Product Summary

$V_{(BR)DSS}$	$R_{DS(on)\ max}$	I_D $T_A = 25℃$
-12V	31mΩ@ V_{GS} = -4.5V	5.2A
	45mΩ@ V_{GS} =-2.5V	4.3A

Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **ESD Protected Up To 3kV**
- **"Green" Device, Halogen and Antimony Free (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Description and Applications

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.

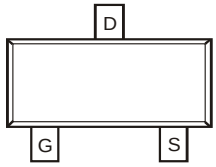
- DC-DC Converters
- Power management functions
- Analog Switch

Mechanical Data

- Case: SOT-23
- 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
- Weight: 0.0072 grams (approximate)

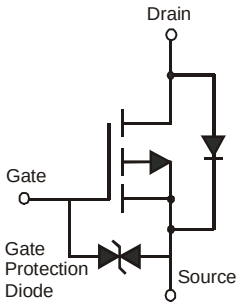
ESD PROTECTED TO 3kV

SOT-23



Top View

Pin Configuration



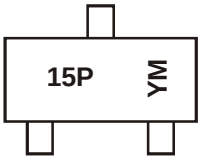
Internal Schematic

Ordering Information (Note 3)

Part Number	Case	Packaging
DMP1045U-7	SOT-23	3,000/Tape & Reel

Notes: 1. No purposefully added lead. Halogen and Antimony Free.
2. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com.
3. For packaging details, go to our website at http://www.diodes.com.

Marking Information



15P = Marking Code
YM = Date Code Marking
Y = Year (ex: X = 2010)
M = Month (ex: 9 = September)

Date Code Key

Year	2010	2011	2012	2013	2014	2015
Code	X	Y	Z	A	B	C

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℃ unless otherwise specified

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{DSS}	-12	V
Gate-Source Voltage			V_{GSS}	±8	V
Continuous Drain Current (Note 4) V_{GS} = -4.5V	Steady State	T_A = 25℃ T_A = 70℃	I_D	4.0 3.1	A
Continuous Drain Current (Note 4) V_{GS} = -2.5V	Steady State	T_A = 25℃ T_A = 70℃	I_D	3.3 2.6	A
Continuous Drain Current (Note 5) V_{GS} = -4.5V	Steady State	T_A = 25℃ T_A = 70℃	I_D	5.2 4.2	A
Continuous Drain Current (Note 5) V_{GS} = -2.5V	Steady State	T_A = 25℃ T_A = 70℃	I_D	4.3 3.4	A
Maximum Continuous Body Diode Forward Current (Note 5)			I_S	2	A
Pulsed Drain Current (10us pulse, duty cycle=1%) (Note 4)			I_{DM}	40	A

Thermal Characteristics @T_A = 25℃ unless otherwise specified

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 4)	P_D	0.8	W
Thermal Resistance, Junction to Ambient (Note 4)	$R_{\theta JA}$	168	℃/W
Total Power Dissipation (Note 5)	P_D	1.3	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	99	℃/W
Thermal Resistance, Junction to Case (Note 5)	$R_{\theta Jc}$	14.8	℃/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	℃

Electrical Characteristics @T_A = 25℃ unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)						
Drain-Source Breakdown Voltage	BV_{DSS}	-12	-	-	V	V_{GS} = 0V, I_D = -250μA
Zero Gate Voltage Drain Current T_J = 25 C	I_{DSS}	-	-	-1.0	μA	V_{DS} = -12V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	-	-	±10	μA	V_{GS} = ±8V, V_{DS} = 0V
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	$V_{GS(th)}$	-0.3	-0.55	-1.0	V	V_{DS} = V_{GS}, I_D = -250μA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	-	26	31	mΩ	V_{GS} = -4.5V, I_D = -4.0A
			31	45		V_{GS} = -2.5V, I_D = -3.5A
			45	75		V_{GS} = -1.8V, I_D = -2.7A
Forward Transfer Admittance	$\|Y_{fs}\|$	-	12	-	S	V_{DS} = -5V, I_D = -4A
Diode Forward Voltage	V_{SD}	-	-0.6	-	V	V_{GS} = 0V, I_S = -1A
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C_{iss}	-	1357	-	pF	V_{DS} = -10V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	-	504	-	pF	
Reverse Transfer Capacitance	C_{rss}	-	235	-	pF	
Gate Resistnace	R_g	-	14.1	-	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
SWITCHING CHARACTERISTICS (Note 7)						
Total Gate Charge	Q_g	-	15.8	-	nC	V_{GS} = -4.5V, V_{DS} = -10V, I_D = -4A
Gate-Source Charge	Q_{gs}	-	2.0	-	nC	
Gate-Drain Charge	Q_{gd}	-	3.9	-	nC	
Turn-On Delay Time	$t_{D(on)}$	-	15.7	-	ns	V_{DS} = -10V, V_{GS} = -4.5V, R_L = 2.5Ω, R_G = 3.0Ω
Turn-On Rise Time	t_r	-	23.3	-	ns	
Turn-Off Delay Time	$t_{D(off)}$	-	91.2	-	ns	
Turn-Off Fall Time	t_f	-	106.9	-	ns	

Notes: 4. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
5. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal vias to bottom layer 1inch square copper plate
6 .Short duration pulse test used to minimize self-heating effect.
7. Guaranteed by design. Not subject to production testing.

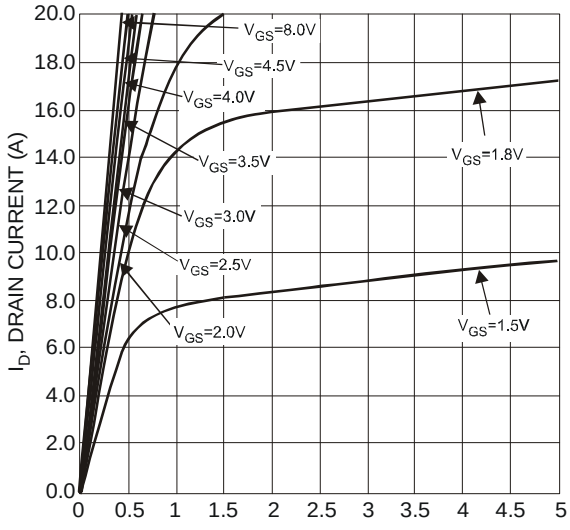


Fig. 1 Typical Output Characteristics

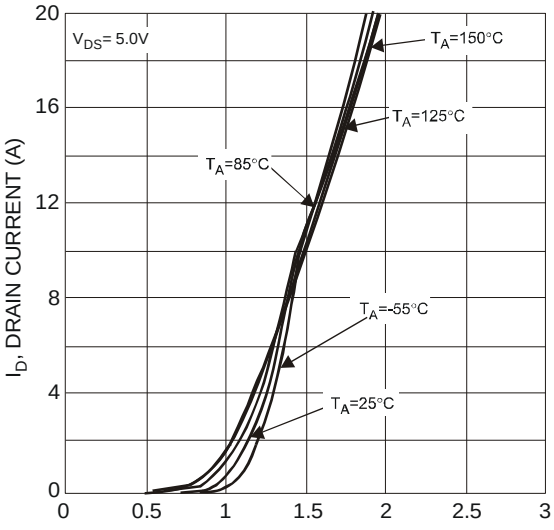


Fig. 2 Typical Transfer Characteristics

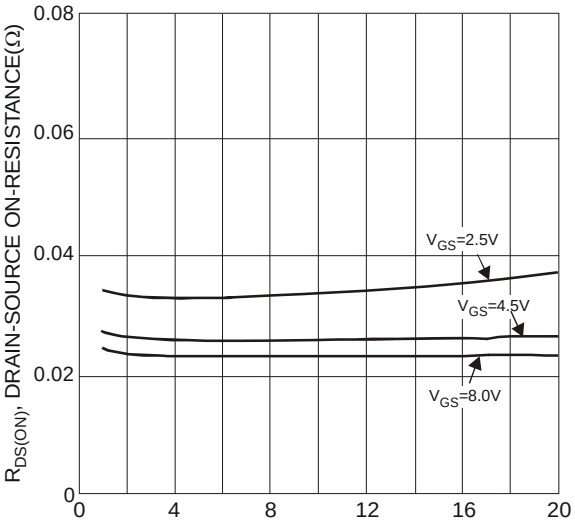


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

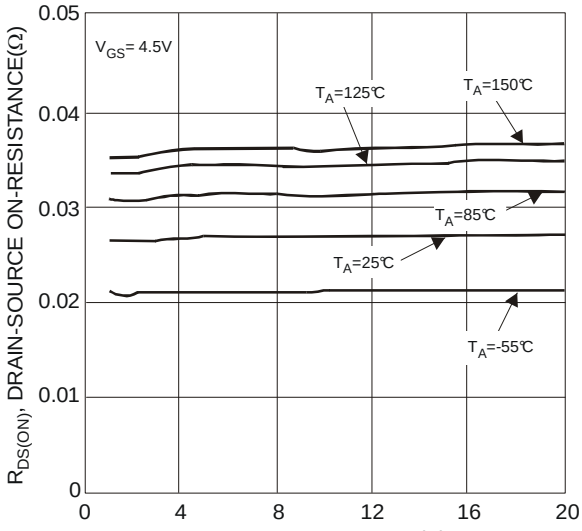


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

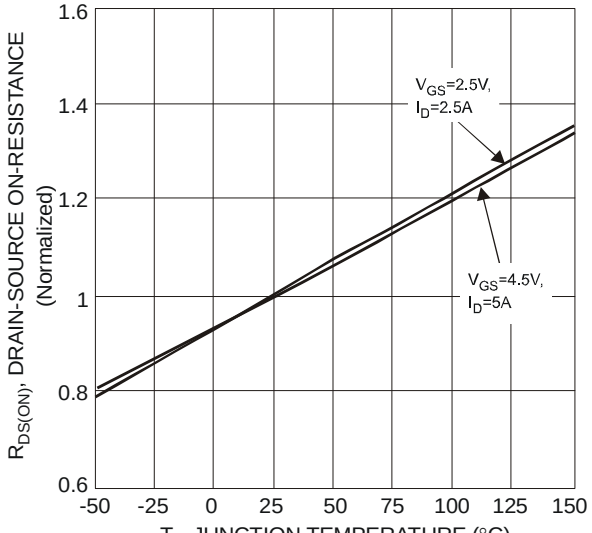


Fig. 5 On-Resistance Variation with Temperature

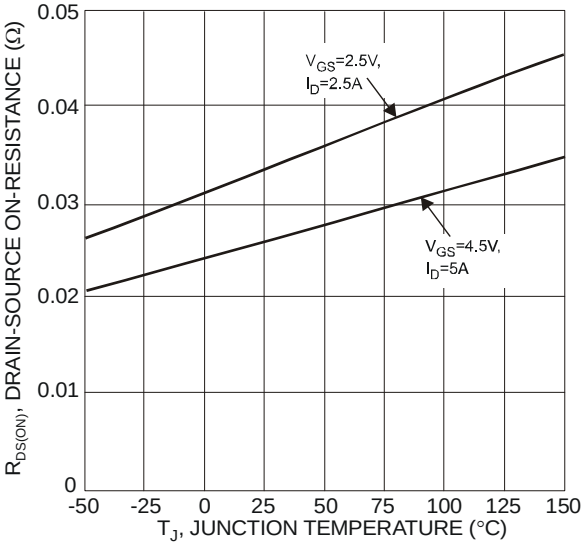


Fig. 6 On-Resistance Variation with Temperature

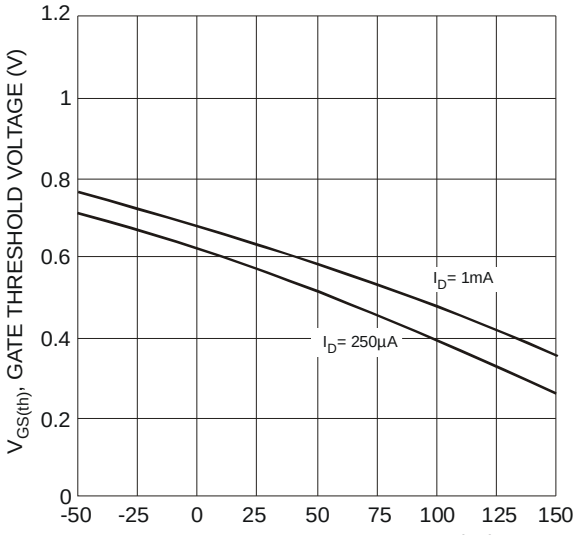


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

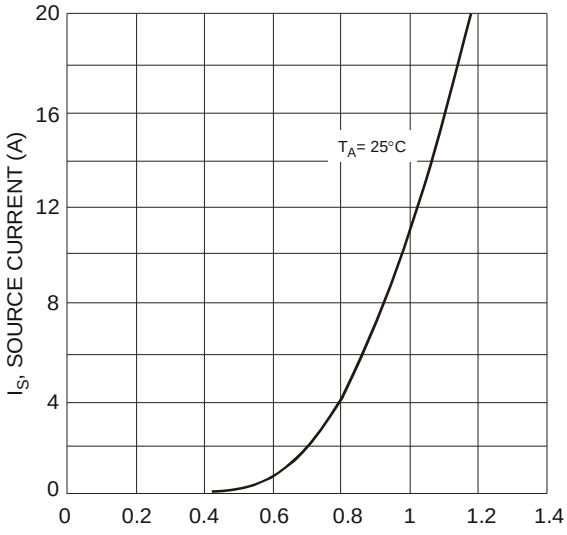


Fig. 8 Diode Forward Voltage vs. Current

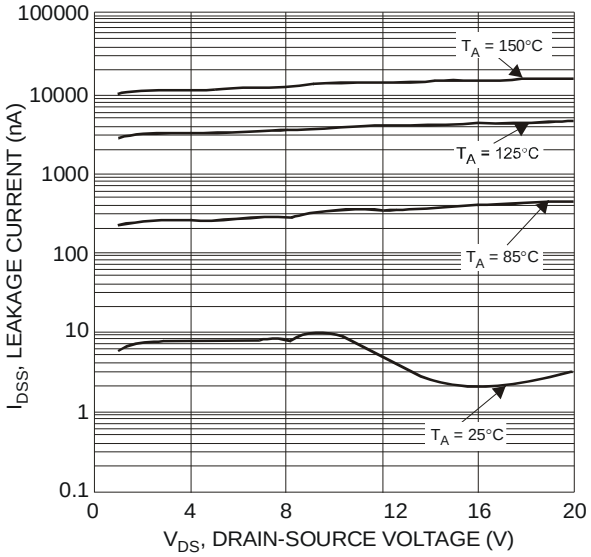


Fig. 9 Typical Drain-Source Leakage Current vs. Voltage

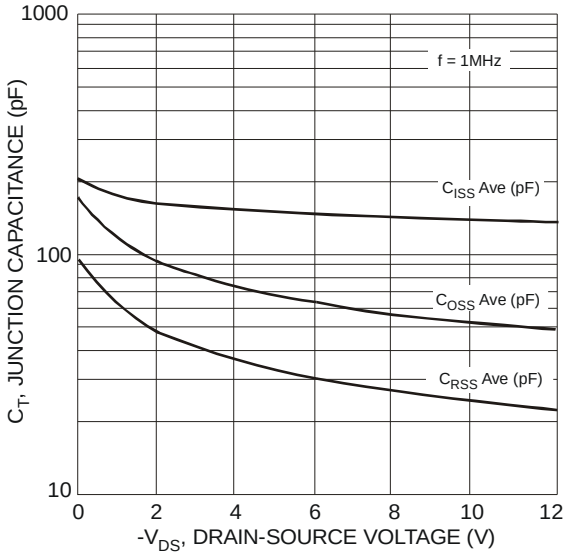


Fig. 10 Typical Junction Capacitance

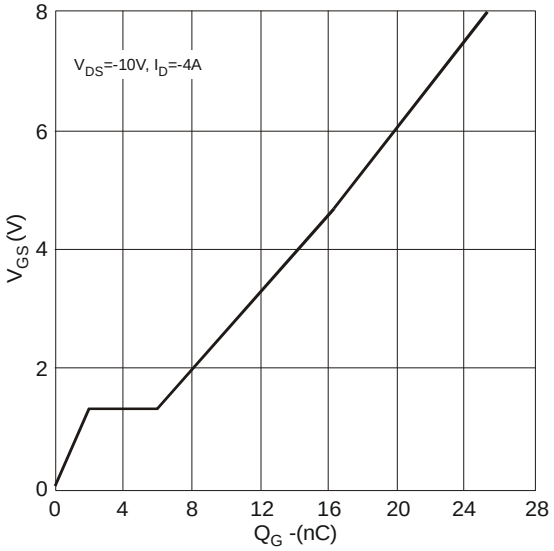


Fig. 11 Gate Charge Characteristics

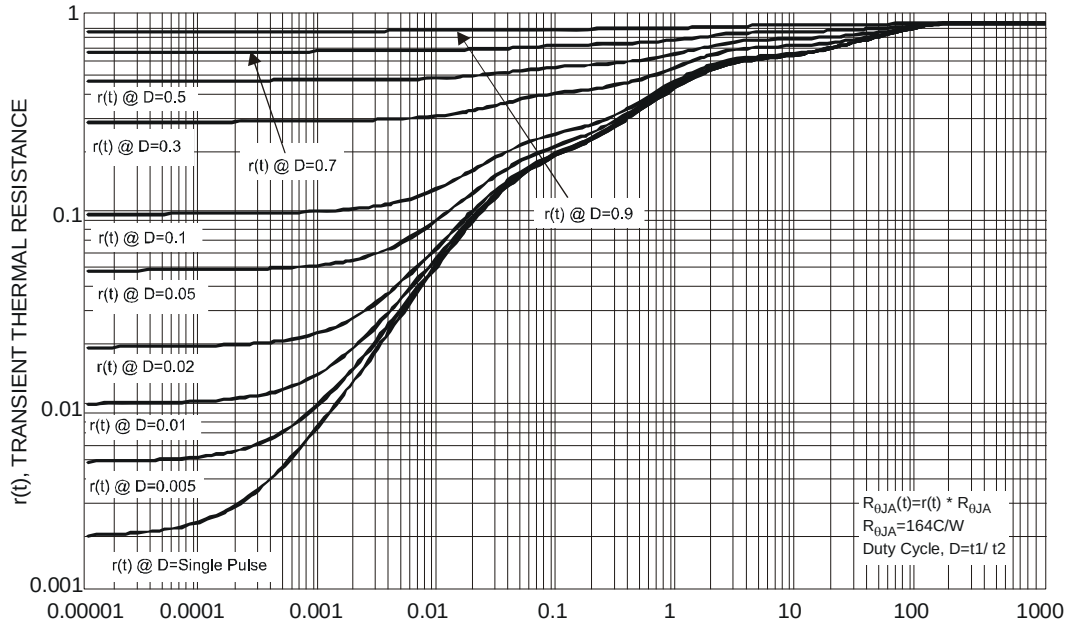
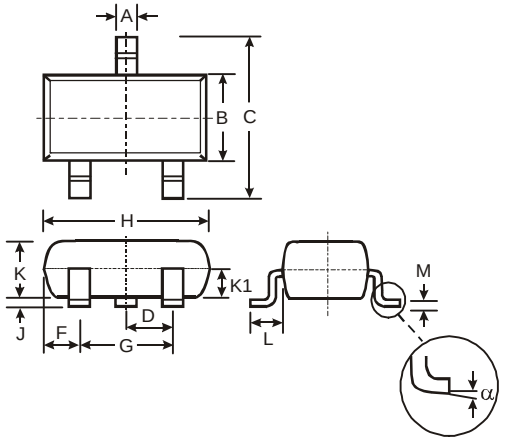


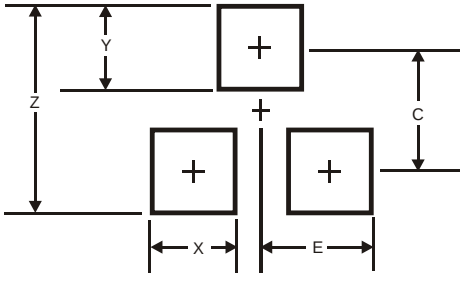
Fig. 12 Transient Thermal Resistance

Package Outline Dimensions



SOT-23			
Dim	**Min**	**Max**	**Typ**
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.903	1.10	1.00
K1	-	-	0.400
L	0.45	0.61	0.55
M	0.085	0.18	0.11
α	0°	8°	-
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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