

DUAL N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV _{DSS}	R _{DS(on)} max	I _D T _A = +25°C
20V	0.55Ω @ V _{GS} = 4.5V	540mA

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)**
- **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 refer to the related automotive grade (Q-suffix) part. A listing can be found at <https://www.diodes.com/products/automotive/automotive-products/>.**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. <https://www.diodes.com/quality/product-definitions/>**
- **An Automotive-Compliant Part is Available Under Separate Datasheet ([DMN2004DWKQ](#))**

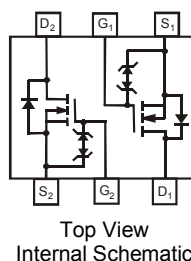
Description and Applications

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.

- Load Switches

Mechanical Data

- Case: SOT363 (Standard)
- 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
DMN2004DWK-7	SOT363 (Standard)	3,000/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



NAB = Product Type Marking Code
 YM = Date Code Marking
 Y or Y = Year (ex: 1 = 2021)
 M = Month (ex: 9 = September)

Date Code Key

Year	2006		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Code	T		I	J	K	L	M	N	O	P	R	S

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}	20	V
Gate-Source Voltage	V _{GSS}	±8	V
Drain Current (Note 5)	I _D	540 390	mA
Pulsed Drain Current (Note 6)	I _{DM}	1.5	A

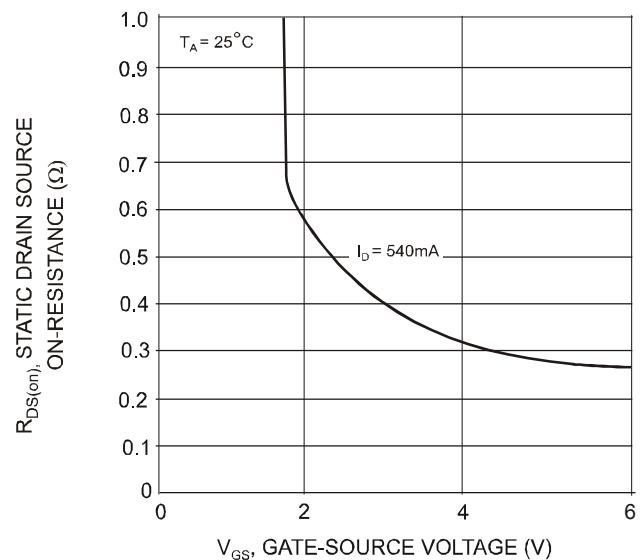
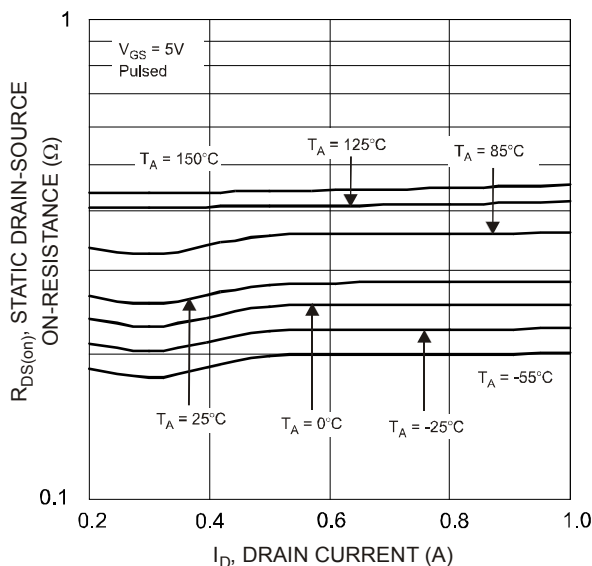
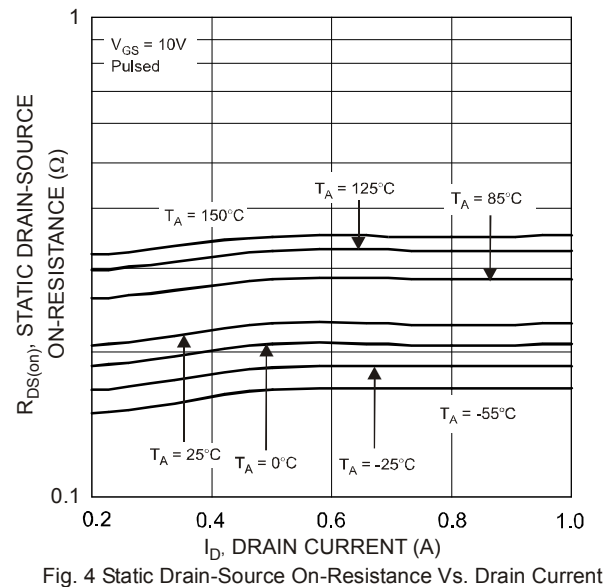
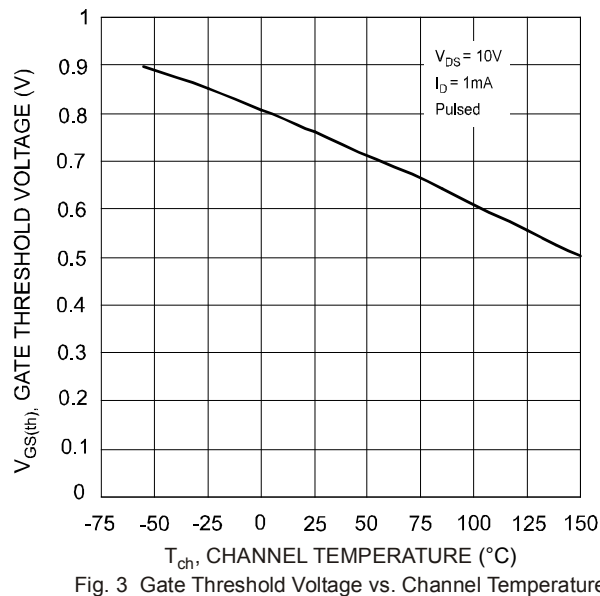
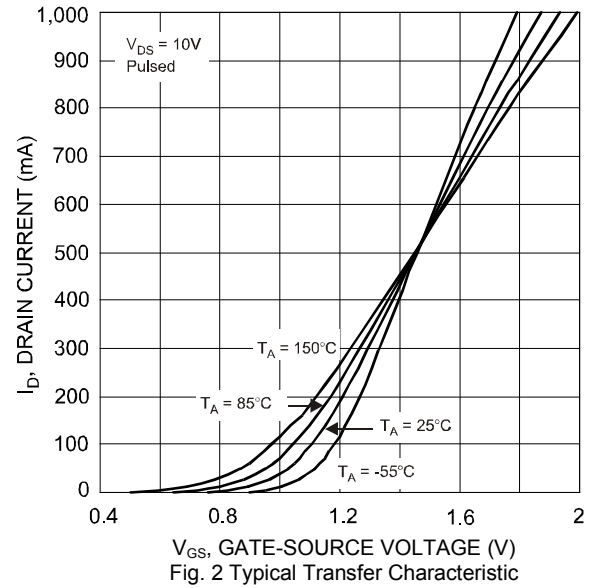
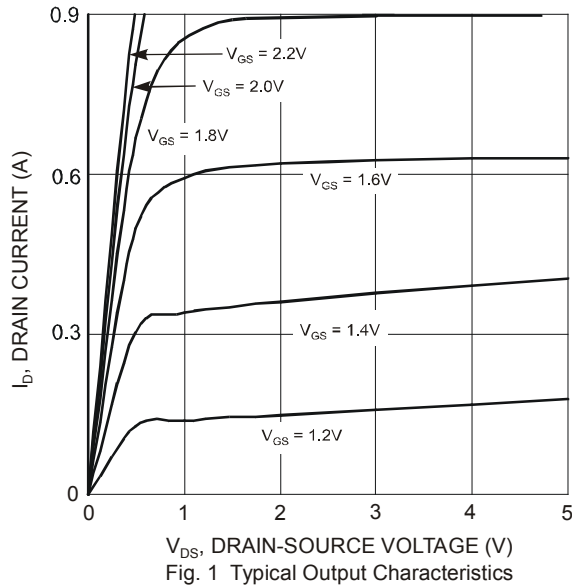
Thermal Characteristics (@ T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P _D	200	mW
Thermal Resistance, Junction to Ambient	R _{θJA}	625	°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 7)						
Drain-Source Breakdown Voltage	BV _{DSS}	20	—	—	V	V _{GS} = 0V, I _D = 10μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	μA	V _{DS} = 16V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±1	μA	V _{GS} = ±4.5V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(th)}	0.5	—	1.0	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(on)}	—	0.4	0.55	Ω	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 7)	V _{SD}	0.5	—	1.4	V	V _{GS} = 0V, I _S = 115mA
DYNAMIC CHARACTERISTICS (Note 7)						
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 = 47Ω, V _{GEN} = 4.5V, R _{GEN} = 10Ω
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: 5. Device mounted on FR-4 PCB.
 6. Pulse width ≤10μs, Duty Cycle ≤1%.
 7. Short duration pulse test used to minimize self-heating effect.



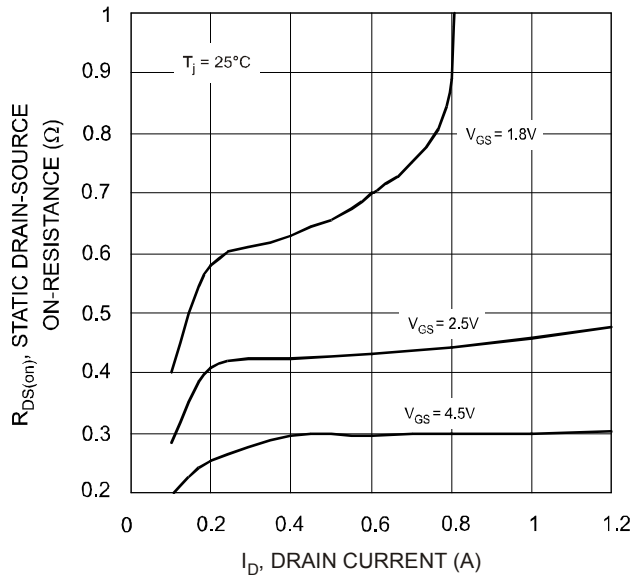


Fig. 7 On-Resistance vs. Drain Current and Gate Voltage

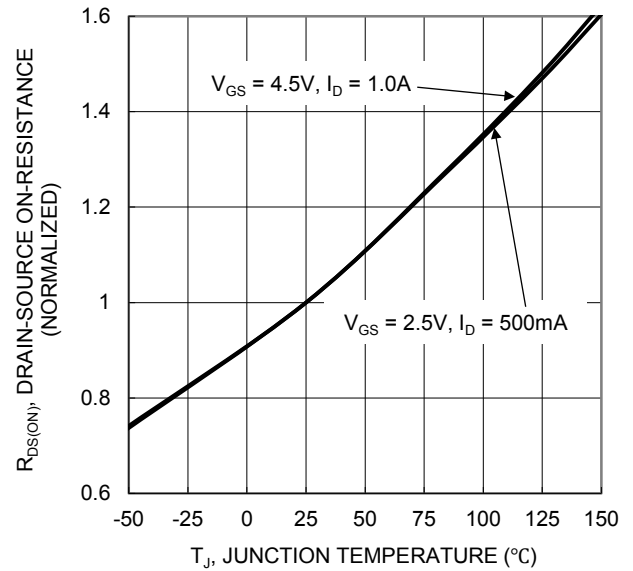


Fig. 8 On-Resistance Variation with Temperature

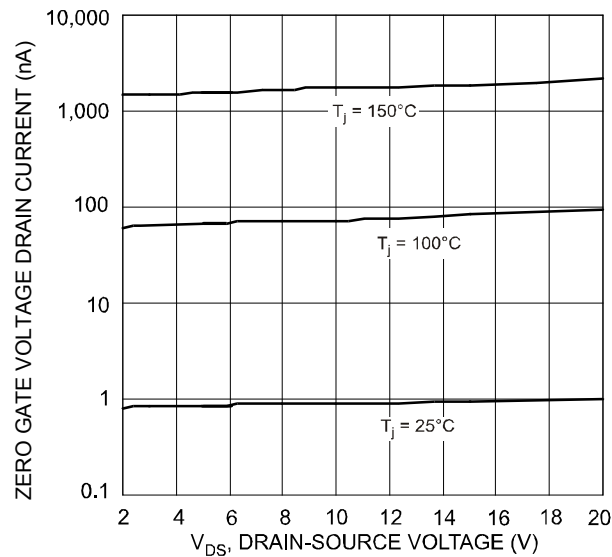


Fig. 9 Drain Source Leakage Current vs. Voltage

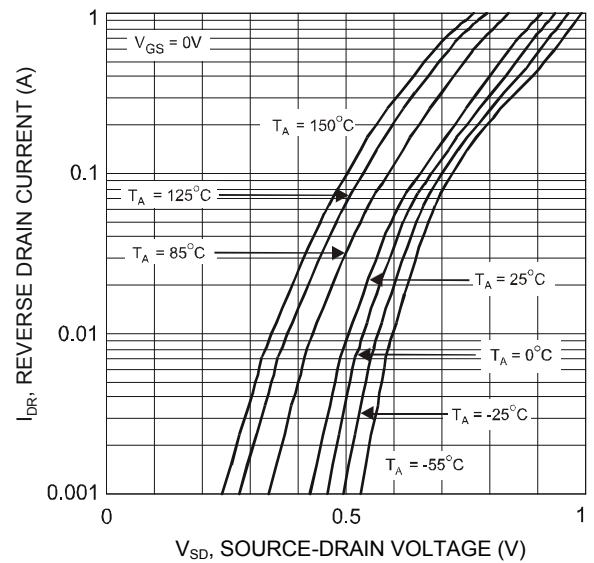


Fig. 10 Reverse Drain Current vs. Source-Drain Voltage

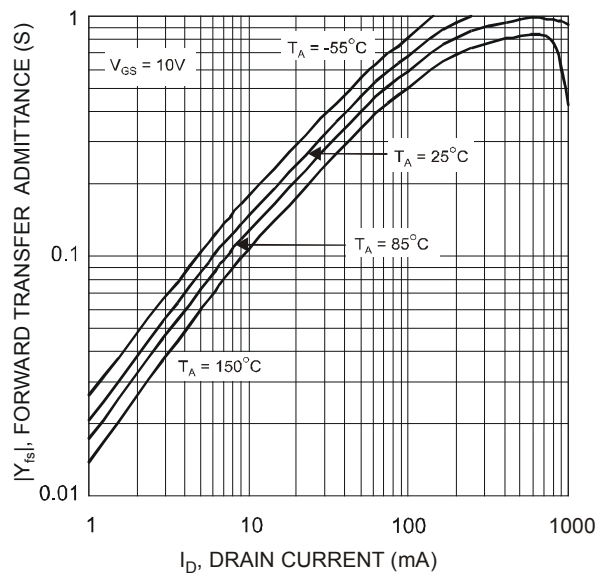


Fig. 11 Forward Transfer Admittance vs. Drain Current

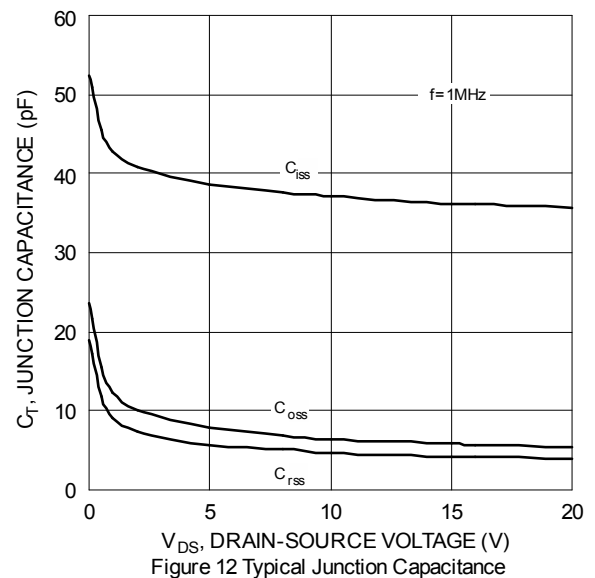
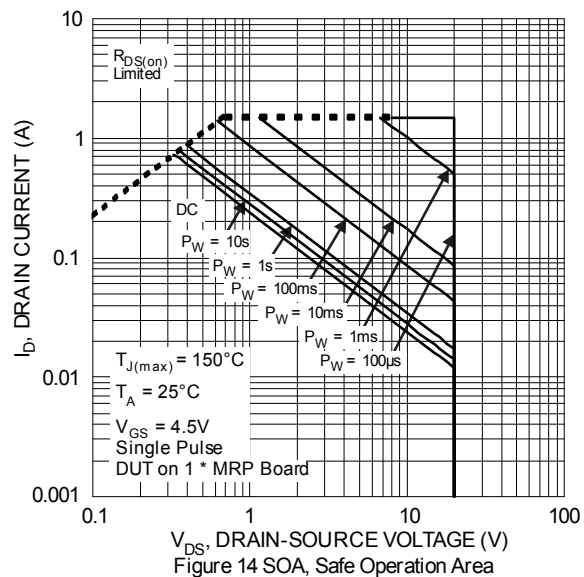
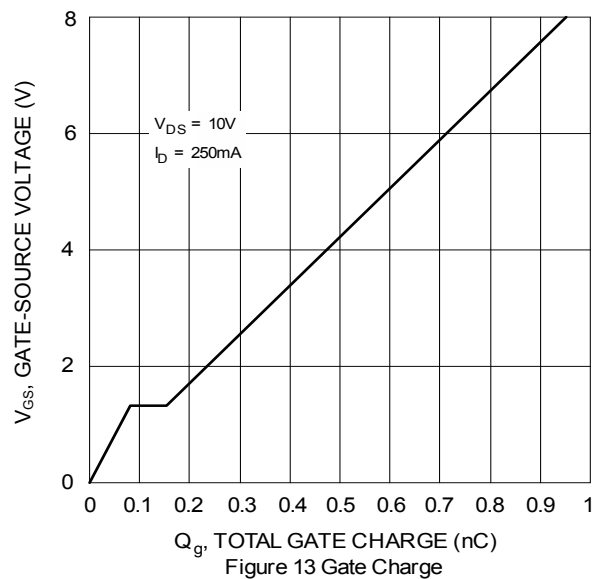


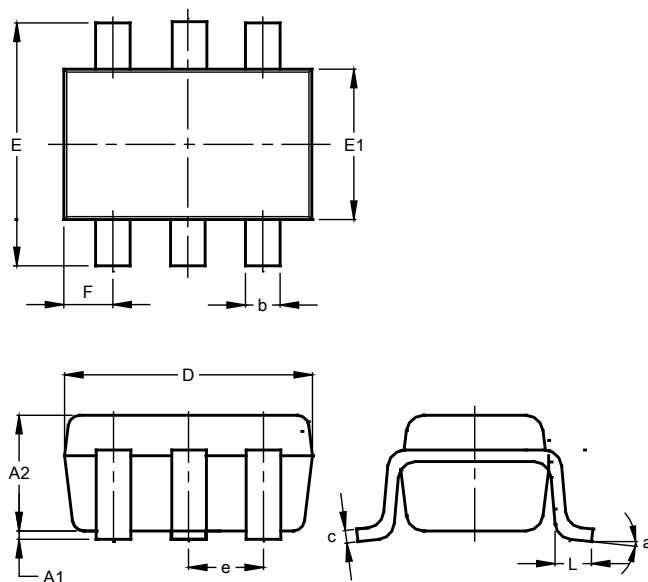
Figure 12 Typical Junction Capacitance



Package Outline Dimensions

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

SOT363 (Standard)

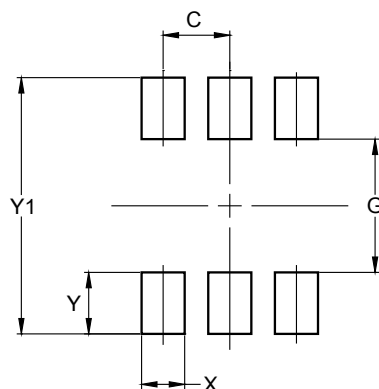


SOT363 (Standard)			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.80	1.00	0.90
b	0.10	0.35	0.225
c	0.08	0.22	0.15
D	1.80	2.20	2.00
E	2.00	2.45	2.225
E1	1.15	1.35	1.25
e	--	--	0.65
F	0.25	0.45	0.35
L	0.25	0.46	0.355
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

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

SOT363 (Standard)



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

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