

**DUAL N-CHANNEL ENHANCEMENT MODE MOSFET**
**Product Summary**

$V_{(BR)DSS}$	$R_{DS(ON)} \text{ max}$	$I_D$ $T_A = +25^\circ\text{C}$
20V	$0.55\Omega @ V_{GS} = 4.5V$	540mA

**Description**

This 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**

- Load Switch

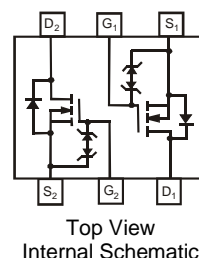
**Features**

- Dual N-Channel MOSFET
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Ultra-Small Surface Mount Package
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen- and Antimony-Free. "Green" Device (Note 3)**
- The DMN2004DWKQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**

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

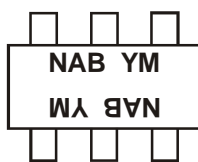
**Mechanical Data**

- Case: SOT363
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish—Matte Tin Annealed over Alloy 42 Lead-Frame. Solderable per MIL-STD-202, Method 208 @3
- Weight: 0.006 grams (Approximate)


**Ordering Information** (Note 4)

Part Number	Case	Packaging
DMN2004DWKQ-7	SOT363	3,000/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 <http://www.diodes.com/products/packages.html>.

**Marking Information**


NAB = Product Type Marking Code  
 YM = Date Code Marking  
 Y or Y = Year (ex: H = 2020)  
 M = Month (ex: 9 = September)

## Date Code Key

Year	2006	2007	....	2020	2021	2022	2023	2024	2025	2026	2027	2028
Code	T	U	....	H	I	J	K	L	M	N	O	P

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 <sub>DSS</sub>	20	V
Gate-Source Voltage			V <sub>GSS</sub>	±8	V
Drain Current (Note 6)	Steady State	T <sub>A</sub> = +25°C	I <sub>D</sub>	540	mA
		T <sub>A</sub> = +85°C		390	
Pulsed Drain Current (Note 7)			I <sub>DM</sub>	1.5	A

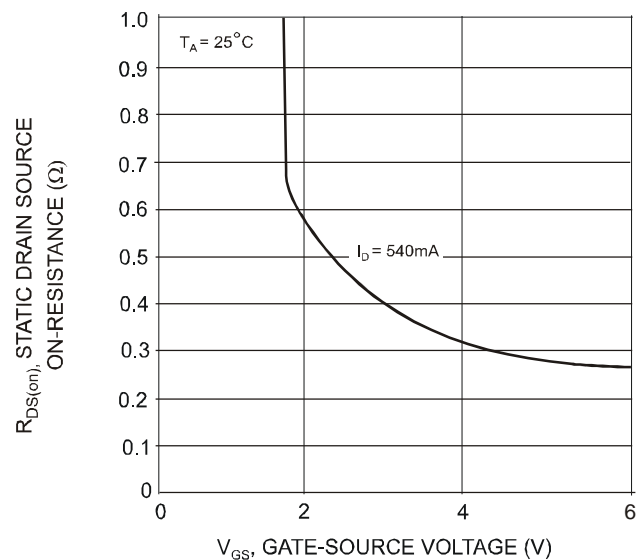
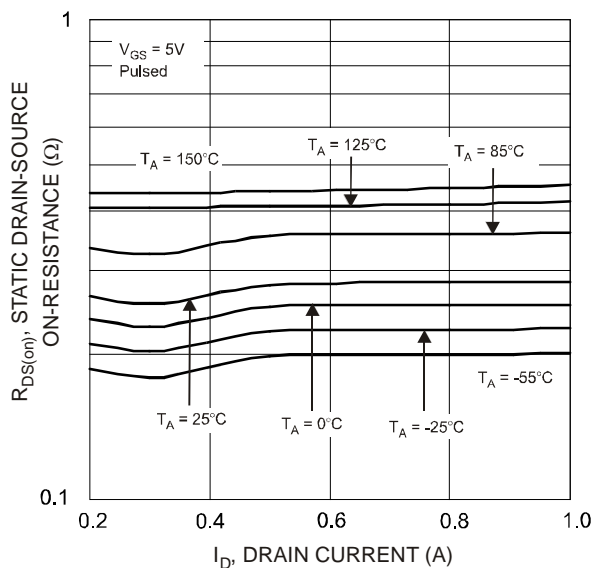
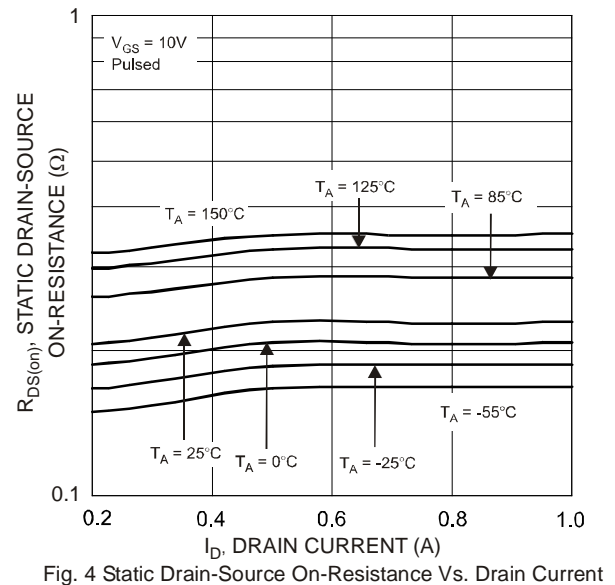
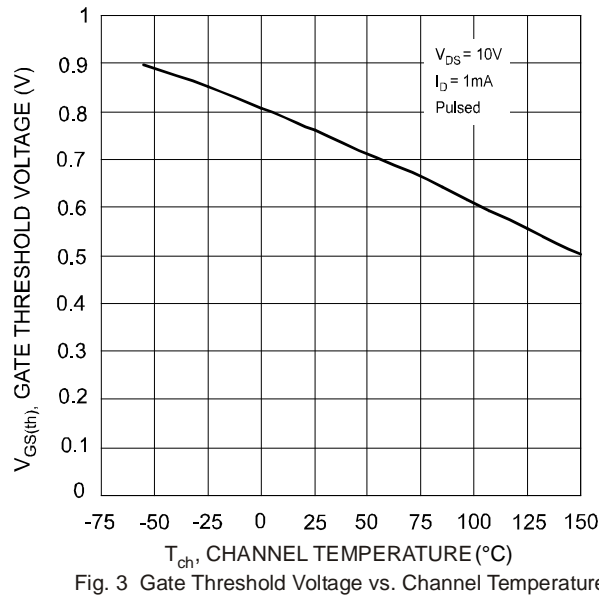
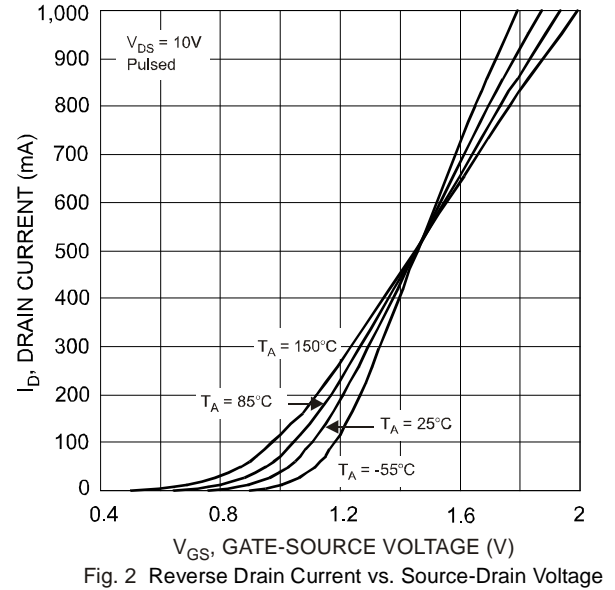
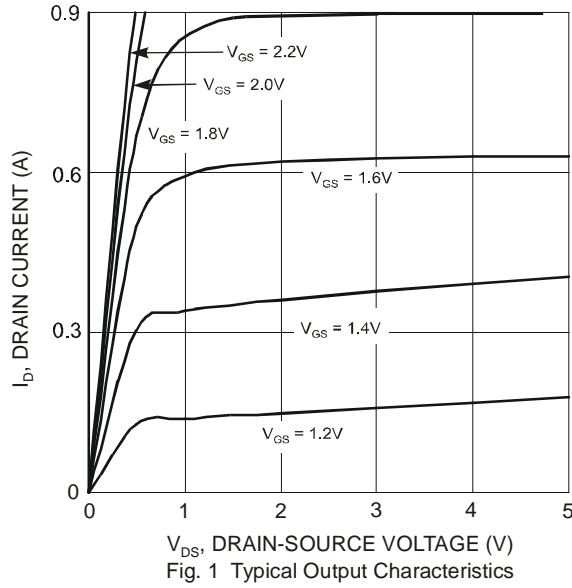
**Thermal Characteristics** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 6)	$P_D$	200	mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	625	$^\circ\text{C/W}$
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
<b>OFF CHARACTERISTICS (Note 8)</b>						
Drain-Source Breakdown Voltage	$BV_{DS}$	20	-	-	V	$V_{GS} = 0V, I_D = 10\mu A$
Zero Gate Voltage Drain Current	$I_{DSS}$	-	-	1	$\mu A$	$V_{DS} = 16V, V_{GS} = 0V$
Gate-Source Leakage	$I_{GSS}$	-	-	$\pm 1$	$\mu A$	$V_{GS} = \pm 4.5V, V_{DS} = 0V$
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	0.5	-	1.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	-	0.4	0.55	$\Omega$	$V_{GS} = 4.5V, I_D = 540mA$
			0.5	0.70		$V_{GS} = 2.5V, I_D = 500mA$
			0.7	0.9		$V_{GS} = 1.8V, I_D = 350mA$
Forward Transfer Admittance	$ Y_{fs} $	200	-	-	mS	$V_{DS} = 10V, I_D = 0.2A$
Diode Forward Voltage (Note 8)	$V_{SD}$	0.5	-	1.4	V	$V_{GS} = 0V, I_S = 115mA$
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	$C_{iss}$	-	36	150	pF	$V_{DS} = 16V, V_{GS} = 0V$ $f = 1.0MHz$
Output Capacitance	$C_{oss}$	-	5.7	25	pF	
Reverse Transfer Capacitance	$C_{rss}$	-	4.2	20	pF	
Total Gate Charge ( $V_{GS} = 4.5V$ )	$Q_g$	-	0.53	-	nC	$V_{DS} = 10V, I_D = 250mA$
Total Gate Charge ( $V_{GS} = 8.0V$ )	$Q_g$	-	0.95	-		
Gate-Source Charge	$Q_{gs}$	-	0.08	-		
Gate-Drain Charge	$Q_{gd}$	-	0.07	-		
Turn-On Delay Time	$t_{D(ON)}$	-	4.1	-	ns	$V_{DD} = 10V, R_L = 47\Omega$ , $V_{GEN} = 4.5V, R_{GEN} = 10\Omega$
Turn-On Rise Time	$t_R$	-	7.3	-	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	-	13.8	-	ns	
Turn-Off Fall Time	$t_F$	-	10.5	-	ns	

Notes: 6. Device mounted on FR-4 PCB.  
7. Pulse width  $\leq 10\mu S$ , Duty Cycle  $\leq 1\%$ .  
8. Short duration pulse test used to minimize self-heating effect.



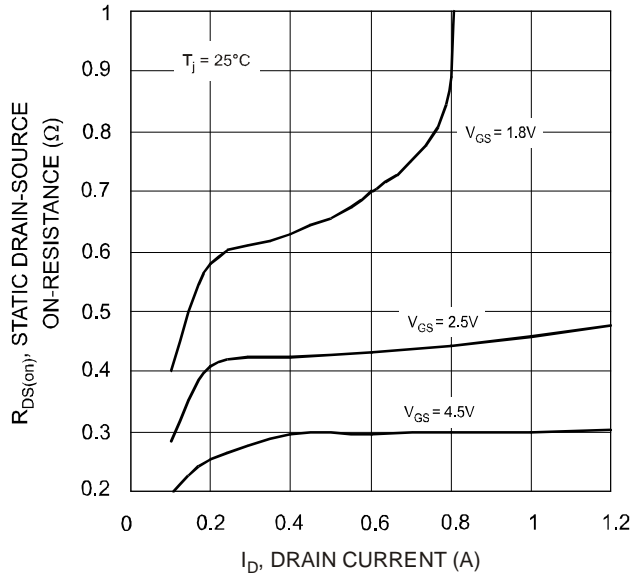


Fig. 7 On-Resistance vs. Drain Current and Gate Voltage

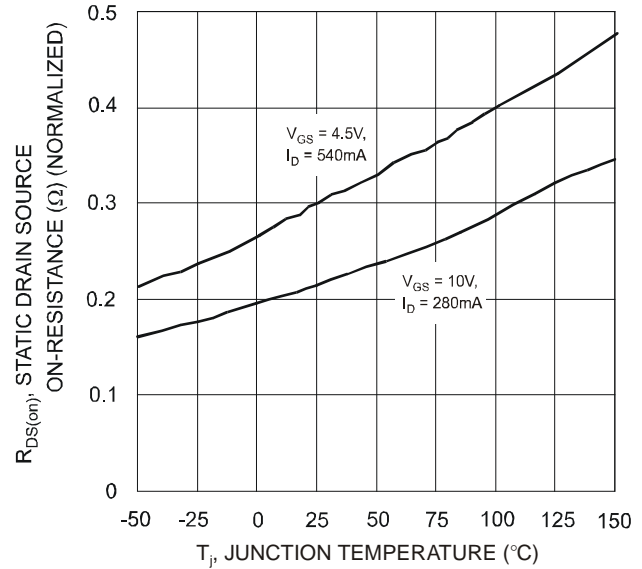


Fig. 8 Static Drain-Source, On-Resistance vs. Temperature

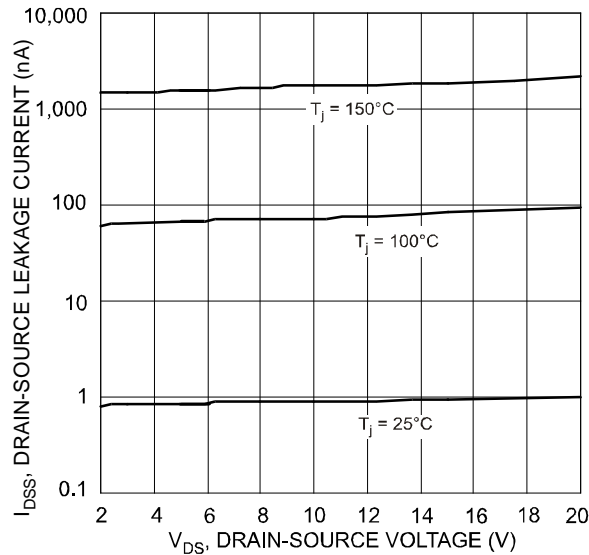


Fig. 9 Drain Source Leakage Current vs. Voltage

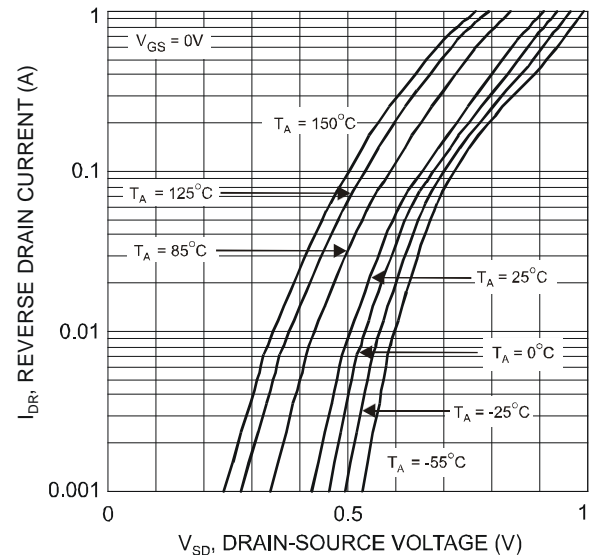


Fig. 10 Reverse Drain Current vs. Source-Drain Voltage

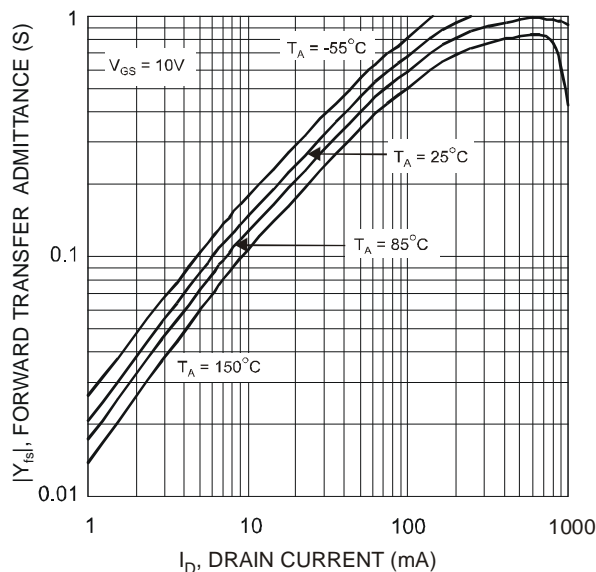


Fig. 11 Forward Transfer Admittance vs. Drain Current

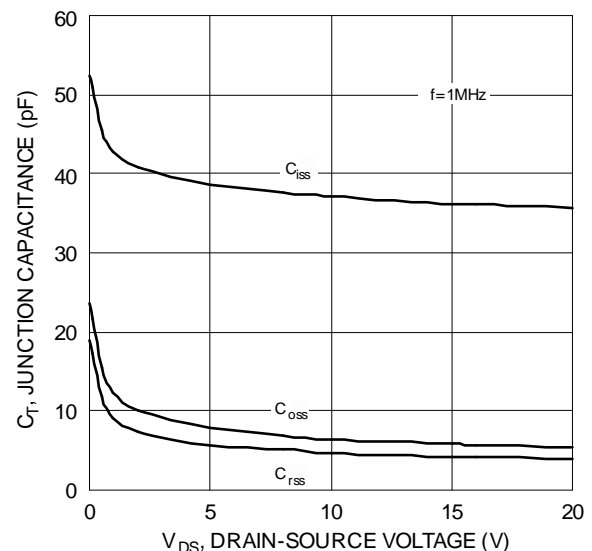
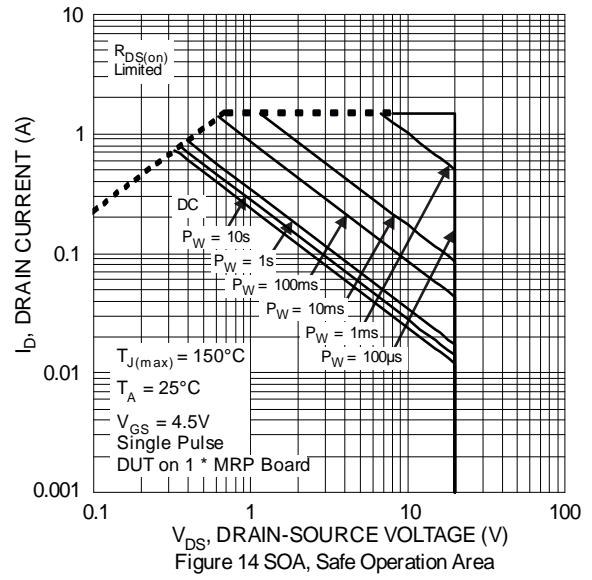
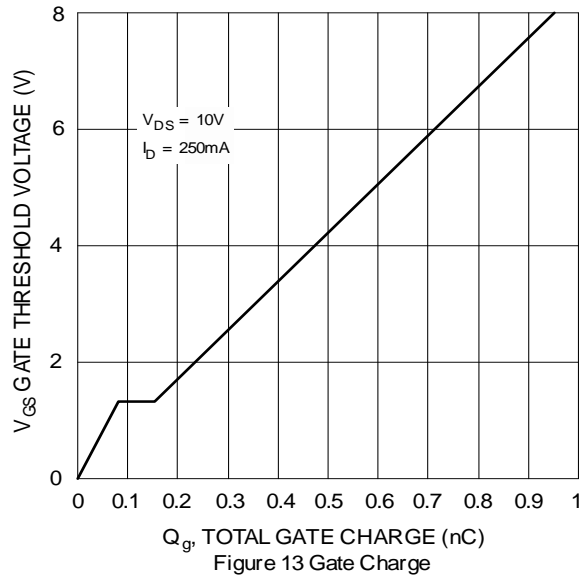
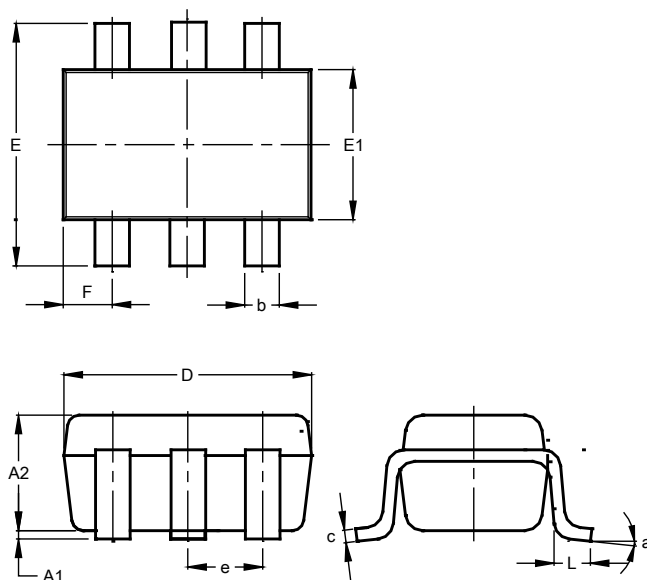


Figure 12 Typical Junction Capacitance



## Package Outline Dimensions

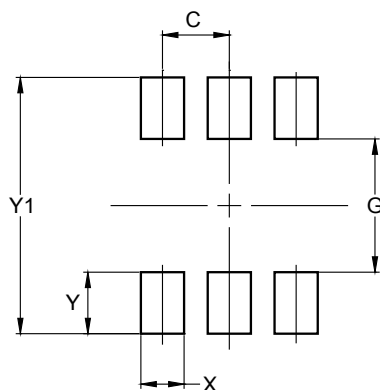
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



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	8°		
All Dimensions in mm			

## Suggested Pad Layout

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



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

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