

DUAL N-CHANNEL ENHANCEMENT MODE MOSFET
Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D MAX T _A = +25°C
20V	5.4mΩ @ V _{GS} = 4.5V	14.5A
	6.2mΩ @ V _{GS} = 4.0V	13.5A
	6.4mΩ @ V _{GS} = 3.7V	13.0A
	7.5mΩ @ V _{GS} = 3.1V	12.0A
	9.6mΩ @ V _{GS} = 2.5V	10.5A

Description

This new generation MOSFET is designed to minimize the on-state resistance (R_{DS(ON)}), yet maintain superior switching performance, making it ideal for high efficiency power management applications.

Applications

- Power Management Functions
- Battery Pack
- Load Switch

Features

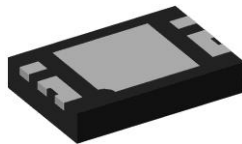
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- ESD Protected Gate
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

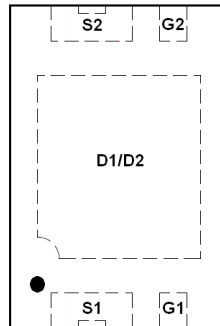
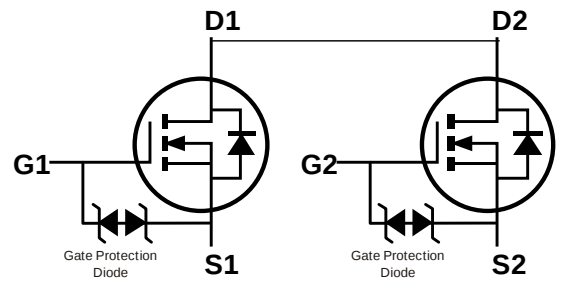
- Case: U-DFN2030-6 (Type B)
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: – NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208 ^(e4)
- Terminal Connections: See Diagram Below
- Weight: 0.012 grams (Approximate)



U-DFN2030-6 (Type B)



Bottom View

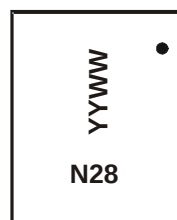

 Top View
Pin-Out


Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2008LFU-7	U-DFN2030-6 (Type B)	3,000/Tape & Reel
DMN2008LFU-13	U-DFN2030-6 (Type B)	10,000/Tape & Reel

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 - See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 - For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information


N28 = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 18 for 2018)
 WW = Week Code (01 to 53)

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	20	V
Gate-Source Voltage			V _{GSS}	±12	V
Continuous Drain Current (Note 6) V _{GS} = 4.5V	Steady State	T _A = +25°C T _A = +70°C	I _D	14.5 11.5	A
Maximum Continuous Body Diode Forward Current (Note 6)			I _S	2.2	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)			I _{DM}	75	A
Avalanche Current (Note 7) L = 0.1mH			I _{AS}	10	A
Avalanche Energy (Note 7) L = 0.1mH			E _{AS}	20	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T _A = +25°C	P _D	1.0	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	123	°C/W
Total Power Dissipation (Note 6)	T _A = +25°C	P _D	1.7	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R _{θJA}	73	°C/W
Thermal Resistance, Junction to Case		R _{θJC}	12	
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 8)						
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}	—	—	±10	μA	V _{GS} = ±9.6V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	0.5	—	1.5	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	3.5	4.7	5.4	mΩ	V _{GS} = 4.5V, I _D = 5.5A
		3.6	4.8	6.2		V _{GS} = 4.0V, I _D = 5.5A
		3.7	4.9	6.4		V _{GS} = 3.7V, I _D = 5.5A
		3.8	5.1	7.5		V _{GS} = 3.1V, I _D = 5.5A
		3.9	5.7	9.6		V _{GS} = 2.5V, I _D = 5.5A
Diode Forward Voltage	V _{SD}	—	0.7	1.2	V	V _{GS} = 0V, I _S = 11A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{ISS}	—	1,418	—	pF	V _{DS} = 10V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{OSS}	—	323	—	pF	
Reverse Transfer Capacitance	C _{RSS}	—	106	—	pF	
Gate Resistance	R _g	—	465	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	18.7	—	nC	
Total Gate Charge (V _{GS} = 10V)	Q _g	—	42.3	—	nC	
Gate-Source Charge	Q _{gs}	—	3.2	—	nC	
Gate-Drain Charge	Q _{gd}	—	4.4	—	nC	V _{DD} = 16V, I _D = 5.5A, V _{GS} = 4.5V, R _g = 6Ω
Turn-On Delay Time	t _{D(ON)}	—	277	—	ns	
Turn-On Rise Time	t _R	—	653	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	1,989	—	ns	
Turn-Off Fall Time	t _F	—	1,208	—	ns	I _F = 11 A, di/dt = 100A/μs
Reverse Recovery Time	t _{RR}	—	492	—	ns	
Reverse Recovery Charge	Q _{RR}	—	908	—	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 1-inch square copper plate.
 - I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

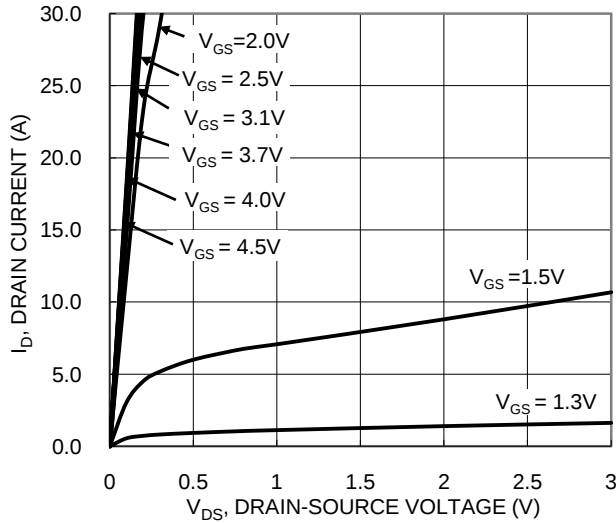


Figure 1. Typical Output Characteristic

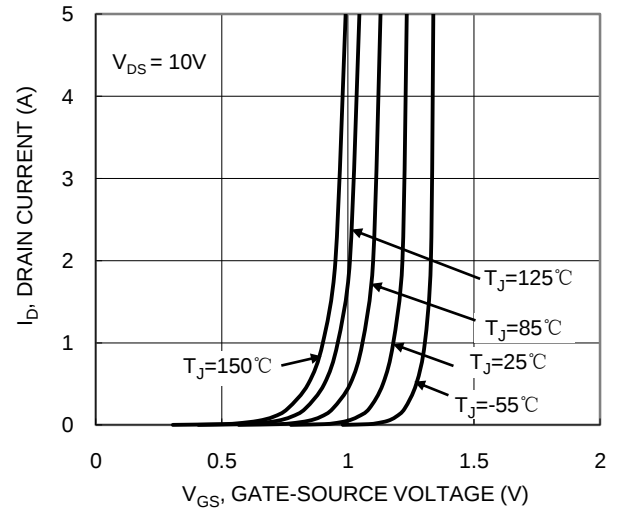


Figure 2. Typical Transfer Characteristic

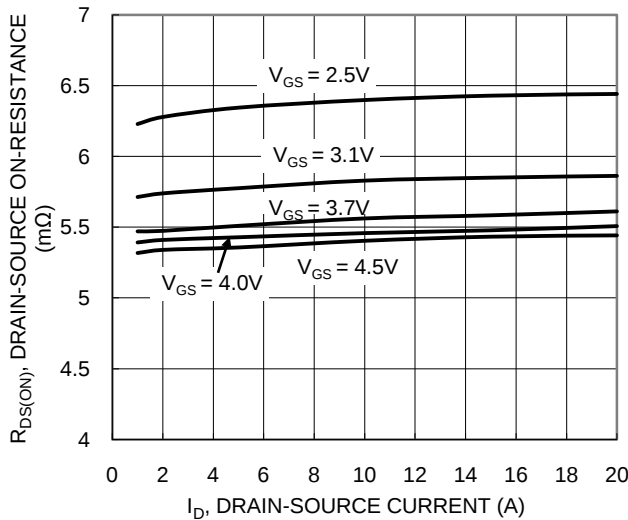


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

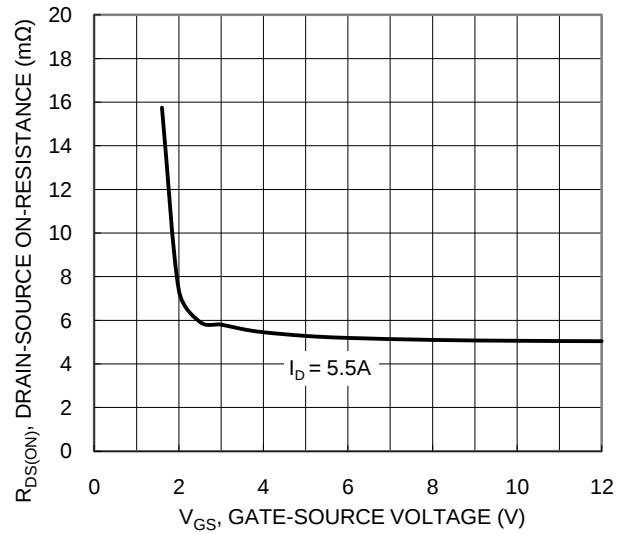


Figure 4. Typical Transfer Characteristic

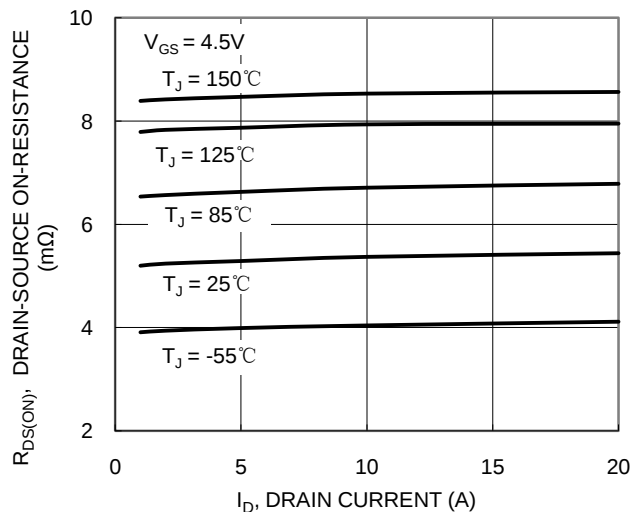


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

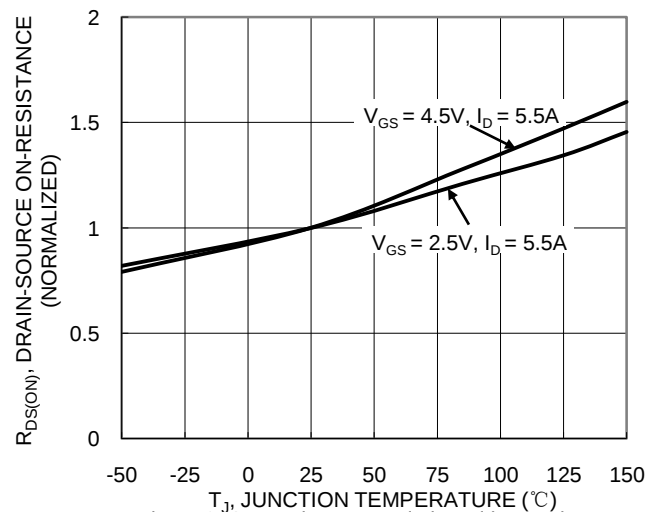
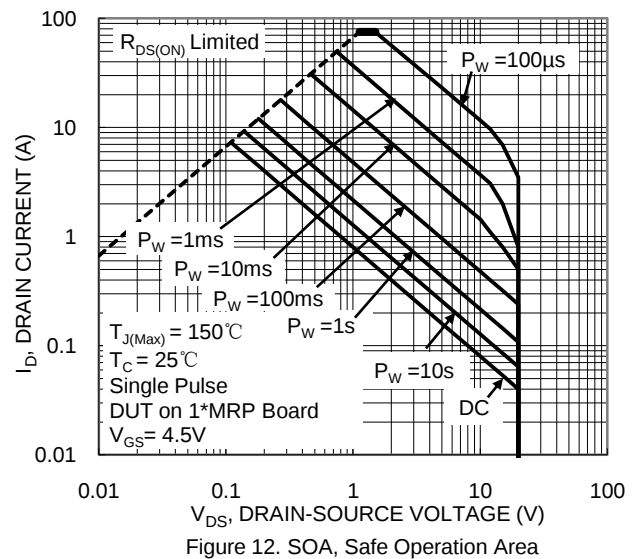
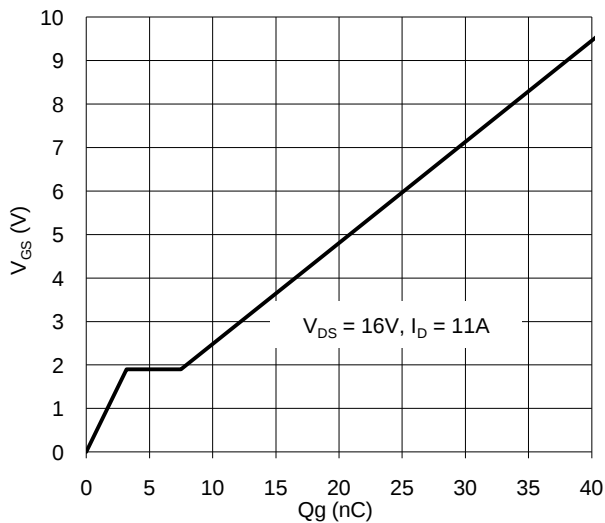
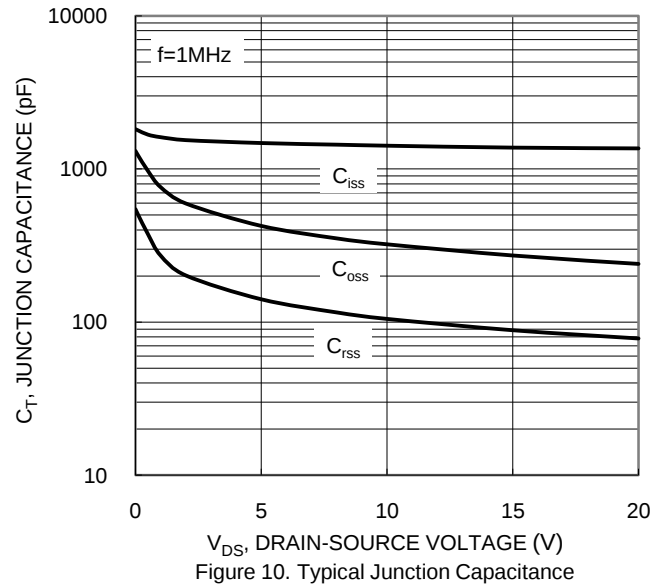
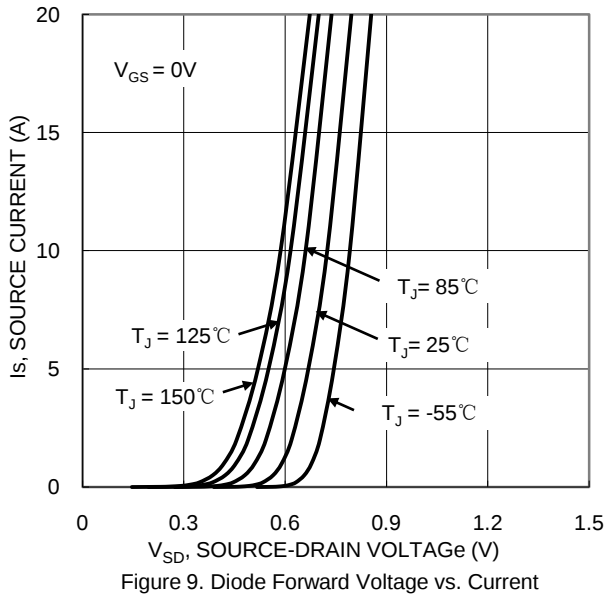
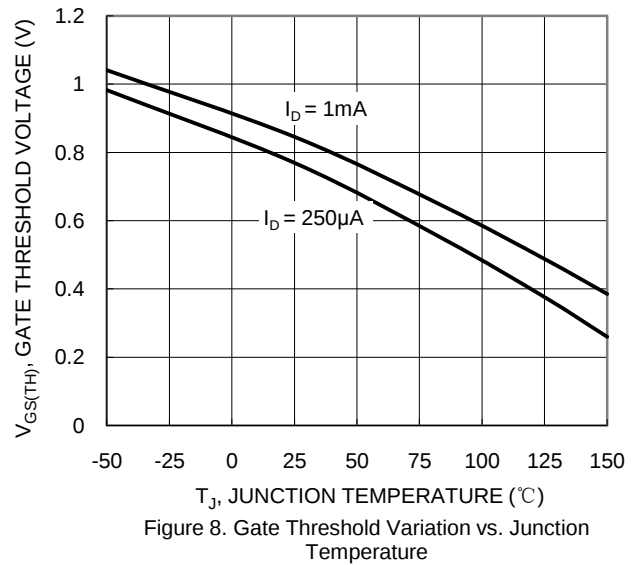
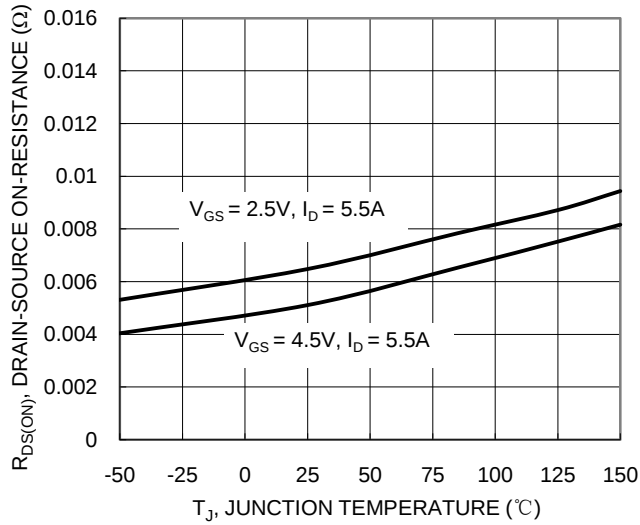


Figure 6. On-Resistance Variation with Junction Temperature



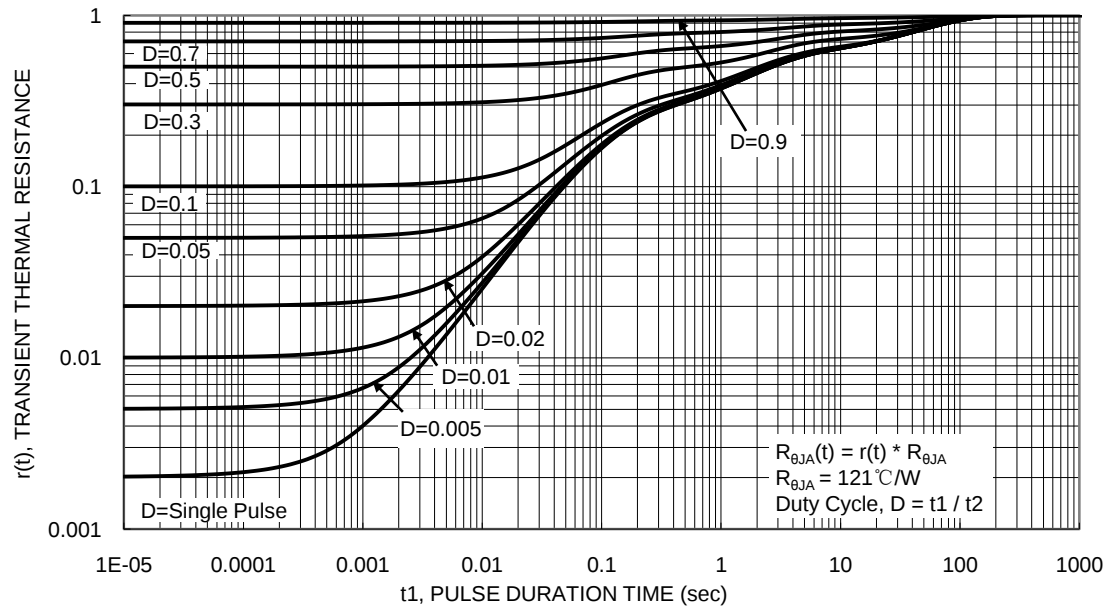
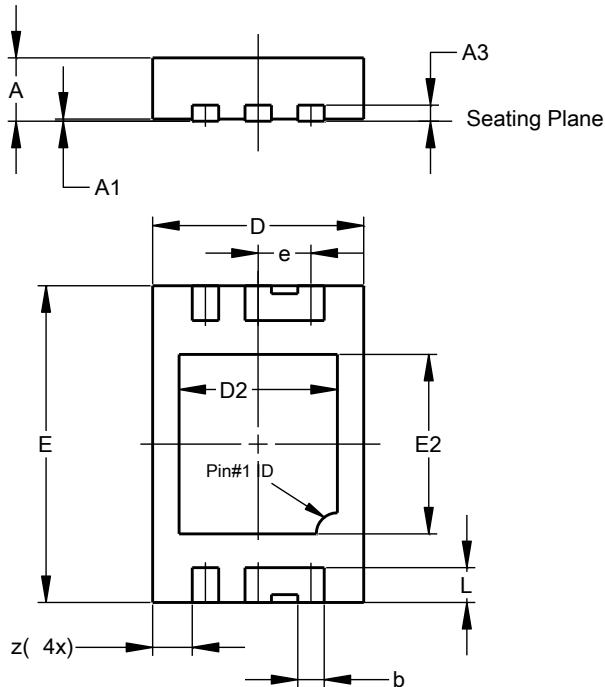


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

U-DFN2030-6 (Type B)

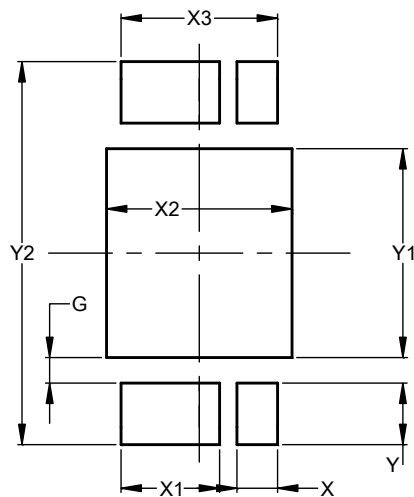


U-DFN2030-6 (Type B)			
Dim	Min	Max	Typ
A	0.55	0.65	0.60
A1	0.00	0.05	0.02
A3	—	—	0.15
b	0.20	0.30	0.25
D	1.95	2.05	2.00
D2	1.40	1.60	1.50
E	2.95	3.05	3.00
E2	1.65	1.75	1.70
e	—	—	0.50
L	0.28	0.38	0.33
z	—	—	0.375
All Dimensions in mm			

Suggested Pad Layout

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

U-DFN2030-6 (Type B)



Dimensions	Value (in mm)
G	0.220
X	0.350
X1	0.850
X2	1.600
X3	1.350
Y	0.530
Y1	1.800
Y2	3.300

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