VTTL050R15BNA

Datasheet

General Description

$V_{(BR)DSS}$	$R_{DS(ON)\_max}$	I_D
500V	1.45Ω@10V	5A

Symbol

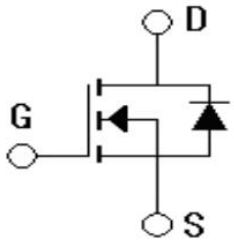
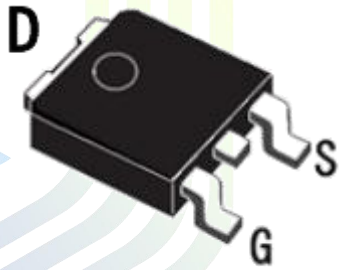


Figure 1 Symbol of VTTL050R15BNA

Features

- Fast Switching
- Low Gate Charge
- Low Crss
- Improved dv/dt capability
- 100% UIS Tested
- RoHS product

Package Type



TO-252

Figure 2 Package Type of VTTL050R15BNA

Application

- High frequency switching mode power supply
- Electronic ballast
- UPS

Ordering Information

Product Name	Package
VTTL050R15BNA	TO-252

Absolute Maximum Ratings (T_C= 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	T_C= 25 ºC	I_D	5	A
Continuous Drain Current	T_C= 100 ºC		3.16	
Pulsed Drain Current Note1		I_{DM}	20	
Avalanche Current Note1		I_{AS}	5	
Single Pulsed Avalanche Energy Note2		E_{AS}	305	mJ
Repetitive Pulsed Avalanche Energy Note1		E_{AR}	12.15	mJ
Peak Diode Recovery dv/dt Note3		dv/dt	4.5	V/ns
Total Power Dissipation	T_C= 25 ºC	P_D	121	W
Junction Temperature		T_J	150	ºC
Storage Temperature		T_{STG}	-55 to 150	ºC
Maximum Lead Temperature for Soldering Purposes		T_L	300	ºC

Thermal Resistance

Parameter	Symbol	Min	Typ	Max	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$		62.5		ºC/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$		1.028		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	500	-	-	V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	I_D= 250uA referenced to 25°C	-	0.5	-	V/ºC
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}= 500V, V_{GS}=0V T_C= 25 ºC	-	-	10	uA
		V_{DS}= 400V, V_{GS}=0V T_C= 125 ºC	-	-	100	
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	2.5	-	4.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D= 2.5A	-	1.25	1.45	Ω
Forward Transconductance[Note4]	g_{FS}	V_{DS}=40V, I_D=2.5A	-	3.47		S
Dynamic Characteristics						
Input Capacitance	C_{ISS}	V_{DS}=25V V_{GS}=0V f=1MHz	-	370	463	pF
Output Capacitance	C_{OSS}		-	62	78	pF
Reverse Transfer Capacitance	C_{RSS}		-	4.3	5.4	pF
Switching Parameters [Note4,5]						
Total Gate Charge	Q_g	V_{DS}=400V V_{GS}=10V I_D= 5A	-	10.3	14.5	nC
Gate-Source Charge	Q_{gs}		-	3.1	-	
Gate-Drain Charge	Q_{gd}		-	4.6	-	
Turn-on Delay Time	$t_{d(on)}$	V_{DD}= 250V I_D= 5A R_G=25Ω	-	19.2	23	ns
Turn-on Rise Time	t_r		-	25.3	30	
Turn-off Delay Time	$t_{d(off)}$		-	35.2	42	
Turn-off Fall Time	t_f		-	24	29	
Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_{SD}= 5A	-	-	1.4	V
Reverse recovery time[Note4]	trr	V_{GS}=0V,I_{SD}= 5A di/dt=100A/us	-	106	-	ns
Reverse recovery charge[Note4]	Qrr		-	0.14	-	uC

Notes:

1. Pulse width limited by maximum junction
2. L=10.5mH, I_{AS}=5A, V_{DD}=50V, R_G=25 Ω,Starting T_J=25°C
3. I_{SD} ≤5A, di/dt ≤200A/μs, V_{DD}≤BV_{DSS} , StartingT_J=25°C
4. Pulse Test：Pulse Width ≤300μs,Duty Cycle≤2％
5. Essentially independent of operating temperature

Typical Performance Characteristics

Figure 3: Transfer Characteristics

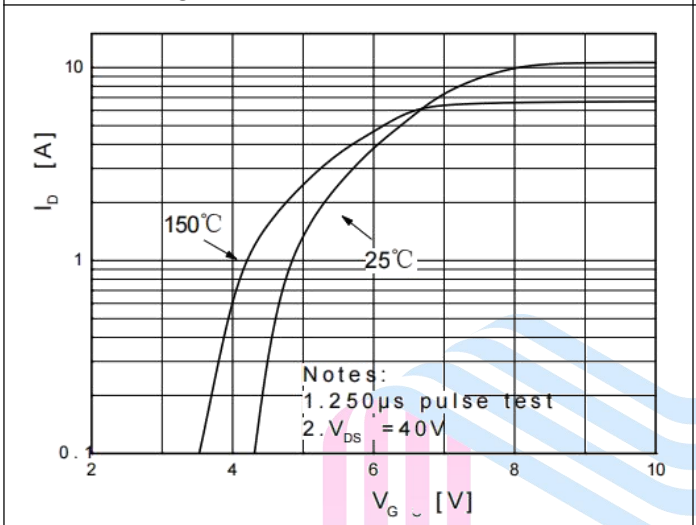


Figure 4: Output Characteristics

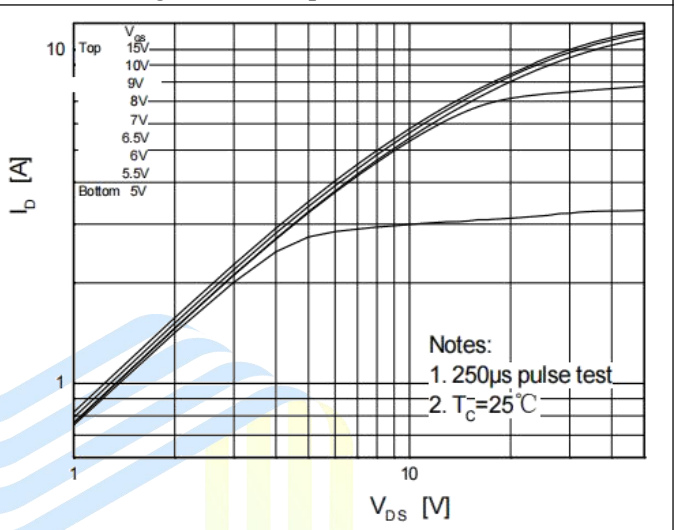


Figure 5: On-Resistance vs. Drain Current

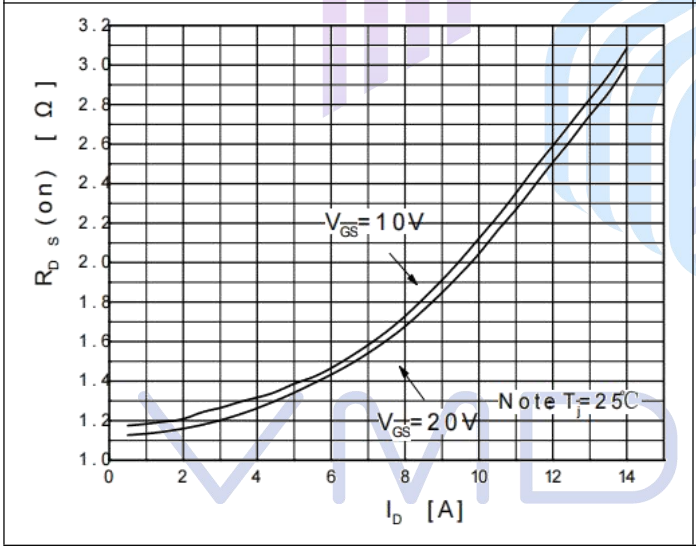


Figure 6: On-Resistance vs. Temperature

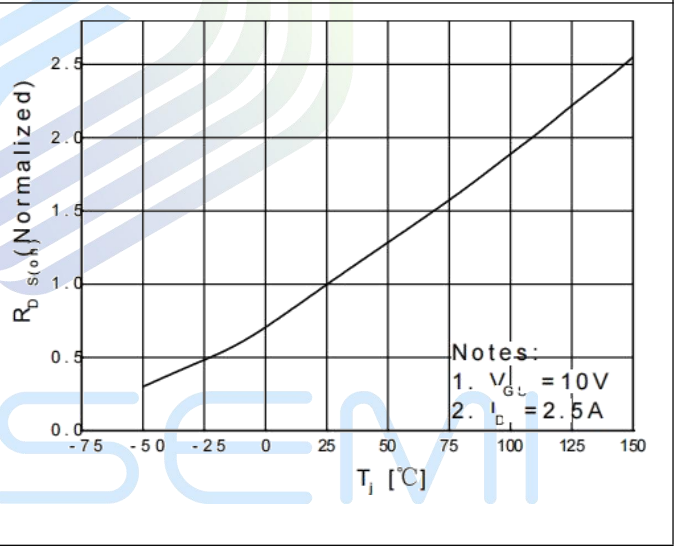


Figure 7: Body Diode Characteristics

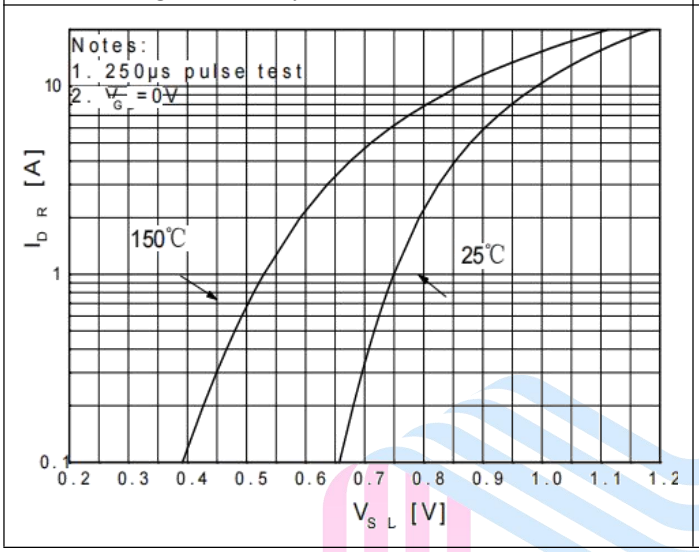


Figure 8: Gate Charge

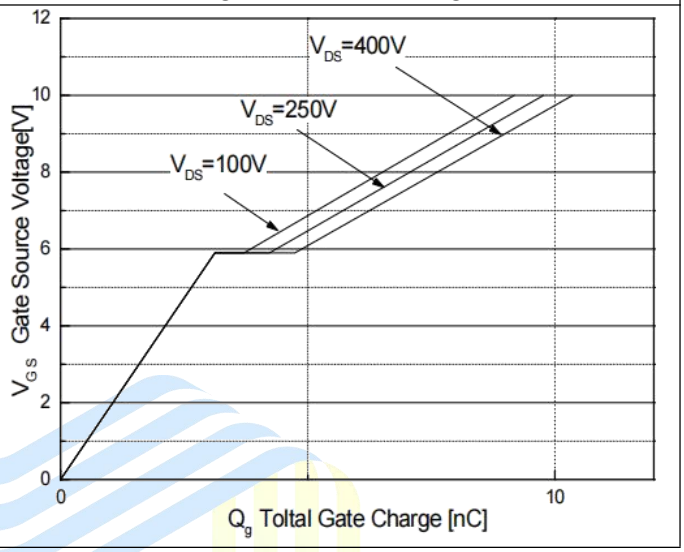


Figure 9: Typical Capacitance

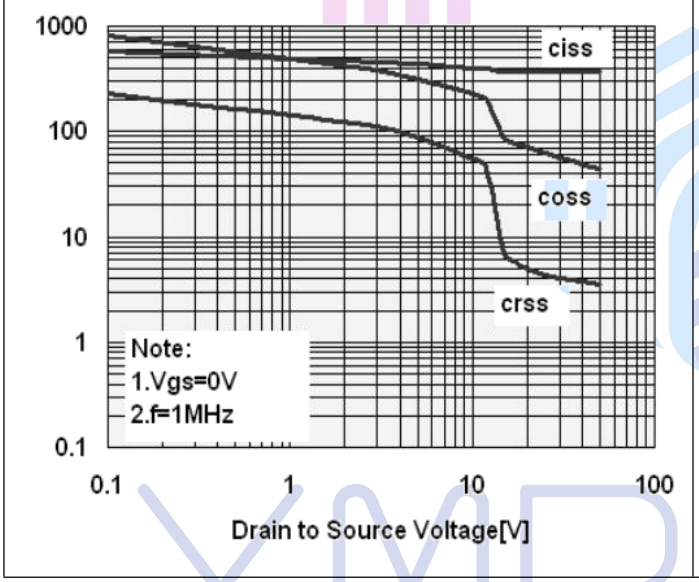


Figure 10: Safe Operation Area

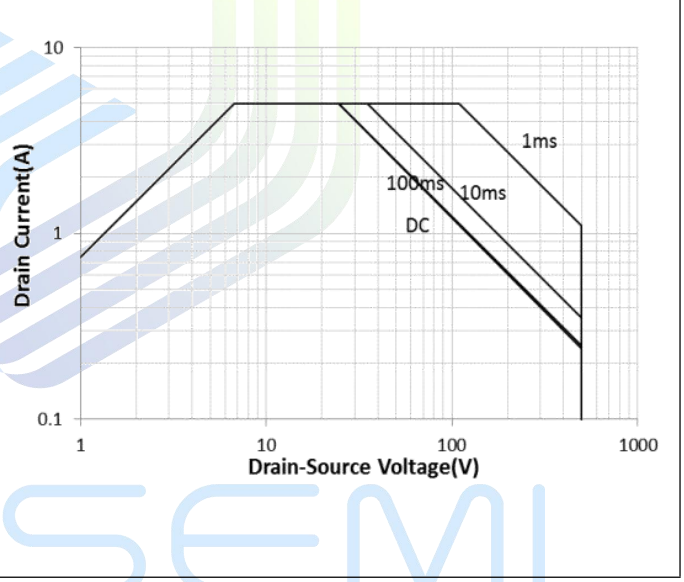


Figure 11: Maximum Drain Current vs. Case Temperature

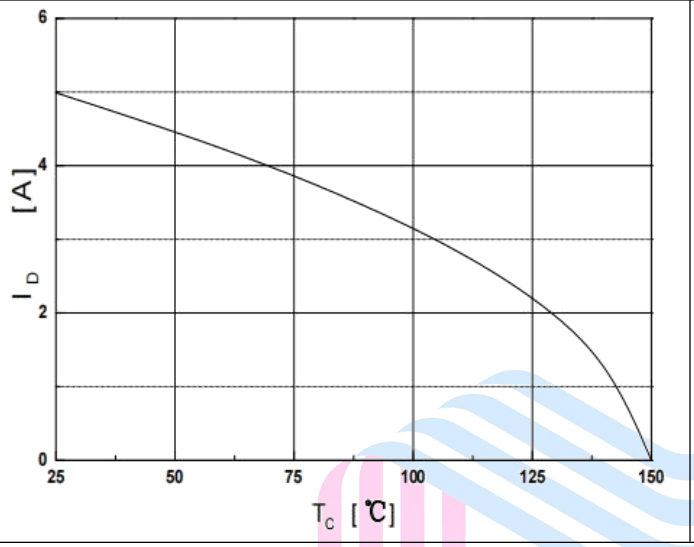
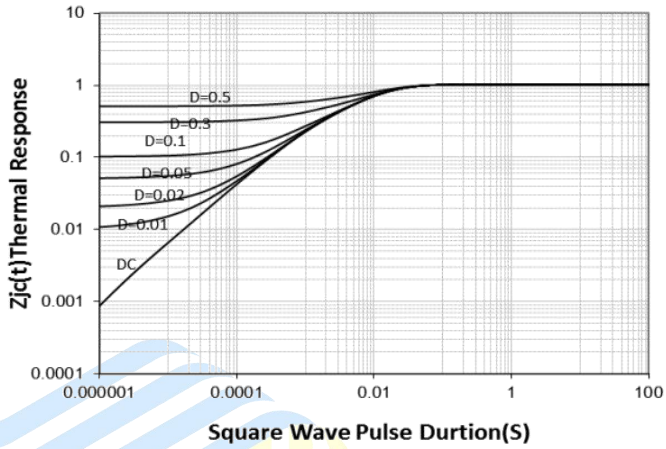


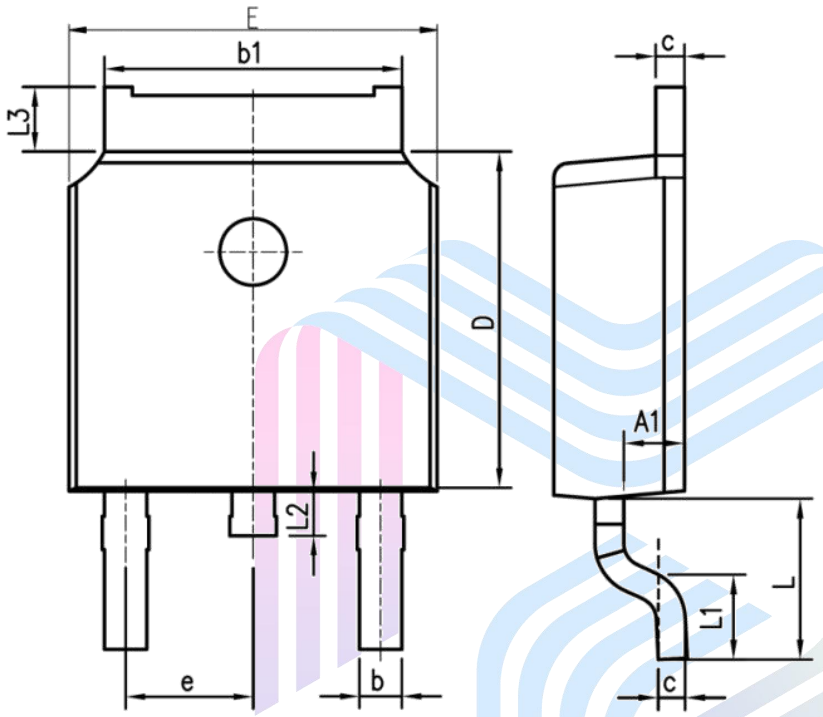
Figure 12: Normalized Maximum Transient Thermal Impedance

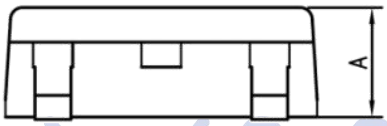


Mechanical Dimensions:

TO-252 Package Information

Unit:mm





SYMBOL	mm	
	MIN	MAX
A	2.10	2.50
A1	0.97	1.17
b	0.63	0.93
b1	5.13	5.53
c	0.40	0.60
D	5.80	6.40
E	6.30	6.90
e	2.286BSC	
L	2.50	3.30
L1	1.20	1.80
L2	0.60	1.00
L3	0.85	1.30

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