

Product Summary

BV _{DSS}	R _{DSON}	I _D T _A = +25°C
60V	8.0mΩ @ V _{GS} = 10V	16.5A

Description and Applications

This MOSFET is designed to meet the stringent requirements of Automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

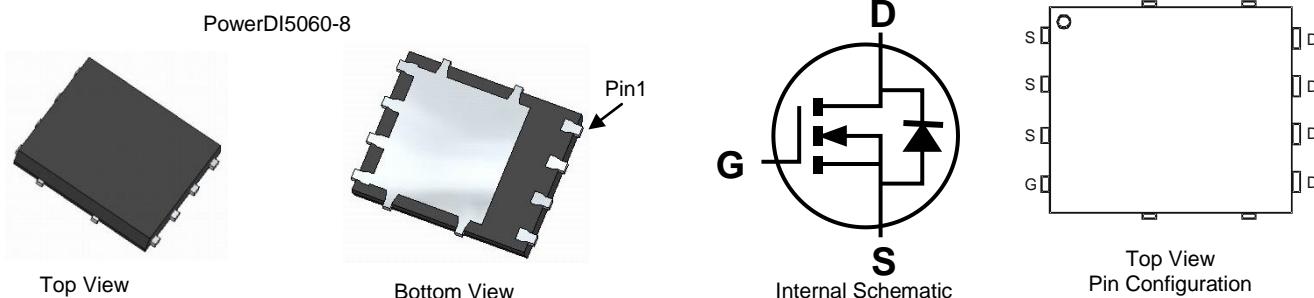
- Motor Control
- DC-DC Converters
- Power Management

Features and Benefits

- Thermally Efficient Package-Cooler Running Applications
- High Conversion Efficiency
- Low R_{DSON} – Minimizes On State Losses
- Low Input Capacitance
- Fast Switching Speed
- <1.1mm Package Profile – Ideal for Thin Applications
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

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
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 ③
- Weight: 0.097 grams (Approximate)



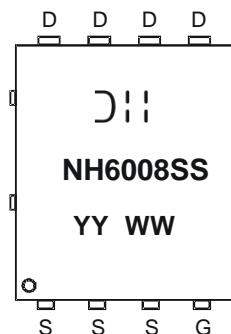
Ordering Information (Note 5)

Part Number	Case	Packaging
DMNH6008SPSQ-13	PowerDI5060-8	2,500 / Tape & Reel

Notes:

1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to http://www.diodes.com/product_compliance_definitions.html.
5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



Manufacturer's Marking
NH6008SS = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 16 = 2016)
WW = Week Code (01 to 52)

Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	60	V
Gate-Source Voltage			V_{GSS}	± 20	V
Continuous Drain Current (Note 7) $V_{GS} = 10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +100^\circ\text{C}$	I_D	16.5 11.7	A
	Steady State	$T_C = +25^\circ\text{C}$ $T_C = +100^\circ\text{C}$	I_D	88 63	A
Pulsed Drain Current (380 μs Pulse, Duty Cycle = 1%)			I_{DM}	140	A
Maximum Continuous Body Diode Forward Current (Note 7)			I_S	90	A
Avalanche Current (Note 8) $L=0.1\text{mH}$			I_{AS}	62	A
Avalanche Energy (Note 8) $L=0.1\text{mH}$			E_{AS}	194	mJ

Thermal Characteristics

Characteristic			Symbol	Value	Unit
Total Power Dissipation (Note 6)			P_D	1.6	W
Thermal Resistance, Junction to Ambient (Note 6)			$R_{\theta JA}$	95	$^\circ\text{C}/\text{W}$
Total Power Dissipation (Note 7)			P_D	3.3	W
Thermal Resistance, Junction to Ambient (Note 7)			$R_{\theta JA}$	46	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case (Note 7)			$R_{\theta JC}$	1.6	
Operating and Storage Temperature Range			T_J, T_{STG}	-55 to +175	$^\circ\text{C}$

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 9)						
Drain-Source Breakdown Voltage	BV_{DSS}	60	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	$V_{DS} = 48\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 16\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	$V_{GS(\text{TH})}$	2	—	4	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(\text{ON})}$	—	6.0	8.0	$\text{m}\Omega$	$V_{GS} = 10\text{V}, I_D = 20\text{A}$
Diode Forward Voltage	V_{SD}	—	—	1.2	V	$V_{GS} = 0\text{V}, I_S = 1\text{A}$
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{iss}	—	2597	—	pF	$V_{DS} = 30\text{V}, V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	437	—		
Reverse Transfer Capacitance	C_{rss}	—	118	—		
Gate Resistance	R_g	—	2.0	—	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Total Gate Charge ($V_{GS} = 10\text{V}$)	Q_g	—	40.1	—	nC	$V_{DD} = 30\text{V}, I_D = 20\text{A}$
Total Gate Charge ($V_{GS} = 4.5\text{V}$)	Q_g	—	21.2	—		
Gate-Source Charge	Q_{gs}	—	8.3	—		
Gate-Drain Charge	Q_{gd}	—	11.8	—		
Turn-On Delay Time	$t_{D(\text{ON})}$	—	5.7	—	ns	$V_{DD} = 30\text{V}, V_{GS} = 10\text{V}, R_g = 1\Omega, I_D = 20\text{A}$
Turn-On Rise Time	t_R	—	5.0	—		
Turn-Off Delay Time	$t_{D(\text{OFF})}$	—	15.6	—		
Turn-Off Fall Time	t_F	—	3.3	—		
Reverse Recovery Time	t_{RR}	—	33	—	ns	$I_F = 20\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge	Q_{RR}	—	33	—	nC	

Notes:

6. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
7. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
8. I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep $T_J = +25^\circ\text{C}$.
9. Short duration pulse test used to minimize self-heating effect.
10. Guaranteed by design. Not subject to product testing.

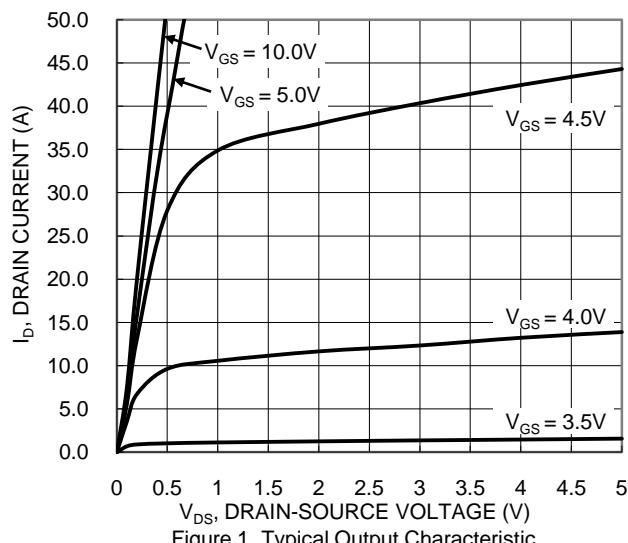


Figure 1. Typical Output Characteristic

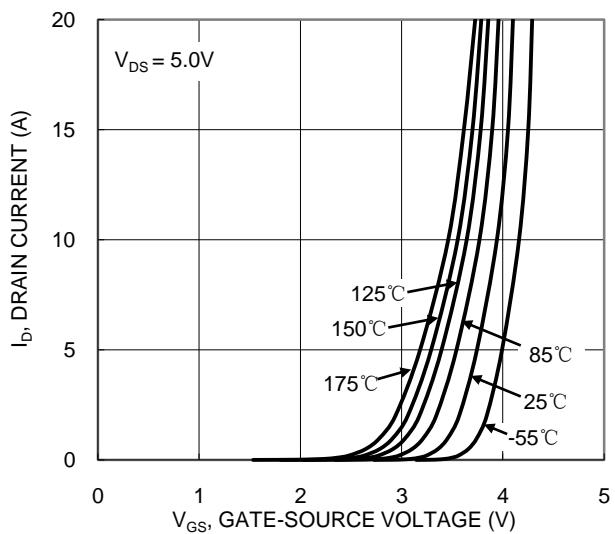


Figure 2. Typical Transfer Characteristic

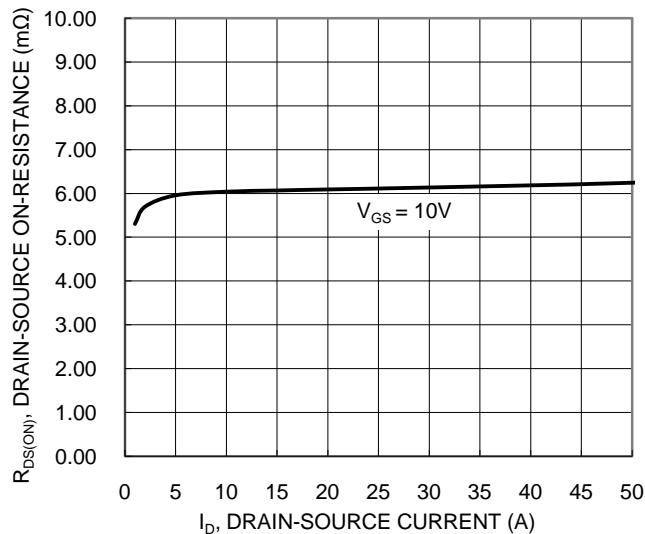


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

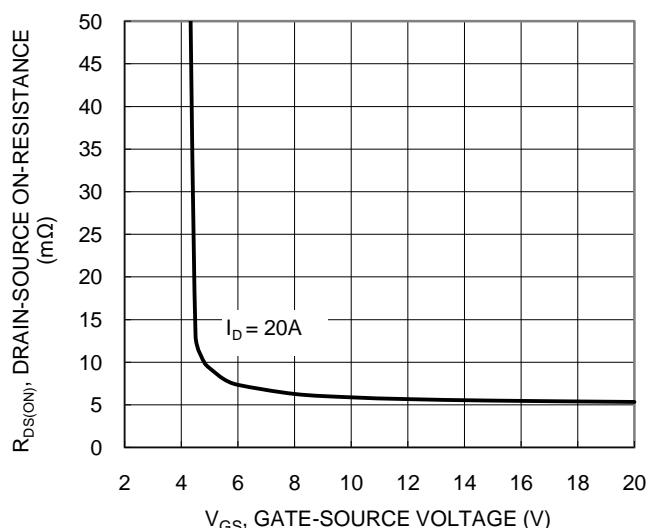


Figure 4. Typical Transfer Characteristic

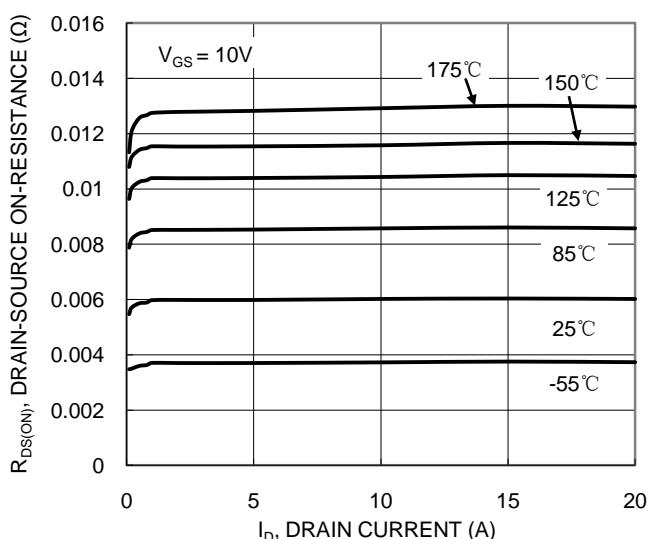


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

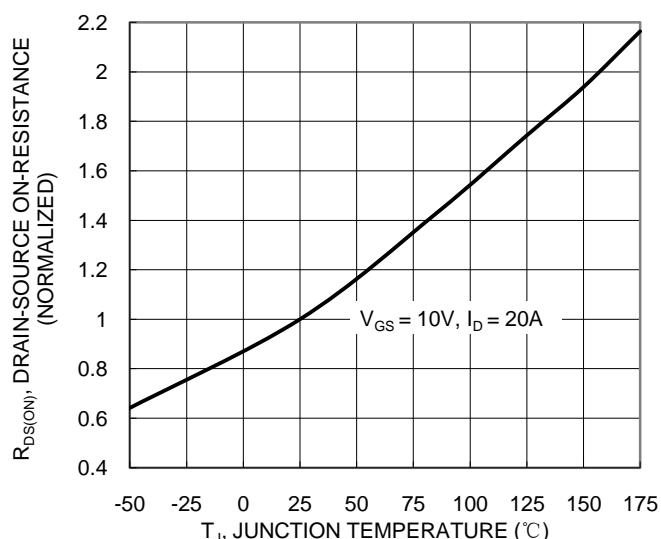
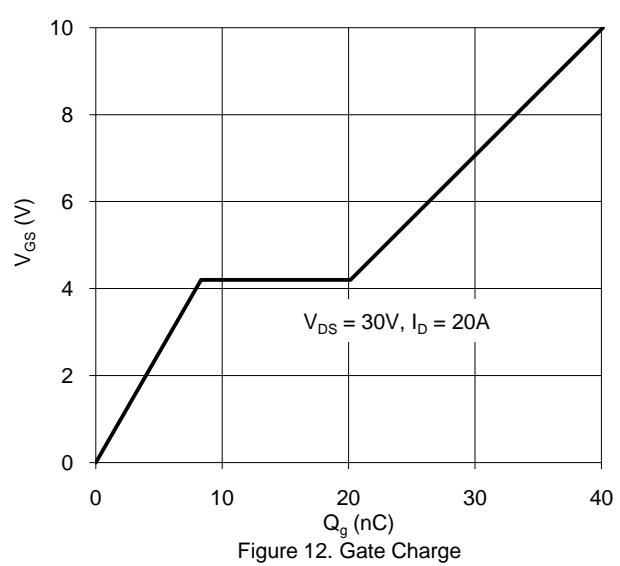
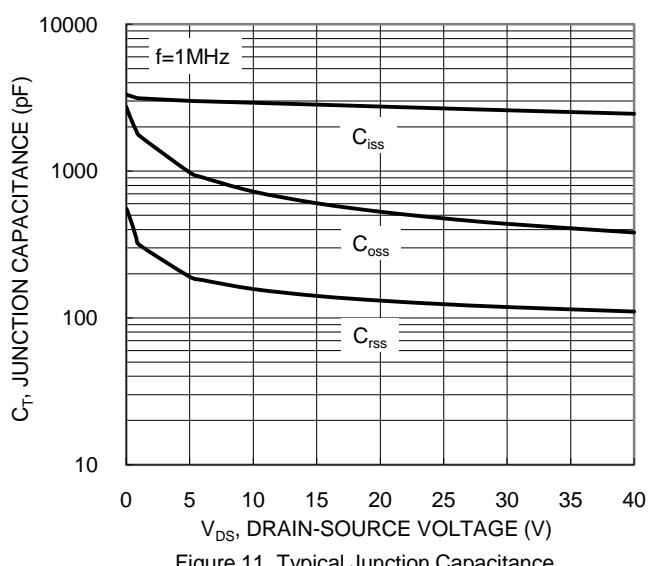
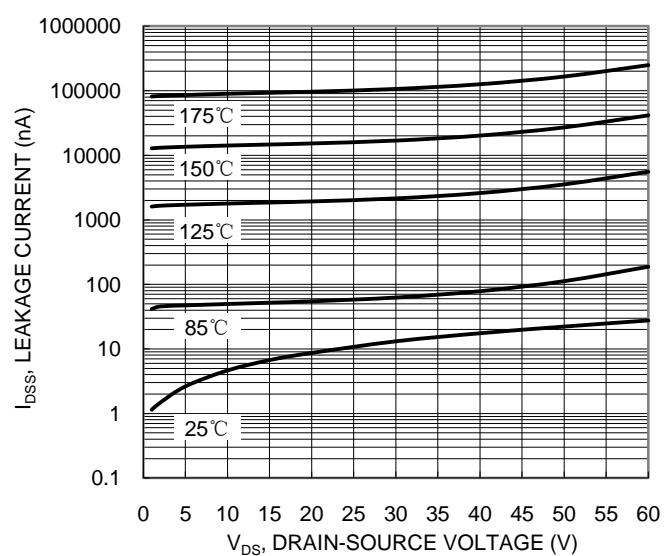
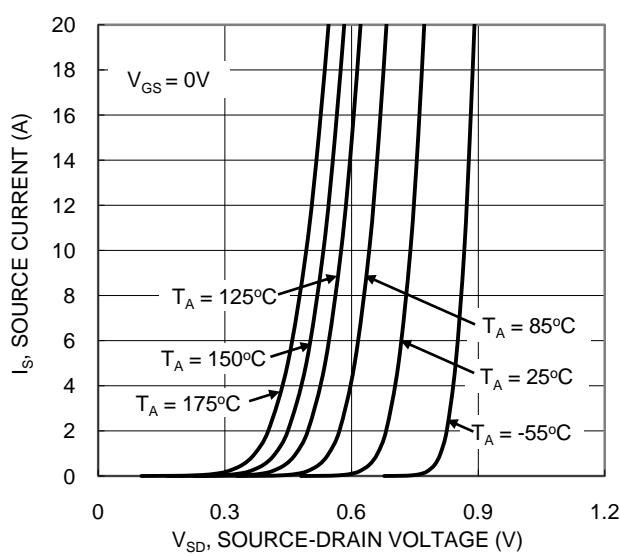
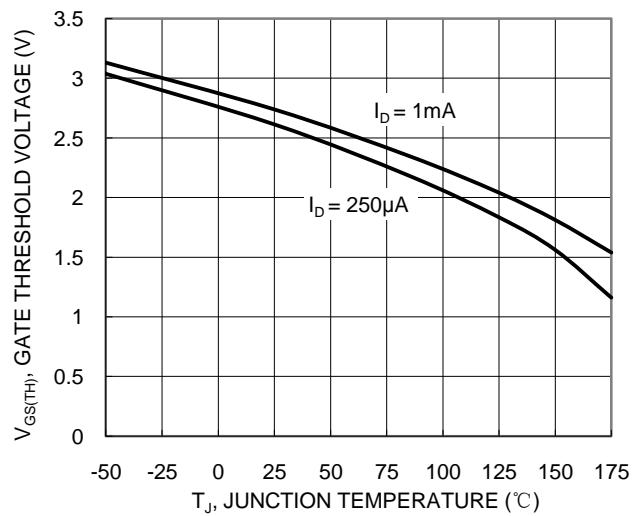
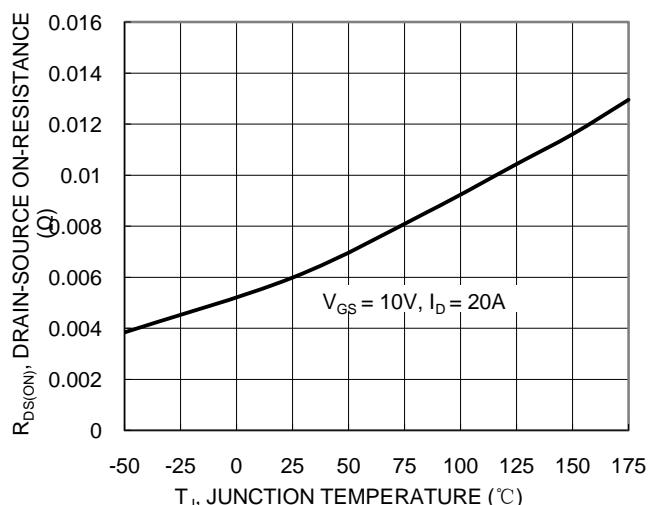


Figure 6. On-Resistance Variation with Temperature



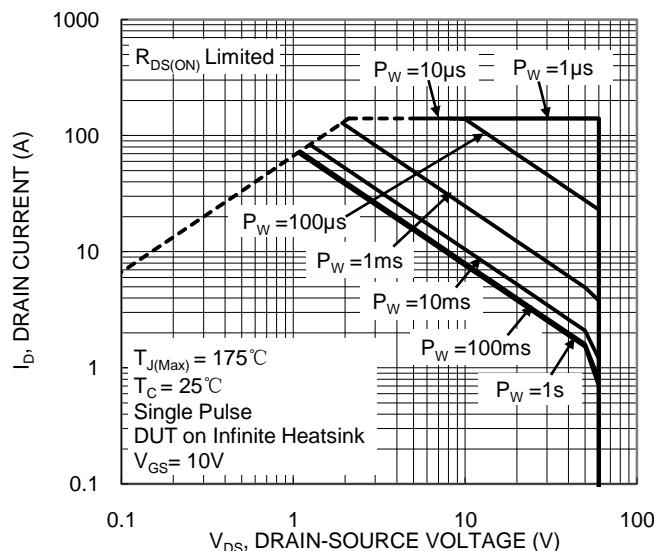


Figure 13. SOA, Safe Operation Area

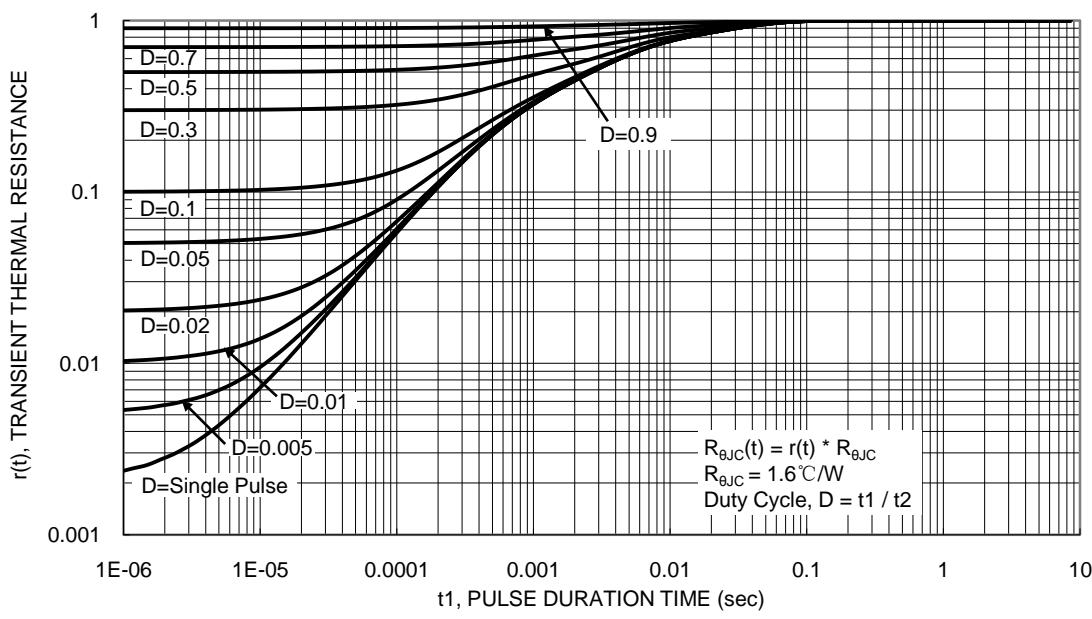
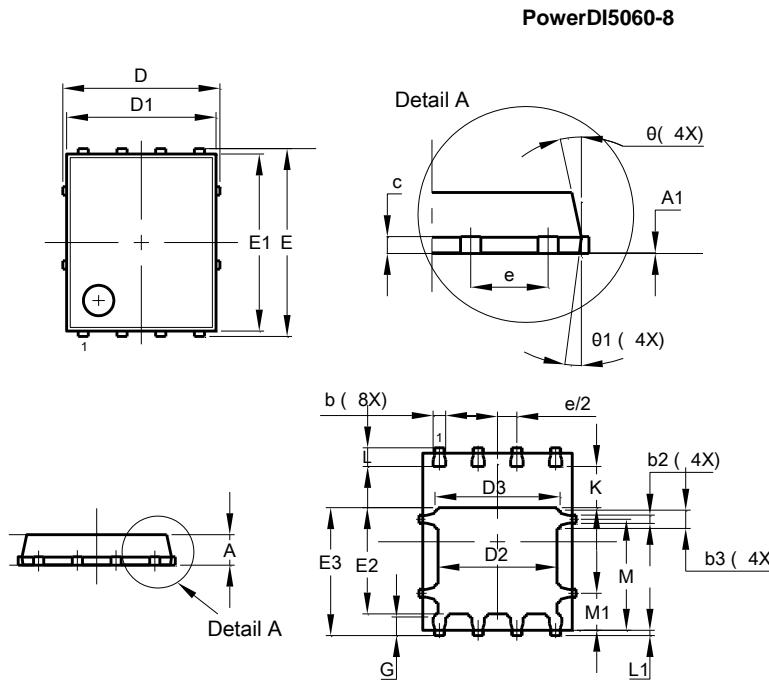


Figure 14. Transient Thermal Resistance

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

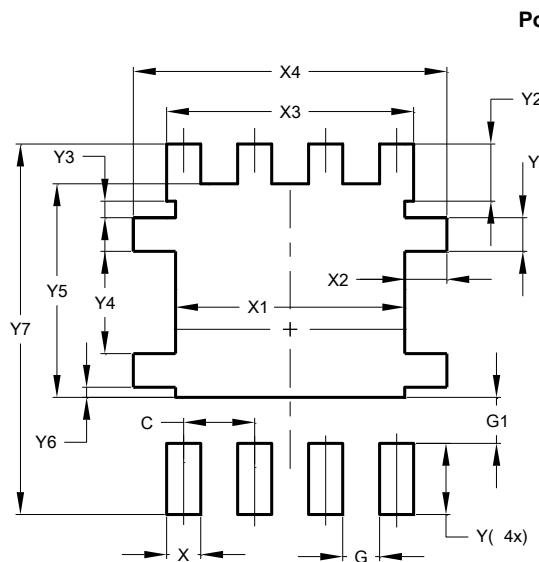


PowerDI5060-8			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0.00	0.05	—
b	0.33	0.51	0.41
b2	0.200	0.350	0.273
b3	0.40	0.80	0.60
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	3.70	4.10	3.90
D3	3.90	4.30	4.10
E	6.15 BSC		
E1	5.60	6.00	5.80
E2	3.28	3.68	3.48
E3	3.99	4.39	4.19
e	1.27 BSC		
G	0.51	0.71	0.61
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
Θ	10°	12°	11°
Θ1	6°	8°	7°

All Dimensions in mm

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.



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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