

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON) \max}$	$I_D \max$ $T_A = +25^\circ\text{C}$
-12V	48m $\Omega$ @ $V_{GS} = -4.5\text{V}$	-3.8A
	59m $\Omega$ @ $V_{GS} = -2.5\text{V}$	-3.4A
	80m $\Omega$ @ $V_{GS} = -1.8\text{V}$	-2.9A

## Description

This new generation MOSFET is designed to minimize the on-state resistance ( $R_{DS(ON)}$ ) and yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

## Applications

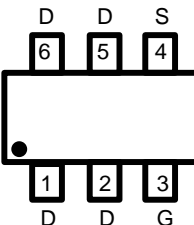
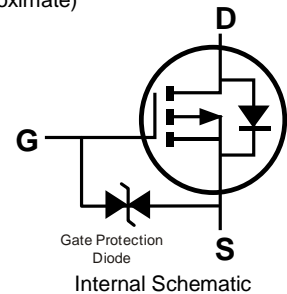
- DC-DC Converters
- Power Management Functions
- Battery Operated Systems and Solid-State Relays
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc.



SOT363



Top View


 Top View  
Pin out


Internal Schematic

## Features

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Small Surface Mount Package
- ESD Protected
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

## Mechanical Data

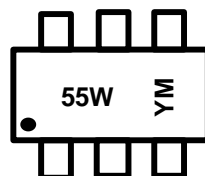
- Case: SOT363
- Case Material: Molded Plastic.  
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish annealed over Alloy 42 Leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208 (E3)
- Terminal Connections: See Diagram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

## Ordering Information (Note 4)

Part Number	Case	Packaging
DMP1055USW-7	SOT363	3,000/Tape & Reel
DMP1055USW-13	SOT363	10,000/Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) 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 <http://www.diodes.com/products/packages.html>.

## Marking Information



55W = Product Type Marking Code  
 YM = Date Code Marking  
 Y or  $\bar{Y}$  = Year (ex: D = 2016)  
 M = Month (ex: 9 = September)

### Date Code Key

Year	2016	2017	2018	2019	2020	2021	2022	2023
Code	D	E	F	G	H	I	J	K

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<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V <sub>DSS</sub>	-12	V
Gate-Source Voltage			V <sub>GSS</sub>	±8	V
Continuous Drain Current (Note 6) V <sub>GS</sub> = -4.5V	Steady State	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	-3.8 -3.0	A
Maximum Continuous Body Diode Forward Current (Note 6)			I <sub>S</sub>	-1.7	A
Pulsed Drain Current (10μs pulse, duty cycle = 1%)			I <sub>DM</sub>	-20	A

**Thermal Characteristics**

Characteristic			Symbol	Value	Units
Total Power Dissipation (Note 5)			P <sub>D</sub>	0.66	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State		R <sub>θJA</sub>	192	°C/W
Total Power Dissipation (Note 6)			P <sub>D</sub>	1.03	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State		R <sub>θJA</sub>	123	°C/W
Thermal Resistance, Junction to Case			R <sub>θJC</sub>	39	°C/W
Operating and Storage Temperature Range			T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-12	-	-	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA
Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C	I <sub>DSS</sub>	-	-	-1.0	μA	V <sub>DS</sub> = -12V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	-	-	±10	μA	V <sub>GS</sub> = ±8V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	-0.4	-	-1	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	-	41	48	mΩ	V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -3.0A
		-	49	59		V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -1.0A
		-	69	80		V <sub>GS</sub> = -1.8V, I <sub>D</sub> = -1.0A
		-	110	150		V <sub>GS</sub> = -1.5V, I <sub>D</sub> = -0.5A
		-	-	-		V <sub>GS</sub> = -1.5V, I <sub>D</sub> = -0.5A
Diode Forward Voltage	V <sub>SD</sub>	-	-0.7	-1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = -3.7A
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>iSS</sub>	-	1,028	-	pF	V <sub>DS</sub> = -6V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oSS</sub>	-	285	-	pF	
Reverse Transfer Capacitance	C <sub>rSS</sub>	-	254	-	pF	
Gate Resistance	R <sub>g</sub>	-	19.6	-	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge (V <sub>GS</sub> = -4.5V)	Q <sub>g</sub>	-	13	-	nC	V <sub>DS</sub> = -10V, I <sub>D</sub> = -4.7A
Total Gate Charge (V <sub>GS</sub> = -8V)		-	20.8	-	nC	
Gate-Source Charge	Q <sub>gs</sub>	-	1.8	-	nC	
Gate-Drain Charge	Q <sub>gd</sub>	-	4.5	-	nC	
Turn-On Delay Time	t <sub>D(ON)</sub>	-	5.6	-	ns	
Turn-On Rise Time	t <sub>r</sub>	-	12.8	-	ns	V <sub>DD</sub> = -6V, V <sub>GS</sub> = -4.5V, R <sub>L</sub> = 1.6Ω, R <sub>G</sub> = 1Ω
Turn-Off Delay Time	t <sub>D(OFF)</sub>	-	30.7	-	ns	
Turn-Off Fall Time	t <sub>f</sub>	-	25.4	-	ns	
Body Diode Reverse Recovery Time	t <sub>RR</sub>	-	31.6	-	ns	I <sub>S</sub> = -3.6A, dI/dt = 100A/μs
Body Diode Reverse Recovery Charge	Q <sub>RR</sub>	-	7.8	-	nC	I <sub>S</sub> = -3.6A, dI/dt = 100A/μs

- Notes:
5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
  6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout.
  7. Short duration pulse test used to minimize self-heating effect.
  8. Guaranteed by design. Not subject to production testing.

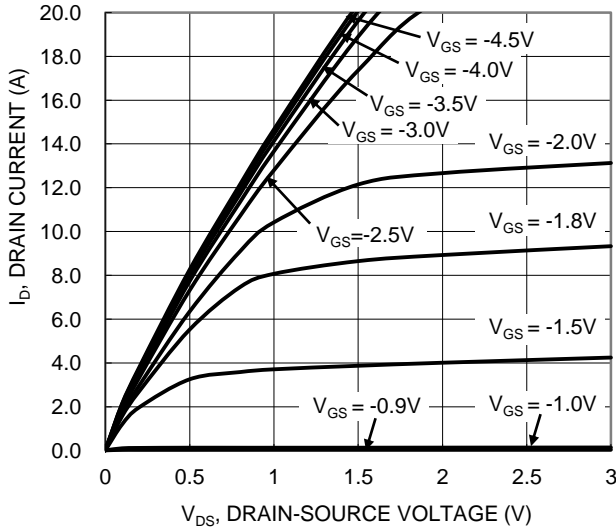


Figure 1. Typical Output Characteristic

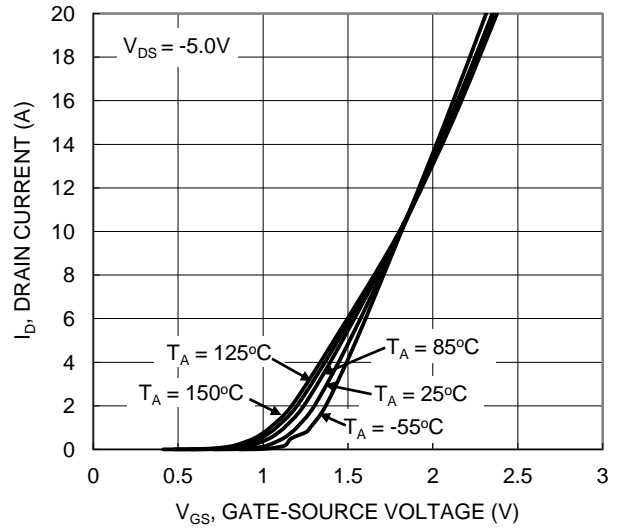


Figure 2. Typical Transfer Characteristic

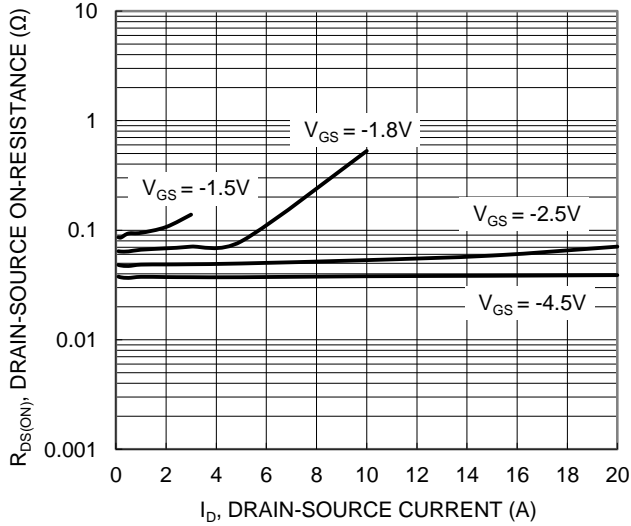


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

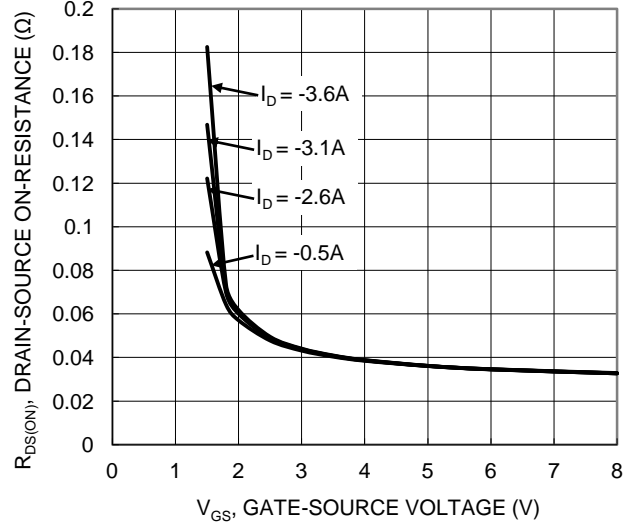


Figure 4. Typical Transfer Characteristic

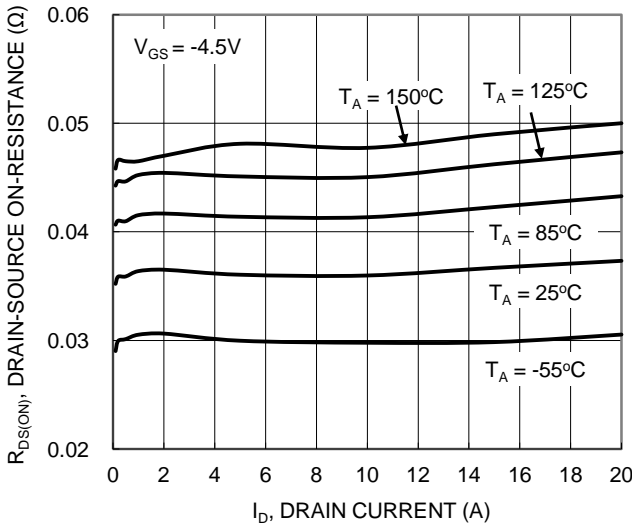


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

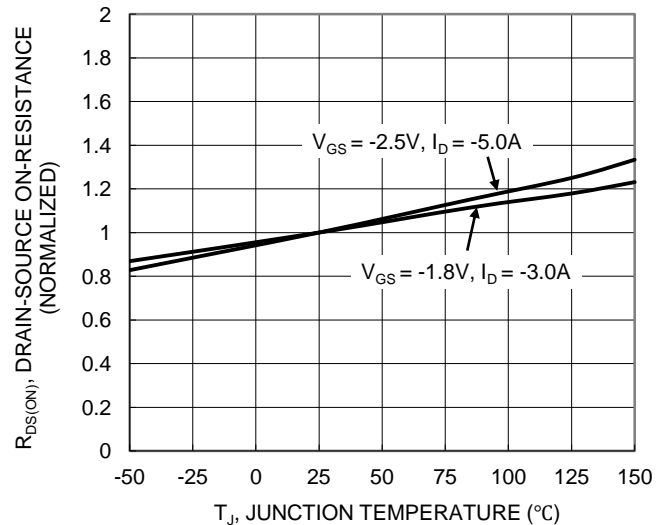


Figure 6. On-Resistance Variation with Temperature

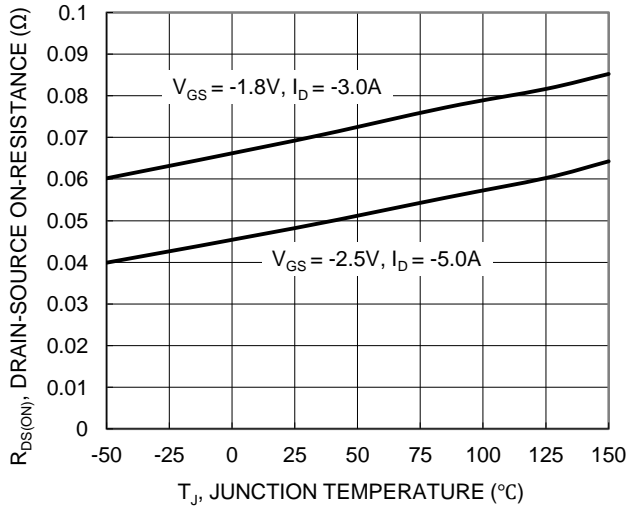


Figure 7. On-Resistance Variation with Temperature

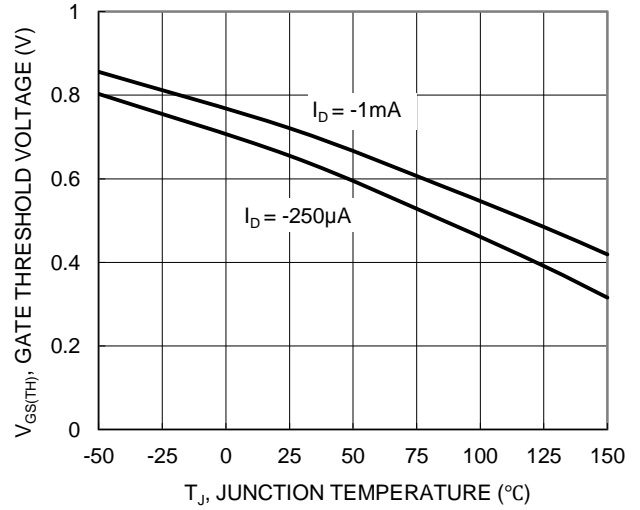


Figure 8. Gate Threshold Variation vs. Junction Temperature

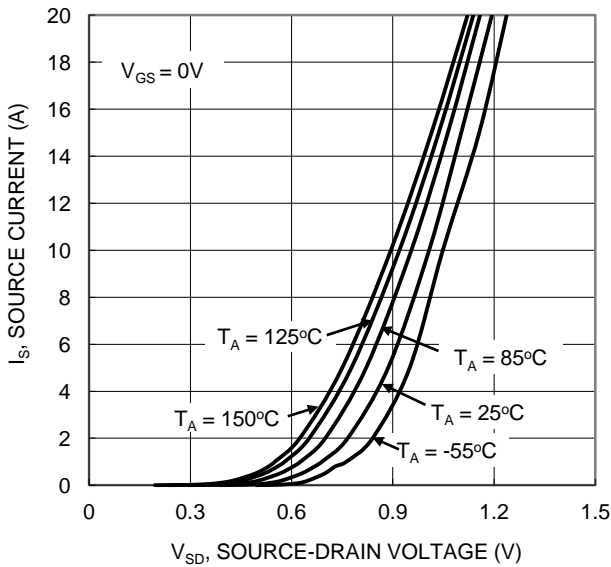


Figure 9. Diode Forward Voltage vs. Current

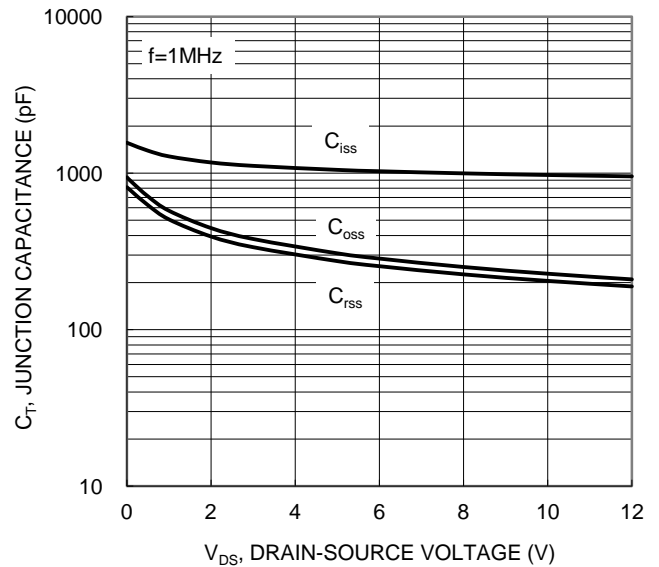


Figure 10. Typical Junction Capacitance

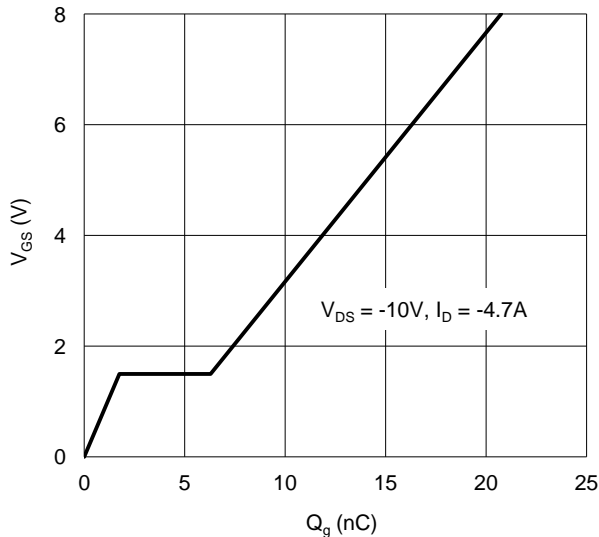


Figure 11. Gate Charge

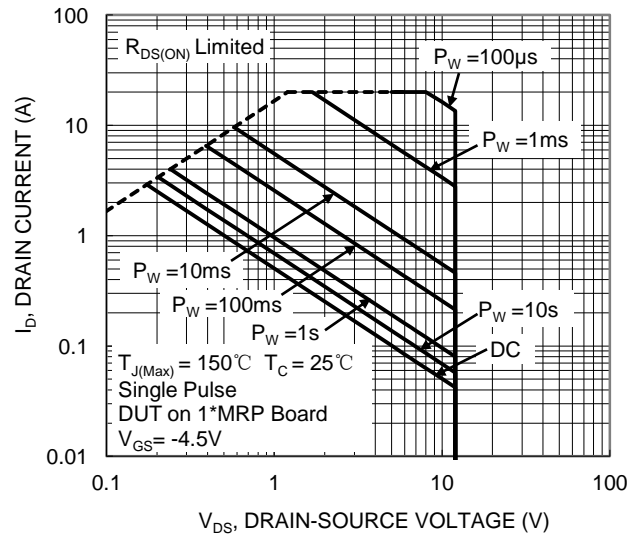


Figure 12. SOA, Safe Operation Area

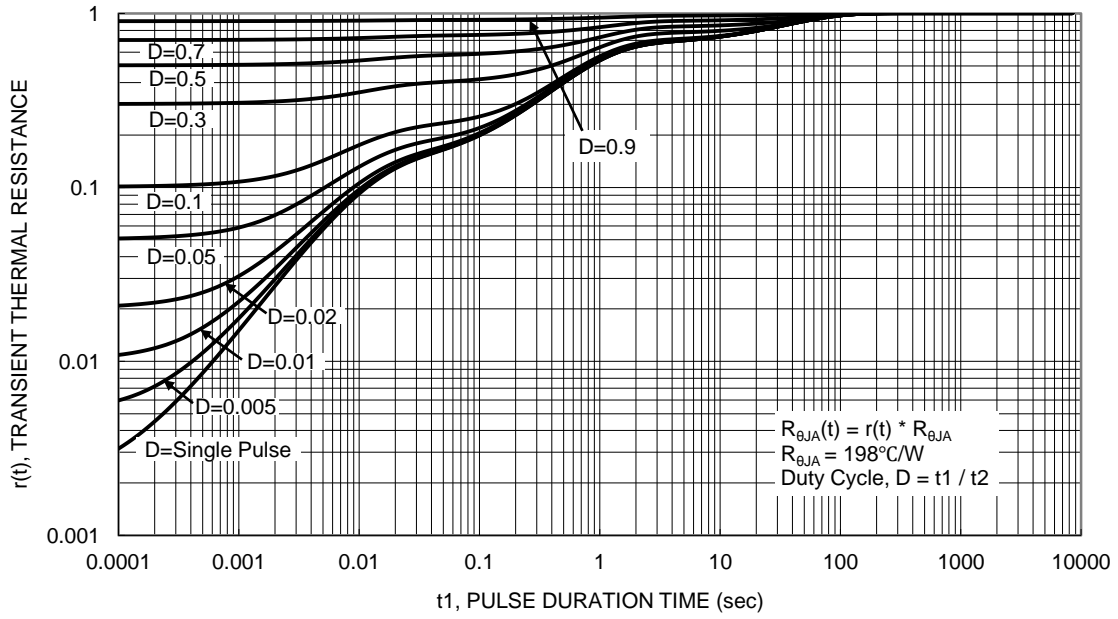
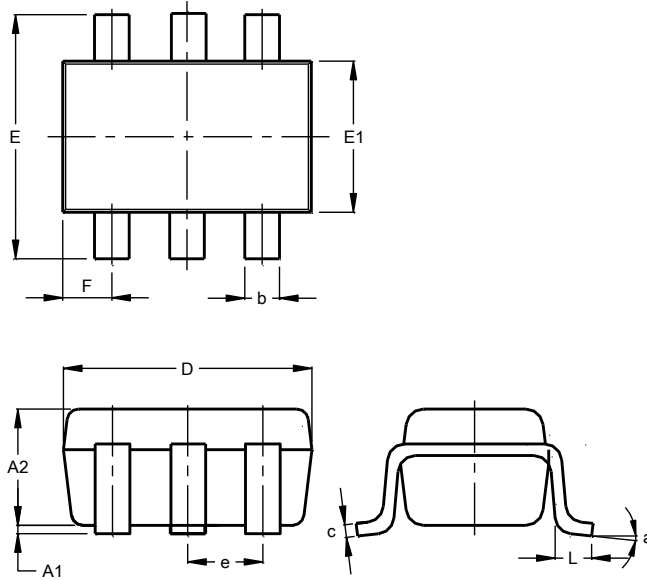


Figure 13. Transient Thermal Resistance

**Package Outline Dimensions**

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

**SOT363**

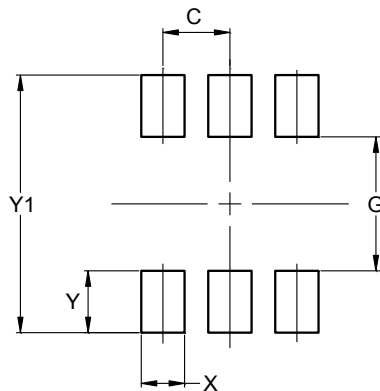


SOT363			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	1.00
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

**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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