VFTV010R020NA

Datasheet

General Description

$V_{(BR)DSS}$	$R_{DS(ON)\_max}$	I_D
100V	2.0mΩ@10V	325A

Symbol

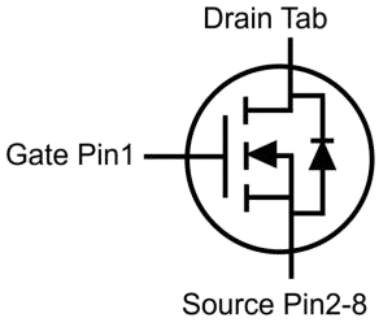
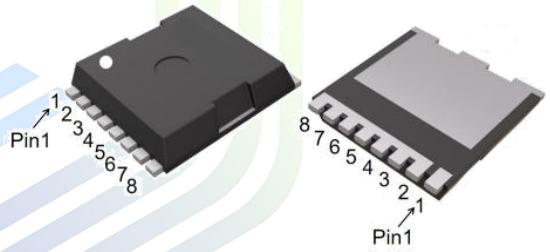


Figure 1 Symbol of VFTV010R020NA

Features

- Low $R_{DS(ON)}$
- 100% Avalanche Tested
- 100% Rg Tested
- Low switching losses

Package Type



TOLL

Figure 2 Package Type of VFTV010R020NA

Application

- PD charger
- Motor driver
- Switching voltage regulator
- DC-DC converter
- Switched mode power supply

Ordering Information

Product Name	Package
VFTV010R020NA	TOLL

Absolute Maximum Ratings (T_A= 25 ºC, unless otherwise specified)

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	100	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current (Wire bond limited)	T_C=25ºC	I_D	325	A
Continuous Drain Current (Silicon limited)	T_C=100ºC		265	A
Pulsed Drain Current Note 1	T_C=25ºC	$I_{D.pulse}$	1160	A
Diode Forward Current (Wire bond limited)	T_C=25ºC	I_S	325	A
Continuous Drain Current	T_A=25ºC	I_{DSM}	28	A
Continuous Drain Current	T_A=70ºC		22	A
Max Power Dissipation Note3	T_C=25ºC	P_D	536	W
Max Power DissipationNote4	T_A=25ºC	P_{DSM}	2.9	W
Avalanche Energy, Single Pulse Note 2		E_{AS}	2209	mJ
Operation and storage temperature		T_J,T_{STG}	-55 to 175	ºC

Thermal Resistance

Parameter	Symbol	Min	Typ	Max	Unit
Thermal Resistance, Junction-to-CaseNote5	$R_{θJC}$	-	0.23	0.28	ºC/W
Thermal Resistance, Junction-to-AmbientNote6	$R_{θJA}$	-	36	43	

Electrical Characteristics(T_J= 25 ºC, unless otherwise specified)

Parameter		Symbol	Test Conditions	Min	Typ	Max	Unit
Statistic Characteristics							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D=250uA	100	-	-	V
Zero Gate Voltage Drain Current		I_{DSS}	V_{DS}=100V, V_{GS}=0V	-	-	1	uA
Zero Gate Voltage Drain Current T_J= 125 ºC			V_{DS}=100V, V_{GS}=0V	-	-	100	uA
Gate-Body Leakage Current	Forward	I_{GSSF}	V_{GS}=20V, V_{DS}=0V	-	-	100	nA
	Reverse	I_{GSSR}	V_{GS}=-20V, V_{DS}=0V	-	-	-100	
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250uA	2.5	3	3.5	V
Drain-Source On-Resistance[Note7]		$R_{DS(ON)}$	V_{GS}=10V, I_D=80A	-	1.5	2	mΩ
Drain-Source On-Resistance[Note7] T_J= 100 ºC				-	2.1	-	
Gate resistance		R_G	f=1 MHz, Open drain	-	1.6	-	Ω
Dynamic Characteristics							
Input Capacitance		C_{ISS}	V_{DS}=50V	-	16340	-	pF
Output Capacitance		C_{OSS}	V_{GS}=0V	-	3635	-	pF
Reverse Transfer Capacitance		C_{RSS}	f=1MHz	-	65	-	pF
Turn-on Delay Time		$t_{d(on)}$	V_{DS}=50V	-	37	-	ns
Rise Time		t_r	I_D=80A	-	85	-	
Turn-off Delay Time		$t_{d(off)}$	R_G=3Ω	-	100	-	
Fall Time		t_f	V_{GS}=10V	-	81	-	
Gate Charge Characteristics							
Gate to Source Charge		Q_{gs}	V_{GS}=10V	-	63	-	nC
Gate to Drain Charge		Q_{gd}	V_{DS}=50V	-	53	-	
Gate Charge Total		Q_g	I_D=80A	-	208	-	
Reverse Diode Characteristics							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=0V, I_{SD}=80A	-	0.9	1.2	V
Reverse Recovery Time		t_{rr}	I_{SD}=80A V_{GS}=0V	-	162	-	ns
Reverse Recovery Charge		Q_{rr}	di/dt=100A/us	-	274	-	nC

Notes:

1. Single pulse; pulse width ≤ 100μs.
2. EAS of 2209mJ is based on starting T_J = 25°C, L = 0.5mH, R_G = 25Ω, I_{AS} = 94A, V_{GS} =10V; 100% FT tested at L = 0.5mH, I_{AS} = 52A.
3. The power dissipation Pd is based on T_J = 175°C, using junction-to-case thermal resistance $R_{\theta JC}$
4. The power dissipation Pdsm is based on T_J = 150°C, using junction-to-ambient thermal resistance $R_{\theta JA}$.
5. Thermal resistance from junction to soldering point (on the exposed drain pad). These tests are performed on a cool plate.
6. These tests are performed with the device mounted on 1 in2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C.
7. Pulse width ≤380μs; duty cycle≤ 2%.

Typical Performance Characteristics

Figure 3: Typ. Output Characteristics

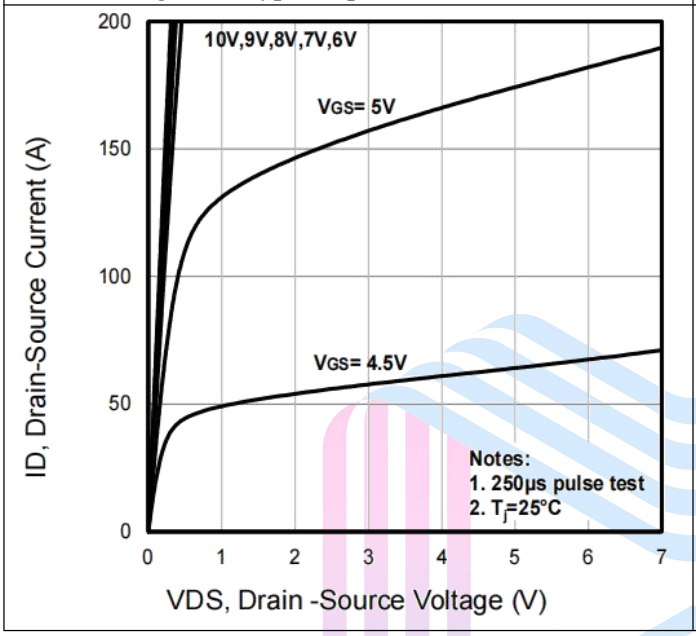


Figure 4: Typ. Gate Charge

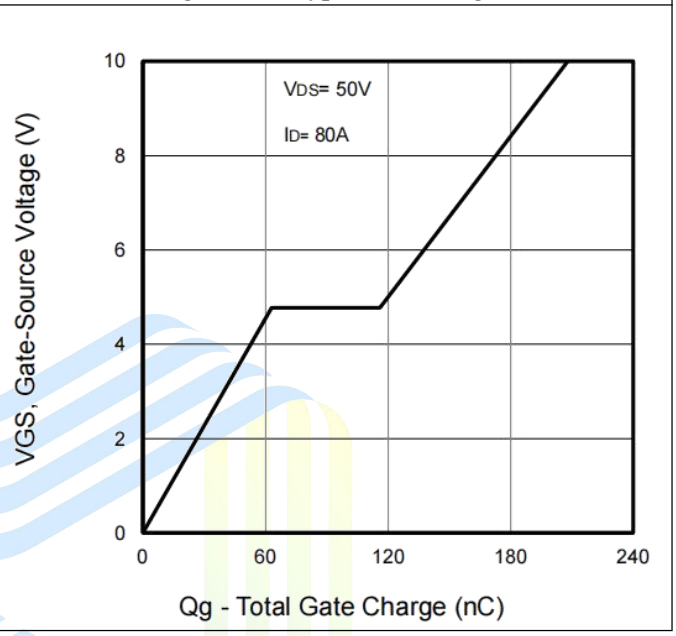


Figure 5: Normalized On-State Resistance

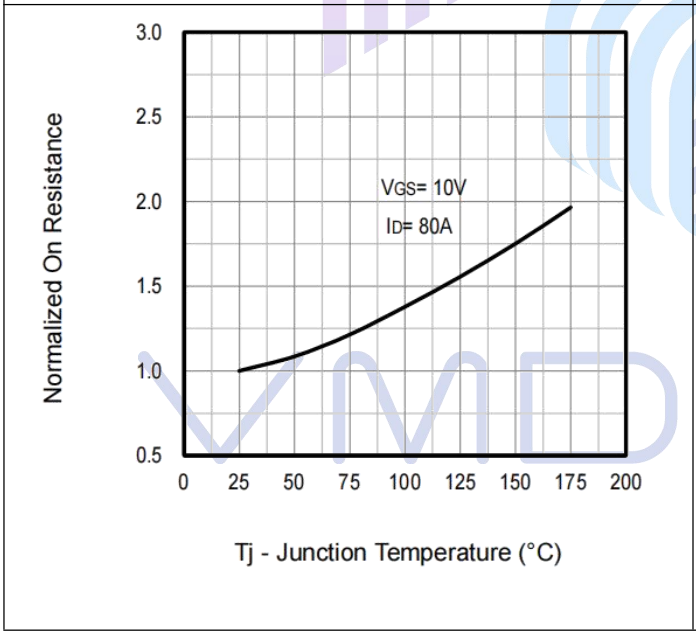


Figure 6: Typ. Transfer Characteristics

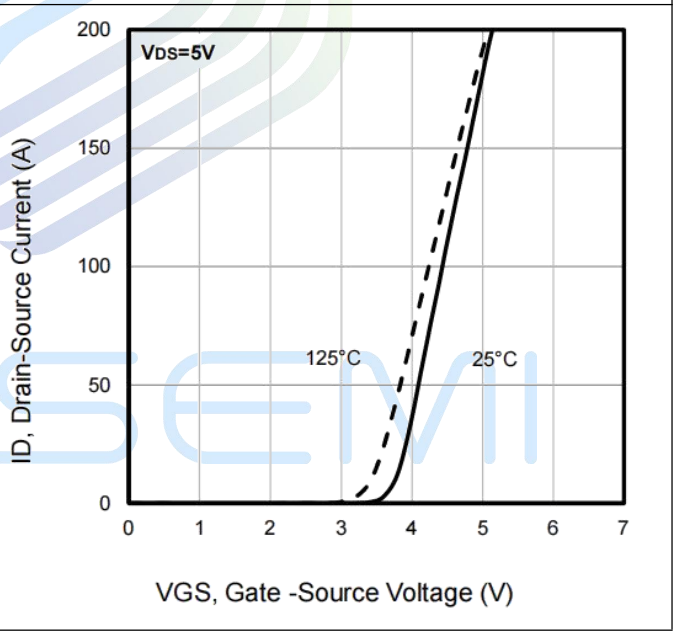


Figure 7: Typical On Resistance vs VGS

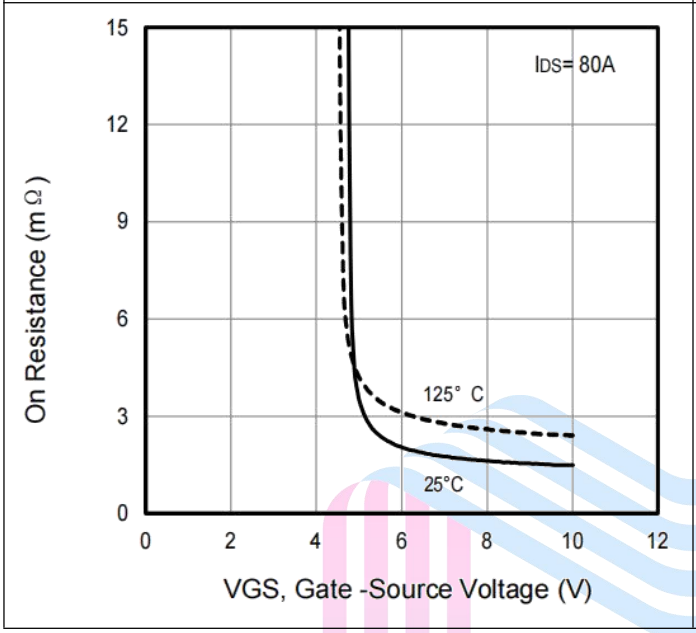


Figure 8: Typical On Resistance vs ID and Gate

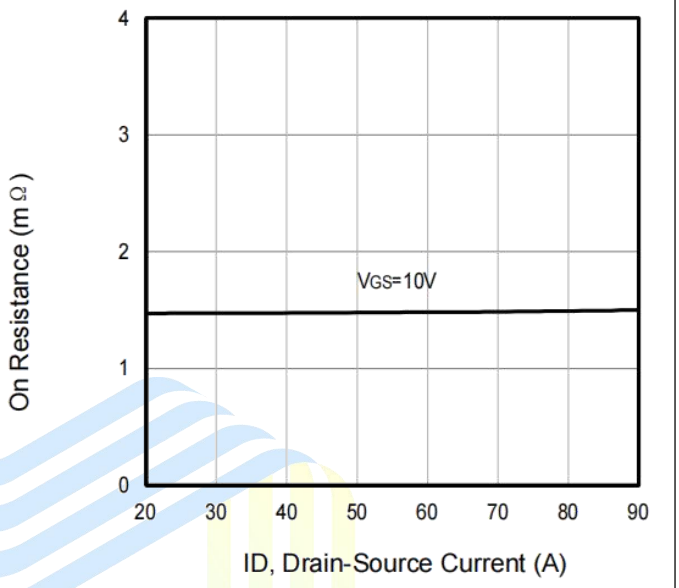


Figure 9: Power Dissipation Vs. Case Temperature

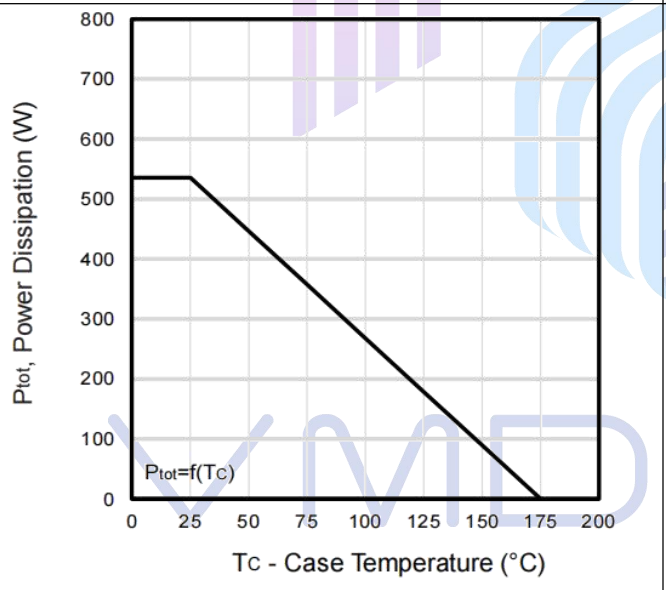


Figure 10: Drain Current Vs. Case Temperature

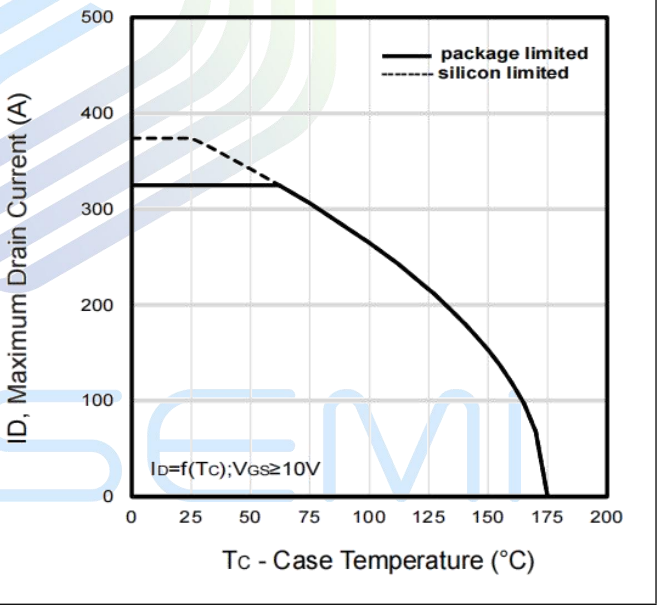


Figure 11: Typ. Capacitances

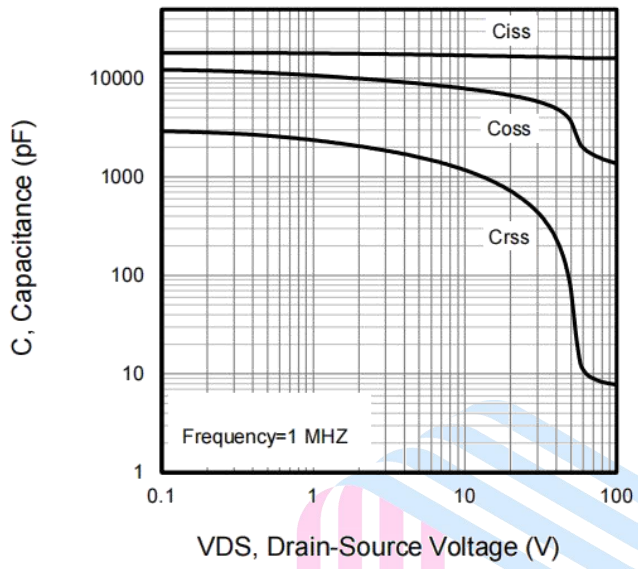


Figure 12: Forward Characteristics of Body Diode

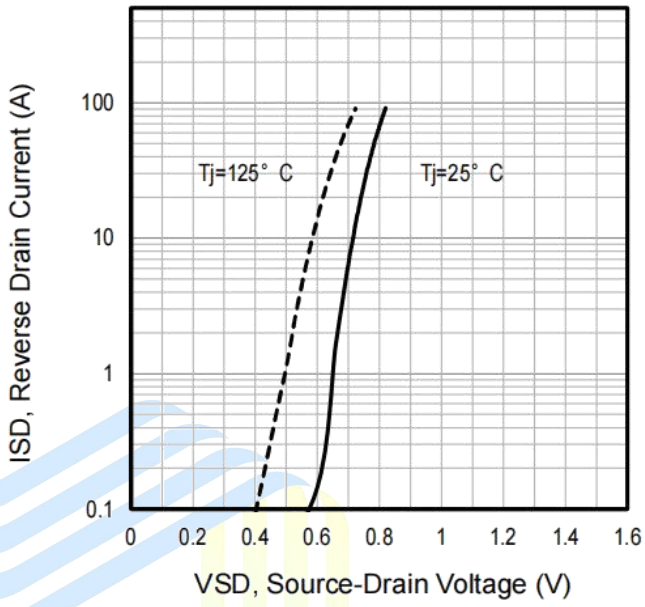


Figure 13: Gate-Source Threshold Voltage

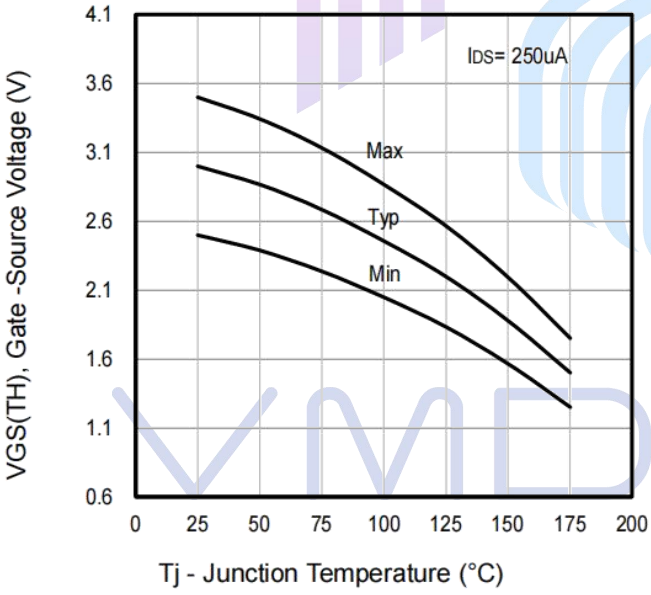


Figure 14: Safe Operating Area

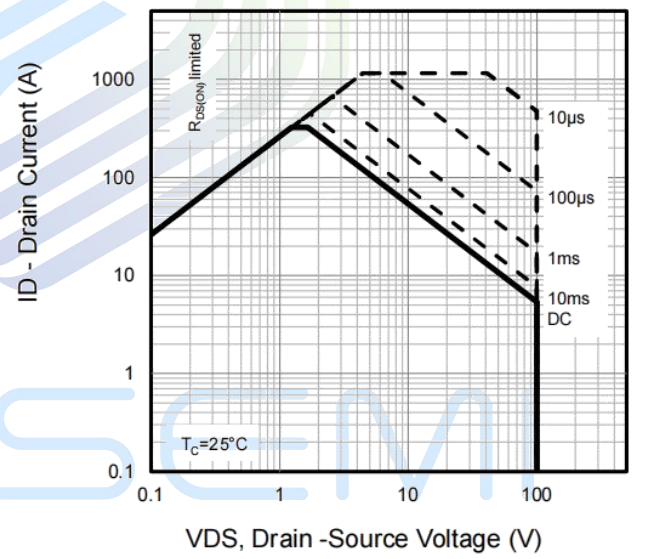
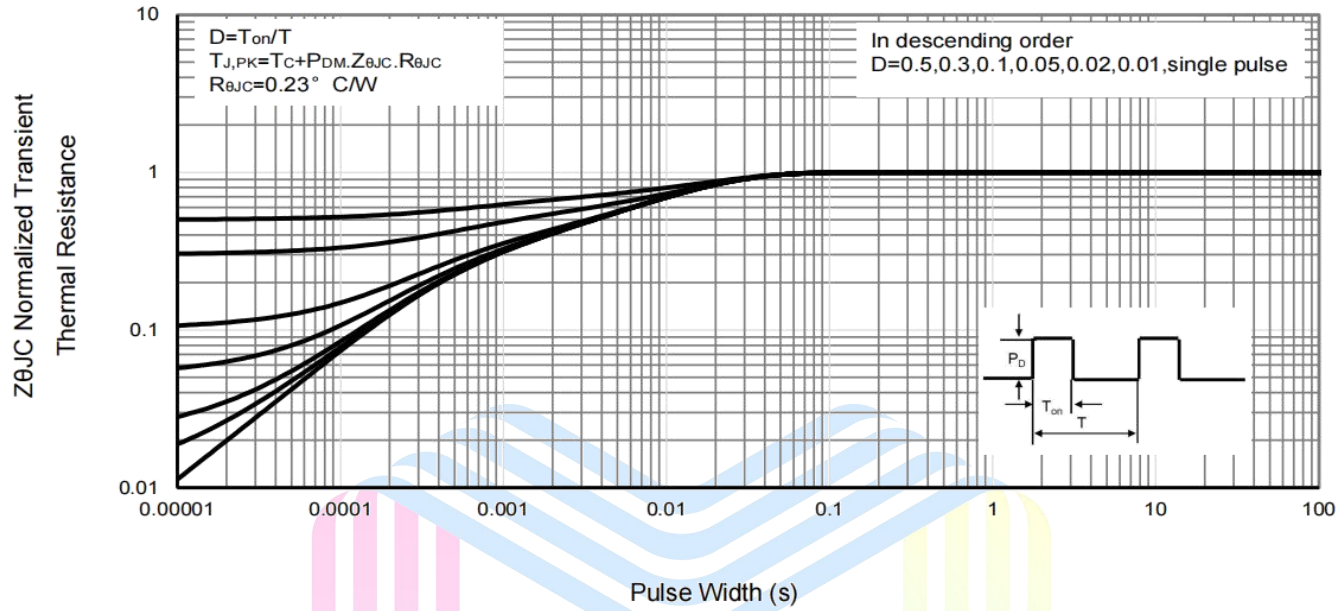
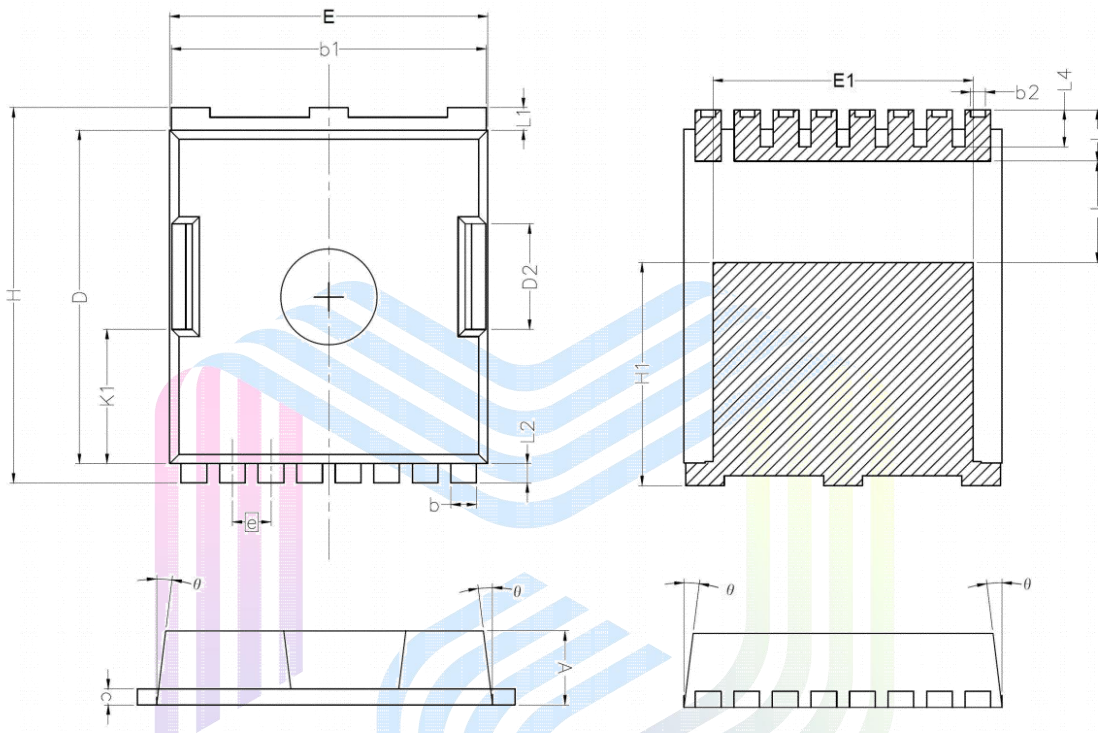


Figure 15: Normalized Maximum Transient Thermal Impedance



Mechanical Dimensions

Package Information TOLL



Note:

1. All dimensions are in mm,angles in degrees.
2. Dimensions do not include mold flash protrusions or gate burrs.

Symbol	DIMENSIONS (unit : mm)			Symbol	DIMENSIONS (unit : mm)		
	Min	Typ	Max		Min	Typ	Max
A	2.20	--	2.40	H	11.48	11.68	11.88
b	0.70	--	0.90	H1	6.75	6.95	7.15
b1	9.70	--	9.90	N	--	8	--
b2	0.42	--	0.50	J	3.00	3.15	3.30
c	0.40	--	0.60	K1	3.98	4.18	4.38
D	10.28	--	10.58	L	1.40	1.60	1.80
D2	3.10	3.30	3.50	L1	0.60	0.70	0.80
E	9.70	9.90	10.10	L2	0.50	0.60	0.70
E1	7.90	8.10	8.30	L4	1.00	1.15	1.30
e	1.20BSC			θ	4°	7°	10°

NOTICE

Hangzhou VMD Semiconductor Co., Ltd (VMD) reserves the right to make changes without notice in order to improve reliability, function or design and to discontinue any product or service without notice. Customers should obtain the latest relevant information before orders and should verify that such information is current and complete. All products are sold subject to VMD's terms and conditions supplied at the time of order acknowledgement.

VMD, its affiliates, agents, and employees, and all persons acting on its or their behalf, disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

VMD disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify VMD's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

VMD warrants performance of its hardware products to the specifications at the time of sale, testing, reliability and quality control are used to the extent VMD deems necessary to support this warrantee. Except where agreed upon by contractual agreement, testing of all parameters of each product is not necessarily performed.

VMD does not assume any liability arising from the use of any product or circuit designs described herein. Customers are responsible for their products and applications using VMD's components. To minimize risk, customers must provide adequate design and operating safeguards.

VMD does not warrant or convey any license to any intellectual property rights either expressed or implied under its patent rights, nor the rights of others. Reproduction of information in VMD's data sheets or data books is permissible only if reproduction is without modification or alteration. Reproduction of this information with any alteration is an unfair and deceptive business practice.

VMD is not responsible or liable for such altered documentation. Resale of VMD's products with statements different from or beyond the parameters stated by VMD for that product or service voids all express or implied warrantees for the associated VMD product or service and is an unfair and deceptive business practice.

Via-Media Semiconductor Limited Company

http://www.vmdsemi.com

Main Sites:

- **Headquarters**

Hangzhou Via-Media Semiconductor Co., LTD.
1305-1306, Building 71, No. 90, Wensan Road, Xihu District, Hangzhou, Zhejiang Province, P.R. China
Tel: +86-0571-8515 0563

- **Chengdu Office**

Chengdu Winhi Semiconductor Co., LTD.
Floor 15, Building 5, No. 171, Hele 2nd Street, Chengdu, Sichuan Province, P.R. China
Tel: +86-028-8505 0771

- **Shanghai**

Shanghai R&D Center.
1506~1508, Xinyin Building, 888 Yishan Road, Shanghai, P.R of China
Tel: +86-021-54201999

- **Shenzhen**

Shenzhen Sales office
Room 4A15, Block AB, Tianxiang Building, Chegongmiao , Futian District, Shenzhen, P.R of China
Tel: +86-0755-82570682

- **Xi'an**

Xi'an R&D Center
1703B, Building A, Greenland Center, Jinye Road, High-Tech Zone, Xi'an, Shaanxi, P.R of China