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USE DMP2120U

DMP2160U

P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ max	I_D max T_A = +25°C
-20V	75mΩ @ V_{GS} = -4.5V	-3.3A
	140mΩ @ V_{GS} = -1.8V	-2.4A

Features and Benefits

- Low On-Resistance
- Very Low Gate Threshold Voltage $V_{GS(th)}$ ≤ 1V
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q 101 Standards for High Reliability**

Description and Applications

This 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.

- Battery Charging
- Power Management Functions
- DC-DC Converters
- Portable Power Adaptors

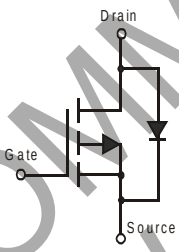
Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram Below
- Terminals: Finish - Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.008 grams (approximate)

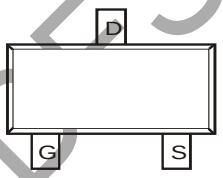
SOT23



Top View



Internal Schematic



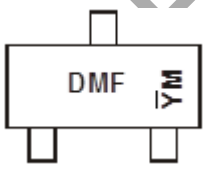
Top View

Ordering Information (Note 4)

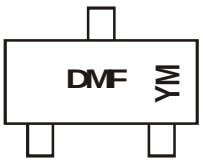
Part Number	Case	Packaging
DMP2160U-7	SOT23	3000/Tape & Reel

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



Chengdu A/T Site



Shanghai A/T Site

DMF = Marking Code
YM = Date Code Marking for SAT (Shanghai Assembly/ Test site)
$\overline{Y}$M = Date Code Marking for CAT (Chengdu Assembly/ Test site)
Y or $\overline{Y}$ = Year (ex: A = 2013)
M = Month (ex: 9 = September)

Date Code Key

Year	2008	2009	2010	2011	2012	2013	2014	2015
Code	V	W	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

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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}	±12	V
Continuous Drain Current (Note 5) V_{GS} = -4.5V	T_A = +25°C T_A = +70°C	I_D	-3.3 -2.6	A
Pulsed Drain Current		I_{DM}	-13	A

Thermal Characteristics

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	P_D	1.4	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	90	°C/W
Thermal Resistance, Junction to Case (Note 5)	$R_{\theta JC}$	22	°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 6)						
Drain-Source Breakdown Voltage	BV_{DSS}	-20	—	—	V	V_{GS} = 0V, I_D = -250µA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	—	—	-1.0	µA	V_{DS} = -16V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	— —	— —	±100 ±800	nA	V_{GS} = ±8V, V_{DS} = 0V V_{GS} = ±12V, V_{DS} = 0V
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	$V_{GS(th)}$	-0.4	-0.6	-0.9	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	—	60 73 92	75 96 140	mΩ	V_{GS} = -4.5V, I_D = -1.5A V_{GS} = -2.5V, I_D = -1.2A V_{GS} = -1.8V, I_D = -1.2A
Forward Transconductance	g_{FS}	—	7	—	S	V_{DS} = -10V, I_D = -1.5A
Diode Forward Voltage (Note 5)	V_{SD}	—	—	-1.0	V	V_{GS} = 0V, I_S = -1.0A
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C_{iss}	—	627	—	pF	V_{DS} = -10V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	64	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	53	—	pF	
Gate Resistance	R_G	—	44.9	—	Ω	V_{GS} = 0V, V_{DS} = 0V, f = 1.0MHz
Total Gate Charge	Q_g	—	6.5	—	nC	V_{GS} = -4.5V, V_{DS} = -10V, I_D = -3A
Gate-Source Charge	Q_{gs}	—	0.9	—	nC	
Gate-Drain Charge	Q_{gd}	—	1.5	—	nC	
Turn-On Delay Time	$t_{D(on)}$	—	12.5	—	ns	V_{DS} = -10V, V_{GS} = -4.5V, R_L = 10Ω, R_G = 1.0Ω, I_D = -1A
Turn-On Rise Time	t_r	—	10.3	—	ns	
Turn-Off Delay Time	$t_{D(off)}$	—	46.5	—	ns	
Turn-Off Fall Time	t_f	—	22.2	—	ns	

Notes: 5. Device mounted on 1in^2 FR-4 PCB with 2 oz. Copper. t ≤ 10 sec.
6. Short duration pulse test used to minimize self-heating effect.
7. Guaranteed by design. Not subject to product testing.

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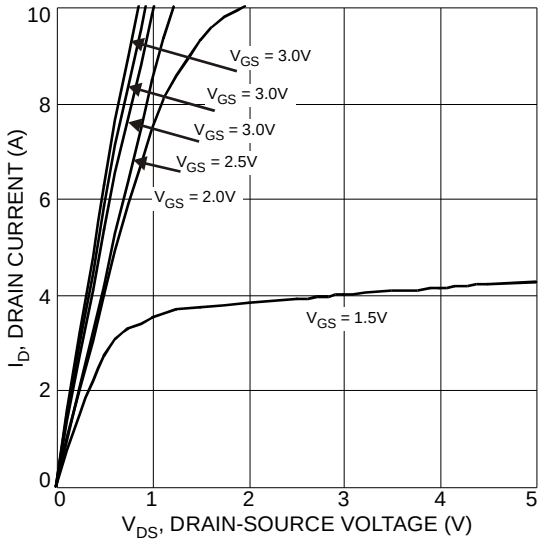

Fig. 1 Typical Output Characteristics

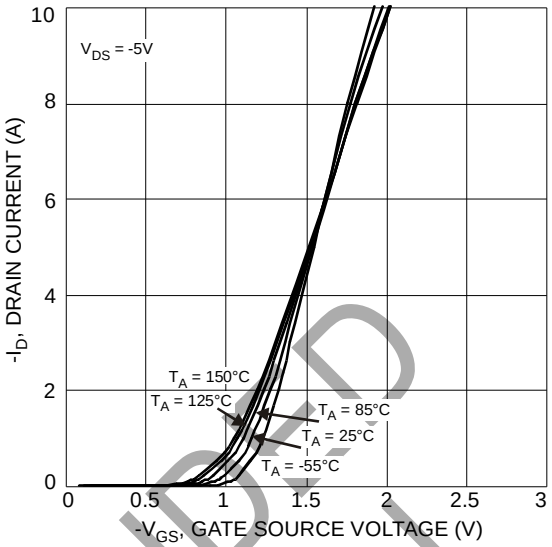

Fig. 2 Typical Transfer Characteristics

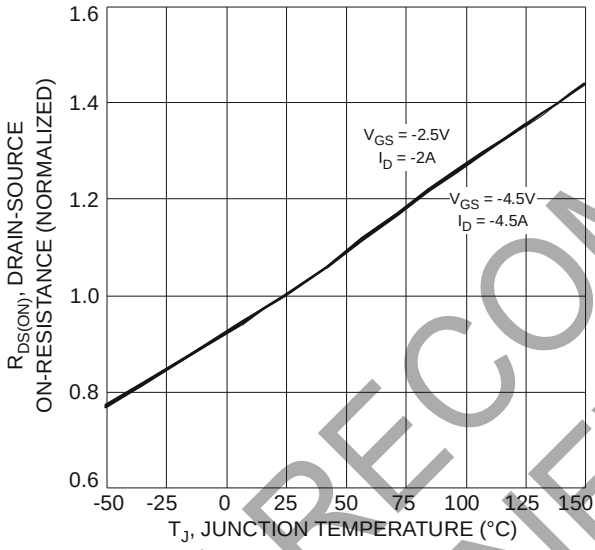

Fig. 3 On-Resistance Variation with Temperature

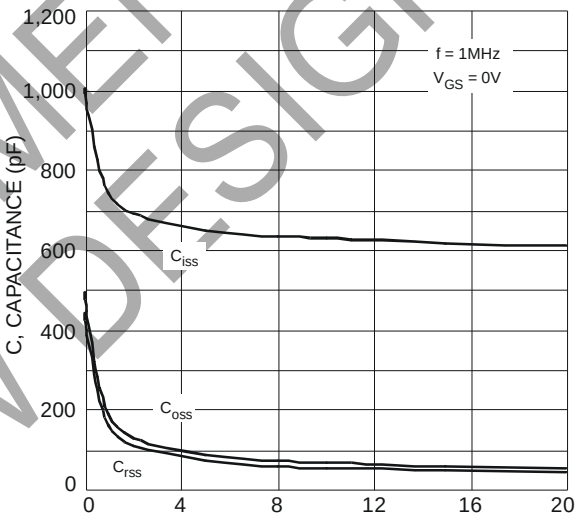

Fig. 4 Typical Capacitance

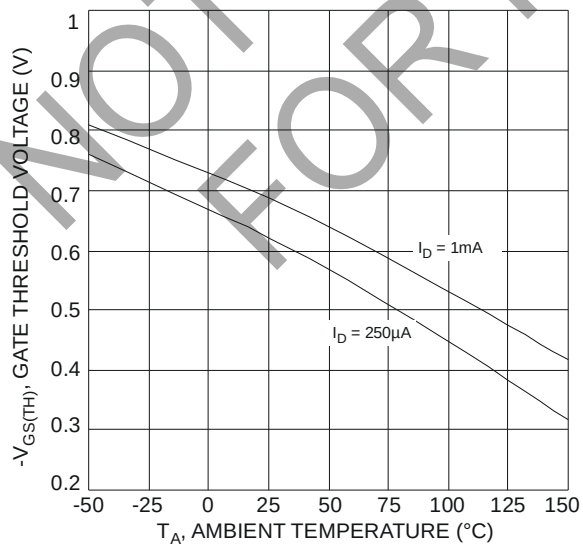

Fig. 5 Gate Threshold Variation vs. Ambient Temperature

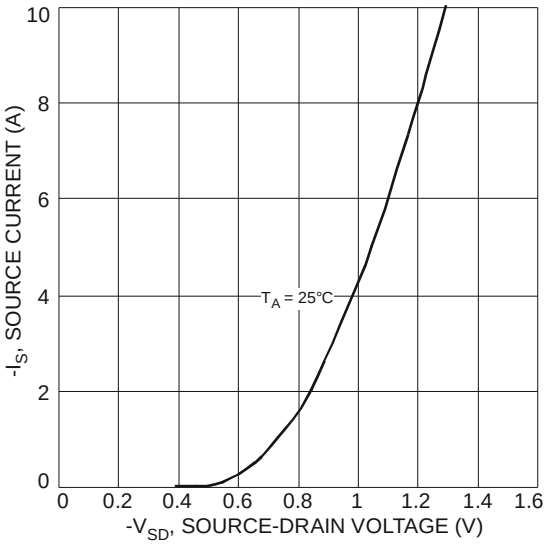

Fig. 6 Diode Forward Voltage vs. Current

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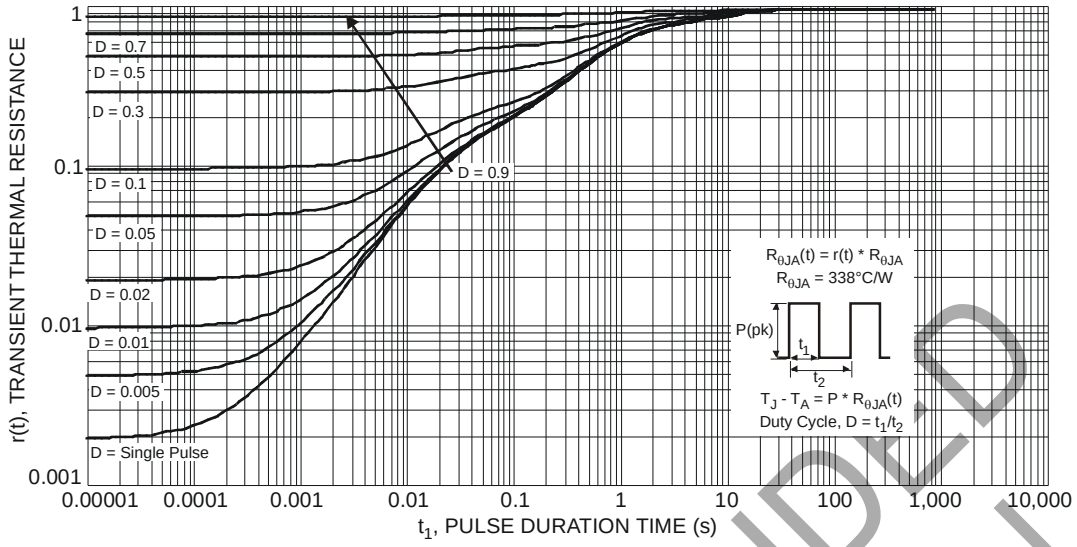
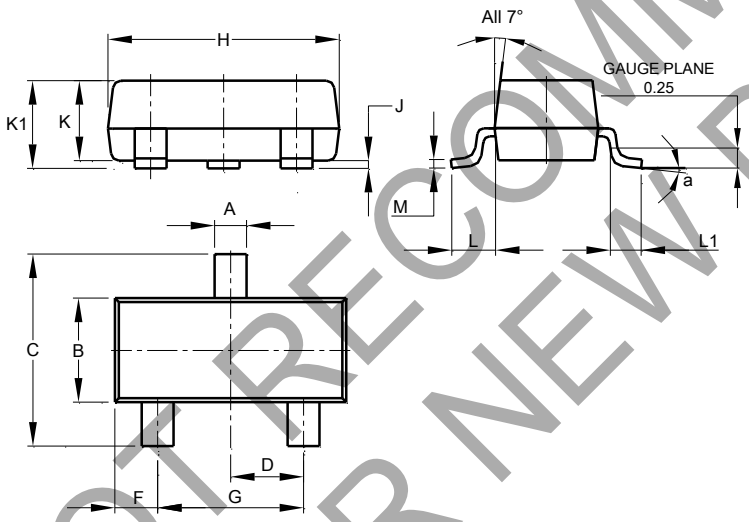


Fig. 7 Transient Thermal Response

Package Outline Dimensions

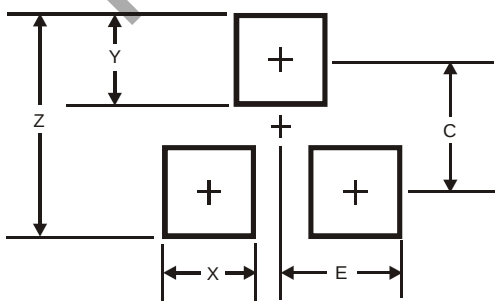
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



SOT23			
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	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
α	8°		
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)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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