VTTA050R19BNA

Datasheet

General Description

$V_{(BR)DSS}$	$R_{DS(ON)\_max}$	I_D
500V	1.9Ω@10V	5A

Symbol

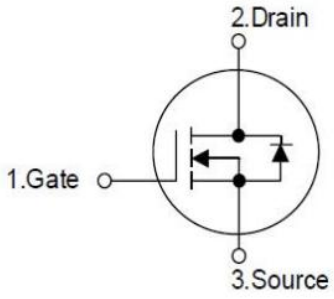


Figure 1 Symbol of VTTA050R19BNA

Features

- 100% avalanche tested
- Fast switching
- Integrate fast recovery diode
- Improved dv/dt capability
- Halogen and Antimony Free. "Green" Device

Application

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)

Package Type

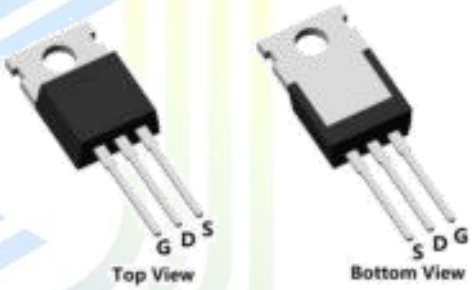


Figure 2 Package Type of VTTA050R19BNA

Ordering Information

Product Name	Package
VTTA050R19BNA	TO-220

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

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	500	V
Gate-Source Voltage		V_{GSS}	±30	V
Continuous Drain Current Note1		I_D	5	A
Pulsed Drain Current Note2		I_{DM}	20	A
Avalanche Current, Single Pulse Note2		I_{AS}	5	A
Avalanche Energy, Single Pulse Note3		E_{AS}	131	mJ
Power Dissipation	T_C= 25 ºC	P_D	127	W
Operation and storage temperature		T_J, T_{STG}	-55 to 150	ºC

Thermal Resistance

Parameter	Symbol	Min	Typ	Max	Unit
Thermal Resistance, Junction-to-Case Note4	$R_{\theta JC}$	-	0.98	-	ºC/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	-	47.4	-	

Notes:

1) Calculated continuous current based on maximum allowable junction temperature $T_{J(MAX)}$ =150°C.

2) Repetitive rating; pulse width limited by max. junction temperature.

3) EAS test condition: V_{DD}= 40V, I_D= 5A, L=10.5mH, Starting T_J=25°C

Electrical Characteristics (T_A= 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	500	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=500V, V_{GS}=0V	-	-	1	uA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±30V, V_{DS}=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250uA	2.0	-	4.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=2A	-	1.5	1.9	Ω
Dynamic Characteristics						
Input Capacitance	C_{ISS}	V_{DS}=25V	-	499	-	pF
Output Capacitance	C_{OSS}	V_{GS}=0V	-	52	-	pF
Reverse Transfer Capacitance	C_{RSS}	f=1MHz	-	3	-	pF
Gate Resistance	R_G	f=1MHz	-	2.08	-	Ω
Total Gate Charge (@V_{GS}=10V)	Q_g	V_{DD}=400V	-	8.1	-	nC
Gate to Source Charge	Q_{gs}	I_D=5A	-	3	-	
Gate to Drain Charge	Q_{gd}	V_{GS}=10V	-	4.1	-	
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=250V,	-	10.2	-	ns
Rise Time	t_r	V_{GS}=10V,	-	8	-	
Turn-off Delay Time	$t_{d(off)}$	I_D=5A,	-	31.6	-	
Fall Time	t_f	R_G=25Ω	-	28.4	-	
Reverse Diode Characteristics						
Source-drain current	I_{SD}	-	-	-	5	A
Source-drain current (Pulsed)	I_{SDM}	-	-	-	20	
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_{SD}=2A	-	0.85	1.2	V
Reverse Recovery Time	t_{rr}	I_F=0.5A,I_R=1.0A,I_{RR}=0.25A	-	70	-	ns
Reverse Recovery Time	t_{rr}	V_{DD}=250V	-	60	-	ns
Reverse Recovery Charge	Q_{rr}	I_F=5.0A,	-	0.12	-	nC
Peak Reverse Recovery Current	I_{rrm}	di/dt=100A/us	-	3.83	-	A

Notes:

4)Short duration pulse test used to minimize self-heating effect.

5) Guaranteed by design. Not subject to product testing.

Typical Performance Characteristics

Figure 1. Output Characteristics

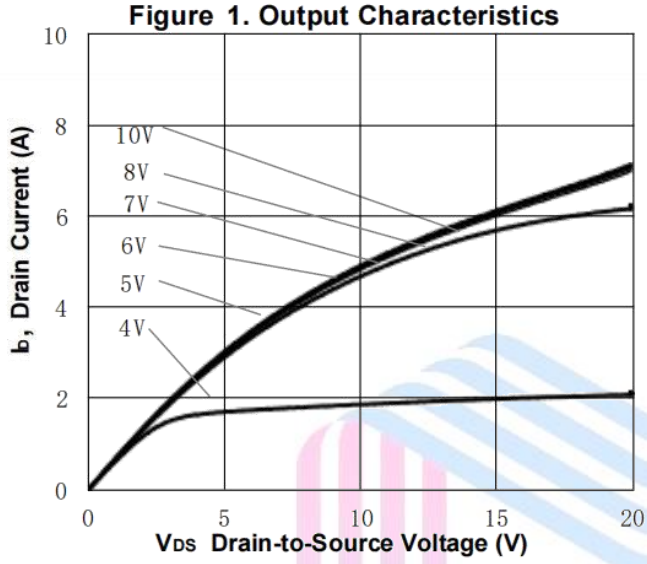


Figure 2. Transfer Characteristics

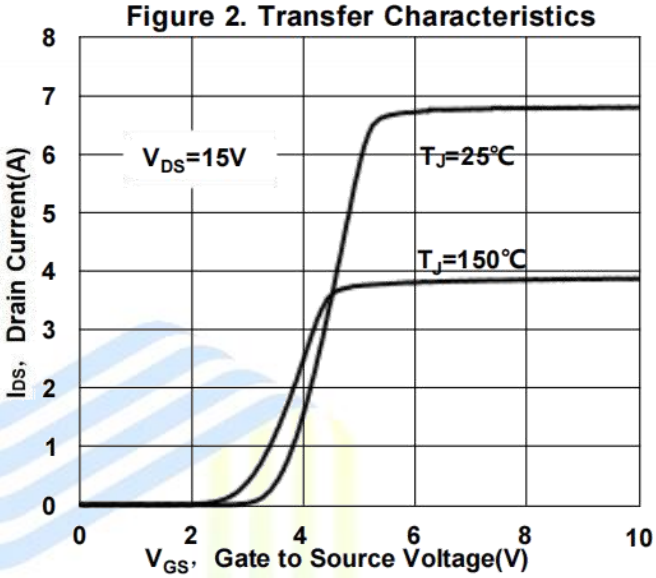


Figure 3. BV_{DSS} vs. Temperature

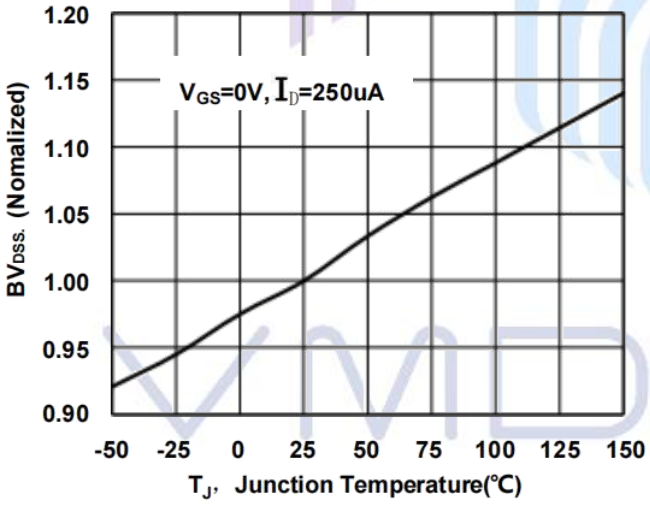


Figure 4. On-Resistance vs. Temperature

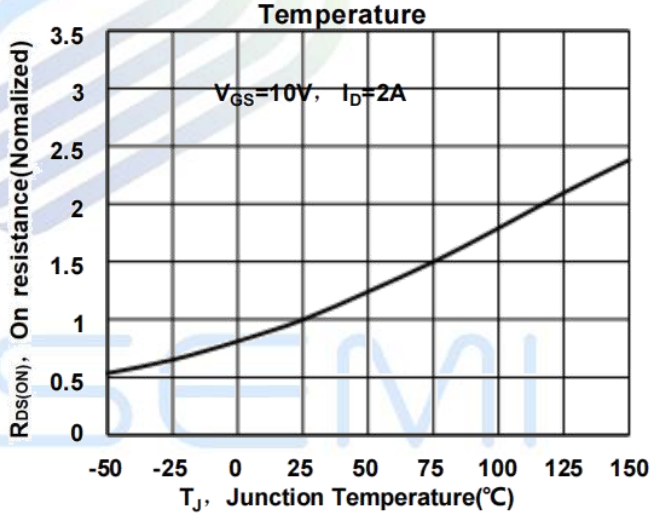


Figure 5.Power Dissipation vs. Temperature

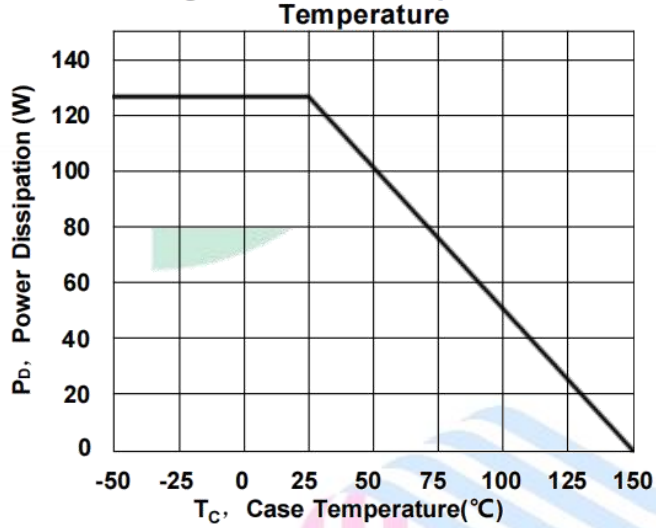


Figure 6. Drain Current vs. Temperature

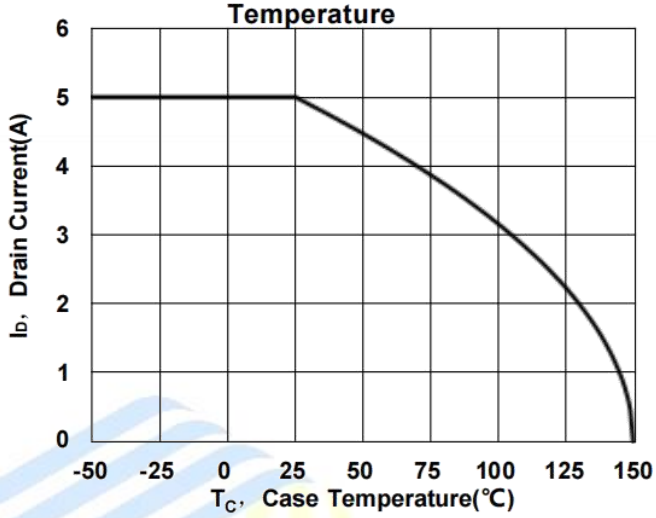


Figure 7. Capacitance Characteristics

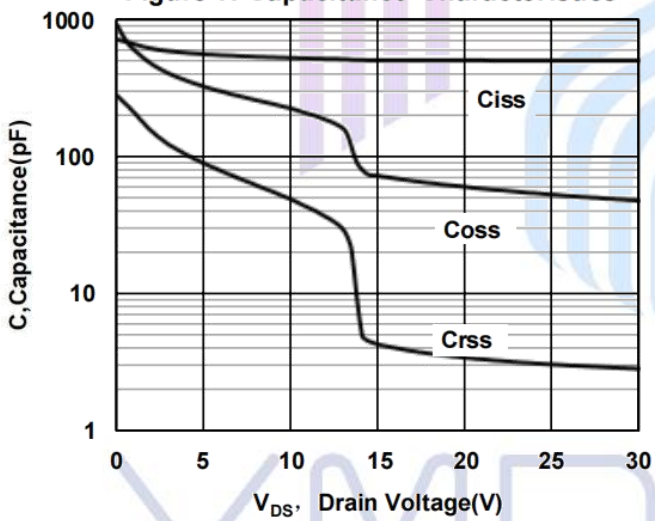


Figure 8. Gate-Charge Characteristics

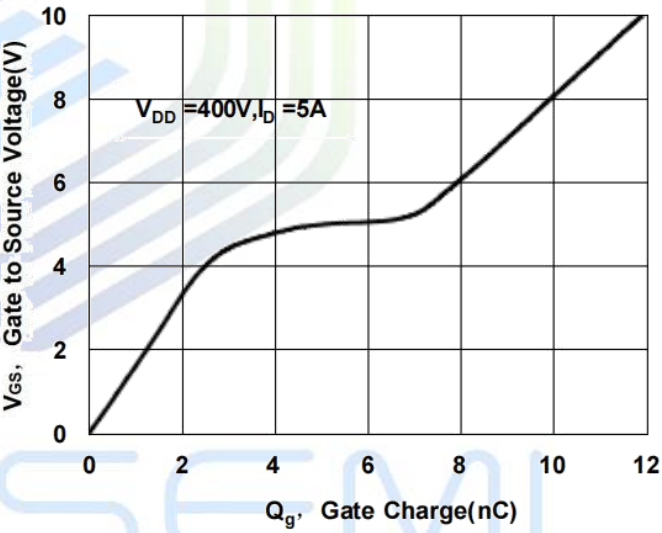


Figure 9. Body Diode Forward Voltage

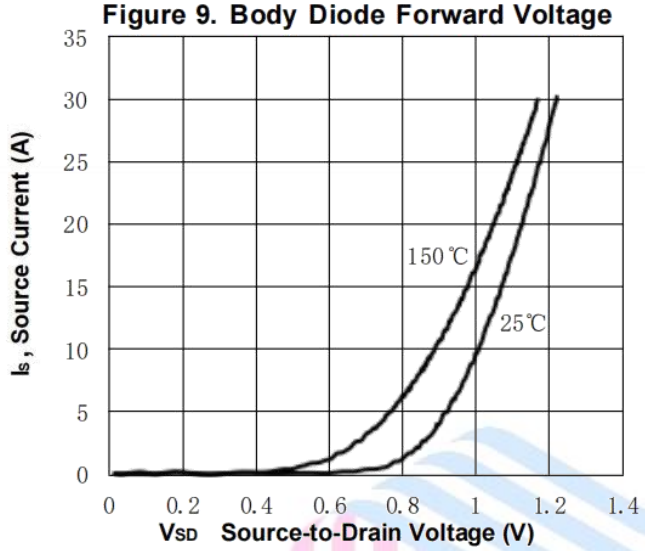


Figure 10. Safe Operating Area

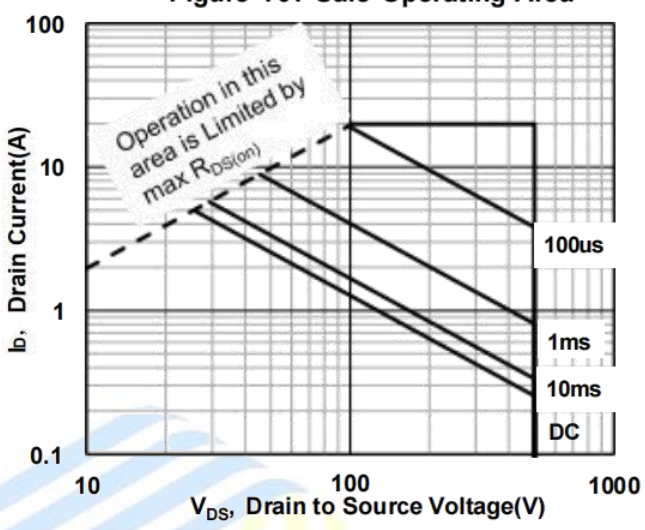
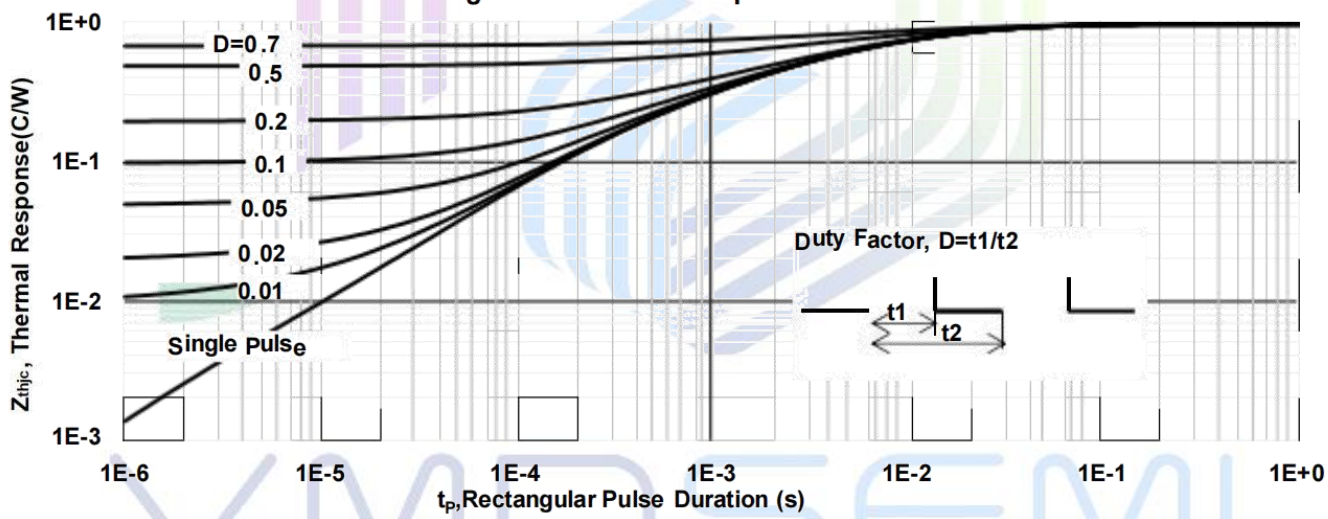
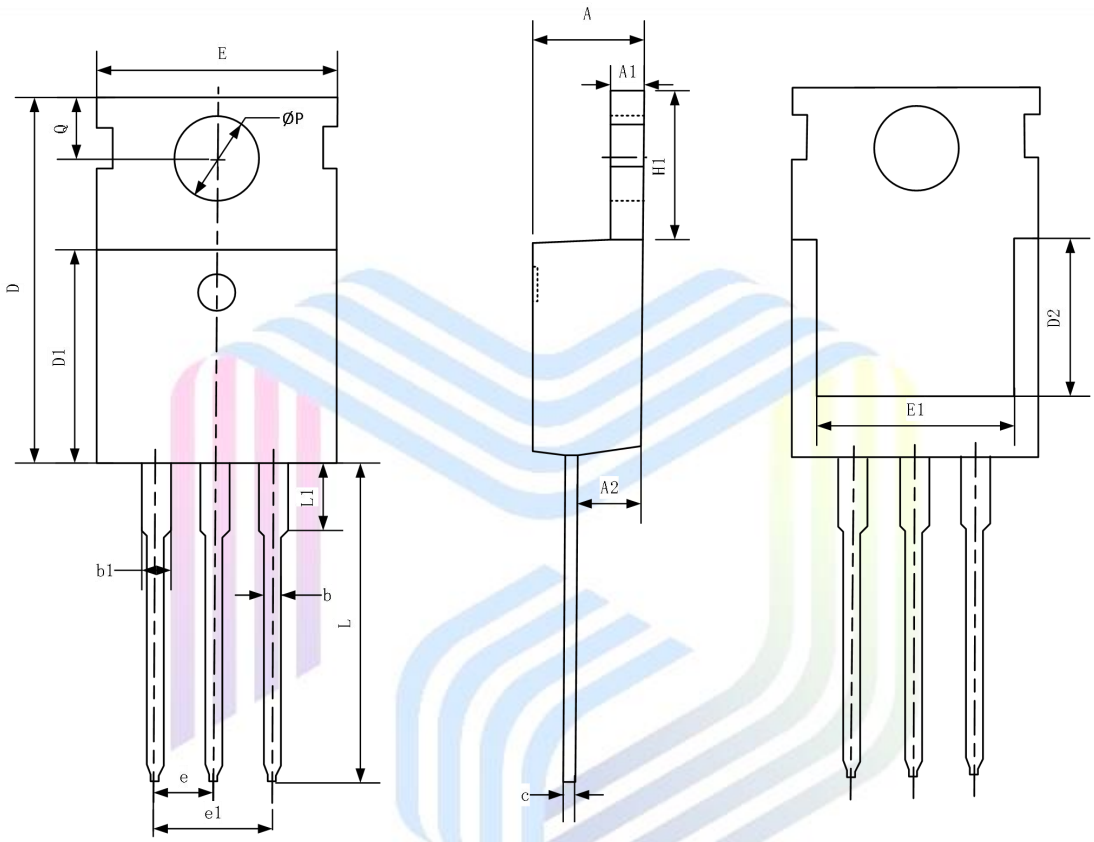


Figure 11. Thermal Impedance



Mechanical Dimensions

TO220 Package Information



SYMBOL	MIN(mm)	MAX(mm)
A	4.3	4.80
A1	1.2	1.45
A2	2.2	2.90
b	0.69	0.95
b1	1.00	1.60
c	0.33	0.65
D	14.70	16.20
D1	8.59	9.65
D2	5.64	7.05
E	9.60	10.60
E1	7.00	8.64
e	2.54BSC	
L	12.60	14.80
L1	2.70	3.80
ΦP	3.50	3.90
Q	2.40	3.10

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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 Center.
17B, No.1 Phoenix Building, 2008 Shennan Road, 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