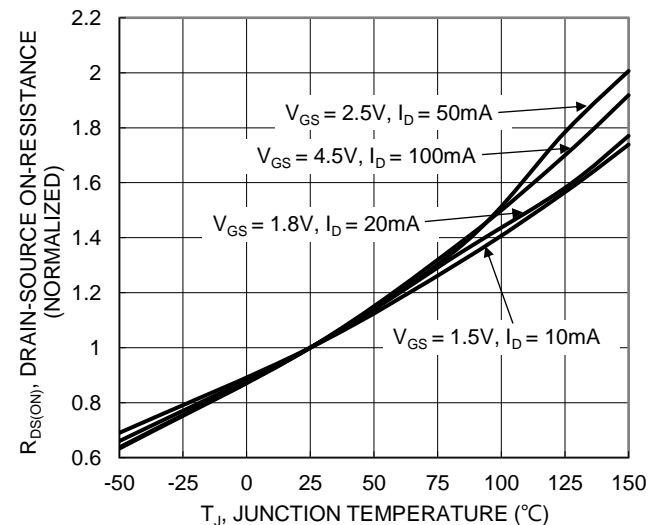


Figure 6. On-Resistance Variation with Junction Temperature

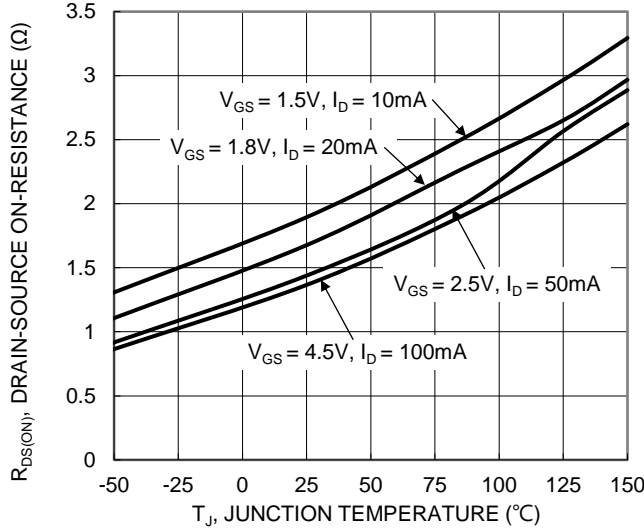


Figure 7. On-Resistance Variation with Junction Temperature

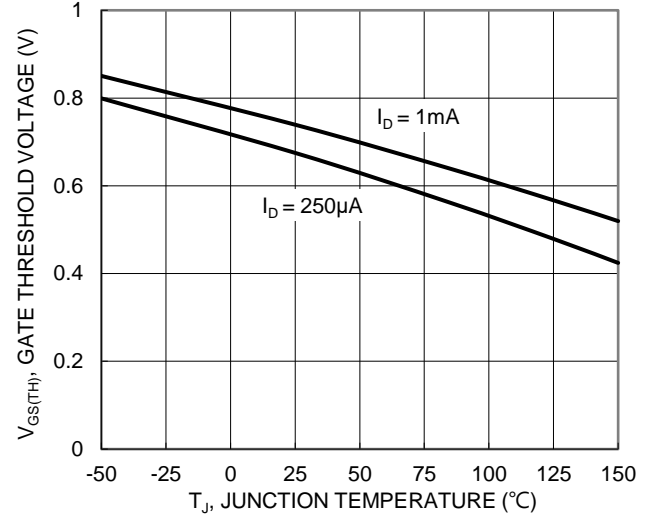


Figure 8. Gate Threshold Variation vs. Junction Temperature

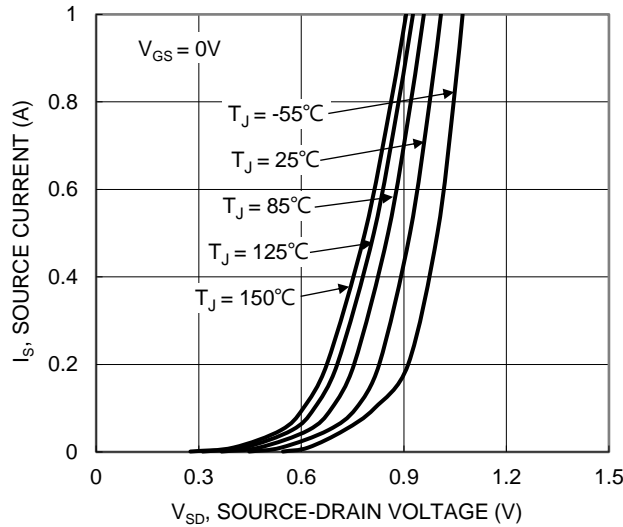


Figure 9. Diode Forward Voltage vs. Current

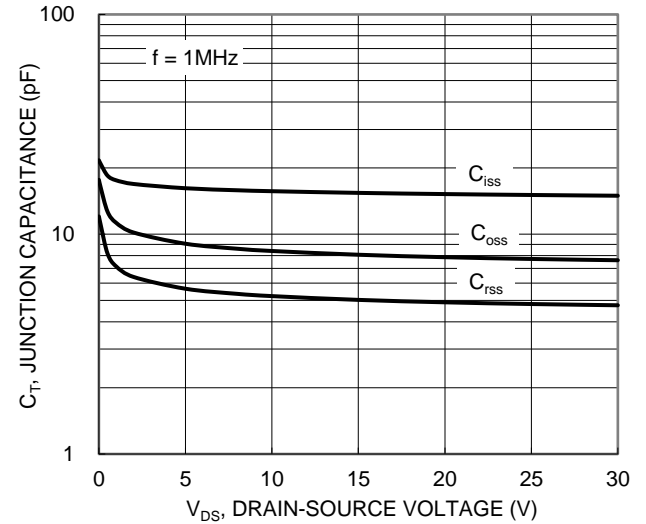


Figure 10. Typical Junction Capacitance

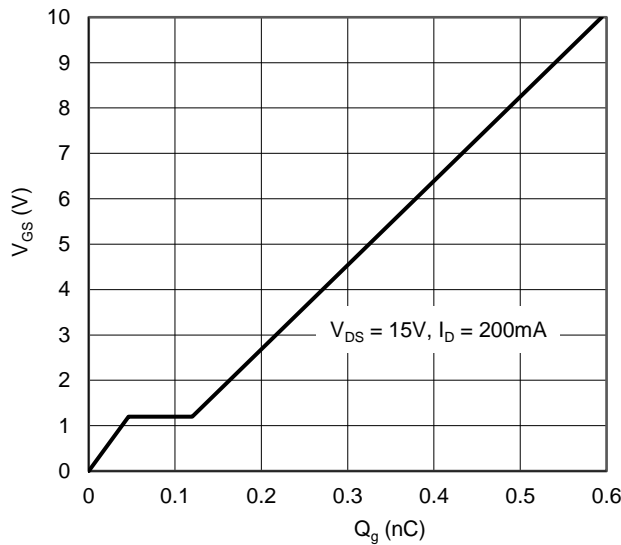


Figure 11. Gate Charge

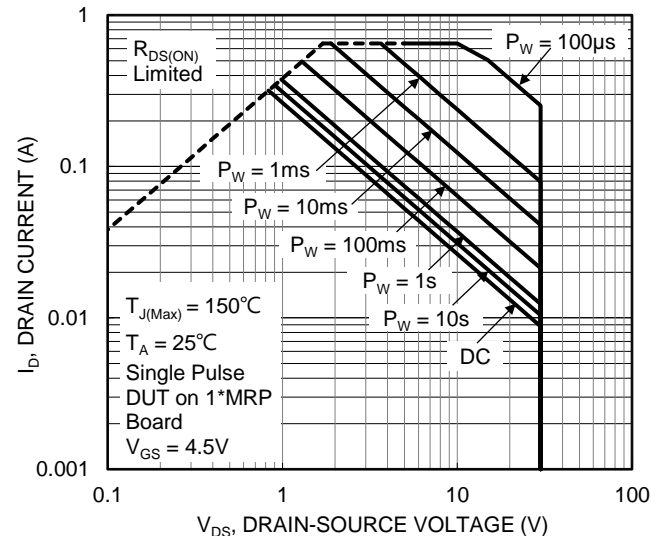


Figure 12. SOA, Safe Operation Area

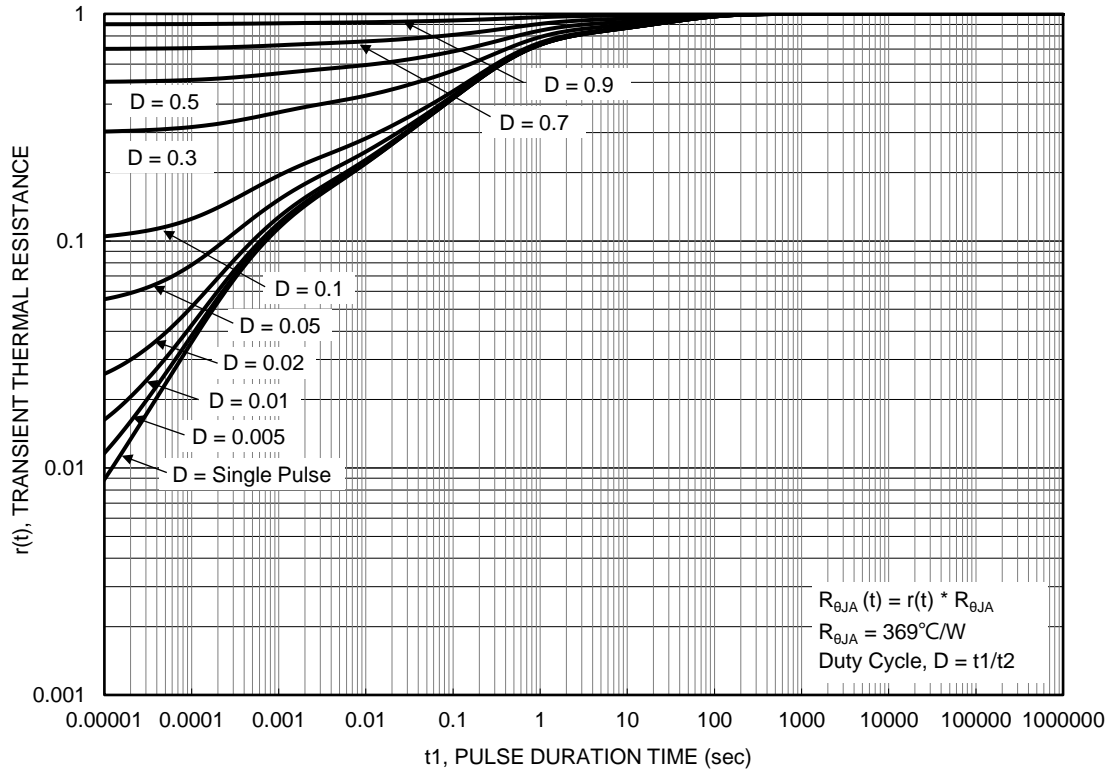
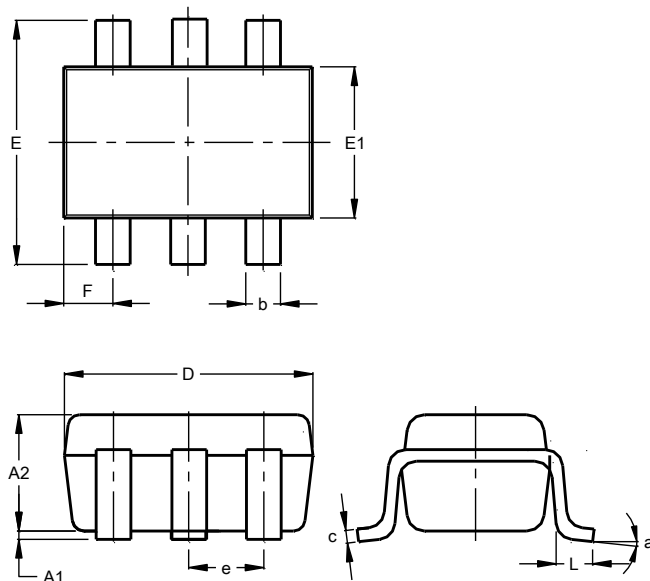


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

SOT363

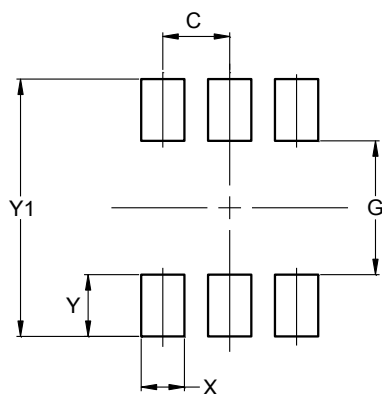


SOT363			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

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

SOT363



Dimensions	Value (in mm)
C	0.650
G	1.300
X	0.420
Y	0.600
Y1	2.500

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