30V N-CHANNEL ENHANCEMENT MODE MOSFET H-BRIDGE

Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D Max T_A = +25°C
30V	10mΩ @ V_{GS} = 10V	13A
	15mΩ @ V_{GS} = 4.5V	11A

Features

- Low On-Resistance
- Low Input Capacitance
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Description

This 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.

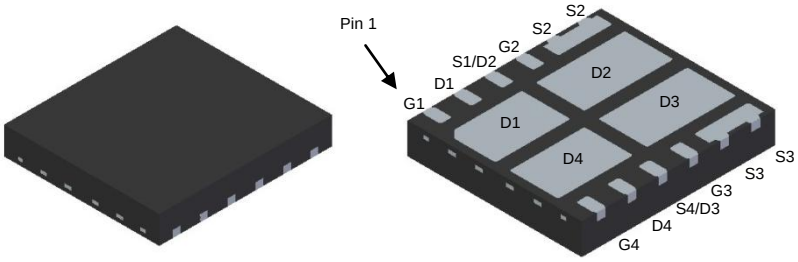
Applications

- High-Efficiency Bridge Rectifiers

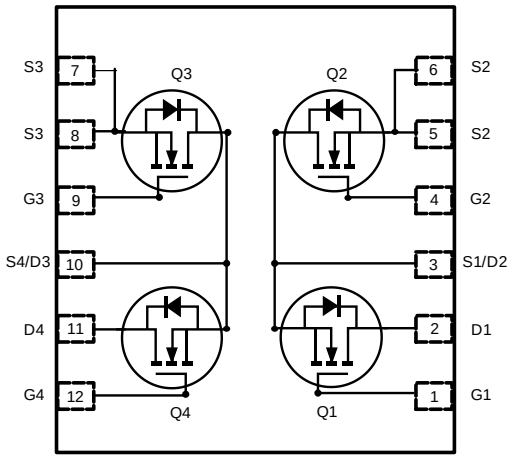
Mechanical Data

- Case: V-DFN5045-12
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e4
- Weight: 0.056grams (Approximate)

V-DFN5045-12 (Type C)



Top View Bottom View



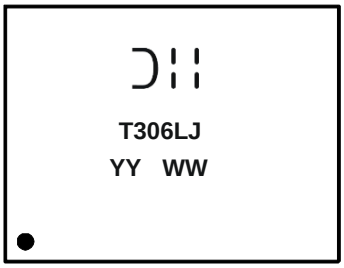
Internal Schematic
Top View

Ordering Information (Note 4)

Part Number	Case	Quantity per Reel
DMHT3006LFJ-13	V-DFN5045-12 (Type C)	3000

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. 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.
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 https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information



= Manufacturer's Marking
T306LJ = Product Type Marking Code
YYWW = Date Code Marking
YY = Year (ex: 18 = 2018)
WW = Week (01 to 53)

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	30	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current (Note 6) V_{GS} = 10V	Steady State	T_A = +25°C T_A = +70°C	I_D	13 10	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I_{DM}	80	A
Continuous Source-Drain Diode Current (Note 6)		T_A = +25°C	I_S	2	A
Avalanche Current (Note 7) L = 0.1mH			I_{AS}	23	A
Avalanche Energy (Note 7) L = 0.1mH			E_{AS}	28	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T_A = +25°C	P_D	1.3	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	95	°C/W
Total Power Dissipation (Note 6)	T_A = +25°C	P_D	2.1	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	60	°C/W
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	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 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current (T_J = +25°C)	I_{DSS}	—	—	1	µA	V_{DS} = 24V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = +20V, V_{DS} = 0V V_{GS} = -16V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	1.0	—	3.0	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	5.8	10	mΩ	V_{GS} = 10V, I_D = 10A
			7.8	15		V_{GS} = 4.5V, I_D = 8A
Diode Forward Voltage	V_{SD}	—	0.7	1.0	V	V_{GS} = 0V, I_S = 2A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	1171	—	pF	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	421	—		
Reverse Transfer Capacitance	C_{rss}	—	63	—		
Gate Resistance	R_g	—	1.9	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_g	—	9.0	—	nC	V_{DD} = 15V, I_D = 9A
Total Gate Charge (V_{GS} = 10V)	Q_g	—	17	—		
Gate-Source Charge	Q_{gs}	—	2.7	—		
Gate-Drain Charge	Q_{gd}	—	4.7	—		
Turn-On Delay Time	$t_{D(ON)}$	—	7.4	—	ns	V_{DD} = 15V, V_{GS} = 10V, R_g = 3Ω, I_D = 9A
Turn-On Rise Time	t_R	—	54	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	16	—		
Turn-Off Fall Time	t_F	—	4.3	—		
Reverse Recovery Time	t_{RR}	—	18	—	ns	I_F = 1.5A, di/dt = 100A/µs
Reverse Recovery Charge	Q_{RR}	—	8.5	—	nC	

Notes:
5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
7. I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

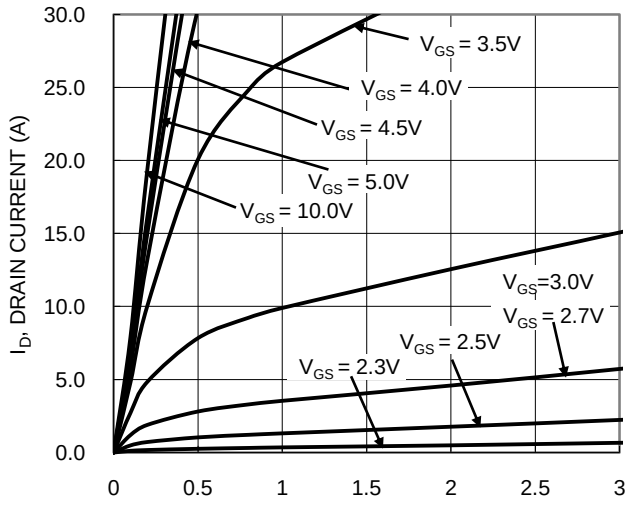


Figure 1. Typical Output Characteristic

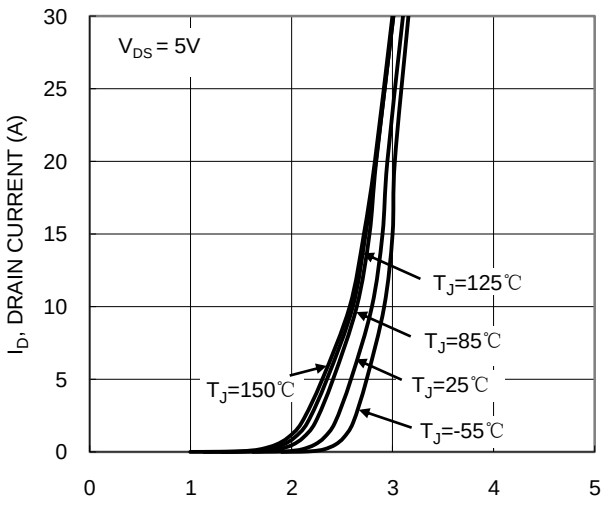


Figure 2. Typical Transfer Characteristic

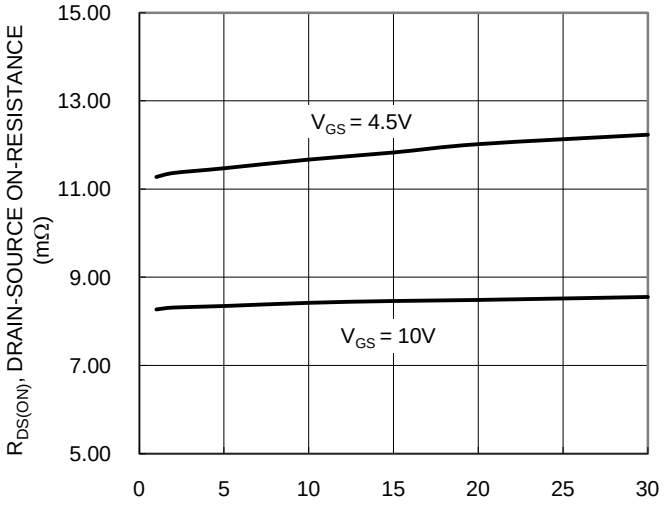


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

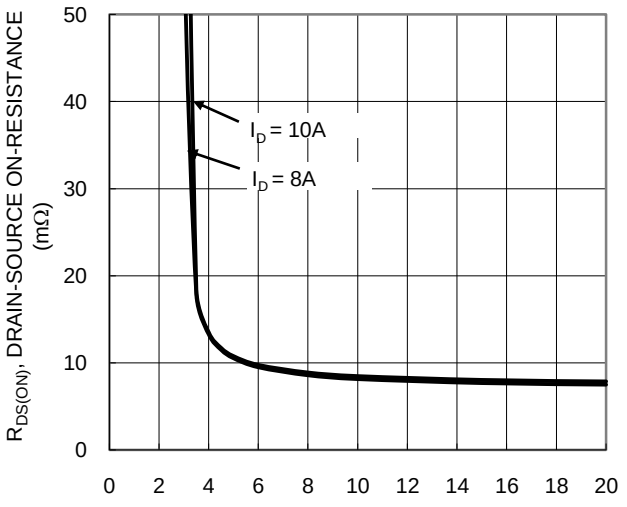


Figure 4. Typical Transfer Characteristic

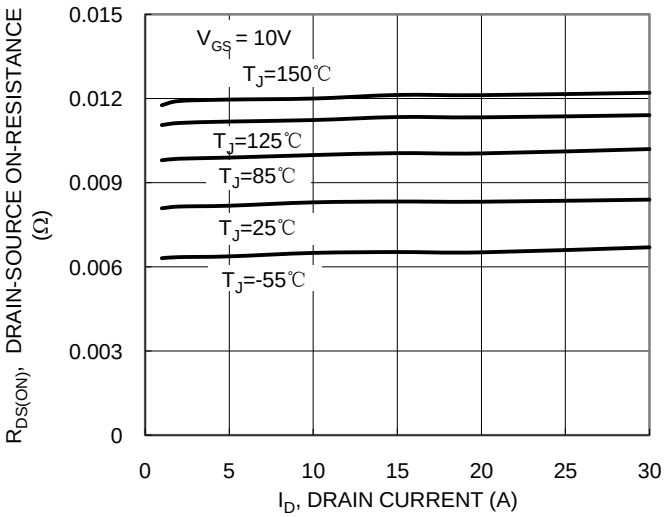


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

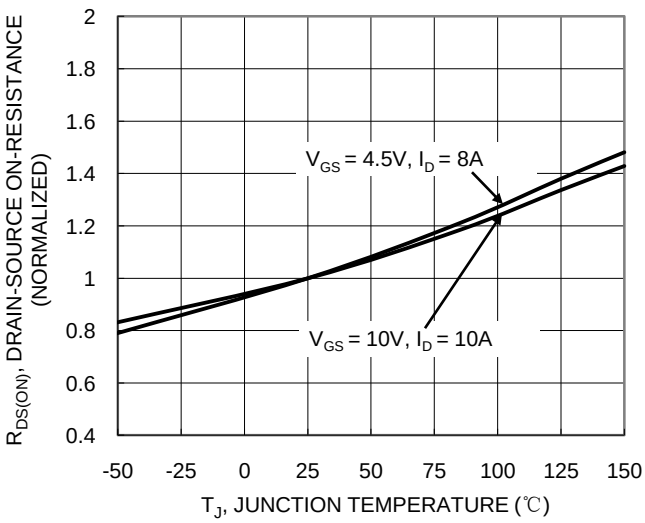


Figure 6. On-Resistance Variation with Temperature

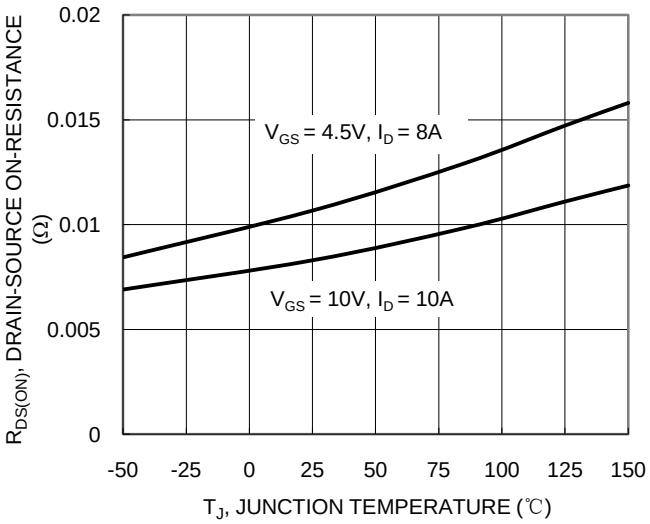


Figure 7. On-Resistance Variation with Temperature

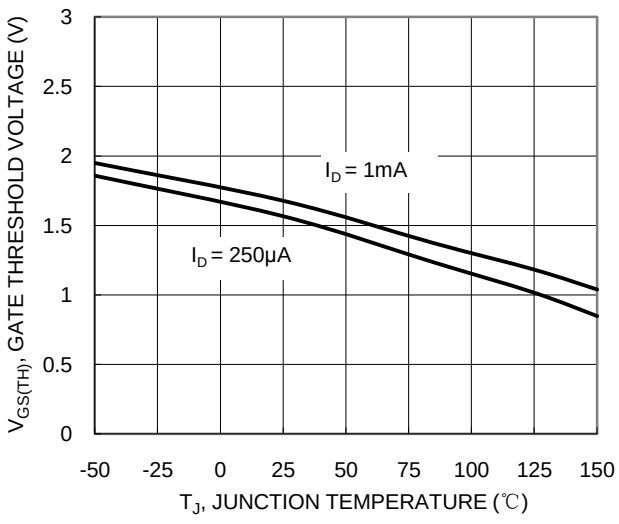


Figure 8. Gate Threshold Variation vs. Junction Temperature

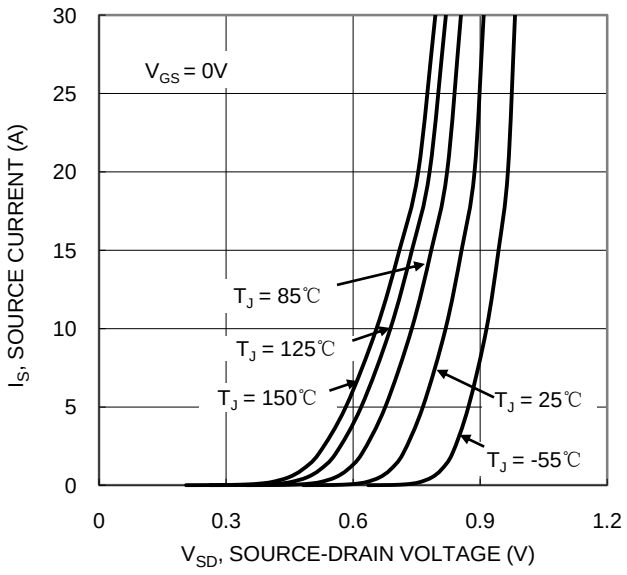


Figure 9. Diode Forward Voltage vs. Current

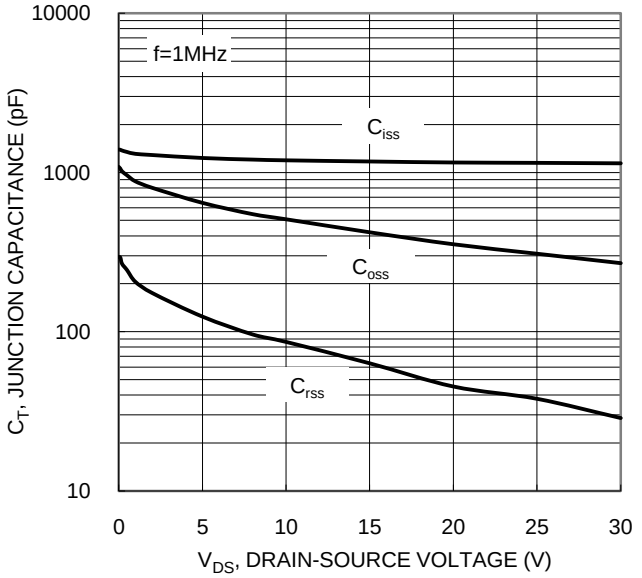


Figure 10. Typical Junction Capacitance

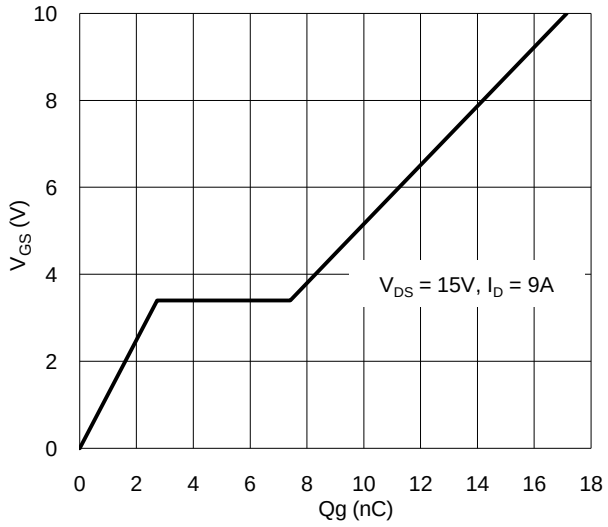


Figure 11. Gate Charge

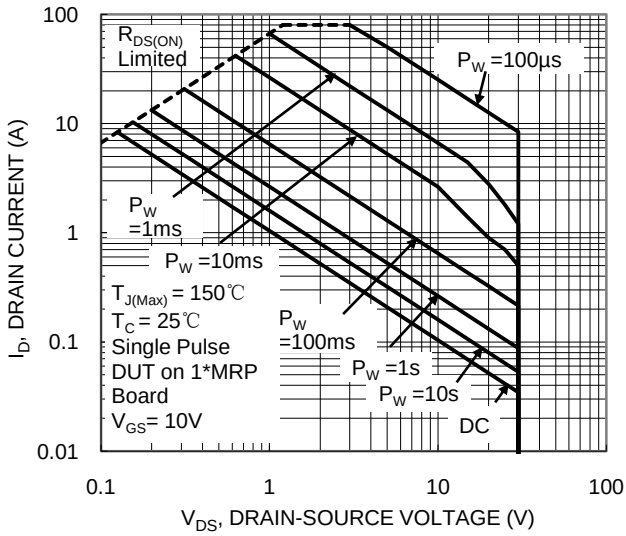


Figure 12. SOA, Safe Operation Area

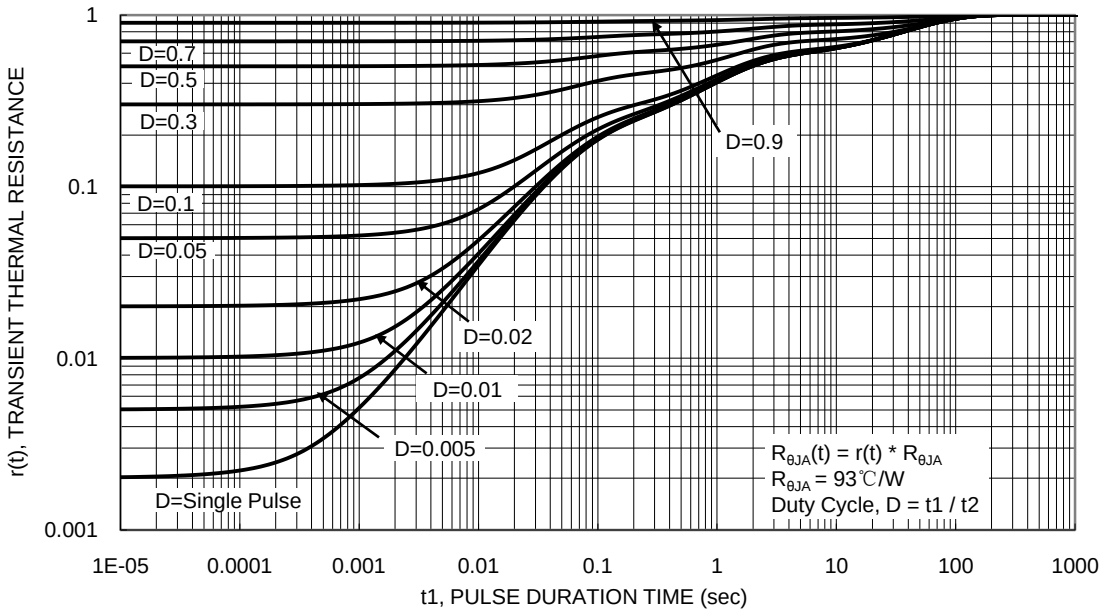
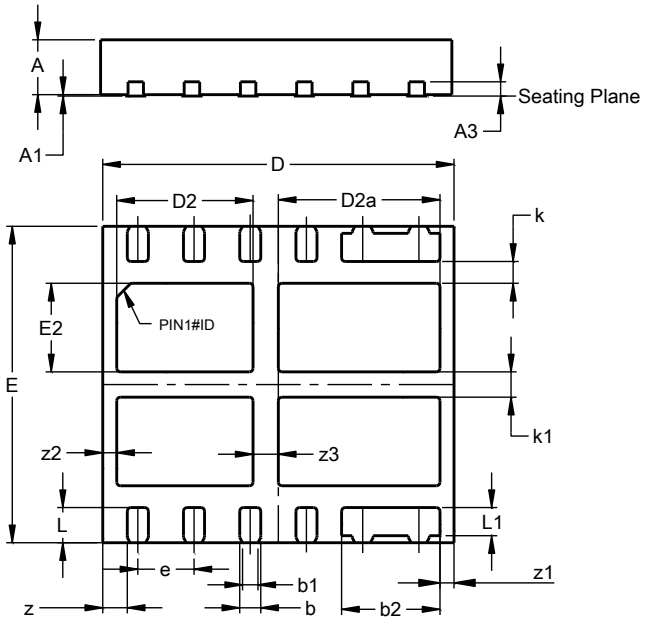


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

V-DFN5045-12 (Type C)

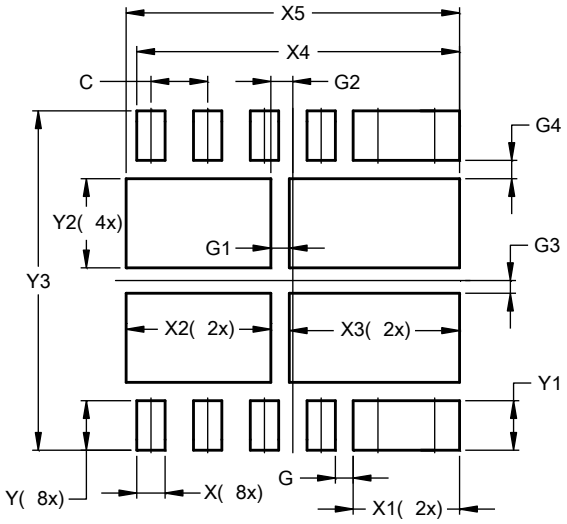


V-DFN5045-12 (Type C)			
Dim	**Min**	**Max**	**Typ**
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	--	--	0.203
b	0.25	0.35	0.30
b1	0.17	0.27	0.22
b2	1.35	1.45	1.40
D	4.95	5.05	5.00
D2	1.84	2.04	1.94
D2a	2.20	2.40	2.30
e	--	--	0.80
E	4.45	4.55	4.50
E2	1.16	1.36	1.26
k	--	--	0.31
k1	--	--	0.36
L	0.45	0.55	0.50
L1	0.35	0.45	0.40
z	--	--	0.35
z1	--	--	0.20
z2	--	--	0.20
z3	--	--	0.36
All Dimensions in mm			

Suggested Pad Layout

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

V-DFN5045-12 (Type C)



Dimensions	Value (in mm)
C	0.800
G	0.250
G1	0.260
G2	0.310
G3	0.180
G4	0.260
X	0.400
X1	1.500
X2	2.040
X3	2.400
X4	4.550
X5	4.700
Y	0.700
Y1	0.700
Y2	1.260
Y3	4.800

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