VUPB004R025NA

Datasheet

2.5mΩ, 40V, N-Channel Power MOSFET VUPB004R025NA

General Description

$V_{(BR)DSS}$	$R_{DS(ON)\_max}$	I_D
40V	2.5mΩ@10V	110A
	3.5mΩ@4.5V	

Symbol

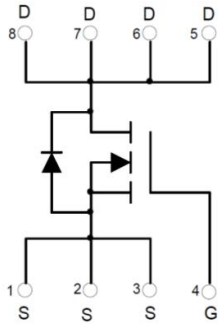
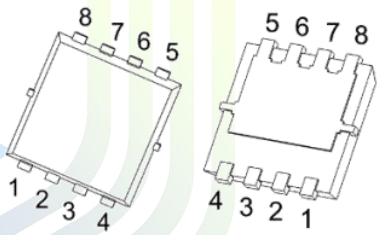


Figure 1 Symbol of VUPB004R025NA

Features

- Trench Technology Power MOSFET
- Low $R_{DS(ON)}$
- Low Gate Charge
- Low Gate Resistance
- 100% UIS Tested

Package Type



PDFN5X6-8L

Figure 2 Package Type of VUPB004R025NA

Application

- Battery protection applications
- Power Switch Application

Ordering Information

Product Name	Package
VUPB004R025NA	PDFN5X6-8L

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

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current[Note1]	T_C= 25 ºC	I_D	110	A
Continuous Drain Current[Note1]	T_A= 25 ºC		44	
Pulsed Drain Current [Note2]		I_{DM}	440	
Single Pulsed Avalanche Energy[Note3]		E_{AS}	1089	mJ
Avalanche Current[Note3]		I_{AS}	66	A
Total Power Dissipation[Note5]	T_C= 25 ºC	P_D	78	W
Total Power Dissipation[Note5]	T_A= 25 ºC		2.5	
Junction Temperature		T_J	150	ºC
Storage Temperature		T_{STG}	-55 to 150	ºC

Thermal Resistance

Parameter	Symbol	Min	Typ	Max	Unit
Thermal Resistance, Junction-to-Ambient [Note6]	$R_{\theta JA}$		50		ºC/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$		1.6		ºC/W

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	40			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}= 32V, V_{GS}=0V			1	uA
Gate-Body Leakage Current	I_{GSS}	V_{GS} = ±20V, V_{DS}= 0V			±100	nA
Gate Threshold Voltage[Note4]	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA	1.0	1.7	3.0	V
Static Drain-Source On-Resistance[Note4]	$R_{DS(ON)}$	V_{GS}=10V, I_D= 20A		1.85	2.5	mΩ
		V_{GS}=4.5V, I_D= 20A		2.35	3.5	
Forward Transconductance[Note4]	g_{FS}	V_{DS}=10V, I_D= 10A	20			S
Dynamic Characteristics						
Input Capacitance	C_{ISS}	V_{DS}=20V		11700		pF
Output Capacitance	C_{OSS}	V_{GS}=0V		798		pF
Reverse Transfer Capacitance	C_{RSS}	f=100KHz		645		pF
Total Gate Charge	Q_g	V_{DS}=20V		150		nC
Gate-Source Charge	Q_{gs}	V_{GS}=10V		34.5		
Gate-Drain Charge	Q_{gd}	I_D= 20A		12		
Gate Resistance	Rg	f = 1MHz, Open drain		1.2		Ω
Switching Parameters						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}= 20V		33		ns
Turn-on Rise Time	t_r	V_{GS}= 10V		10.5		
Turn-off Delay Time	$t_{d(off)}$	R_L=1Ω		108		
Turn-off Fall Time	t_f	R_G=3Ω		9		
Diode Characteristics						
Diode Forward Voltage [Note4]	V_{SD}	V_{GS}=0V, I_S= 20A			1.2	V

Notes :

1.The maximum current rating is limited by package.And device mounted on a large heatsink.

2.Pulse Test : Pulse Width ≤ 10μs, duty cycle ≤ 1%.

3.E_{AS} condition: V_{DD} = 25V, V_{GS} = 10V, L = 0.5mH, R_G=25Ω Starting T_J = 25°C.

4.Pulse Test : Pulse Width ≤ 300μs, duty cycle ≤ 2%.

5.The power dissipation P_D is limited by $T_{J(MAX)}$ = 150°C.And device mounted on a large heatsink

6.Device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C.

Typical Performance Characteristics

Figure 3: Transfer Characteristics

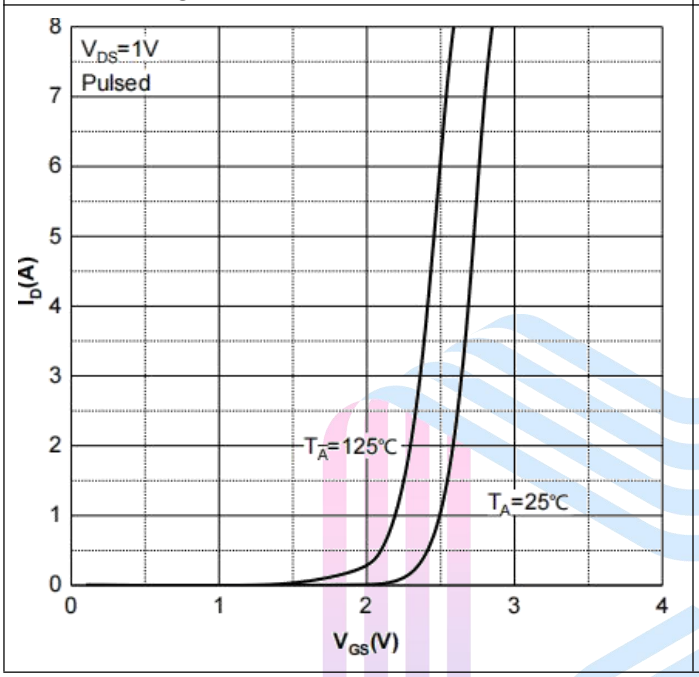


Figure 4: Output Characteristics

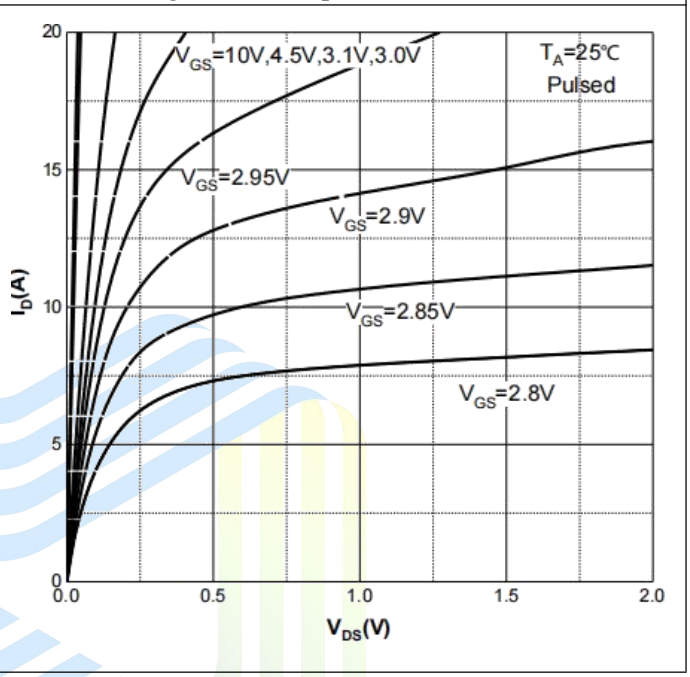


Figure 5: On-Resistance vs. Drain Current

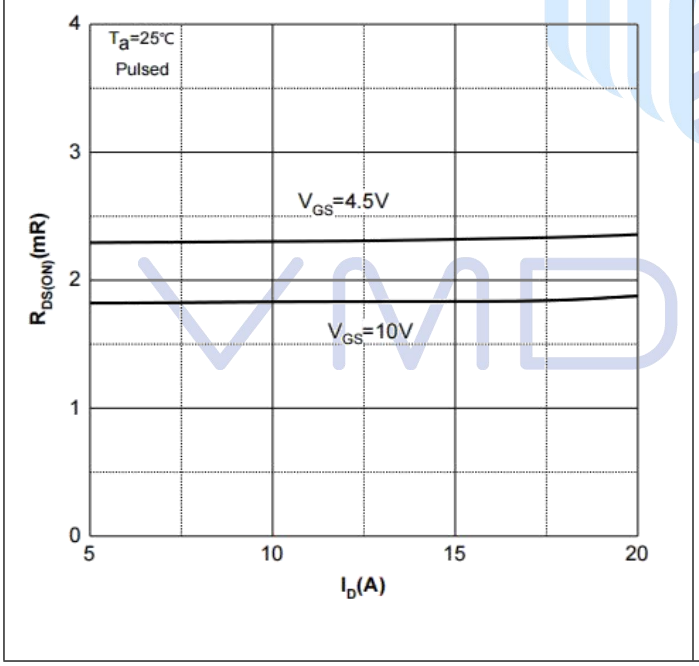


Figure 6: On-Resistance vs. Gate Voltage

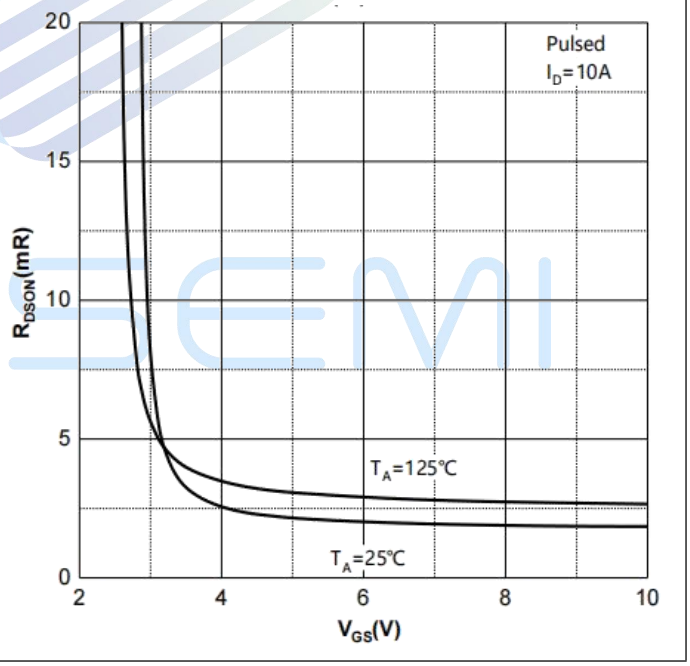


Figure 7: Body Diode Characteristics

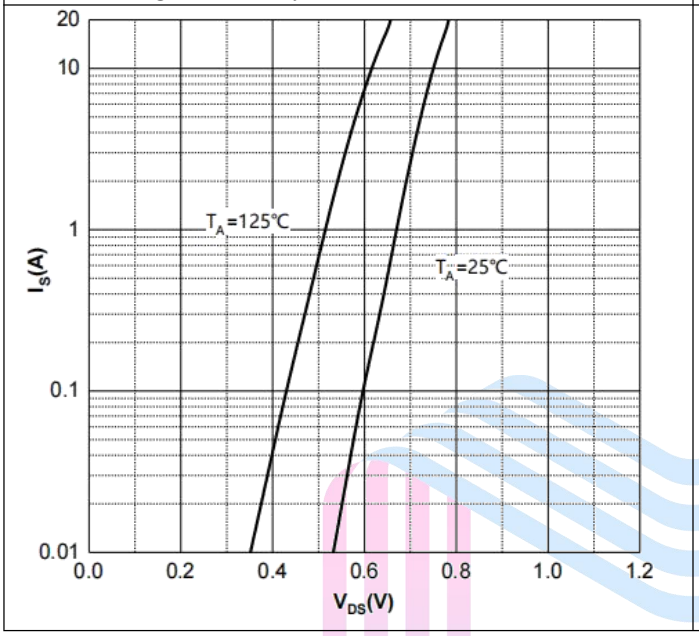


Figure 8: Threshold Voltage

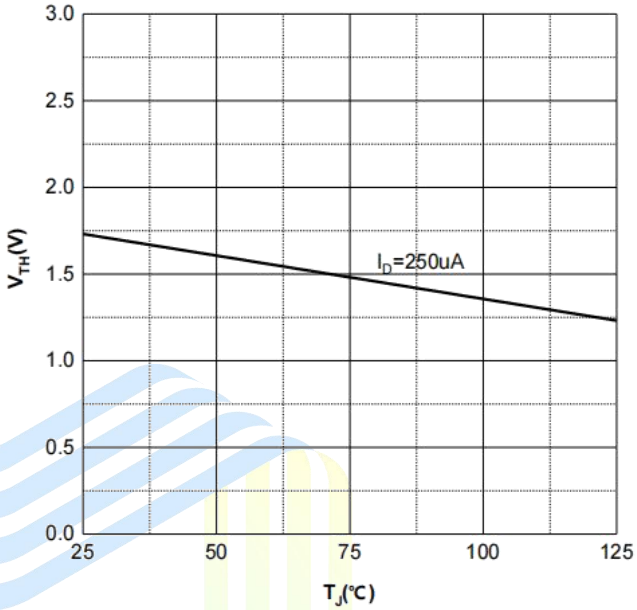


Figure 9: Typical Capacitance

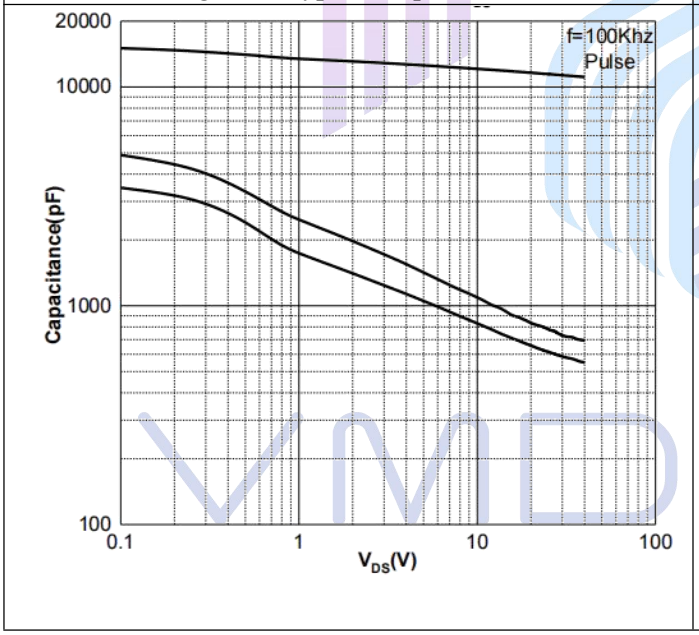


Figure 10: Safe Operation Area

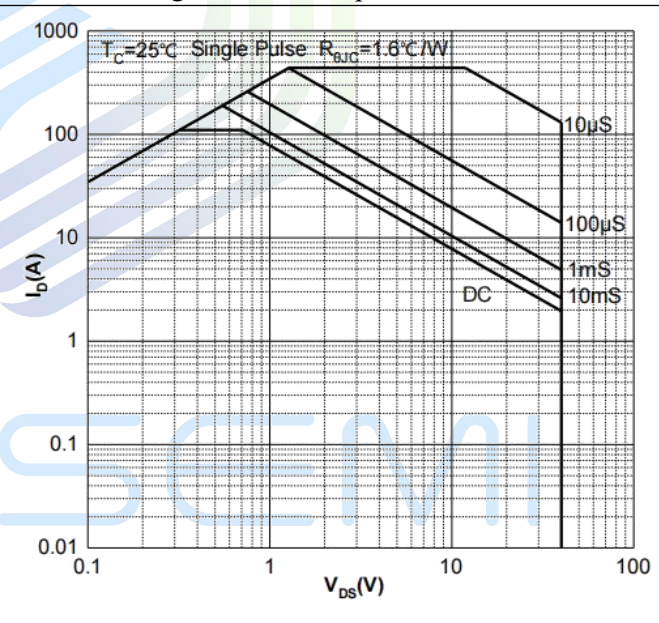
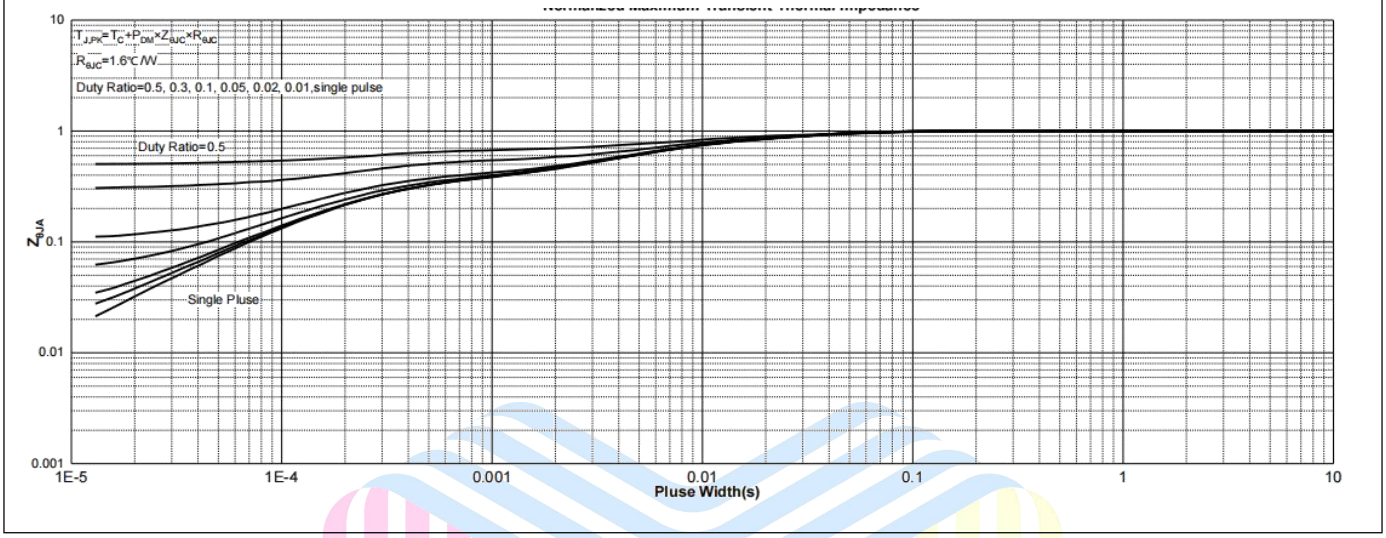
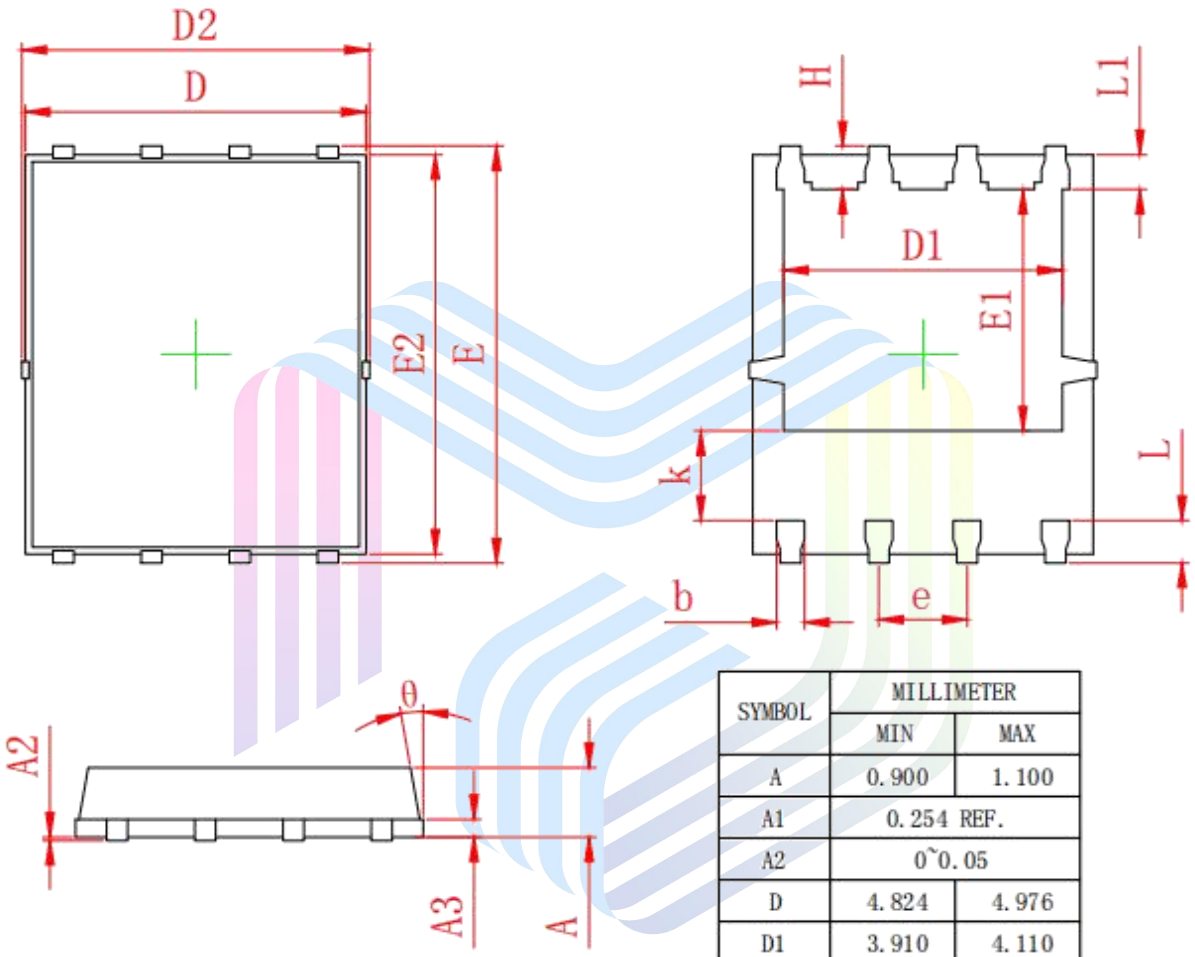


Figure 11: Normalized Maximum Transient Thermal Impedance



Mechanical Dimensions:

PDFN5X6-8L Package Information



SYMBOL	MILLIMETER	
	MIN	MAX
A	0.900	1.100
A1	0.254 REF.	
A2	0~0.05	
D	4.824	4.976
D1	3.910	4.110
D2	4.944	5.076
E	5.924	6.076
E1	3.375	3.575
E2	5.674	5.826
b	0.350	0.450
e	1.270 TYP.	
L	0.534	0.686
L1	0.424	0.576
k	1.190	1.390
H	0.549	0.701
θ	8°	12°

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