

## Product Summary

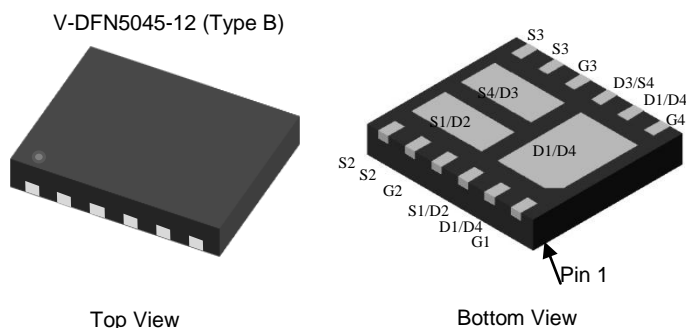
BV <sub>DSS</sub>	R <sub>DS(ON)</sub>	I <sub>D</sub> T <sub>A</sub> = +25°C
60V	22mΩ @ V <sub>GS</sub> = 10V	10.6A
	30mΩ @ V <sub>GS</sub> = 4.5V	8.7A

## Description

This new generation complementary MOSFET H-Bridge features low on-resistance achievable with low gate drive.

## Applications

- Motor Control
- DC-DC Converters
- Power Management

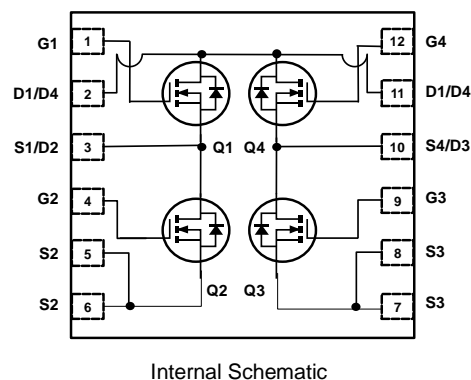


## Features

- Thermally Efficient Package – Cooler Running Applications
- High Conversion Efficiency
- Low R<sub>DS(ON)</sub> – Minimizes On-State Losses
- Low Input Capacitance
- Fast Switching Speed
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**

## Mechanical Data

- Case: V-DFN5045-12 (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: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.097 grams (Approximate)

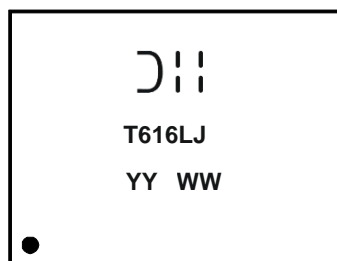


## Ordering Information (Note 4)

Part Number	Case	Packaging
DMHT6016LFJ-13	V-DFN5045-12 (Type B)	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



= Manufacturer's Marking  
 T616LJ = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last Two Digits of Year (ex: 16 = 2016)  
 WW = Week Code (01 to 53)

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

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DSS</sub>	60	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	10.6
		T <sub>A</sub> = +70°C	8.5
	t < 10s	T <sub>A</sub> = +25°C	14.8
		T <sub>A</sub> = +70°C	11.9
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I <sub>DM</sub>	60	A
Maximum Continuous Body Diode Forward Current (Note 6)	I <sub>S</sub>	2	A
Avalanche Current (Note 7) L=0.1mH	I <sub>AS</sub>	15.3	A
Avalanche Energy (Note 7) L=0.1mH	E <sub>AS</sub>	11.7	mJ

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P <sub>D</sub>	1.16	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R <sub>θJA</sub>	108
		t < 10s	56
Total Power Dissipation (Note 6)	P <sub>D</sub>	2.7	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R <sub>θJA</sub>	46
		t < 10s	24
Thermal Resistance, Junction to Case (Note 6)	R <sub>θJC</sub>	4.4	°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</b> (Note 8)						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	60	—	—	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> = 48V, 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</b> (Note 8)						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	1	—	3	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	17	22	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 10A
		—	22.2	30		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 6A
Diode Forward Voltage	V <sub>SD</sub>	—	0.7	1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A
<b>DYNAMIC CHARACTERISTICS</b> (Note 9)						
Input Capacitance	C <sub>ISS</sub>	—	864	—	pF	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V, f = 1MHz
Output Capacitance	C <sub>OSS</sub>	—	282	—		
Reverse Transfer Capacitance	C <sub>RSS</sub>	—	27	—		
Gate Resistance	R <sub>G</sub>	—	1.3	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>G</sub>	—	8.4	—	nC	V <sub>DS</sub> = 30V, I <sub>D</sub> = 10A
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>G</sub>	—	17	—		
Gate-Source Charge	Q <sub>GS</sub>	—	3.1	—		
Gate-Drain Charge	Q <sub>GD</sub>	—	4.3	—		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	3.4	—	ns	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 30V, R <sub>G</sub> = 6Ω, I <sub>D</sub> = 10A
Turn-On Rise Time	t <sub>R</sub>	—	5.2	—		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	13	—		
Turn-Off Fall Time	t <sub>F</sub>	—	7	—		
Reverse Recovery Time	t <sub>RR</sub>	—	22	—	ns	I <sub>F</sub> = 10A, di/dt = 100A/µs
Reverse Recovery Charge	Q <sub>RR</sub>	—	11	—	nC	

- Notes:
- Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1-inch square copper plate.
  - I<sub>AS</sub> and E<sub>AS</sub> ratings 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.

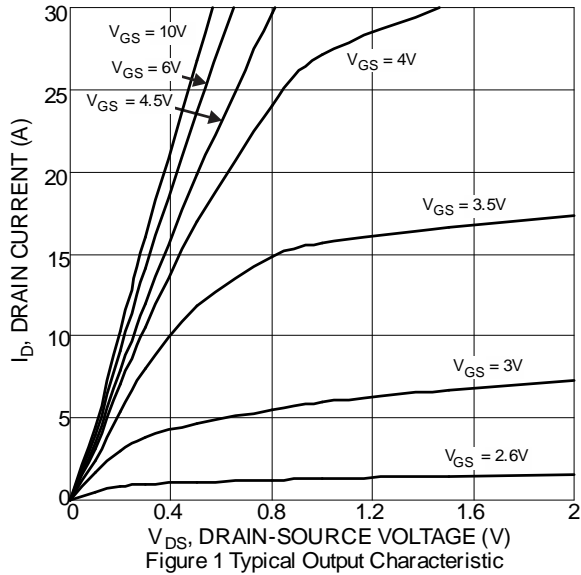


Figure 1 Typical Output Characteristic

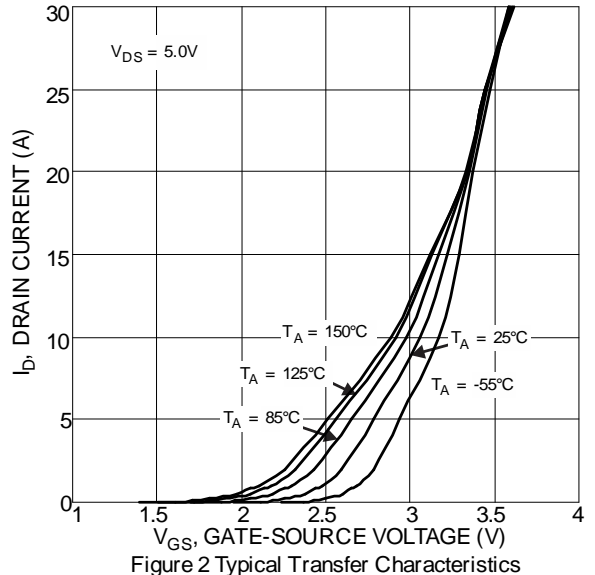


Figure 2 Typical Transfer Characteristics

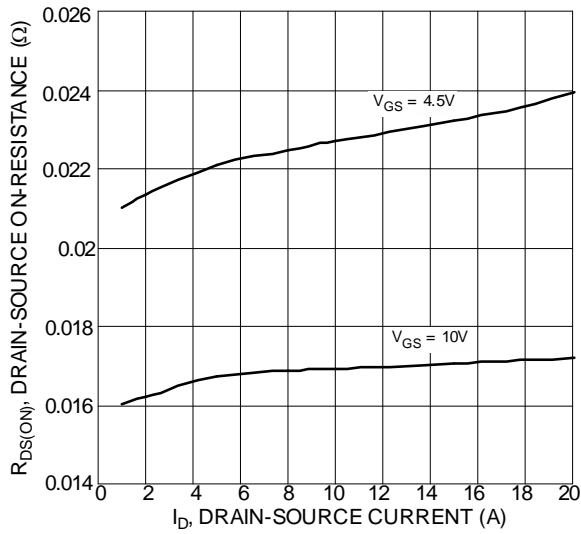


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

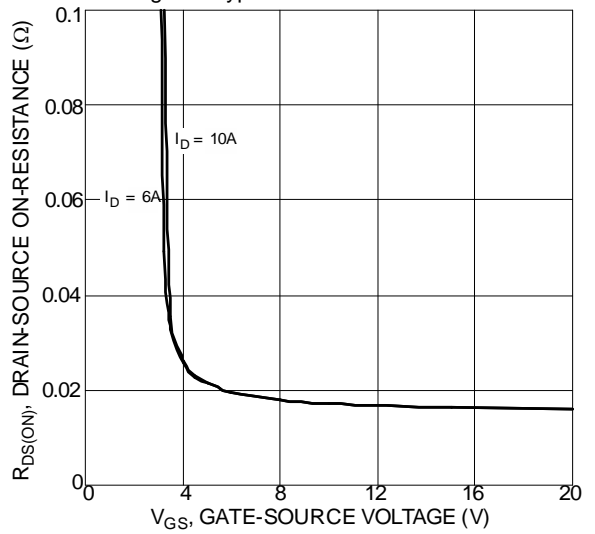


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

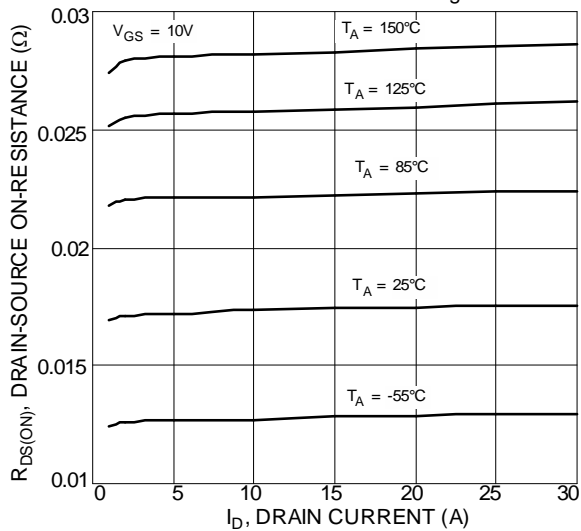


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

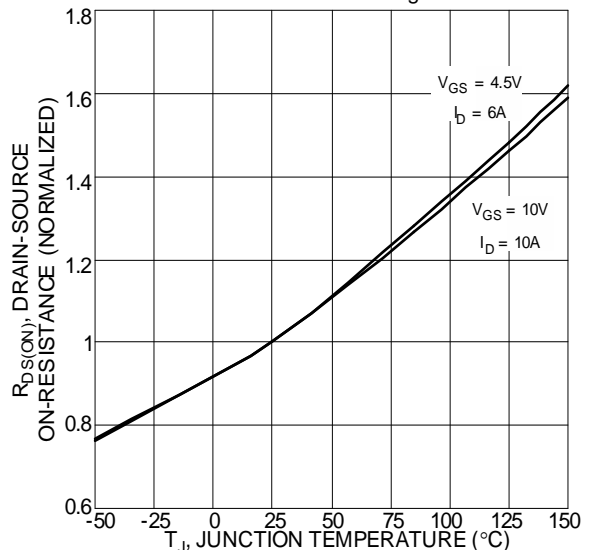


Figure 6 On-Resistance Variation with Temperature

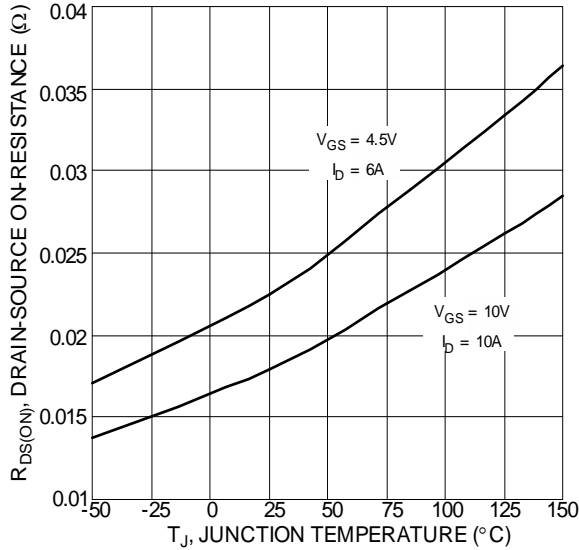


Figure 7 On-Resistance Variation with Temperature

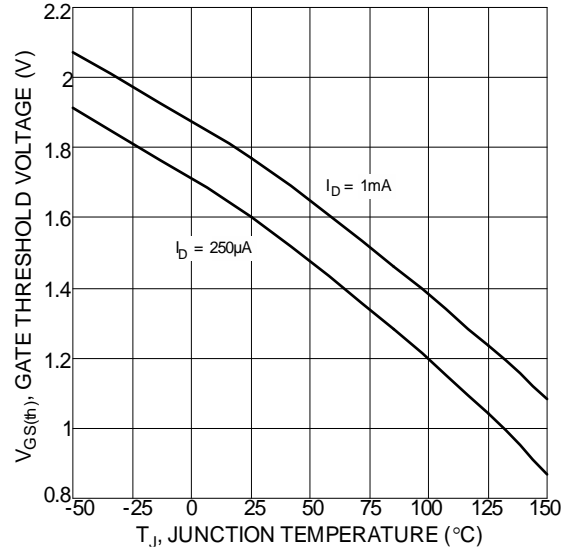


Figure 8 Gate Threshold Variation vs. Temperature

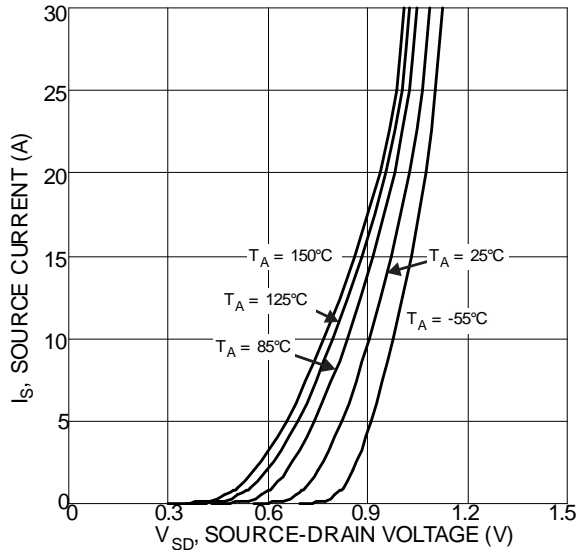


Figure 9 Diode Forward Voltage vs. Current

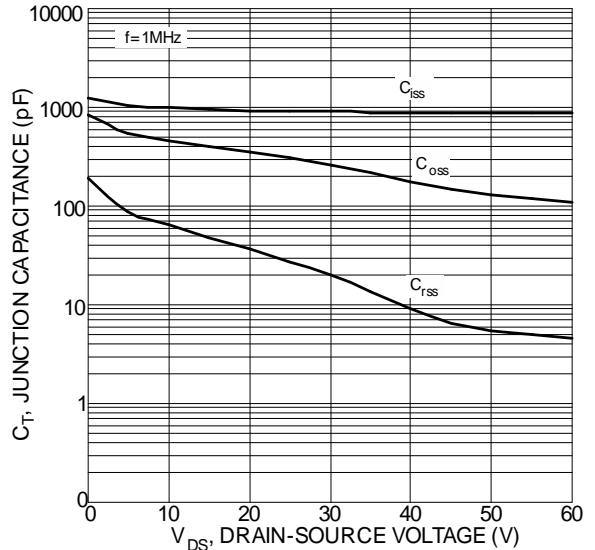


Figure 10 Typical Junction Capacitance

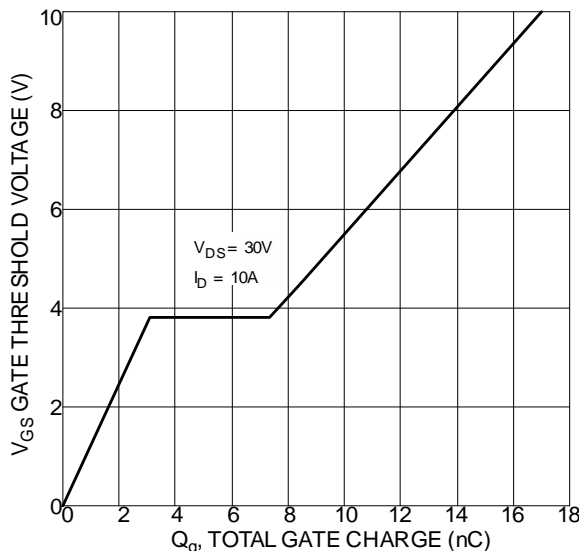


Figure 11 Gate Charge

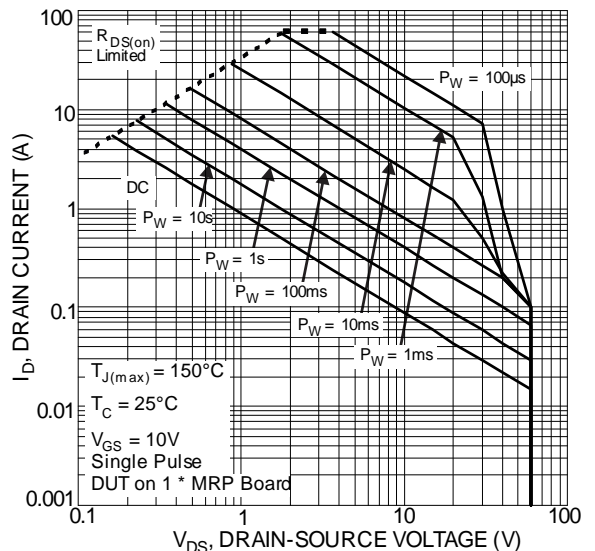
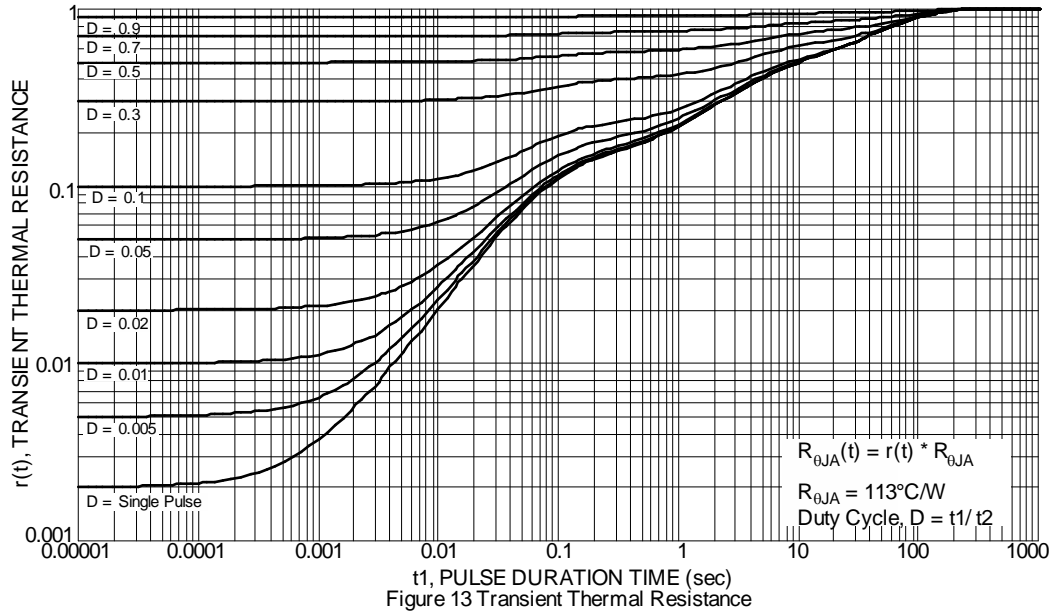


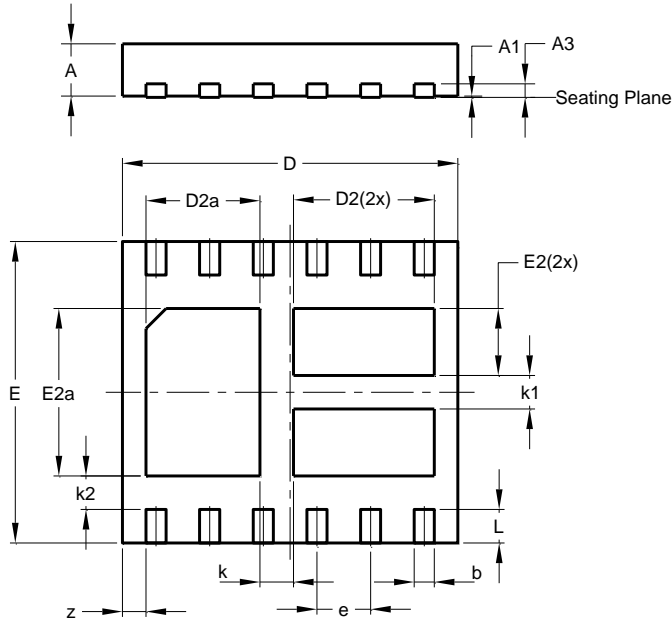
Figure 12 SOA, Safe Operation Area



**Package Outline Dimensions**

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

**V-DFN5045-12 (Type B)**



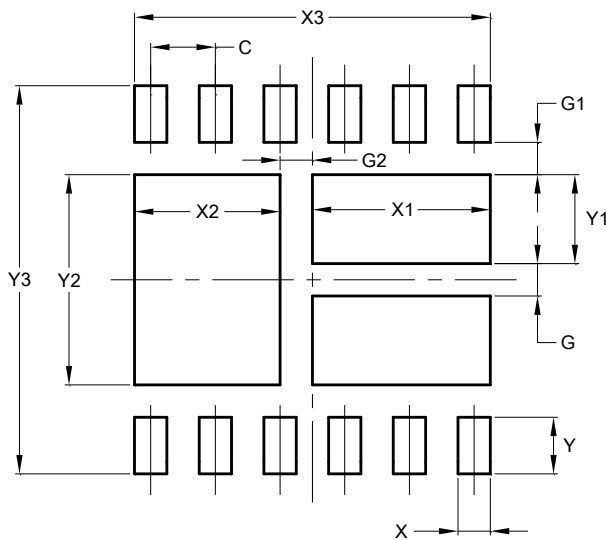
V-DFN5045-12 (Type B)			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	-	-	0.203
b	0.25	0.35	0.30
D	4.95	5.05	5.00
D2	2.00	2.20	2.10
D2a	1.60	1.80	1.70
E	4.45	4.55	4.50
E2	0.90	1.10	1.00
E2a	2.40	2.60	2.50
e	-	-	0.80
k	-	-	0.50
k1	-	-	0.50
k2	-	-	0.50
L	0.45	0.55	0.50
z	-	-	0.35

**All Dimensions in mm**

**Suggested Pad Layout**

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

**V-DFN5045-12 (Type B)**



Dimensions	Value (in mm)
C	0.800
G	0.40
G1	0.40
G2	0.40
X	0.40
X1	2.20
X2	1.80
X3	4.40
Y	0.700
Y1	1.100
Y2	2.600
Y3	4.800

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