VFTA010R052NA

Datasheet

General Description

$V_{(BR)DSS}$	$R_{DS(ON)\_max}$	I_D
100V	5.2mΩ@10V	125A

Symbol

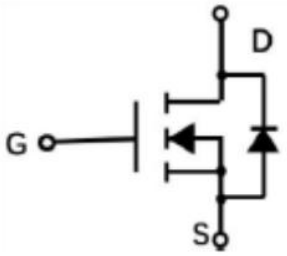
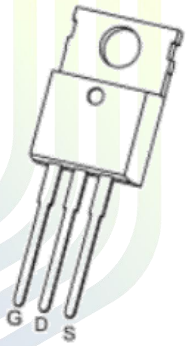


Figure 1 Symbol of VFTA010R052NA

Features

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

Package Type



TO-220-3L-C

Figure 2 Package Type of VFTA010R052NA

Application

- DC/DC Converter
- Synchronous Rectification
- High-Frequency Switch

Ordering Information

Product Name	Package
VFTA010R052NA	TO-220-3L-C

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[Note1]	T_C= 25 ºC	I_D	125	A
Pulsed Drain Current [Note2]		I_{DM}	500	
Avalanche Current[Note3]		I_{AS}	18	
Single Pulsed Avalanche Energy[Note3]		E_{AS}	81	mJ
Total Power Dissipation[Note5]	T_C= 25 ºC	P_D	271	W
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]	$R_{\theta JA}$		60		ºC/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$		0.46		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	105			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=100V, 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	2.0	3.0	V
Static Drain-Source On-Resistance[Note4]	$R_{DS(ON)}$	V_{GS}=10V, I_D= 20A		4.3	5.2	mΩ
Forward Transconductance[Note4]	g_{FS}	V_{DS}=5V, I_D= 20A	20			S
Dynamic Characteristics						
Input Capacitance	C_{ISS}	V_{DS}=45V		3465		pF
Output Capacitance	C_{OSS}	V_{GS}=0V		674		pF
Reverse Transfer Capacitance	C_{RSS}	f=1MHz		6.8		pF
Total Gate Charge	Q_g	V_{DS}=50V		57.2		nC
Gate-Source Charge	Q_{gs}	V_{GS}=10V		5.8		nC
Gate-Drain Charge	Q_{gd}	I_D= 20A		3.1		nC
Gate Resistance	Rg	f = 1MHz, Open drain		1.2		Ω
Switching Parameters						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}= 50V		21		ns
Turn-on Rise Time	t_r	V_{GS}= 10V		22		ns
Turn-off Delay Time	$t_{d(off)}$	R_L=2.5Ω		58		ns
Turn-off Fall Time	t_f	R_G=3Ω		20		ns
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} = 50V, 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 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C.

Typical Performance Characteristics

Figure 3: Transfer Characteristics

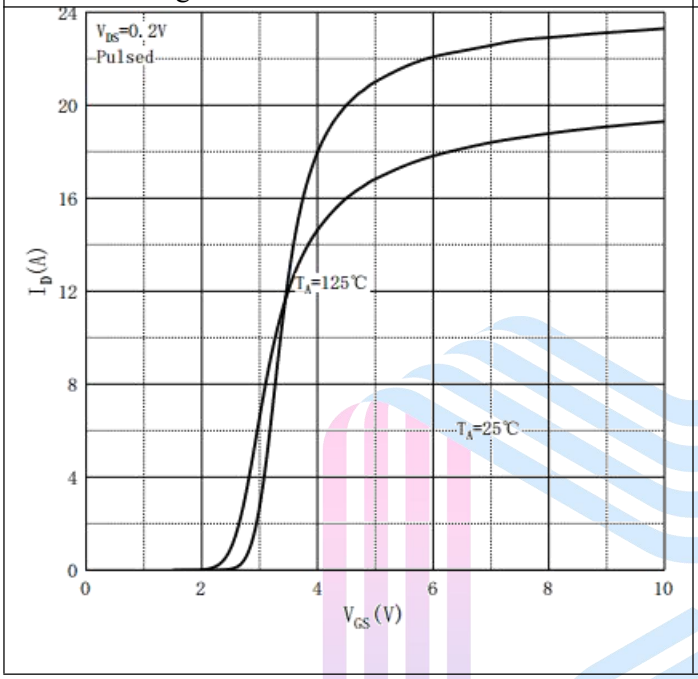


Figure 4: Output Characteristics

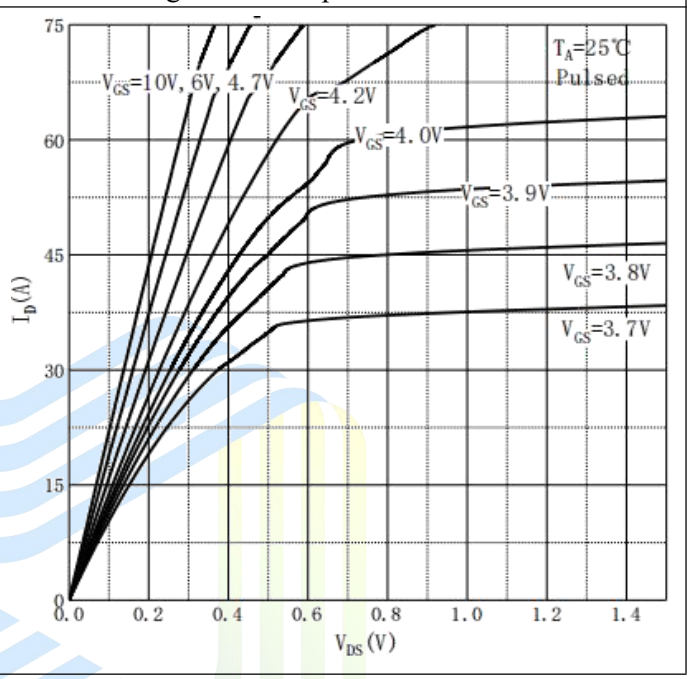


Figure 5: On-Resistance vs. Drain Current

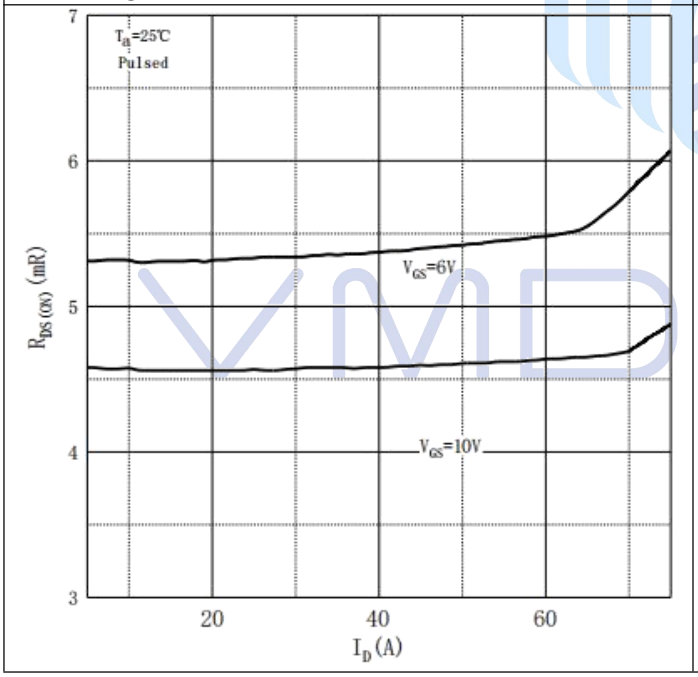


Figure 6: On-Resistance vs. Gate Voltage

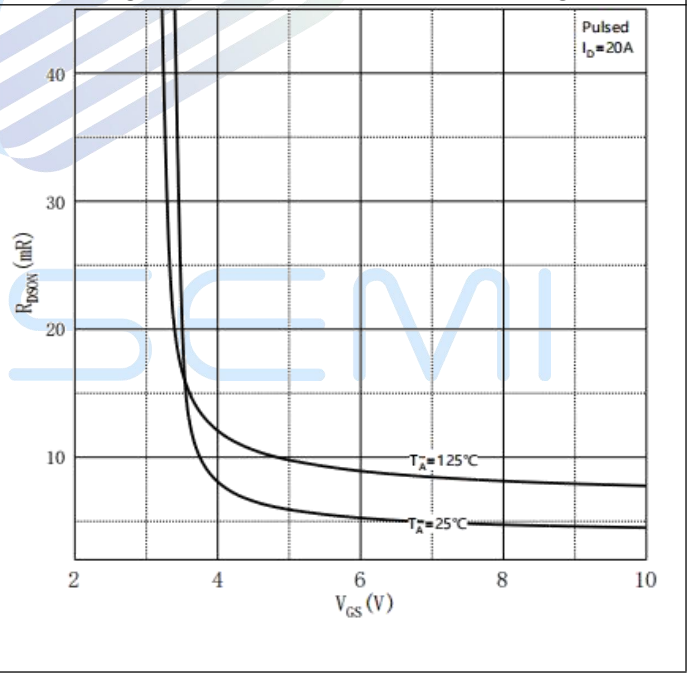


Figure 7: Body Diode Characteristics

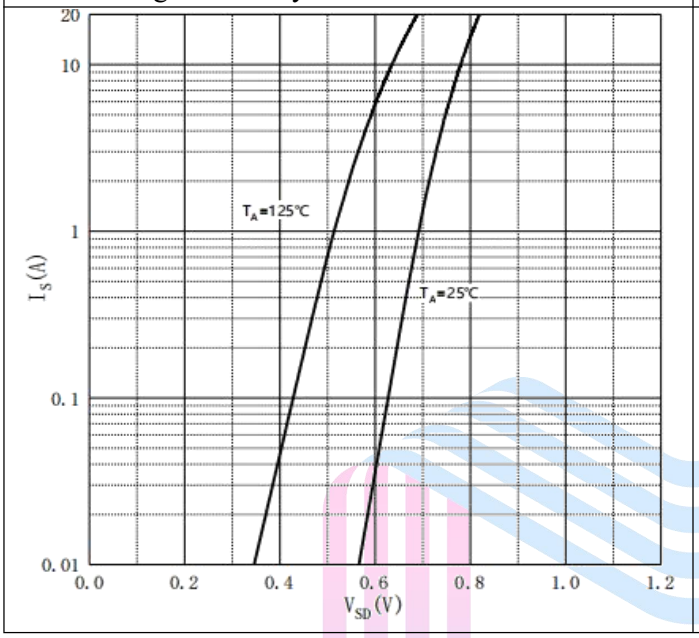


Figure 8: Threshold Voltage

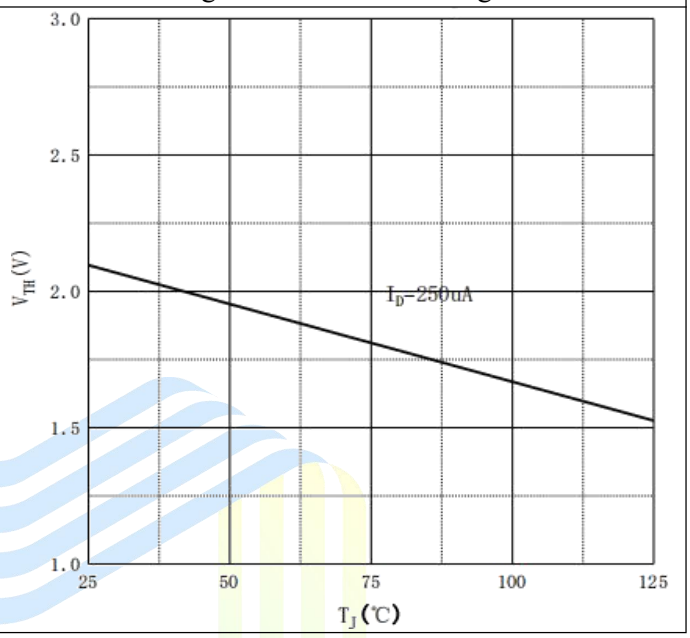


Figure 9: Typical Capacitance

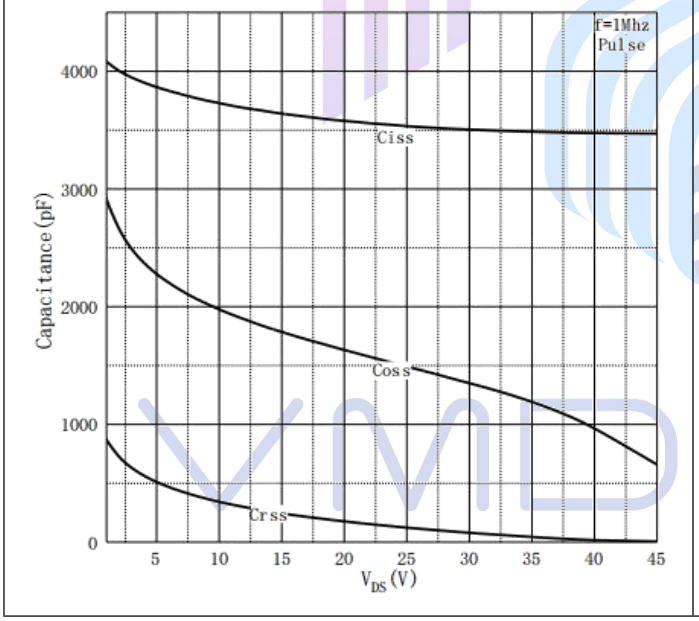


Figure 10: Safe Operation Area

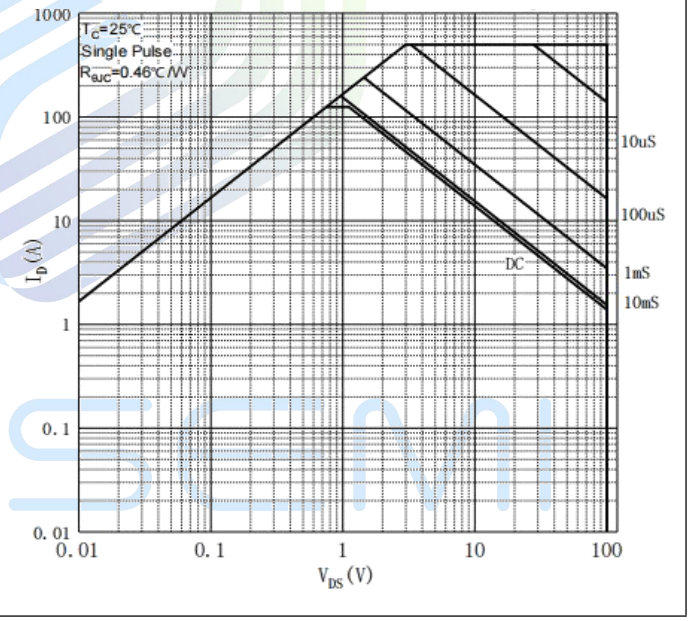
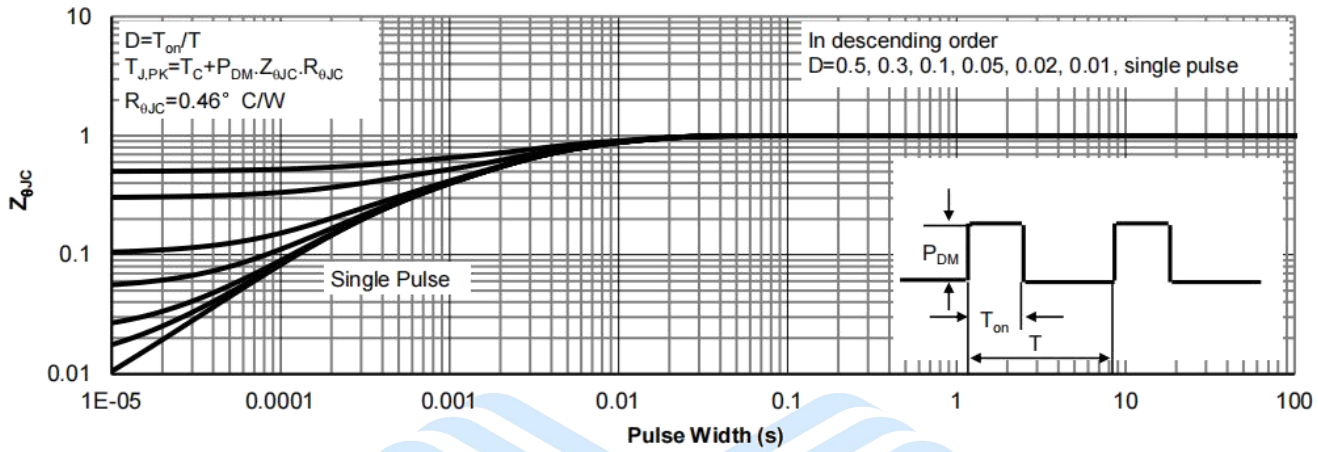
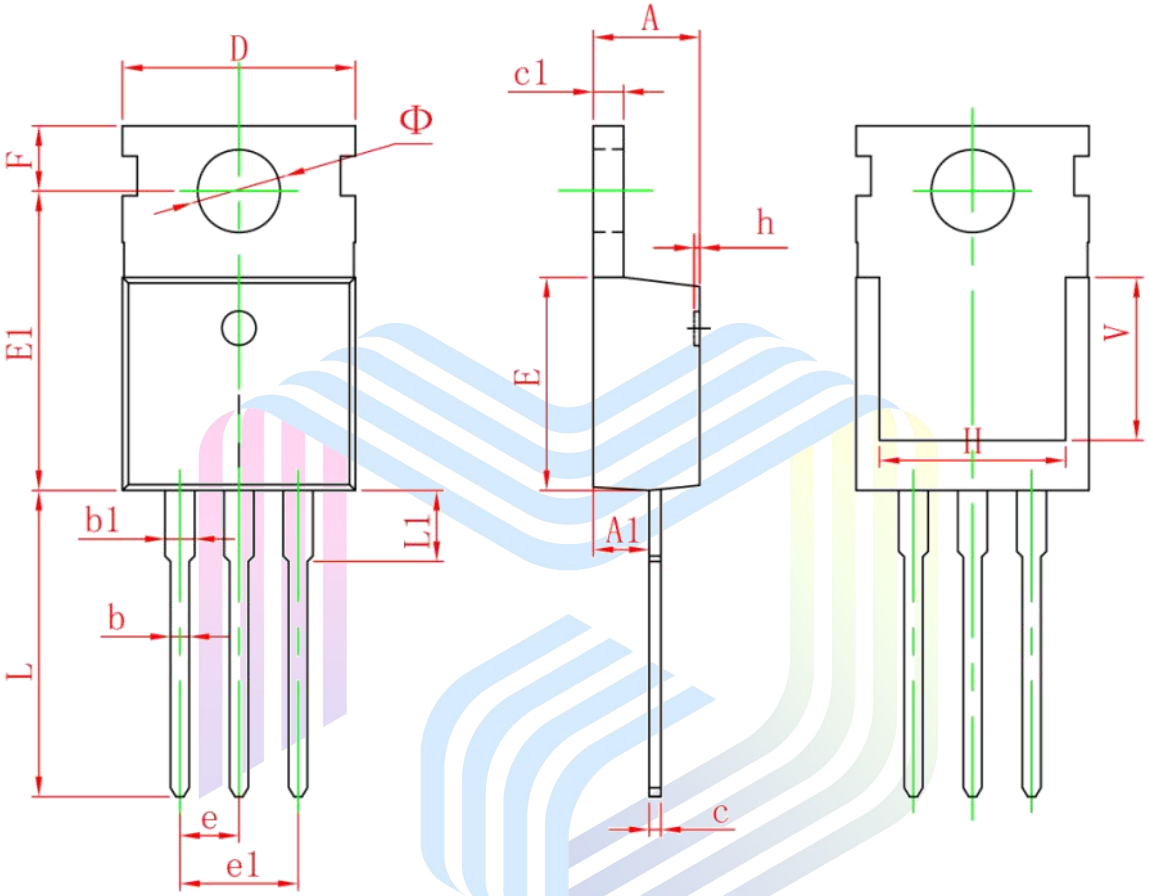


Figure 11: Normalized Maximum Transient Thermal Impedance



Mechanical Dimensions:

TO-220-3L-C Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.950	9.750	0.352	0.384
E1	12.650	13.050	0.498	0.514
e	2.540TYP		0.100TYP	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	6.900REF		0.272REF	
Φ	3.400	3.800	0.134	0.150

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