

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D $T_A = +25^\circ C$
-20V	5.5Ω @ $V_{GS} = -4.5V$	-200mA
	7.5Ω @ $V_{GS} = -2.5V$	-170mA

Description

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

Applications

- DC-DC Converters
- Power Management Functions

Features

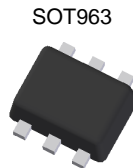
- Dual P-Channel MOSFET
- Low On-Resistance
 - 5.5Ω @ -4.5V
 - 7.5Ω @ -2.5V
 - 11.5Ω @ -1.8V
 - 17.5Ω @ -1.5V
- Very Low Gate Threshold Voltage $V_{GS(TH)} < 1.15V$
- Low Input Capacitance
- Fast Switching Speed
- **ESD Protected Gate**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

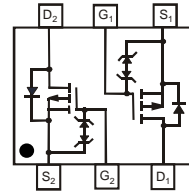
- Case: SOT963
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish—Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.0027 grams (Approximate)



ESD protected



Top View



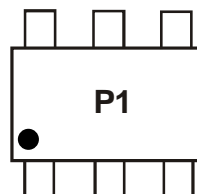
Internal Schematic

Ordering Information (Note 4)

Part Number	Case	Packaging
DMP210DUDJ-7	SOT963	10,000/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, see <http://www.diodes.com/products/packages.html>.

Marking Information (Note 5)



P1 = Product Type Marking Code

- Note: 5. Package is non-polarized. Parts may be on reel in orientation illustrated, 180° rotated, or mixed (both ways).

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

Characteristic	Symbol	Value	Units	
Drain-Source Voltage	V_{DSS}	-20	V	
Gate-Source Voltage	V_{GSS}	± 8	V	
Continuous Drain Current (Note 6) $V_{GS} = -4.5\text{V}$	I_D	$T_A = +25^\circ\text{C}$	-200	mA
		$T_A = +70^\circ\text{C}$	-150	
Continuous Drain Current (Note 6) $V_{GS} = -2.5\text{V}$	I_D	$T_A = +25^\circ\text{C}$	-170	mA
		$T_A = +70^\circ\text{C}$	-130	
Pulsed Drain Current	I_{DM}	-600	mA	

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

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 6)	P_D	330	mW
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	377.16	$^\circ\text{C/W}$
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
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	-20	—	—	V	$V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-100	nA	$V_{DS} = -16\text{V}, V_{GS} = 0\text{V}$
		—	—	-50	nA	$V_{DS} = -5.0\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 5.0\text{V}, V_{DS} = 0\text{V}$
		—	—	± 1	μA	$V_{GS} = \pm 8.0\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	-0.45	—	-1.15	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(on)}$	—	—	5.5	Ω	$V_{GS} = -4.5\text{V}, I_D = -100\text{mA}$
		—	—	7.5		$V_{GS} = -2.5\text{V}, I_D = -50\text{mA}$
		—	—	11.5		$V_{GS} = -1.8\text{V}, I_D = -20\text{mA}$
		—	—	17.5		$V_{GS} = -1.5\text{V}, I_D = -10\text{mA}$
		—	20	—		$V_{GS} = -1.2\text{V}, I_D = -1\text{mA}$
Forward Transfer Admittance	$ Y_{fs} $	—	200	—	mS	$V_{DS} = -10\text{V}, I_D = -0.2\text{A}$
Diode Forward Voltage (Note 7)	V_{SD}	-0.5	—	-1.2	V	$V_{GS} = 0\text{V}, I_S = -115\text{mA}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	13.72	27.44	pF	$V_{DS} = -15\text{V}, V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	4.01	8.02	pF	
Reverse Transfer Capacitance	C_{rss}	—	2.34	4.68	pF	
SWITCHING CHARACTERISTICS (Note 8)						
Turn-On Delay Time	$t_{d(on)}$	—	7.7	—	ns	$V_{GS} = -4.5\text{V}, V_{DD} = -15\text{V}$ $I_D = -180\text{mA}, R_G = 2.0\Omega$
Rise Time	t_r	—	19.3	—		
Turn-Off Delay Time	$t_{d(off)}$	—	25.9	—		
Fall Time	t_f	—	31.5	—		

- Notes:
- Device mounted on 1" x 1" FR-4 substrate PCB, with minimum recommended pad layout, single sided.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to production testing.

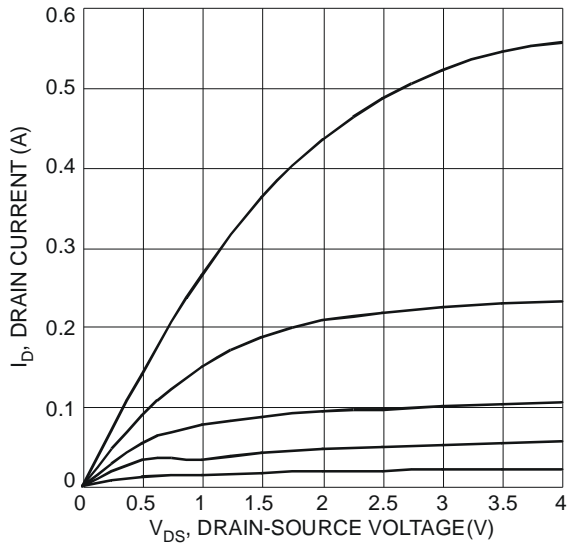


Fig. 1 Typical Output Characteristics

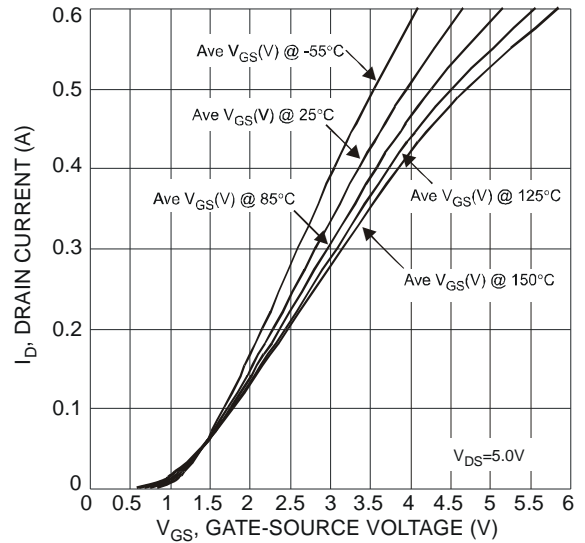


Fig. 2 Typical Transfer Characteristics

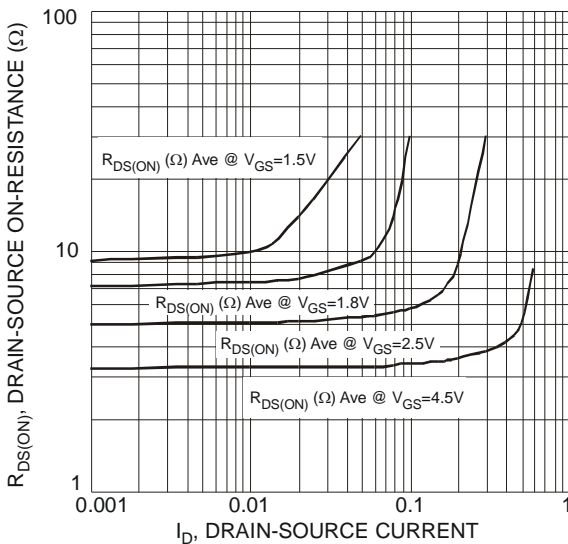


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

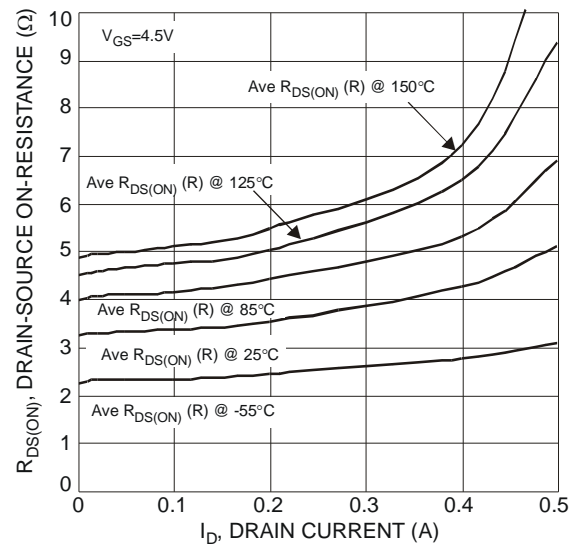


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

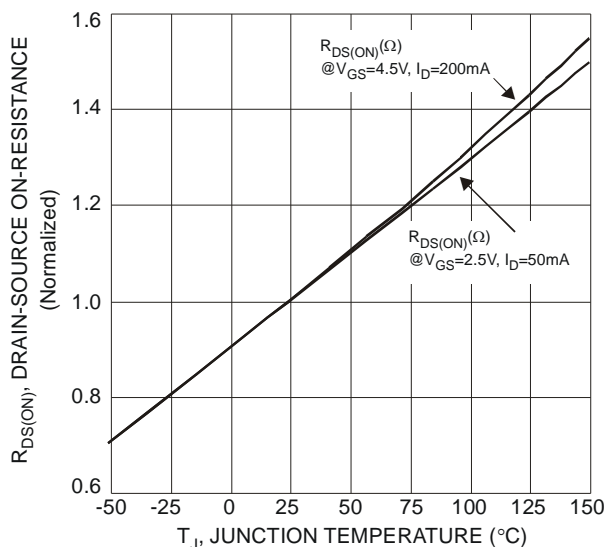


Fig. 5 On-Resistance Variation with Temperature

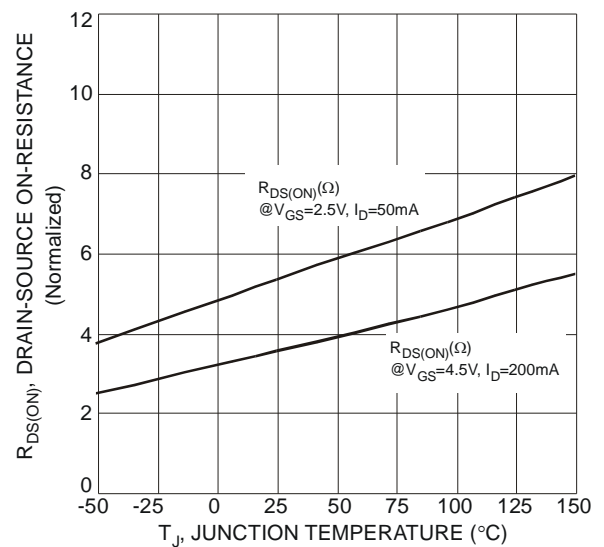


Fig. 6 On-Resistance vs. Temperature

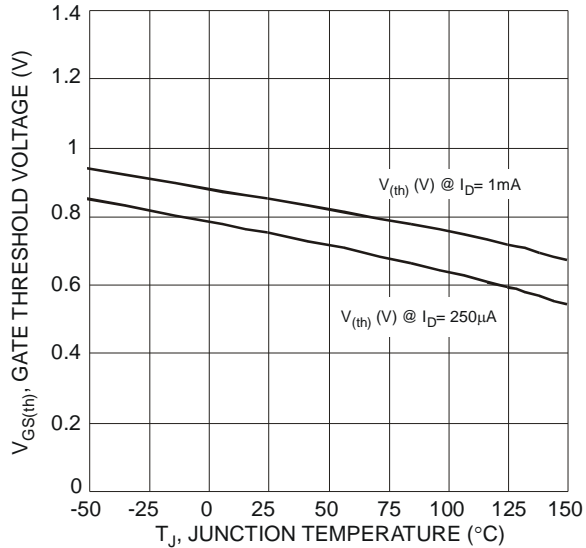


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

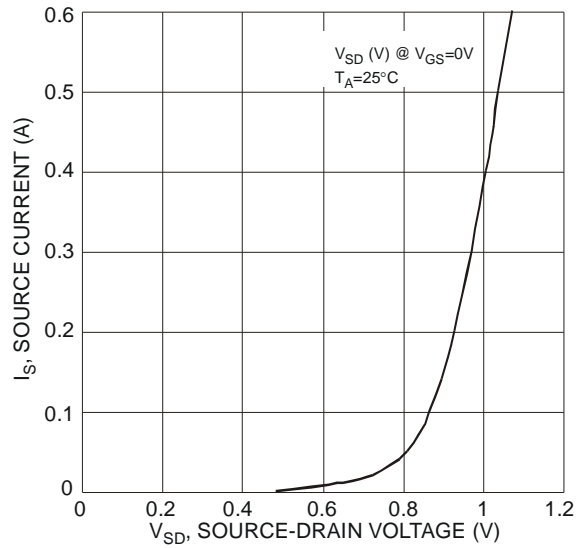


Fig. 8 Diode Forward Voltage vs. Current

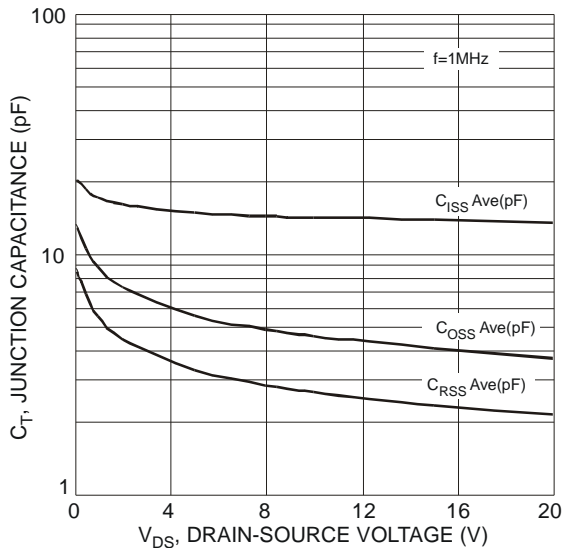


Fig. 9 Typical Junction Capacitance

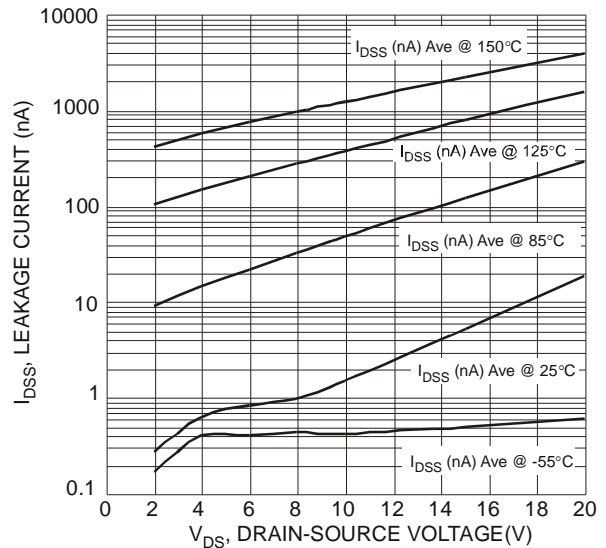


Fig. 10 Typical Drain-Source Leakage Current vs. Voltage

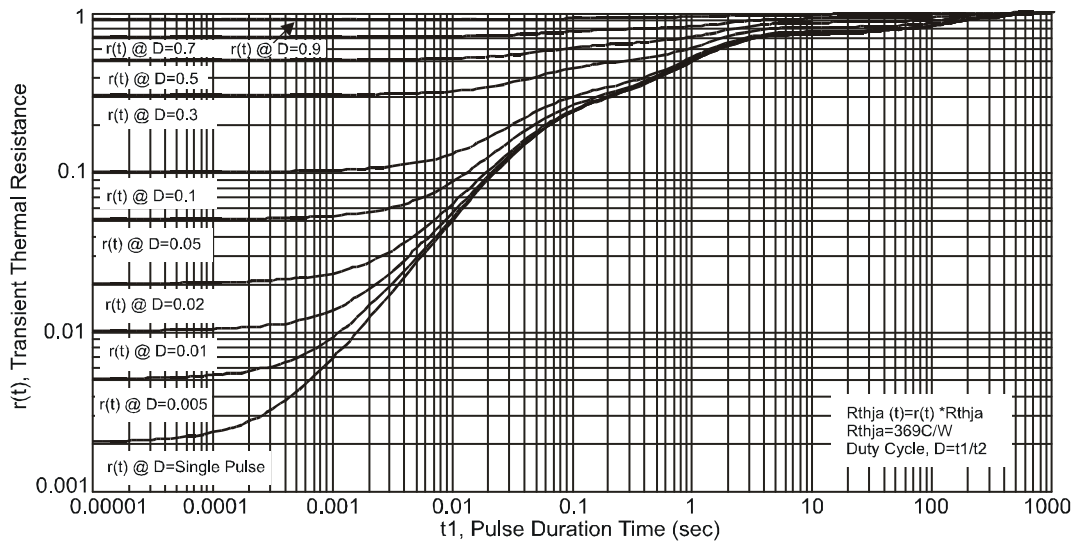
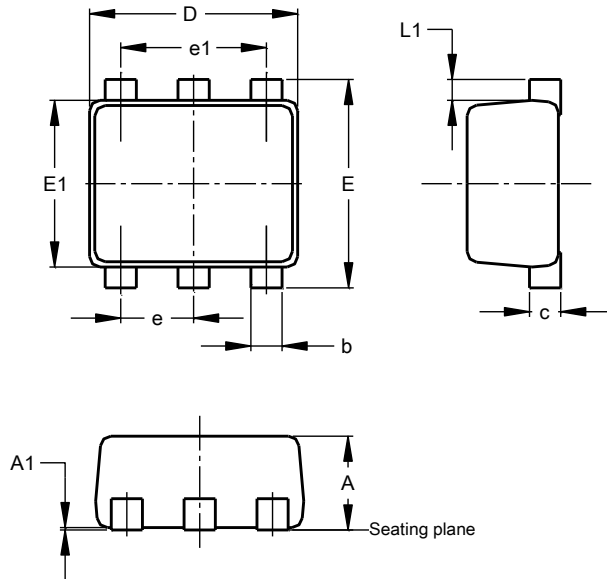


Fig. 11 Transient Thermal Resistance

Package Outline Dimensions

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

SOT963

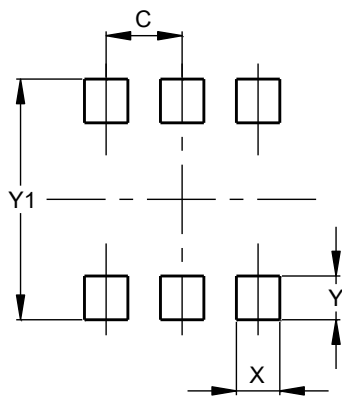


SOT963			
Dim	Min	Max	Typ
A	0.40	0.50	0.45
A1	0.00	0.05	—
b	0.10	0.20	0.15
c	0.120	0.180	0.150
D	0.95	1.05	1.00
E	0.95	1.05	1.00
E1	0.75	0.85	0.80
e	—	—	0.35
e1	—	—	0.70
L1	0.05	0.15	0.10
All Dimensions in mm			

Suggested Pad Layout

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

SOT963



Dimensions	Value (in mm)
C	0.350
X	0.200
Y	0.200
Y1	1.100