



#### **60V N-CHANNEL ENHANCEMENT MODE MOSFET H-BRIDGE**

## **Product Summary**

BV <sub>DSS</sub>	R <sub>DS(ON)</sub>	I <sub>D</sub> T <sub>A</sub> = +25°C
60V	$22m\Omega$ @ V <sub>GS</sub> = 10V	10.6A
	$30m\Omega @ V_{GS} = 4.5V$	8.7A

#### **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)

# **Description**

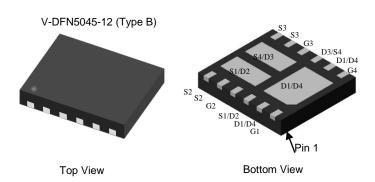
This new generation complementary MOSFET H-Bridge features low on-resistance achievable with low gate drive.

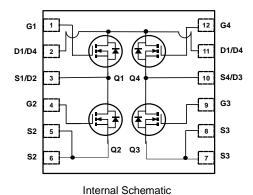
## **Applications**

- Motor Control
- DC-DC Converters
- Power Management

#### **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 @3
- Weight: 0.097 grams (Approximate)





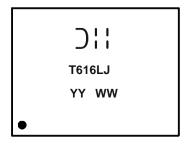
## **Ordering Information** (Note 4)

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.
- 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. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

## **Marking Information**



Dilamanufacturer'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)



# 

Characteristic	Symbol	Value	Unit		
Drain-Source Voltage	$V_{DSS}$	60	V		
Gate-Source Voltage			$V_{GSS}$	±20	V
Continuous Dunis Comment (Nata C) // 40//	Steady State	$T_A = +25^{\circ}C$ $T_A = +70^{\circ}C$	I <sub>D</sub>	10.6 8.5	А
Continuous Drain Current (Note 6) V <sub>GS</sub> = 10V	t<10s	$T_A = +25^{\circ}C$ $T_A = +70^{\circ}C$	Ι <sub>D</sub>	14.8 11.9	А
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I <sub>DM</sub>	60	Α		
Maximum Continuous Body Diode Forward Current (Note 6)	I <sub>S</sub>	2	Α		
Avalanche Current (Note 7) L=0.1mH			I <sub>AS</sub>	15.3	Α
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)		$P_{D}$	1.16	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	D	108	°C/W
Thermal Resistance, Junction to Ambient (Note 5)	t<10s	R <sub>0JA</sub>	56	C/VV
Total Power Dissipation (Note 6)		$P_{D}$	2.7	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	D	46	°C/W
L Thermal Resistance, Junction to Ambient (Note 6)	t<10s	$R_{\theta JA}$	24	
Thermal Resistance, Junction to Case (Note 6)		R <sub>0</sub> JC	4.4	°C/W
Operating and Storage Temperature Range		T <sub>J,</sub> T <sub>STG</sub>	-55 to +150	°C

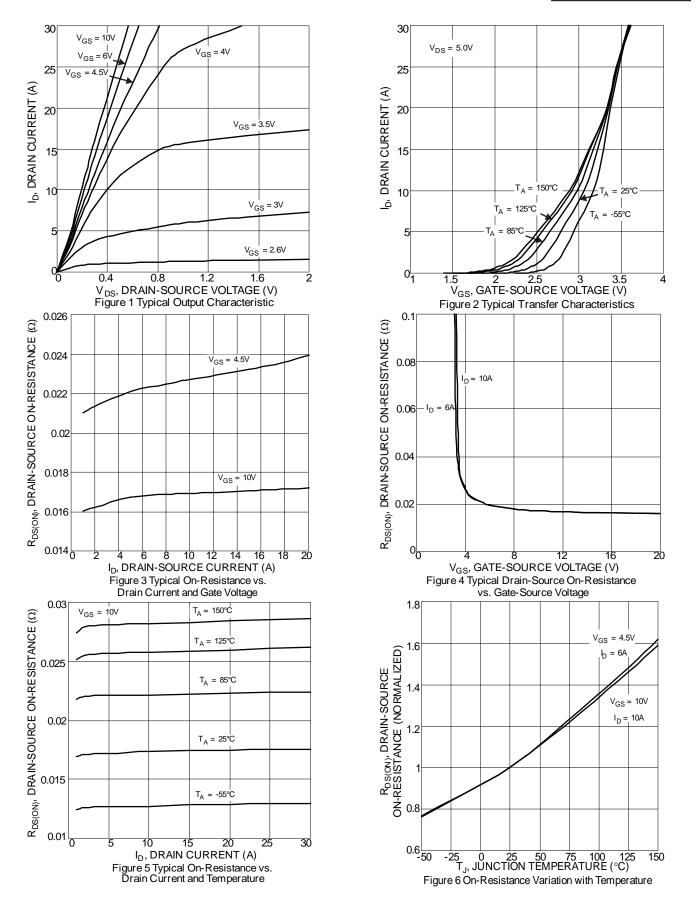
# Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)	- Cyllider		. , , p	max	<u> </u>	root containen
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	60	_	_	V	$V_{GS} = 0V, I_D = 250\mu A$
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	$V_{GS} = \pm 20V, V_{DS} = 0V$
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	1	_	3	V	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$
Static Drain-Source On-Resistance		_	17	22	mΩ	$V_{GS} = 10V, I_D = 10A$
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	_	22.2	30	11177	$V_{GS} = 4.5V, I_D = 6A$
Diode Forward Voltage	$V_{SD}$	_	0.7	1.2	V	$V_{GS} = 0V, I_{S} = 1A$
DYNAMIC CHARACTERISTICS (Note 9)	•		•	•	•	
Input Capacitance	C <sub>ISS</sub>		864	_		$V_{DS} = 30V$ , $V_{GS} = 0V$ , $f = 1MHz$
Output Capacitance	Coss		282	_	pF	
Reverse Transfer Capacitance	C <sub>RSS</sub>	_	27	_		
Gate Resistance	Rg	_	1.3	_	Ω	$V_{DS} = 0V$ , $V_{GS} = 0V$ , $f = 1MHz$
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>G</sub>	_	8.4	_		
Total Gate Charge (V <sub>GS</sub> = 10V)	$Q_{G}$	_	17	_	nC	V 20V I 40A
Gate-Source Charge	Q <sub>GS</sub>	_	3.1	_	liC	$V_{DS} = 30V, I_{D} = 10A$
Gate-Drain Charge	$Q_GD$	_	4.3	_		
Turn-On Delay Time	t <sub>D(ON)</sub>		3.4	_		
Turn-On Rise Time	t <sub>R</sub>		5.2	_		$V_{GS} = 10V, V_{DS} = 30V,$
Turn-Off Delay Time	t <sub>D(OFF)</sub>		13	_	ns	$R_G = 6\Omega$ , $I_D = 10A$
Turn-Off Fall Time	t <sub>F</sub>	_	7	_		
Reverse Recovery Time	t <sub>RR</sub>		22	_	ns	1 400 11/14 4000/
Reverse Recovery Charge	Q <sub>RR</sub>	_	11		$I_F = 10A$ , di/dt = $100A/\mu s$	

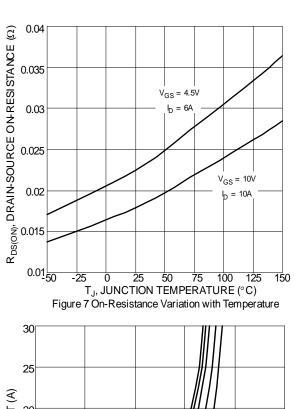
Notes: 5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.

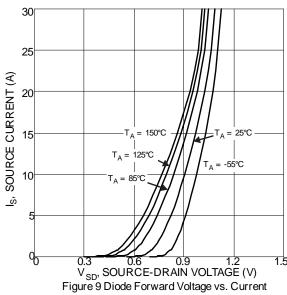
- 6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1-inch square copper plate.
- 7. I<sub>AS</sub> and E<sub>AS</sub> ratings are based on low frequency and duty cycles to keep T<sub>J</sub> = +25°C.
  8. Short duration pulse test used to minimize self-heating effect.
  9. Guaranteed by design. Not subject to product testing.

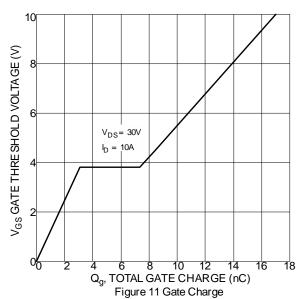












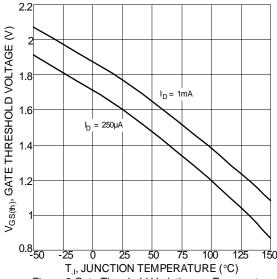
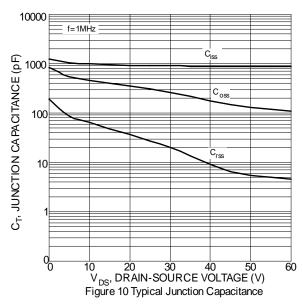
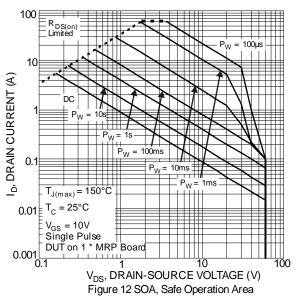
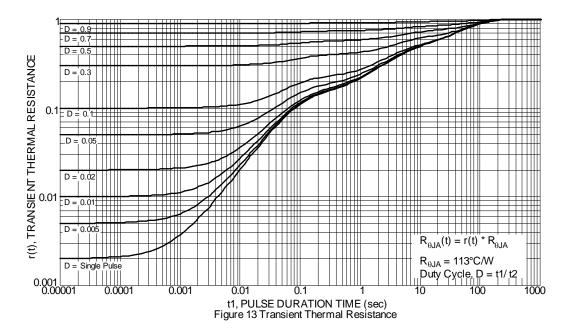


Figure 8 Gate Threshold Variation vs. Temperature







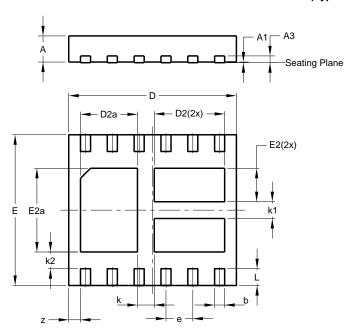




# **Package Outline Dimensions**

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

# V-DFN5045-12 (Type B)

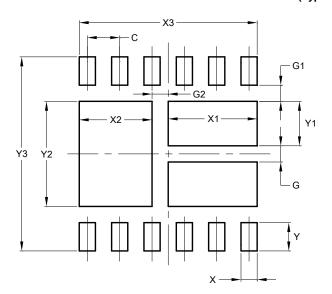


V-DFN5045-12						
(Type B)						
Dim	Min	Max	Тур			
Α	0.75	0.85	0.80			
A1	0.00	0.05	0.02			
A3	_	-	0.203			
b	0.25	0.35	0.30			
D	4.95	5.05	5.00			
D2	2.00	2.20	2.10			
D2a	1.60	1.80	1.70			
Е	4.45	4.55	4.50			
E2	0.90	1.10	1.00			
E2a	2.40	2.60	2.50			
е	_	-	0.80			
k	_	_	0.50			
k1	_	_	0.50			
k2	_	_	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)
С	0.800
G	0.40
G1	0.40
G2	0.40
Х	0.40
X1	2.20
X2	1.80
Х3	4.40
Υ	0.700
Y1	1.100
Y2	2.600
Y3	4.800



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## Офис по работе с юридическими лицами:

105318, г. Москва, ул. Щербаковская д. 3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru moschip.ru\_6 moschip.ru 4 moschip.ru 9