VSTJ065R20BNB

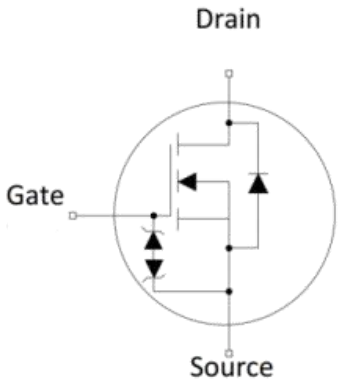
Datasheet

2.0Ω, 650V, N-Channel Power MOSFET VSTJ065R20BNB

General Description

$V_{(BR)DSS}$	$R_{DS(ON)\_max}$	I_D
650V	2.0Ω@10V	3.5A

Symbol

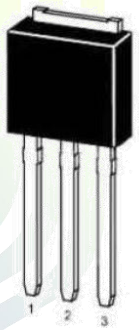


Symbol of VSTJ065R20BNB

Features

- Low RDS(on) & FOM
- Extremely low switching loss
- Excellent stability and uniformity
- Ultra-fast and robust body diode
- Integrated ESD protection diode

Package Type



TO-251

Package Type of VSTJ065R20BNB

Application

- PC power
- Telecom power
- Server power
- EV Charger
- Motor driver

Ordering Information

Product Name	Package	Marking
VSTJ065R20BNB	TO-251	STJ065R20BNB

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

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	650	V
Gate-Source Voltage		V_{GS}	±30	V
Continuous Drain Current Note 1	T_C=25ºC	I_D	3.5	A
Pulsed Drain Current Note 2	T_C=25ºC	$I_{D,\ pulse}$	10.5	A
Continuous Diode Forward Current Note 1	T_C=25ºC	I_S	3.5	A
Diode Pulsed Current Note 2	T_C=25ºC	$I_{S,\ pulse}$	10.5	A
Max Power Dissipation Note 3	T_C=25ºC	P_D	60	W
Avalanche Current, Single Pulse Note 4		I_{AS}	1.6	A
Avalanche Energy, Single Pulse Note4		E_{AS}	77	mJ
Gate source ESD(HBM-C=100pF, R=1.5kΩ)		$V_{ESD(G-S)}$	Class 2	-
MOSFET dv/dt ruggedness, V_{DS}=0~480V		dv/dt	50	V/ns
Reverse diode dv/dt, V_{DS}=0~480V, I_{SD}<= I_D		dv/dt	50	V/ns
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	$R_{θJC}$	-	2.08	-	ºC/W
Thermal Resistance, Junction-to-Ambient Note5	$R_{θJA}$	-	62.5	-	

Notes:

Note1: Calculated continuous current based on maximum allowable junction temperature.

Note2: Pulse width limited by safe operating area.

Note3: Based on max. junction temperature, using junction-case thermal resistance.

Note4: V_{DD}=100V, V_{GS}=10V, L=60mH, starting T_A=25 °C.

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	650	-	-	V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=650V, V_{GS}=0V	-	-	5	uA
Gate-Source Leakage Current	Forward	I_{GSSF}	V_{GS}=30V, V_{DS}=0V	-	-	1	uA
	Reverse	I_{GSSR}	V_{GS}=-30V, V_{DS}=0V	-	-	-1	
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250uA	3	4.3	5	V
Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=2.5A	-	1.77	2.0	Ω
Gate Resistance		R_G	F=1MHz, Open Drain	-	21	-	Ω
Dynamic Characteristics Note5							
Input Capacitance		C_{iss}	V_{DS}=50V	-	200	-	pF
Output Capacitance		C_{oss}	V_{GS}=0V	-	19	-	pF
Reverse Transfer Capacitance		C_{rss}	f=1MHz	-	0.54	-	pF
Turn-on Delay Time		$t_{d(on)}$	V_{DS}=380V	-	7.58	-	ns
Rise Time		t_r	I_D=5A	-	17.64	-	
Turn-off Delay Time		$t_{d(off)}$	R_G=25Ω	-	12.1	-	
Fall Time		t_f	V_{GS}=10V	-	12.83	-	
Gate Charge Characteristics Note5							
Gate to Source Charge		Q_{gs}	V_{DS}=400V	-	2.3	-	nC
Gate to Drain Charge		Q_{gd}	I_D=5A	-	1.5	-	
Gate Charge Total		Q_g	V_{GS}=0 to 10V	-	4.68	-	
Gate Plateau Voltage		$V_{Plateau}$		-	6.58	-	V
Reverse Diode Characteristics Note5							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=0V, I_S=1A	-	0.9	1.5	V
Reverse Recovery Time		t_{rr}	V_R=400V	-	56.75	-	ns
Reverse Recovery Charge		Q_{rr}	I_S=5A	-	178	-	nC
Peak Reverse Recovery Current		I_{rrm}	di/dt=100A/us	-	4.8	-	A

Note5: Repetitive rating, pulse width limited by maximum junction temperature.

Electrical Characteristics Diagrams

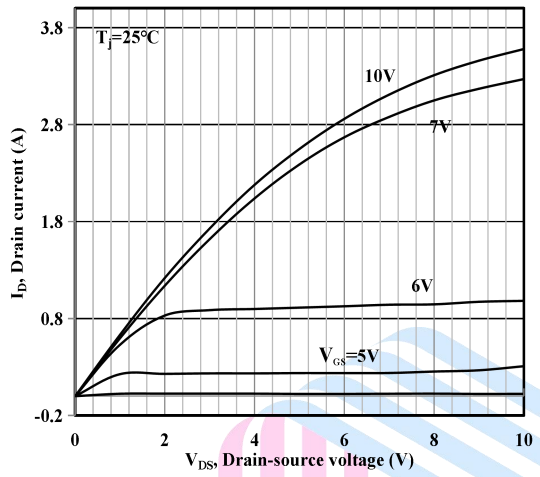


Figure 1. Typ. output characteristics

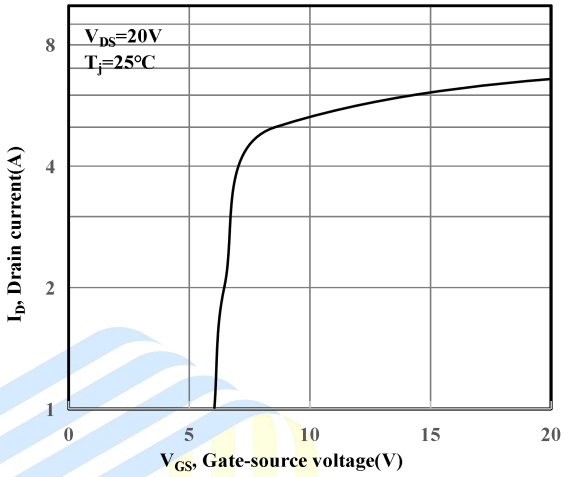


Figure 2. Typ. transfer characteristics

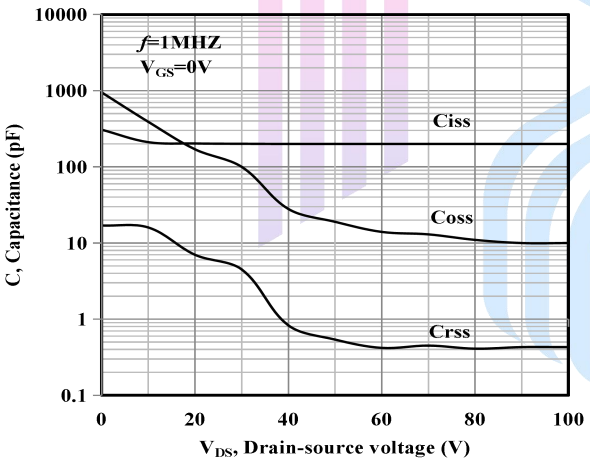


Figure 3. Typ. capacitances

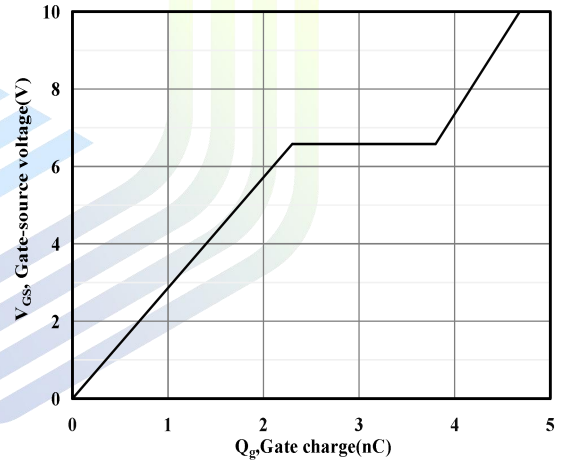


Figure 4. Typ. gate charge

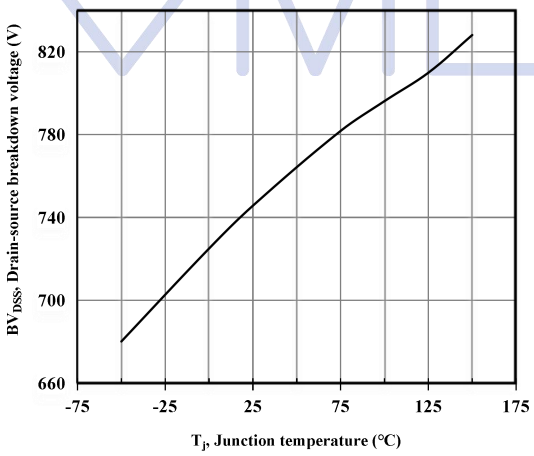


Figure 5. Drain-source breakdown voltage

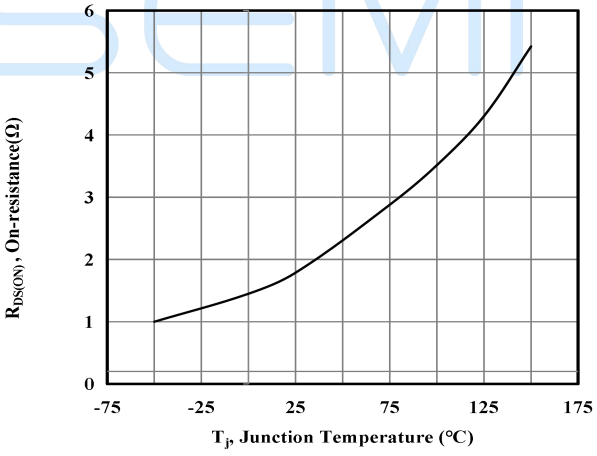


Figure 6. Drain-source on-state resistance

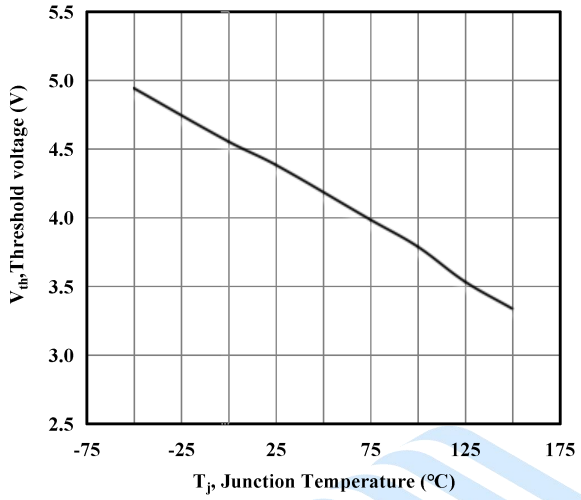


Figure 7. Threshold voltage

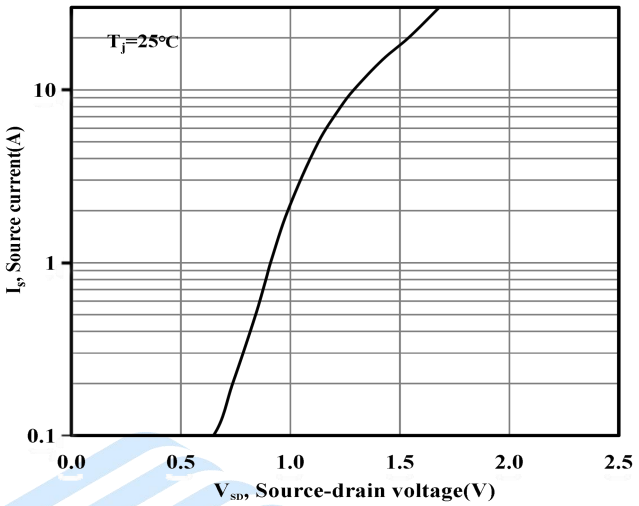


Figure 8. Forward characteristic of body diode

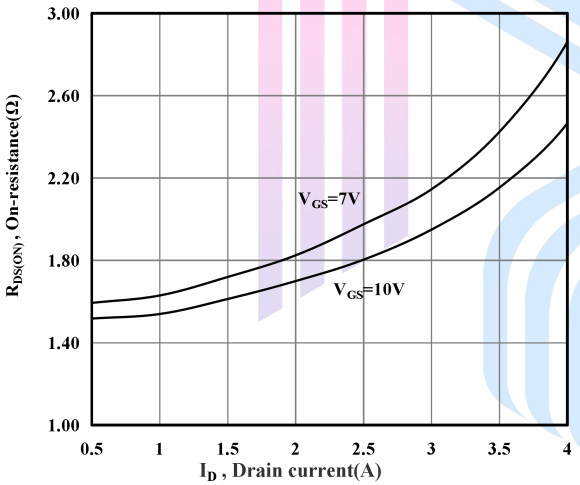


Figure 9. Drain-source on-state resistance

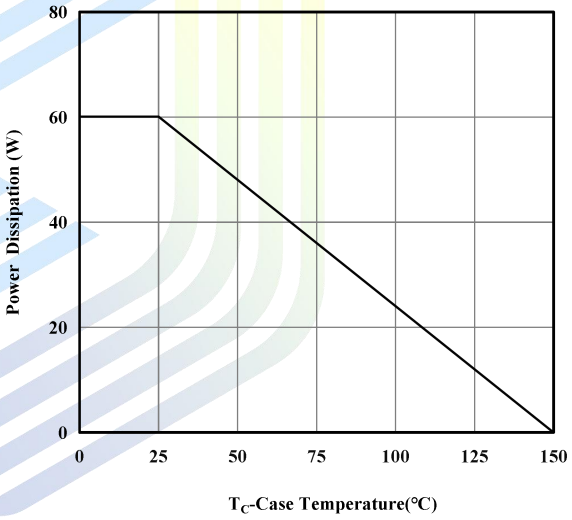


Figure 10. Power dissipation

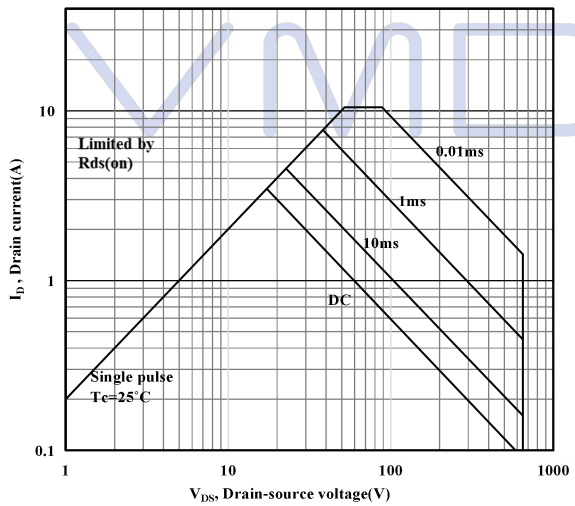


Figure 11. Safe operation area T_C=25℃

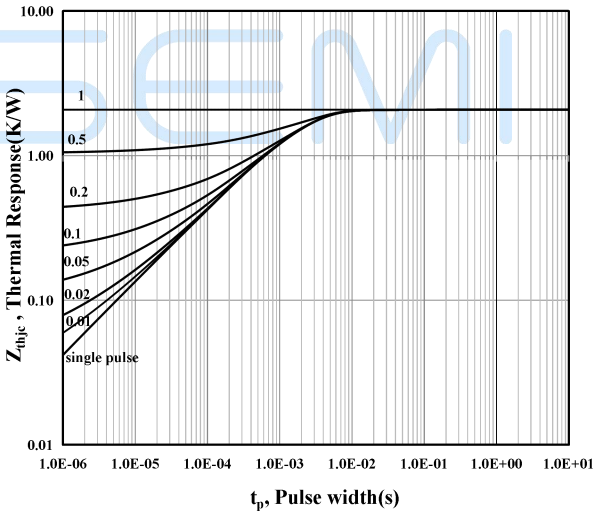
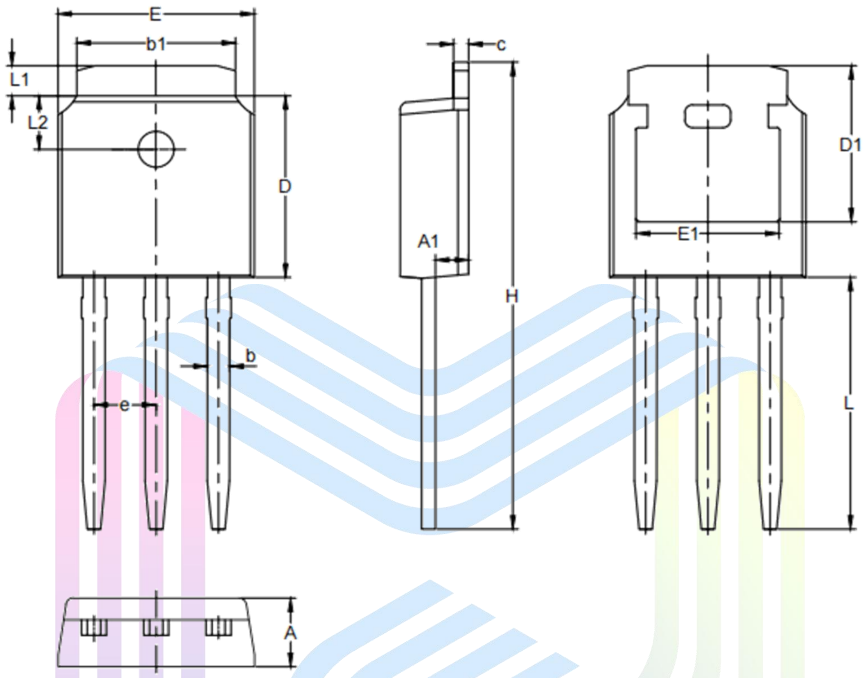


Figure 12. Max. transient thermal impedance

Mechanical Dimensions

TO-251 Package Information



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

Symbol	MIN	MAX
A	2.2	2.4
A1	0.97	1.27
b	0.6	0.9
b1	5.1	5.5
c	0.43	0.61
D	5.95	6.25
D1	5.3REF	
E	6.4	6.75
E1	4.63	-
e	2.286BSC	
H	15.9	16.9
L	9	9.65
L1	0.88	1.28
L2	1.65	1.95

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