

Product Summary

BV_{DSS}	$R_{DS(ON)} \text{ Max}$	I_D $T_A = +25^\circ\text{C}$
50V	2Ω @ $V_{GS} = 5\text{V}$	350mA
	2.5Ω @ $V_{GS} = 2.5\text{V}$	330mA
	4Ω @ $V_{GS} = 1.8\text{V}$	270mA

Features and Benefits

- Low On-Resistance
- Very Low Gate Threshold Voltage (1.0V max)
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- ESD Protected**
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- An automotive-compliant part is available under separate datasheet ([DMN52D0UDWQ](#))

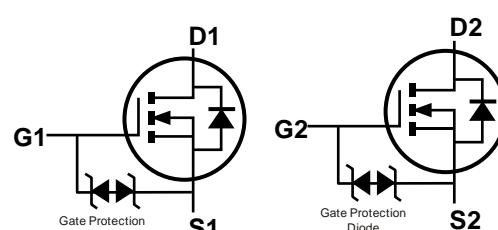
Description and Applications

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.

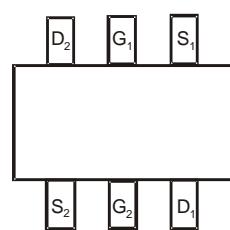
- Load switches
- Level switches



Top View



Equivalent Circuit


 Top View
Pinout

Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMN52D0UDW-7	SOT363	3,000	Reel
DMN52D0UDW-13	SOT363	10,000	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



5DK = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: L = 2024)
 M = Month (ex: 9 = September)

Date Code Key

Year	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Code	K	L	M	N	P	R	S	T	U	V	W	X
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 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	50	V
Gate-Source Voltage			V_{GSS}	± 12	V
Continuous Drain Current (Note 6) $V_{GS} = 5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$	I_D	350 280	mA
Maximum Continuous Body Diode Forward Current (Note 6)		$T_A = +70^\circ\text{C}$	I_S	350	mA
Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%)			I_{DM}	1.2	A

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)		P_D	0.3	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	373	$^\circ\text{C}/\text{W}$
Total Power Dissipation (Note 6)		P_D	0.5	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	241	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	50	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	$V_{DS} = 50\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GS}	—	—	± 10	μA	$V_{GS} = \pm 12\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(\text{TH})}$	0.49	—	1.0	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(\text{ON})}$	—	1.6	4.0	Ω	$V_{GS} = 1.8\text{V}, I_D = 50\text{mA}$
		—	1.2	2.5		$V_{GS} = 2.5\text{V}, I_D = 50\text{mA}$
		—	1.0	2.0		$V_{GS} = 5.0\text{V}, I_D = 50\text{mA}$
Diode Forward Voltage	V_{SD}	—	0.6	1.2	V	$V_{GS} = 0\text{V}, I_D = 50\text{mA}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	42.3	—	pF	$V_{DS} = 25\text{V}, V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	5.7	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	4.5	—	pF	
Gate Resistance	R_g	—	53	—	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge ($V_{GS} = 4.5\text{V}$)	Q_g	—	0.7	—	nC	$V_{DS} = 25\text{V}, I_D = 50\text{mA}$
Total Gate Charge ($V_{GS} = 10\text{V}$)	Q_g	—	1.5	—	nC	
Gate-Source Charge	Q_{gs}	—	0.1	—	nC	
Gate-Drain Charge	Q_{gd}	—	0.2	—	nC	$V_{DS} = 25\text{V}, V_{GS} = 10\text{V}, R_g = 50\Omega, I_D = 50\text{mA}$
Turn-On Delay Time	$t_{D(\text{ON})}$	—	1.1	—	ns	
Turn-On Rise Time	t_r	—	8.3	—	ns	
Turn-Off Delay Time	$t_{D(\text{OFF})}$	—	31	—	ns	
Turn-Off Fall Time	t_f	—	41	—	ns	

Notes:

- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
- Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
- Short duration pulse test used to minimize self-heating effect.
- Guaranteed by design. Not subject to product testing.

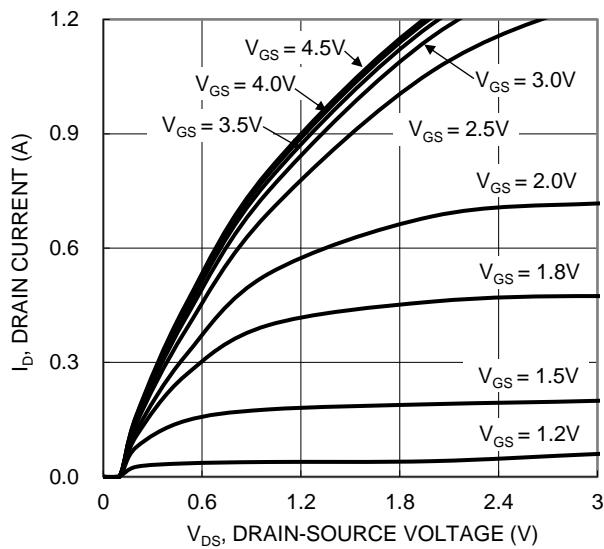


Figure 1. Typical Output Characteristic

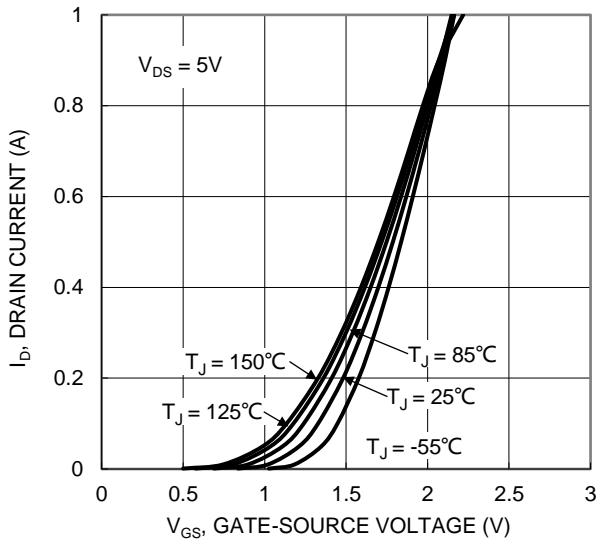


Figure 2. Typical Transfer Characteristic

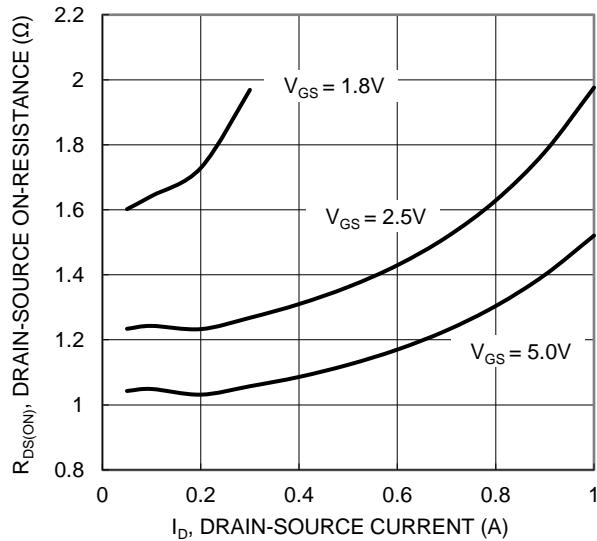


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

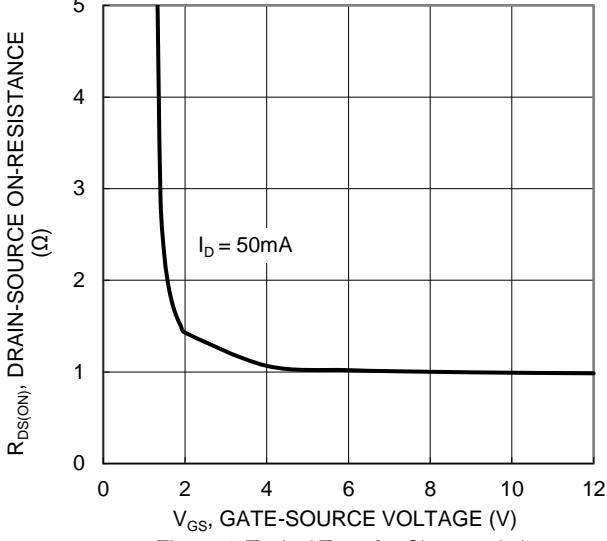


Figure 4. Typical Transfer Characteristic

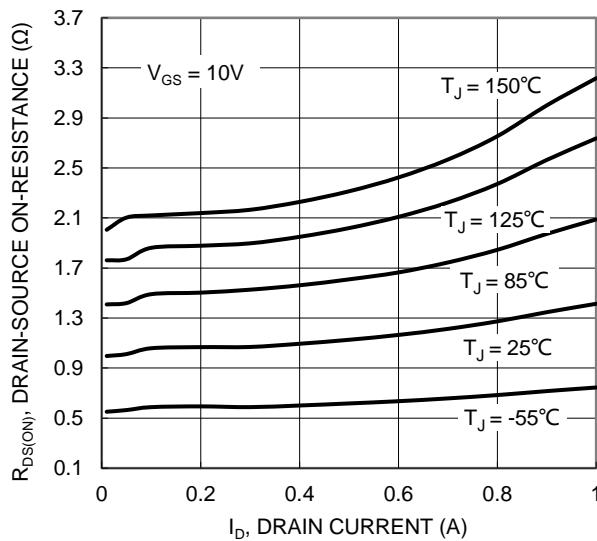


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

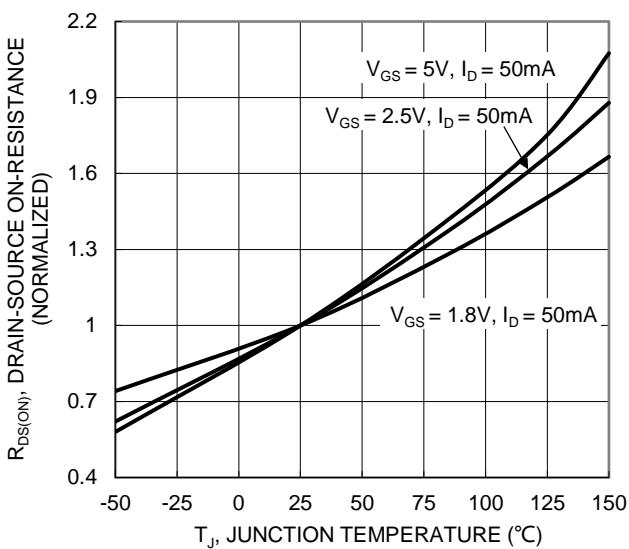
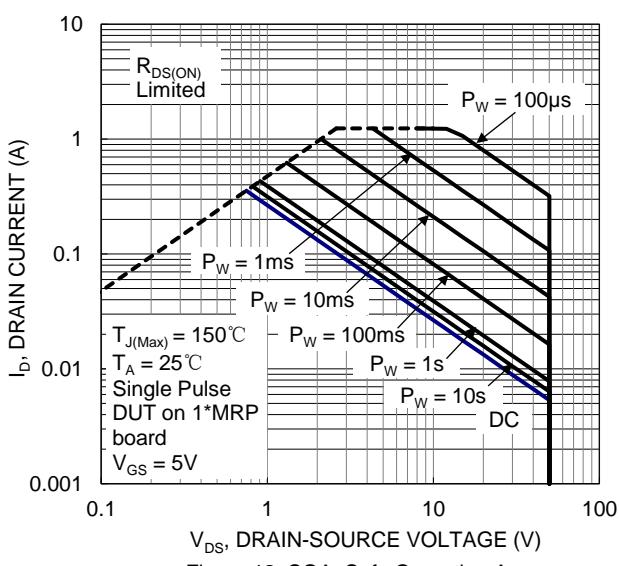
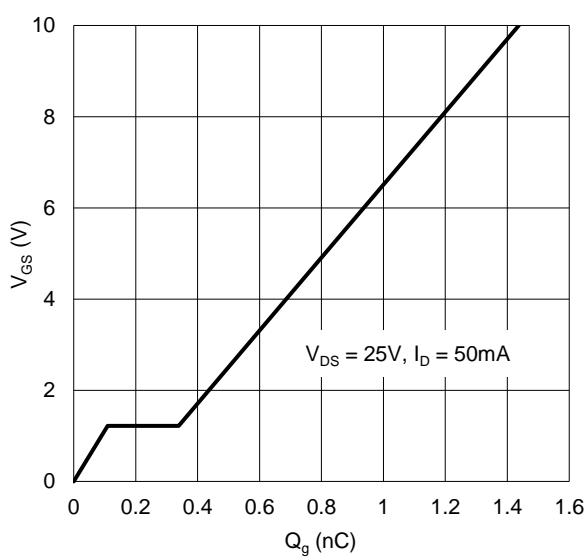
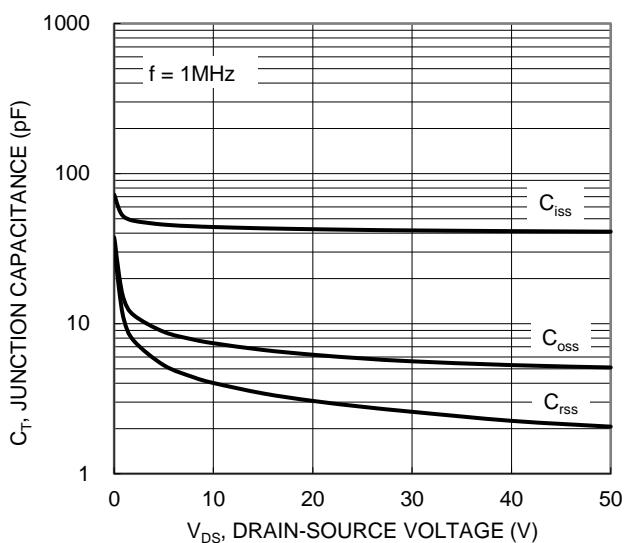
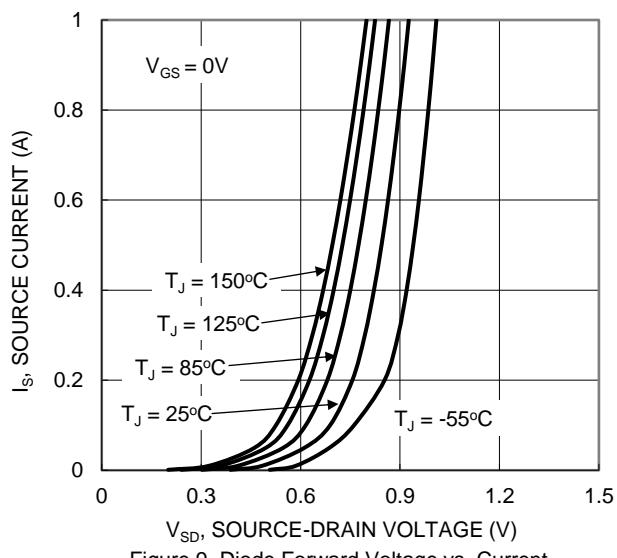
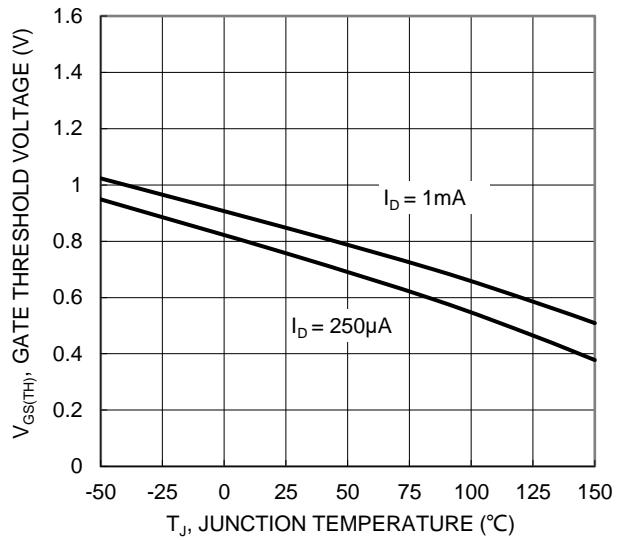
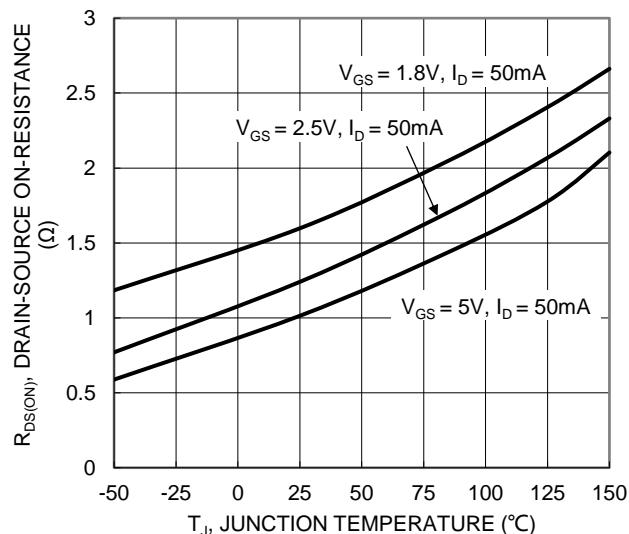


Figure 6. On-Resistance Variation with Temperature



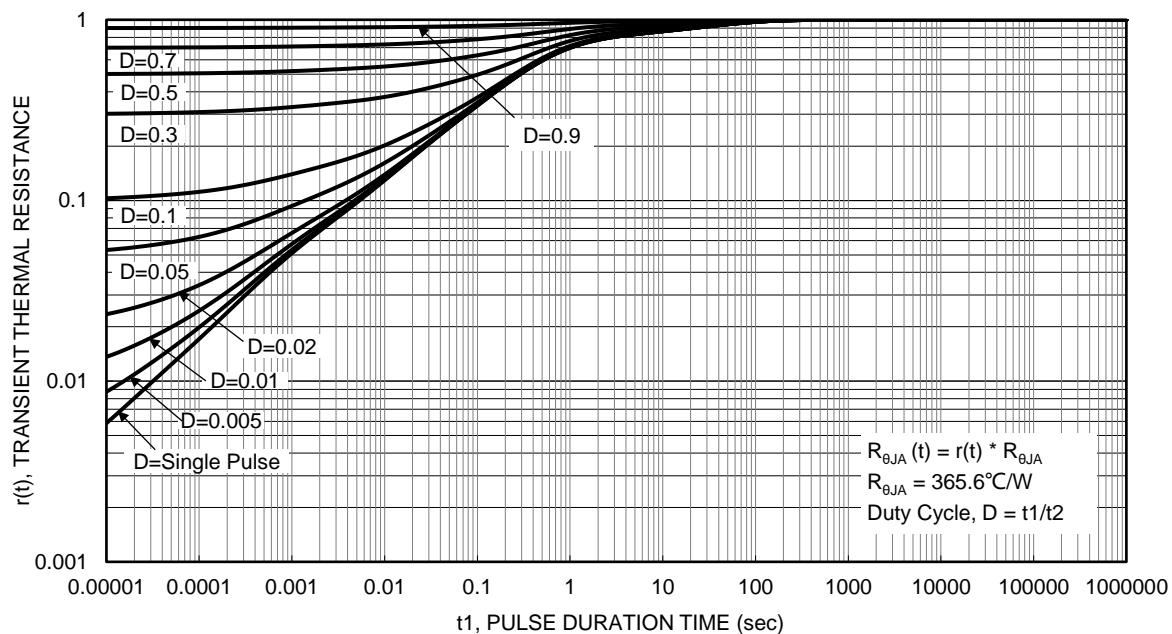
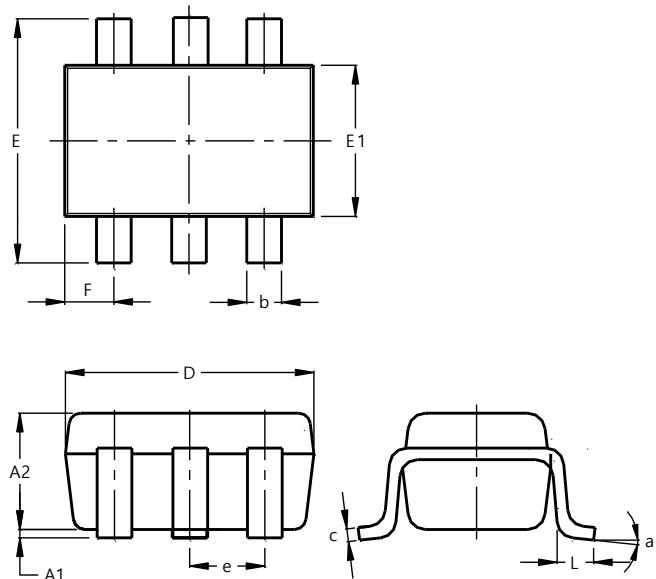


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

SOT363



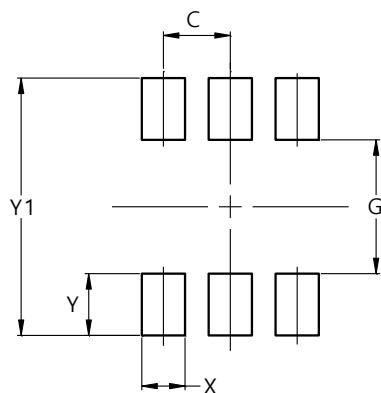
SOT363			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650	0.650 BSC	
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--

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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