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[Diodes Incorporated](#)  
[DMP2070UCB6-7](#)

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**DMP2070UCB6**

**P-CHANNEL ENHANCEMENT MODE MOSFET**

**Product Summary** (Typ. @  $V_{GS} = -4.5V$ ,  $T_A = +25^\circ C$ )

$V_{DSS}$	$R_{DS(on)}$	$Q_g$	$Q_{gd}$	$I_D$
-20V	55mΩ	2.9nC	0.5nC	-3.5A

**Description and Applications**

This new generation 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.

**Applications**

- Battery Management
- Load Switch
- Battery Protection

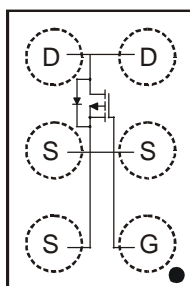
**Features and Benefits**

- LD-MOS Technology with the Lowest Figure of Merit:  
 $R_{DS(on)} = 55m\Omega$  to Minimize On-State Losses  
 $Q_g = 2.9nC$  for Ultra-Fast Switching
- $V_{GS(th)} = -0.6V$  typ. for a Low Turn-On Potential
- CSP with Footprint  $1.5mm \times 1.0mm$
- Height = 0.62mm for Low Profile
- **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: U-WLB1510-6
- Terminal Connections: See Diagram Below
- Weight: 0.0018 grams (Approximate)

U-WLB1510-6



Top View

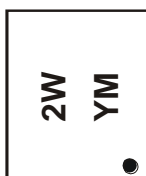
**Ordering Information** (Note 4)

Part Number	Case	Packaging
DMP2070UCB6-7	U-WLB1510-6	3,000/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](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**

U-WLB1510-6



2W = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: Y = 2011)  
 M = Month (ex: 9 = September)

Date Code Key

Year	2011	2012	2013	2014	2015	2016	2017
Code	Y	Z	A	B	C	D	E

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<sub>A</sub> = +25°C unless otherwise specified.)

Characteristic	Symbol	Value	Units
Drain-Source Voltage	V <sub>DSS</sub>	-20	V
Gate-Source Voltage	V <sub>GSS</sub>	±8	V
Continuous Drain Current (Note 4) V <sub>GS</sub> = -4.5V	I <sub>D</sub>	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	A
		-2.5 -2.0	
Continuous Drain Current (Note 5) V <sub>GS</sub> = -4.5V	I <sub>D</sub>	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	A
		-3.5 -2.8	
Pulsed Drain Current (Note 6)	I <sub>DM</sub>	-12	A
Maximum Continuous Body Diode Forward Current (Note 5)	I <sub>S</sub>	-1.8	A

**Thermal Characteristics** (@T<sub>A</sub> = +25°C unless otherwise specified.)

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 4)	P <sub>D</sub>	0.92	W
Total Power Dissipation (Note 5)	P <sub>D</sub>	1.47	W
Thermal Resistance, Junction to Ambient (Note 4)	R <sub>θJA</sub>	136	°C/W
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	84	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**Electrical Characteristics** (@T<sub>A</sub> = +25°C unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-20	-	-	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	-	-	-1	μA	@T <sub>C</sub> = +25°C V <sub>DS</sub> = -16V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	-	-	±100	nA	V <sub>GS</sub> = ±8V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	-0.4	-0.6	-1.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	-	55	70	mΩ	V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -1A
			70	90		
			90	110		
			110	150		
Forward Transfer Admittance	Y <sub>fs</sub>	-	12	-	S	V <sub>DS</sub> = -10V, I <sub>D</sub> = -1A
Diode Forward Voltage (Note 5)	V <sub>SD</sub>	-	-0.7	-1	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = -1A
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>ISS</sub>	-	210	-	pF	V <sub>DS</sub> = -10V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>OSS</sub>	-	92	-	pF	
Reverse Transfer Capacitance	C <sub>RSS</sub>	-	38	-	pF	
Series Gate Resistance	R <sub>G</sub>	-	5.3	-	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge (4.5V)	Q <sub>g</sub>	-	2.9	-	nC	V <sub>GS</sub> = -4.5V, V <sub>DS</sub> = -10V, I <sub>D</sub> = -1A,
Gate-Source Charge	Q <sub>GS</sub>	-	0.3	-	nC	
Gate-Drain Charge	Q <sub>GD</sub>	-	0.5	-	nC	
Turn-On Delay Time	t <sub>D(on)</sub>	-	7.3	-	ns	V <sub>DD</sub> = -10V, V <sub>GS</sub> = -4.5V, I <sub>DS</sub> = -1A, R <sub>G</sub> = 20Ω,
Turn-On Rise Time	t <sub>r</sub>	-	14.0	-	ns	
Turn-Off Delay Time	t <sub>D(off)</sub>	-	42.6	-	ns	
Turn-Off Fall Time	t <sub>f</sub>	-	32	-	ns	

- Notes:
- Device mounted on FR-4 PCB with minimum recommended pad layout.
  - Device mounted on FR4 material with 1-inch<sup>2</sup> (6.45-cm<sup>2</sup>), 2-oz. (0.071-mm thick) Cu.
  - 300ms pulse, pulse duty cycle ≤ 2%.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to production testing.



**DMP2070UCB6**

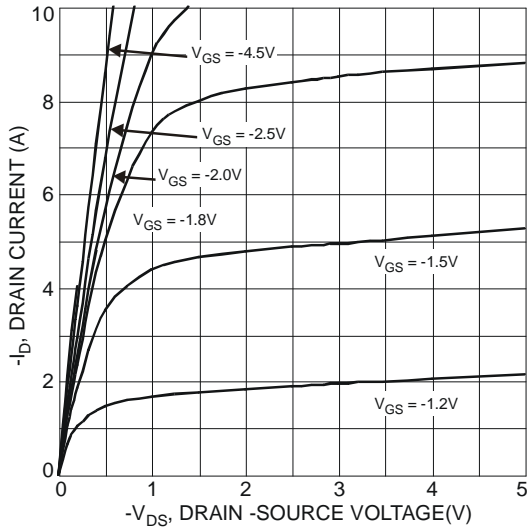


Fig. 1 Typical Output Characteristics

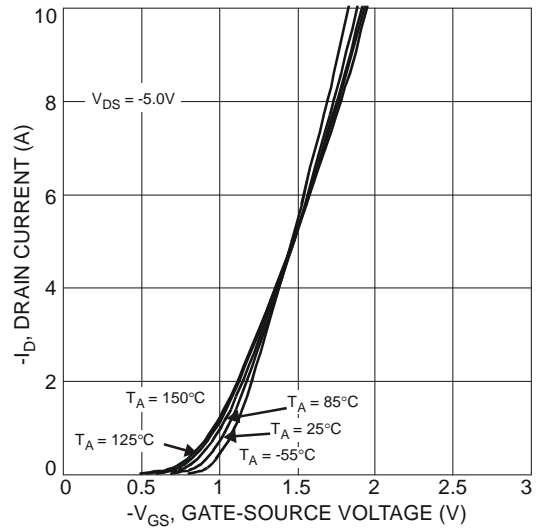


Fig. 2 Typical Transfer Characteristics

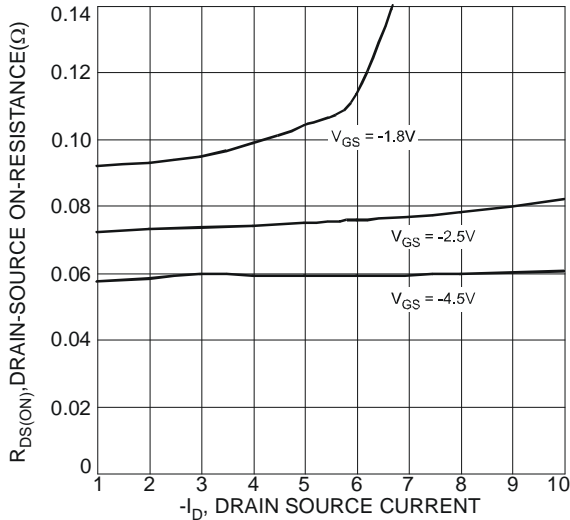


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

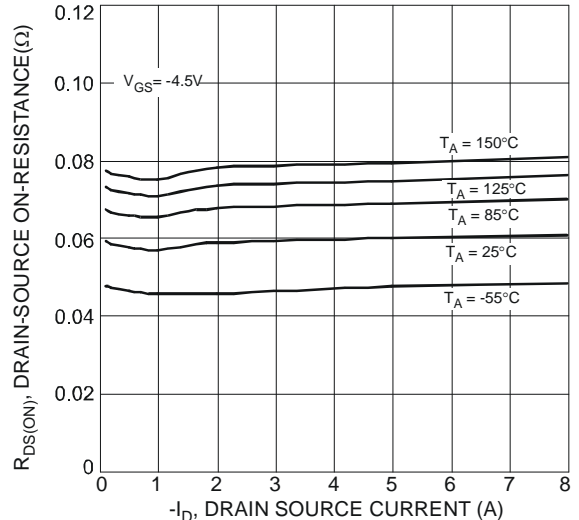


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

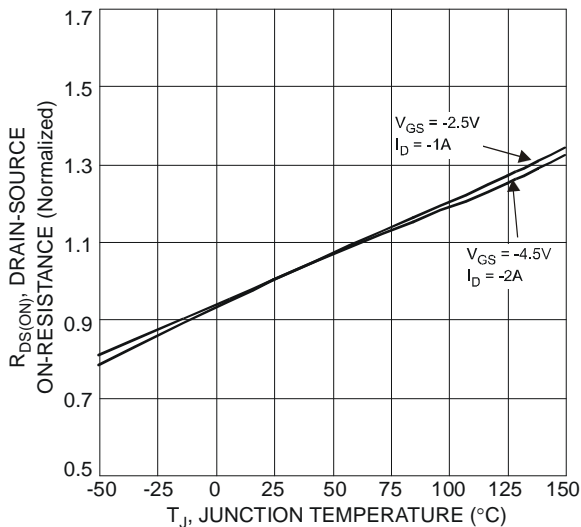


Fig. 5 On-Resistance Variation with Temperature

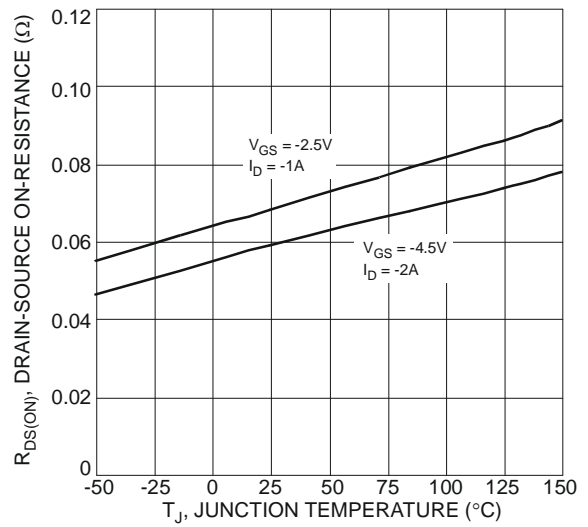


Fig. 6 On-Resistance Variation with Temperature



**DMP2070UCB6**

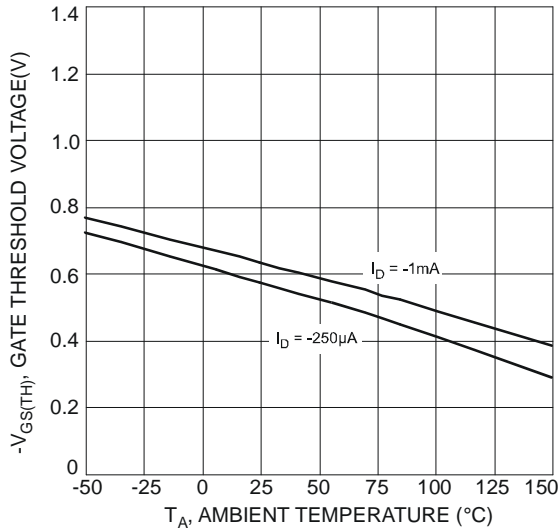


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

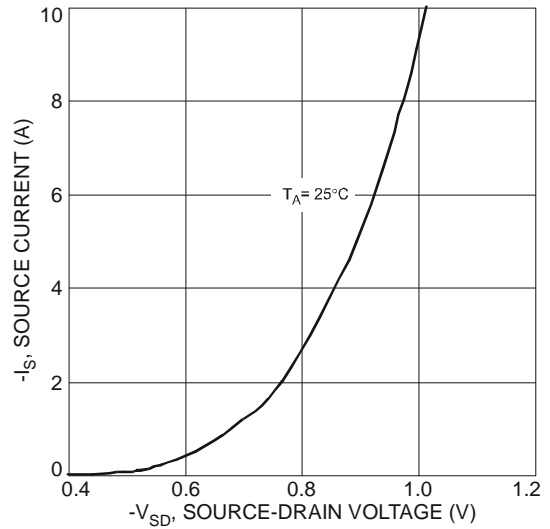


Fig. 8 Diode Forward Voltage vs. Current

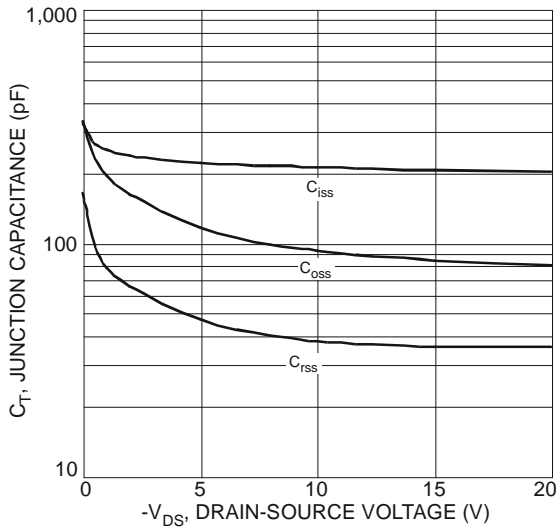


Fig. 9 Typical Junction Capacitance

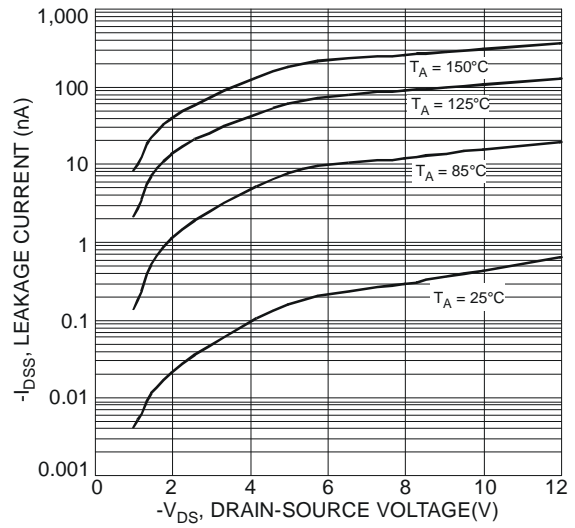


Fig. 10 Typical Drain-Source Leakage Current vs. Voltage

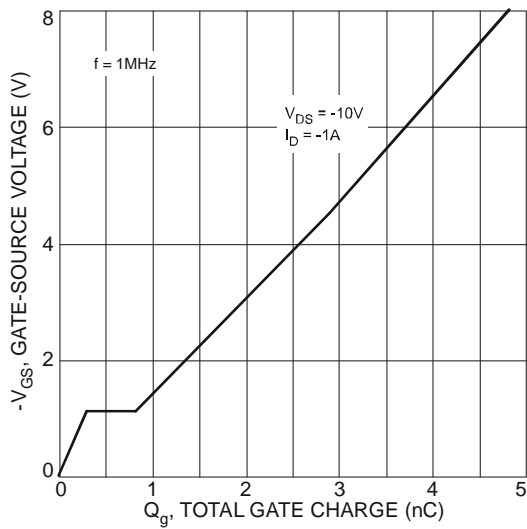


Fig. 11 Gate-Charge Characteristics

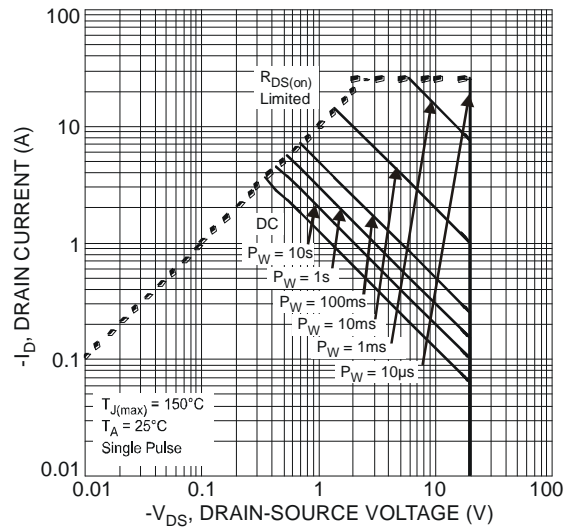


Fig. 12 SOA, Safe Operation Area

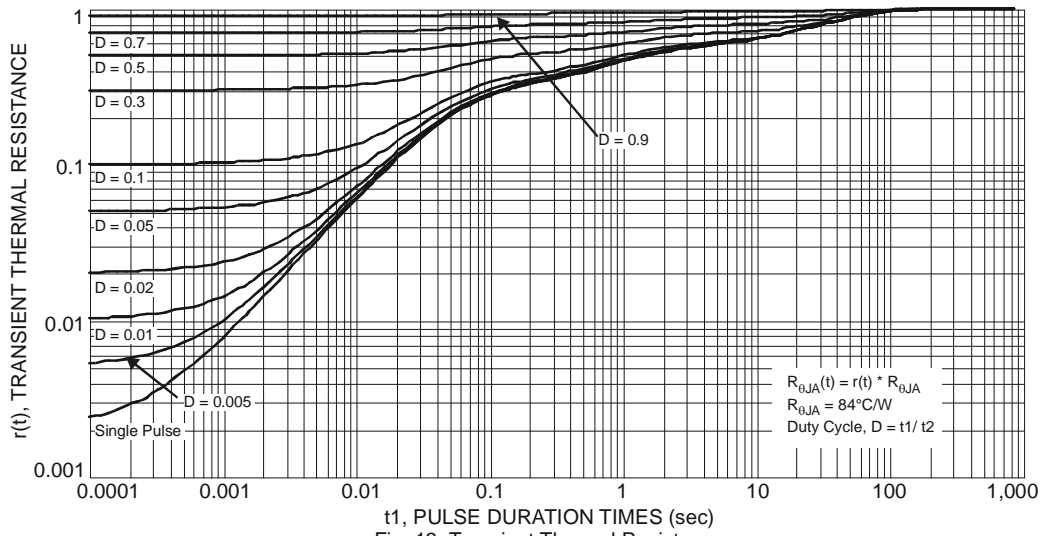
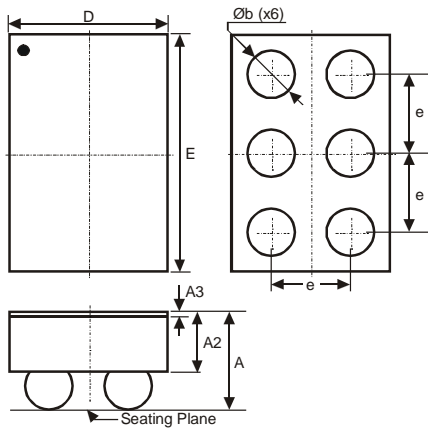


Fig. 13 Transient Thermal Resistance

**Package Outline Dimensions**

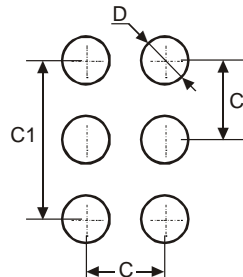
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



U-WLB1510-6			
Dim	Min	Max	Typ
D	0.90	1.00	1.00
E	1.40	1.50	1.50
A	-	0.62	-
A2	-	-	0.38
A3	0.020	0.030	0.025
b	0.27	0.37	0.32
e	-	-	0.50
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	0.50
C1	1.00
D	0.25

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