

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON) max}$	$I_D$ $T_A = +25^\circ C$
30V	12m $\Omega$ @ $V_{GS} = 10V$	10.8A
	16m $\Omega$ @ $V_{GS} = 4.5V$	9.5A

## 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.

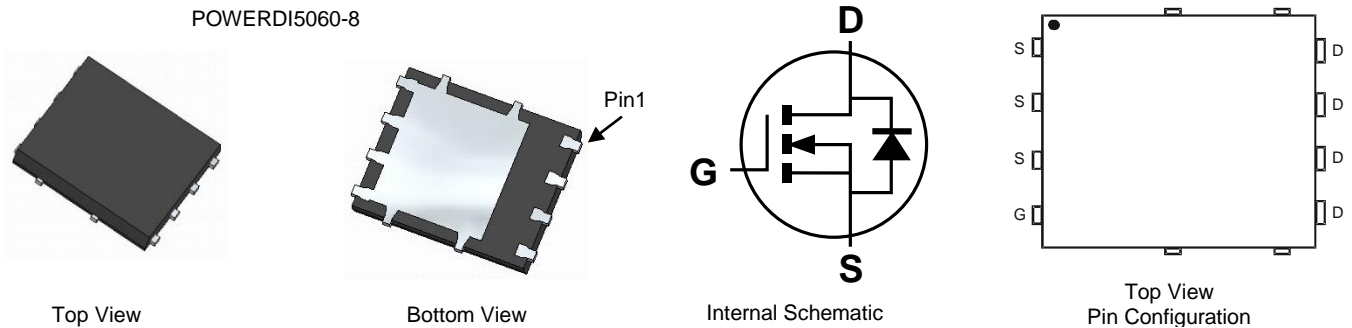
- DC-DC Converters
- Power Management Functions
- Analog Switch

## Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- <1.1mm Package Profile – Ideal for Thin Applications
- **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: POWERDI5060-8
- 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: 0.097 grams (Approximate)

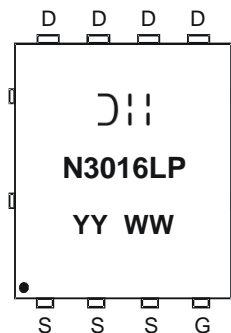


## Ordering Information (Note 4)

Part Number	Case	Packaging
DMN3016LPS-13	POWERDI5060-8	2500 / 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



= Manufacturer's Marking  
 N3016LP = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last Digit of Year (ex: 14 = 2014)  
 WW = Week Code (01 to 53)

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Units
Drain-Source Voltage		V <sub>DSS</sub>	30	V
Gate-Source Voltage		V <sub>GSS</sub>	±20	V
Continuous Drain Current (Note 6) V <sub>GS</sub> = 10V	Steady State	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	10.8 8.5	A
	t < 10s	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	15.5 12.3	A
Continuous Drain Current (Note 6) V <sub>GS</sub> = 4.5V	Steady State	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	9.5 7.5	A
	t < 10s	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	13.5 10.8	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)		I <sub>DM</sub>	70	A
Avalanche Current (Note 7) L = 0.1mH		I <sub>AS</sub>	22	A
Avalanche Energy (Note 7) L = 0.1mH		E <sub>AS</sub>	24	mJ

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

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)		P <sub>D</sub>	1.18	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R <sub>θJA</sub>	109	°C/W
	t < 10s		49	°C/W
Total Power Dissipation (Note 6)		P <sub>D</sub>	2.75	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R <sub>θJA</sub>	46	°C/W
	t < 10s		24	°C/W
Thermal Resistance, Junction to Case (Note 6)		R <sub>θJC</sub>	4.5	°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 8)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	30	-	-	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250µA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	-	-	1	µA	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	-	-	±100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	1.4	-	2.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	-	8.5	12	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A
		-	10.5	16		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 20A
Diode Forward Voltage	V <sub>SD</sub>	-	0.7	1.0	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>iss</sub>	-	1415	-	pF	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	-	119	-	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	-	82	-	pF	
Gate Resistance	R <sub>g</sub>	-	3.0	-	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>g</sub>	-	11.3	-	nC	V <sub>DS</sub> = 15V, I <sub>D</sub> = 12A
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>	-	25.1	-	nC	
Gate-Source Charge	Q <sub>gs</sub>	-	3.5	-	nC	
Gate-Drain Charge	Q <sub>gd</sub>	-	3.6	-	nC	
Turn-On Delay Time	t <sub>D(ON)</sub>	-	4.8	-	ns	V <sub>DD</sub> = 15V, V <sub>GS</sub> = 10V, R <sub>L</sub> = 1.25Ω, R <sub>G</sub> = 3Ω
Turn-On Rise Time	t <sub>R</sub>	-	16.5	-	ns	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	-	26.1	-	ns	
Turn-Off Fall Time	t <sub>F</sub>	-	5.6	-	ns	I <sub>F</sub> = 12A, di/dt = 500A/µs
Reverse Recovery Time	t <sub>RR</sub>	-	12.3	-	ns	
Reverse Recovery Charge	Q <sub>rr</sub>	-	10.4	-	nC	

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
  - I<sub>AS</sub> and E<sub>AS</sub> rating are based on low frequency and duty cycles to keep T<sub>J</sub> = +25°C.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

POWERDI is a registered trademark of Diodes Incorporated.

DMN3016LPS

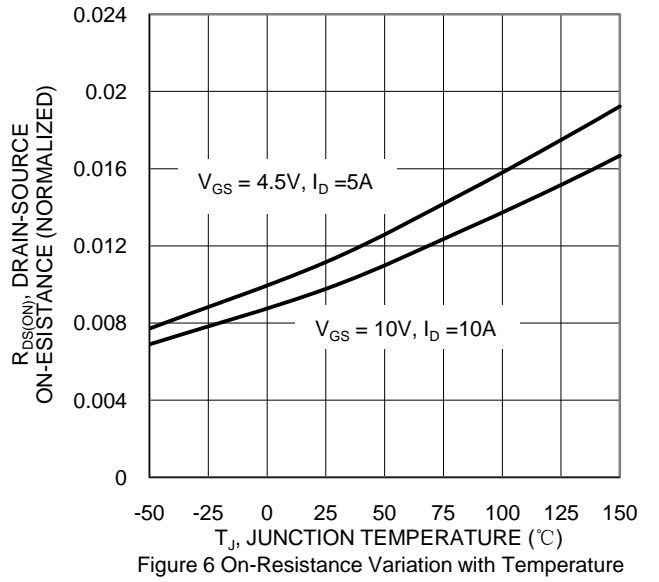
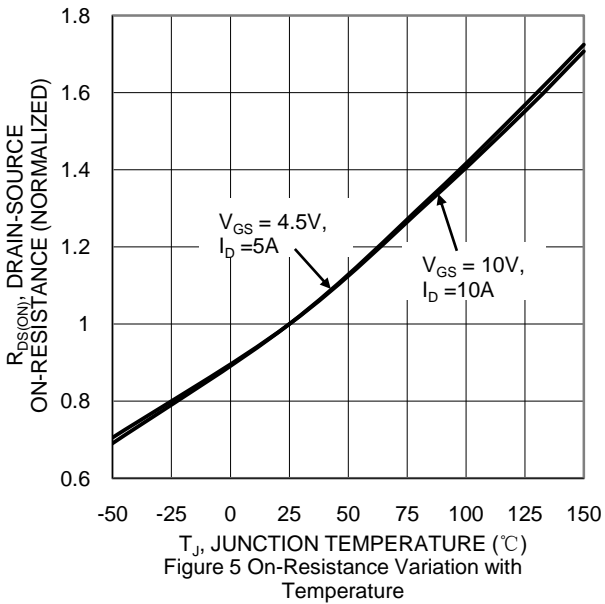
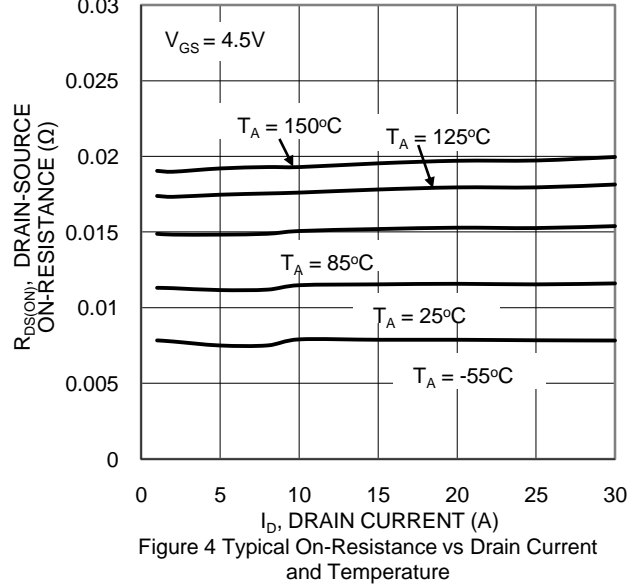
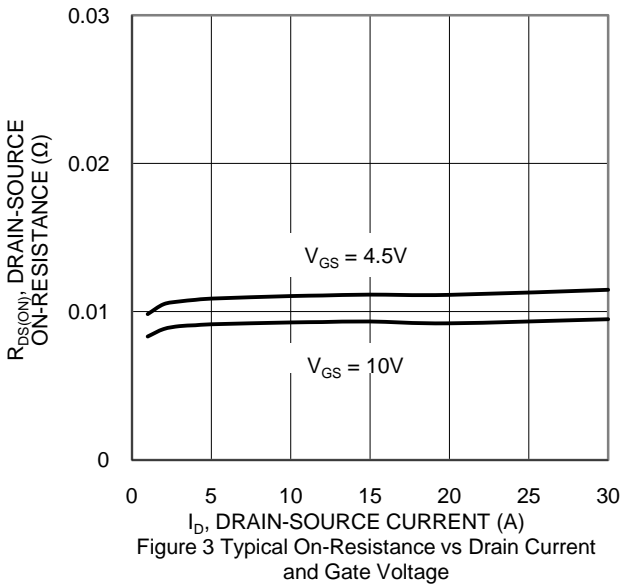
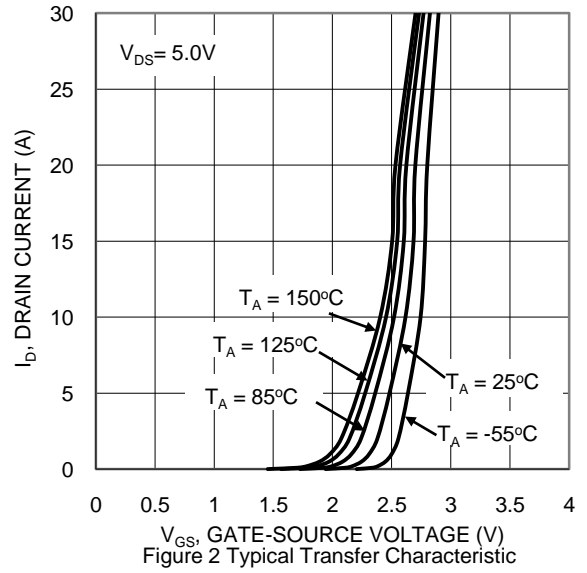
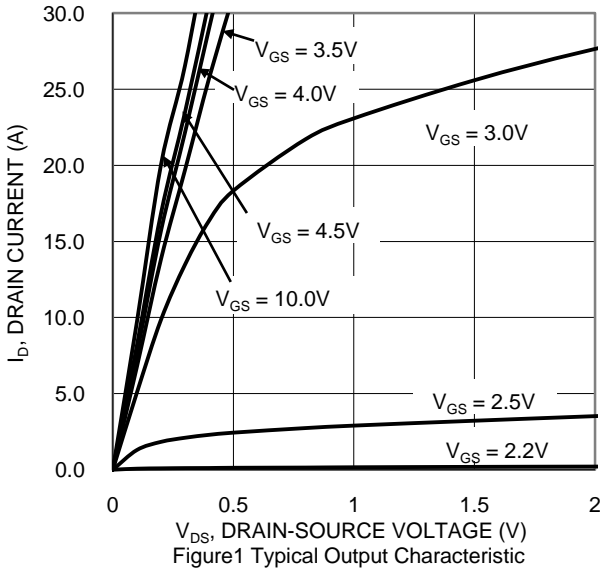
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2 of 7

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February 2015

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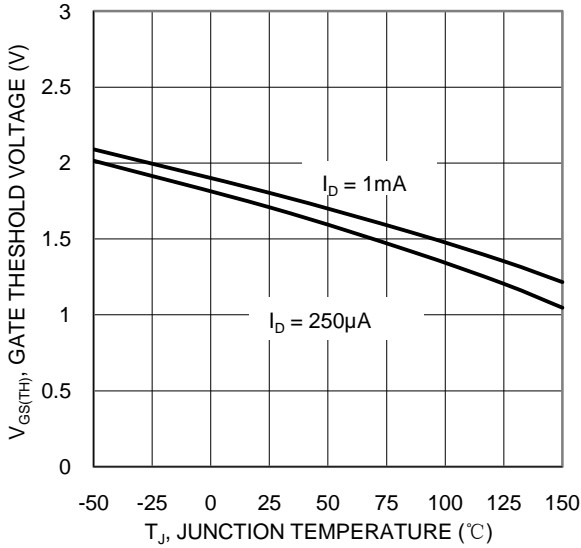


Figure 7 Gate Threshold Variation vs Junction Temperature

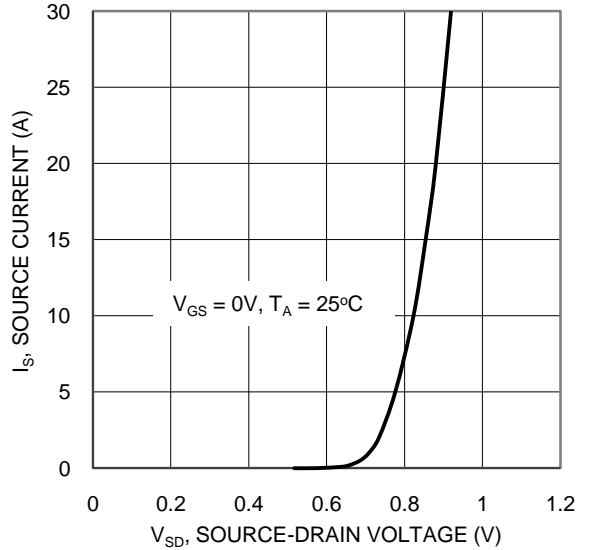


Figure 8 Diode Forward Voltage vs Current

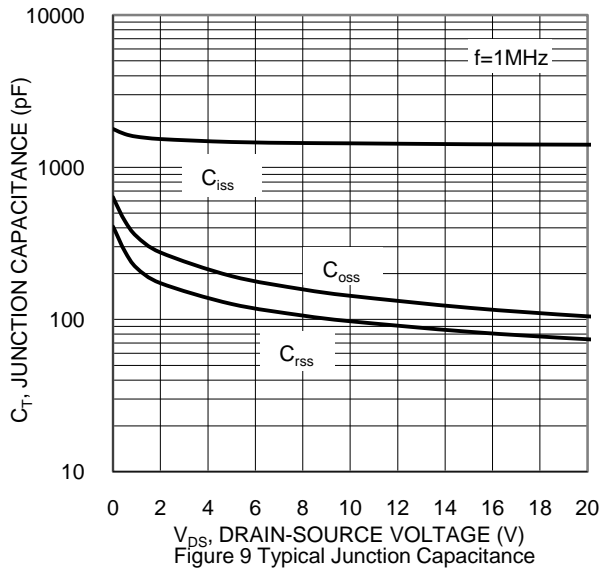


Figure 9 Typical Junction Capacitance

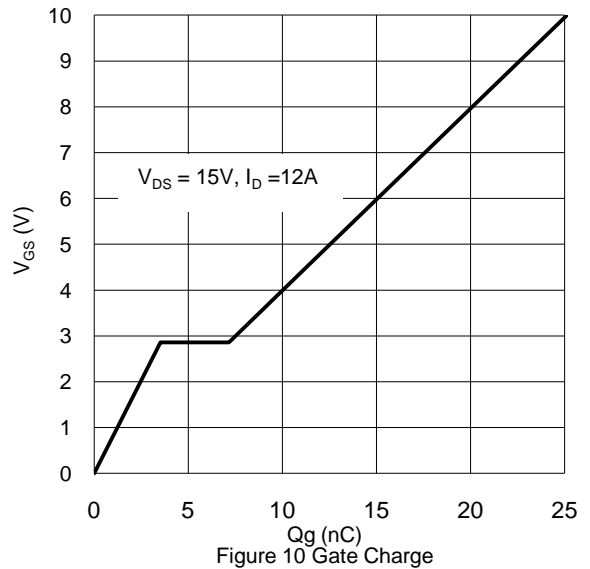


Figure 10 Gate Charge

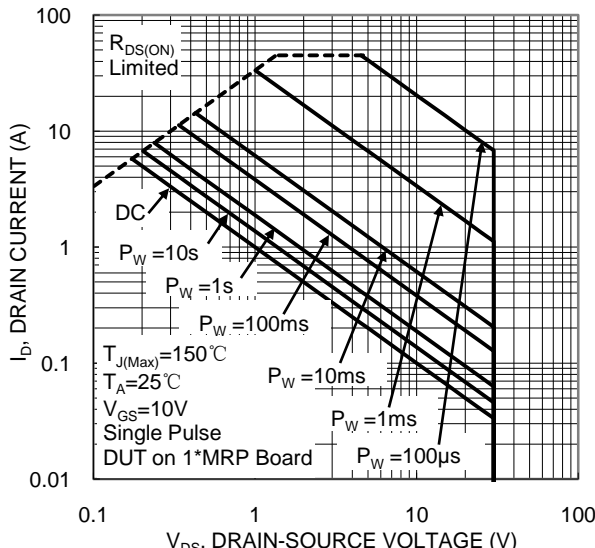


Figure 11 SOA, Safe Operation Area

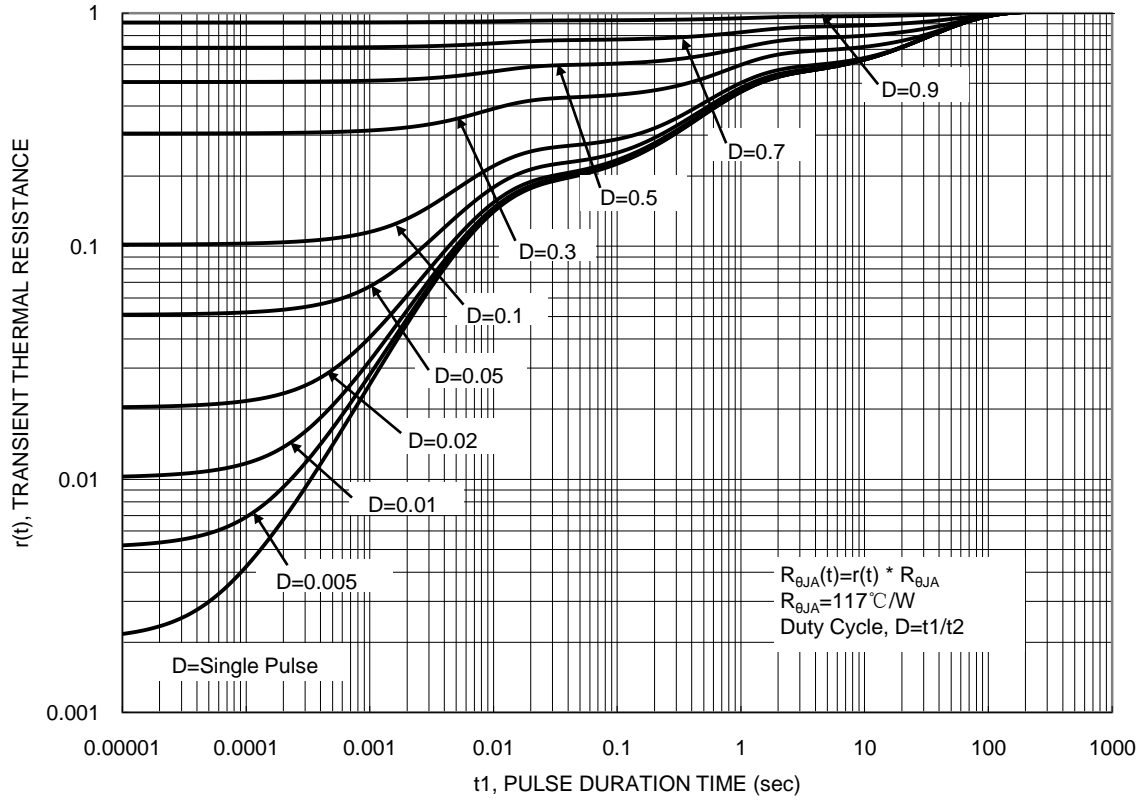
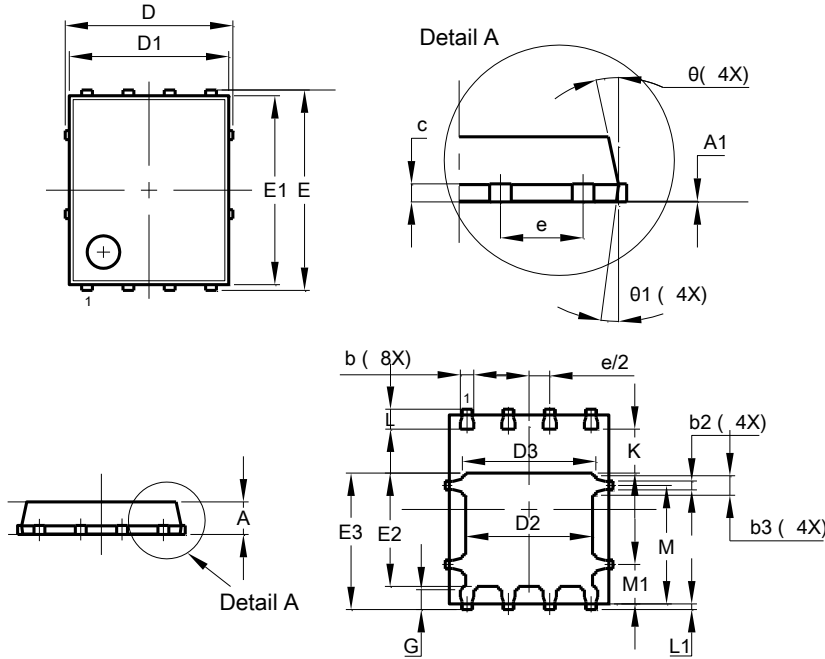


Figure 12 Transient Thermal Resistance

**Package Outline Dimensions**

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

(1) Package Type: POWERDI<sup>®</sup>5060-8

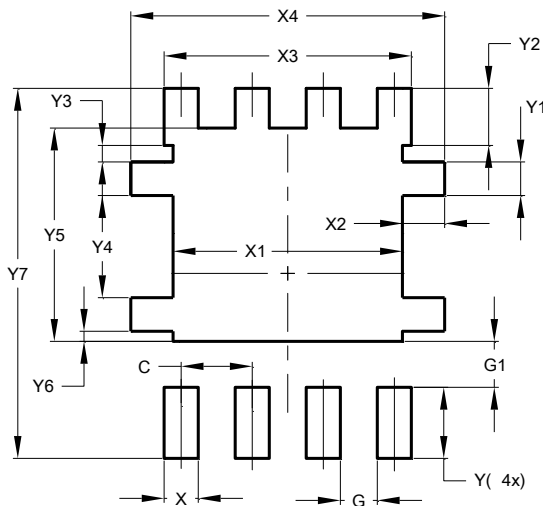


POWERDI <sup>®</sup> 5060-8			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0.00	0.05	
b	0.33	0.51	0.41
b2	0.200	0.350	0.273
b3	0.40	0.80	0.60
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	3.70	4.10	3.90
D3	3.90	4.30	4.10
E	6.15 BSC		
E1	5.60	6.00	5.80
E2	3.28	3.68	3.48
E3	3.99	4.39	4.19
e	1.27 BSC		
G	0.51	0.71	0.61
K	0.51		
L	0.51	0.71	0.61
L1	0.100	0.200	0.175
M	3.235	4.035	3.635
M1	1.00	1.40	1.21
$\theta$	10°	12°	11°
$\theta1$	6°	8°	7°
All Dimensions in mm			

**Suggested Pad Layout**

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

(1) Package Type: POWERDI<sup>®</sup>5060-8



Dimensions	Value (in mm)
C	1.270
G	0.660
G1	0.820
X	0.610
X1	4.100
X2	0.755
X3	4.420
X4	5.610
Y	1.270
Y1	0.600
Y2	1.020
Y3	0.295
Y4	1.825
Y5	3.810
Y6	0.180
Y7	6.610

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