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DUAL P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

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

Description

This new generation MOSFET has been 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

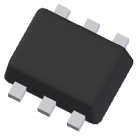
Features

- 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**

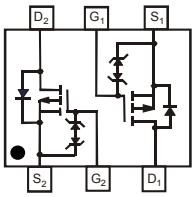
Mechanical Data

- 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 lead frame. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.0027 grams (approximate)

SOT963



Top View



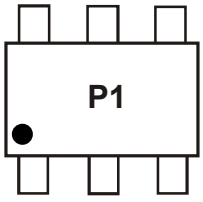
Internal Schematic

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) compliant.
2. See 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 (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°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} = -4.5V	T_A = +25°C T_A = +70°C	I_D	-200 -150	mA
Continuous Drain Current (Note 6) V_{GS} = -2.5V	T_A = +25°C T_A = +70°C	I_D	-170 -130	mA
Pulsed Drain Current	T_P = 10µs	I_{DM}	-600	mA

Thermal Characteristics (@T_A = +25°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	°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 = -250µA
Zero Gate Voltage Drain Current	I_{DSS}	— —	— —	-100 -50	nA nA	V_{DS} = -16V, V_{GS} = 0V V_{DS} = -5.0V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100 ±1	nA µA	V_{GS} = ±5.0V, V_{DS} = 0V V_{GS} = ±8.0V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	-0.45	—	-1.15	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	— — — — —	— — — — 20	5.5 7.5 11.5 17.5 —	Ω	V_{GS} = -4.5V, I_D = -100mA V_{GS} = -2.5V, I_D = -50mA V_{GS} = -1.8V, I_D = -20mA V_{GS} = -1.5V, I_D = -10mA V_{GS} = -1.2V, I_D = -1mA
Forward Transfer Admittance	$\|Y_{fs}\|$	150	200	—	mS	V_{DS} = -10V, I_D = -0.2A
Diode Forward Voltage (Note 7)	V_{SD}	-0.5	—	-1.2	V	V_{GS} = 0V, I_S = -115mA
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	13.72	27.44	pF	V_{DS} = -15V, V_{GS} = 0V f = 1.0MHz
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} = -4.5V, V_{DD} = -15V I_D = -180mA, R_G = 2.0Ω
Rise Time	t_r	—	19.3	—		
Turn-Off Delay Time	$t_{d(off)}$	—	25.9	—		
Fall Time	t_f	—	31.5	—		

Notes: 6. Device mounted on 1"x1" FR-4 substrate PC board, with minimum recommended pad layout, single sided.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.

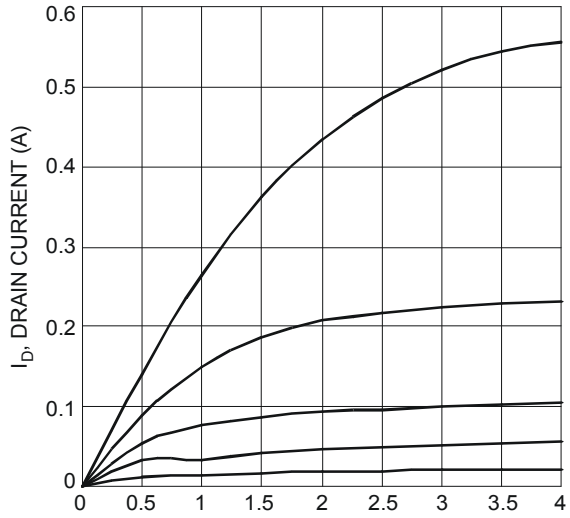


Fig. 1 Typical Output Characteristics

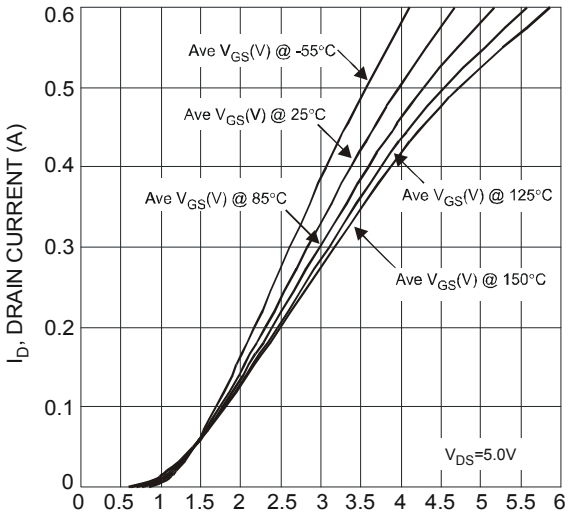


Fig. 2 Typical Transfer Characteristics

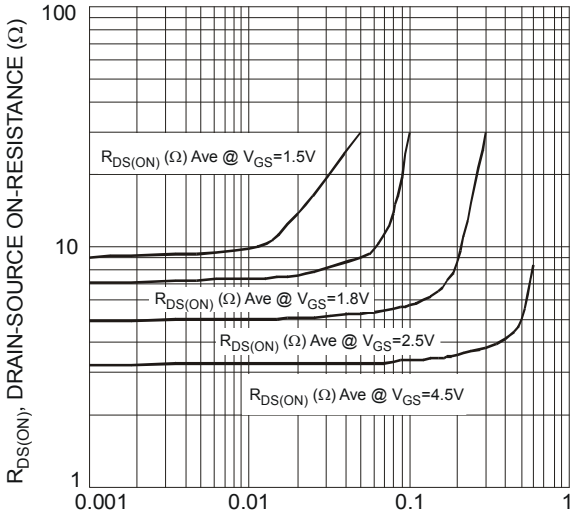


Fig. 3 Typical On-Resistance vs.
Drain Current and Gate Voltage

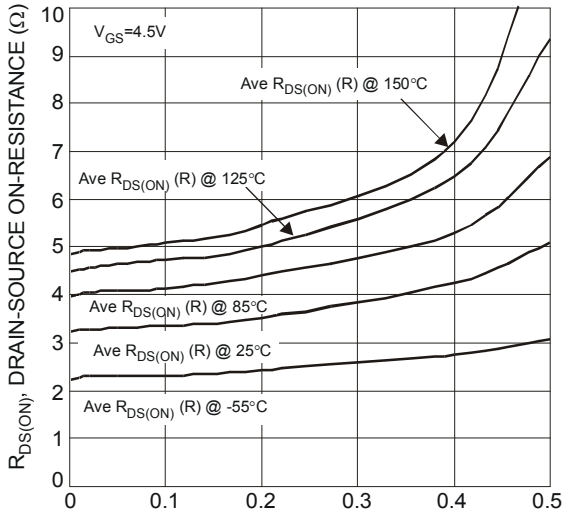


Fig. 4 Typical On-Resistance vs.
Drain Current and Temperature

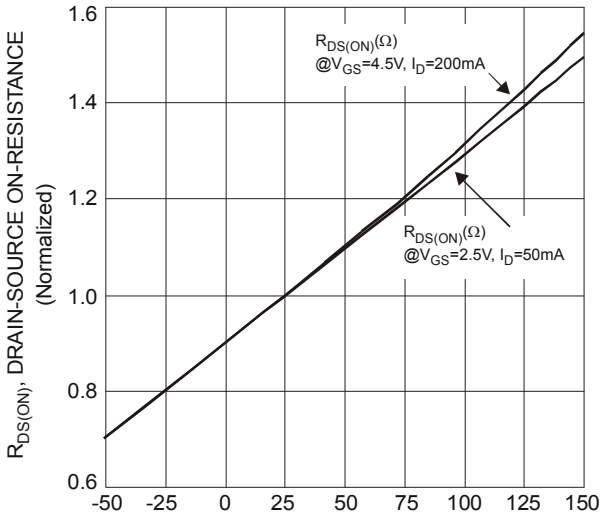


Fig. 5 On-Resisitance Variation with Temperature

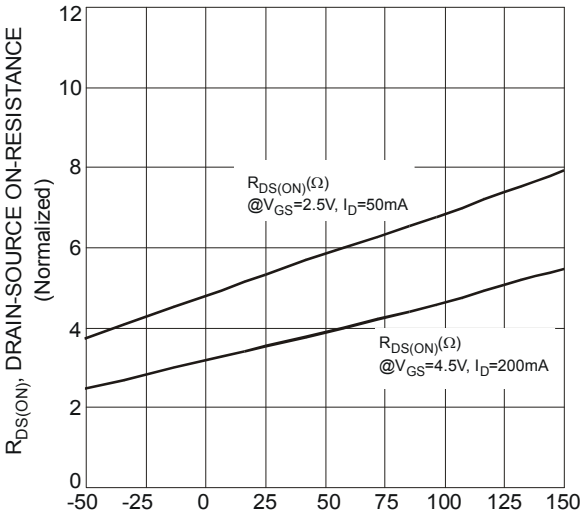


Fig. 6 On-Resisitance vs.Temperature

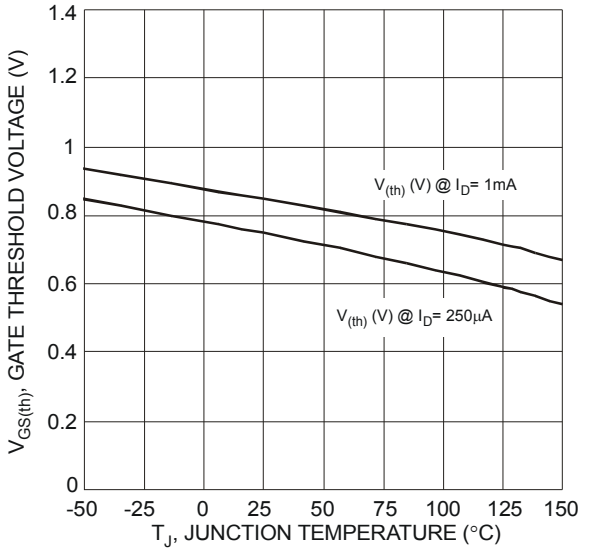


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

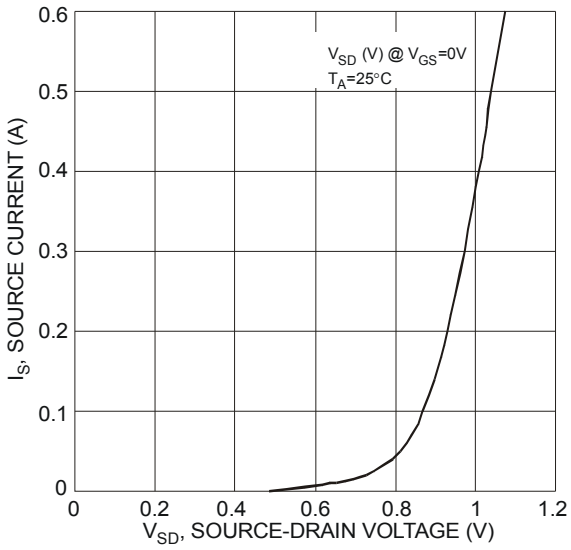


Fig. 8 Diode Forward Voltage vs. Current

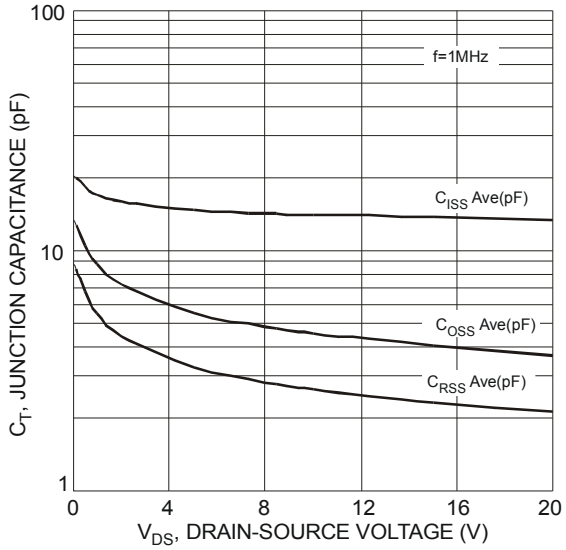


Fig. 9 Typical Junction Capacitance

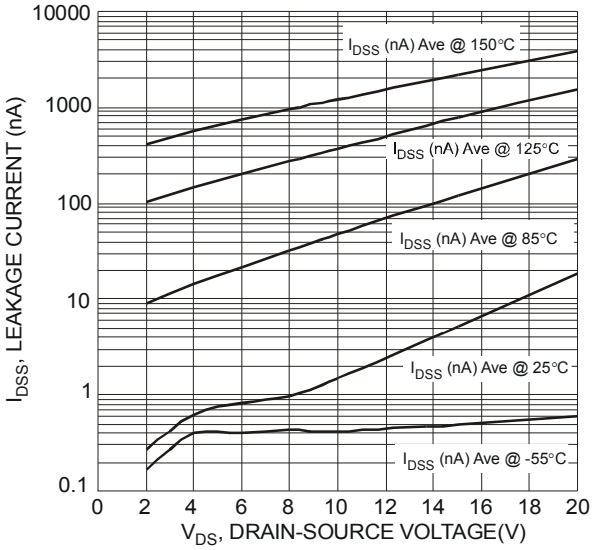


Fig. 10 Typical Drain-Source Leakage Current vs. Voltage

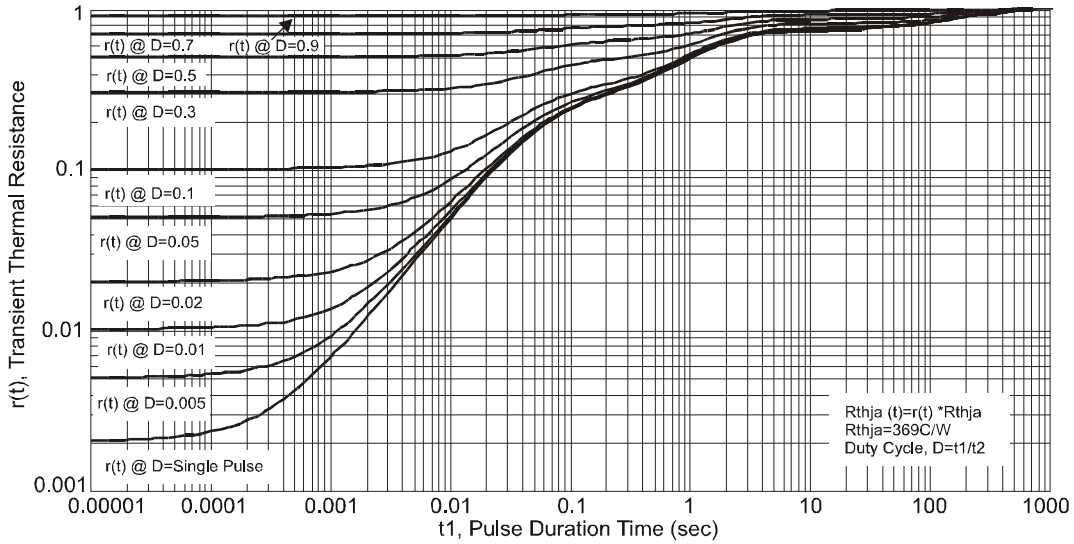
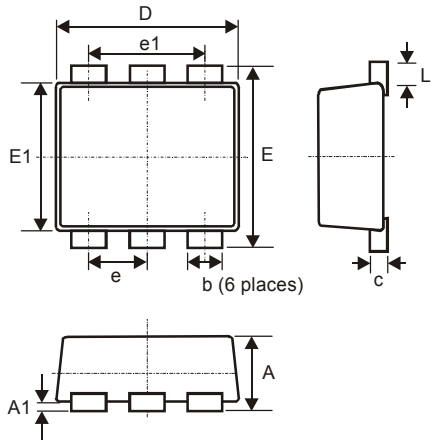


Fig. 11 Transient Thermal Resistance

Package Outline Dimensions

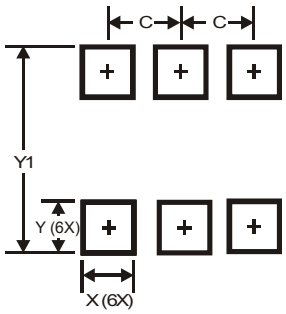
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



SOT963			
Dim	**Min**	**Max**	**Typ**
A	0.40	0.50	0.45
A1	0	0.05	-
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
L	0.05	0.15	0.10
b	0.10	0.20	0.15
e	0.35 Typ		
e1	0.70 Typ		
All Dimensions in mm			

Suggested Pad Layout

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.



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

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