VFTA010R039NA

Datasheet

General Description

$V_{(BR)DSS}$	$R_{DS(ON)\_max}$	I_D
100V	3.9mΩ@10V	145A

Symbol

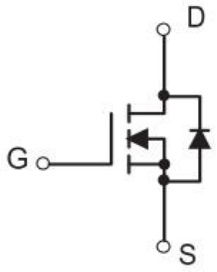
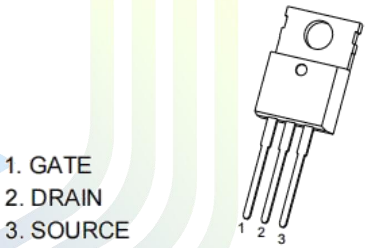


Figure 1 Symbol of VFTA010R039NA

Features

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

Package Type



TO-220-3L-C

Figure 2 Package Type of VFTA010R039NA

Application

- Power Switch Application

Ordering Information

Product Name	Package
VFTA010R039NA	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	145	A
Continuous Drain Current[Note1]	T_C= 100 ºC		102	
Pulsed Drain Current [Note2]		I_{DM}	580	
Avalanche Current[Note3]		I_{AS}	27	
Single Pulsed Avalanche Energy[Note3]		E_{AS}	182	mJ
Total Power Dissipation[Note5]	T_C= 25 ºC	P_D	417	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	$R_{\theta JC}$		0.3		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	100			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	2.0	2.9	4.0	V
Static Drain-Source On-Resistance[Note4]	$R_{DS(ON)}$	V_{GS}=10V, I_D= 20A		3.0	3.9	mΩ
Forward Transconductance[Note4]	g_{FS}	V_{DS}=5V, I_D= 20A		50		S
Dynamic Characteristics						
Input Capacitance	C_{ISS}	V_{DS}=50V		5673		pF
Output Capacitance	C_{OSS}	V_{GS}=0V		1480		pF
Reverse Transfer Capacitance	C_{RSS}	f=1MHz		69		pF
Total Gate Charge	Q_g	V_{DS}=50V		80.9		nC
Gate-Source Charge	Q_{gs}	V_{GS}=10V		25.3		
Gate-Drain Charge	Q_{gd}	I_D= 20A		16,0		
Gate Resistance	Rg	f = 1MHz, Open drain		2.9		Ω
Switching Parameters						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}= 50V		31		ns
Turn-on Rise Time	t_r	V_{GS}= 10V		22		
Turn-off Delay Time	$t_{d(off)}$	R_L=2.5Ω		44		
Turn-off Fall Time	t_f	R_G=3Ω		28		
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

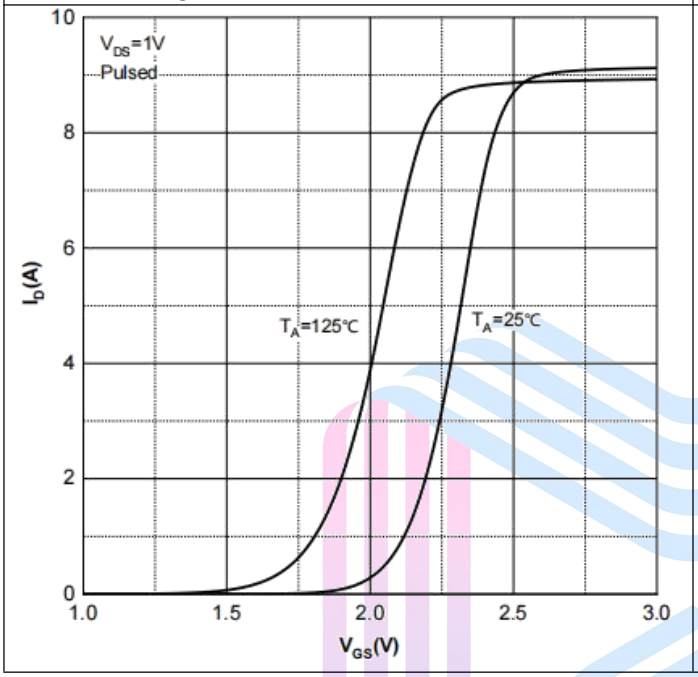


Figure 4: Output Characteristics

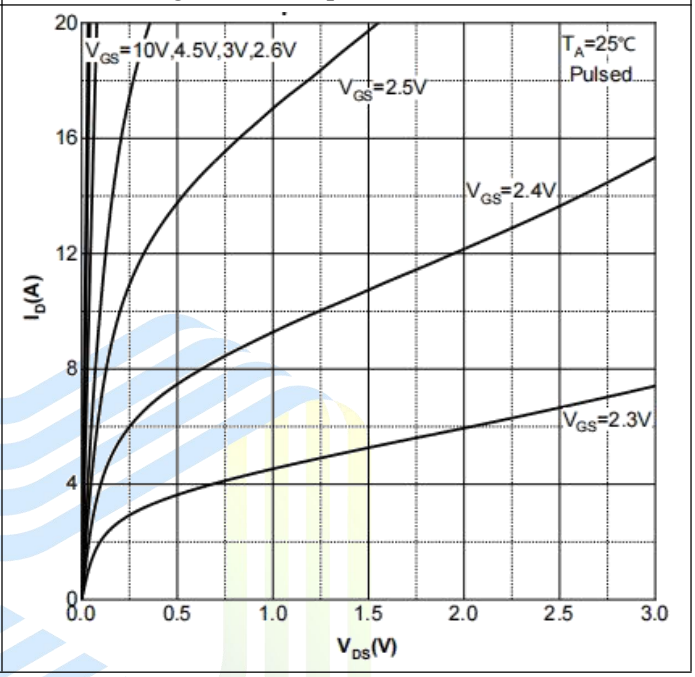


Figure 5: On-Resistance vs. Drain Current

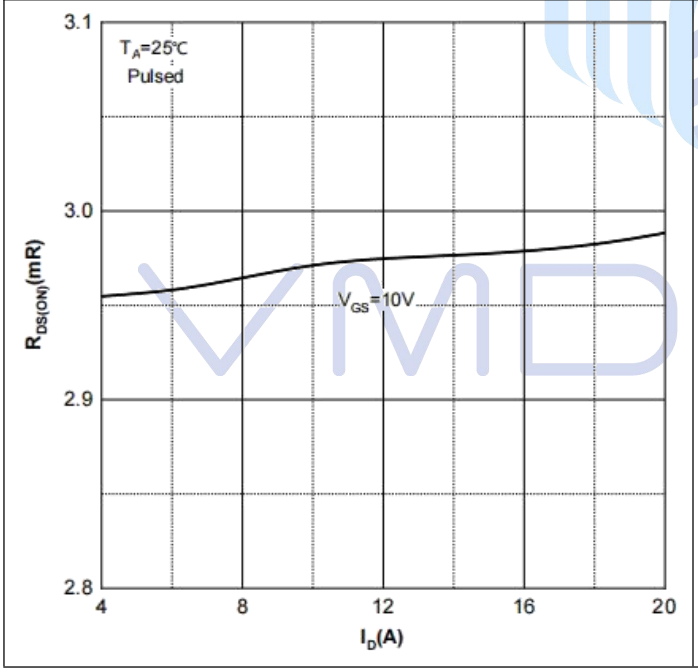


Figure 6: On-Resistance vs. Gate Voltage

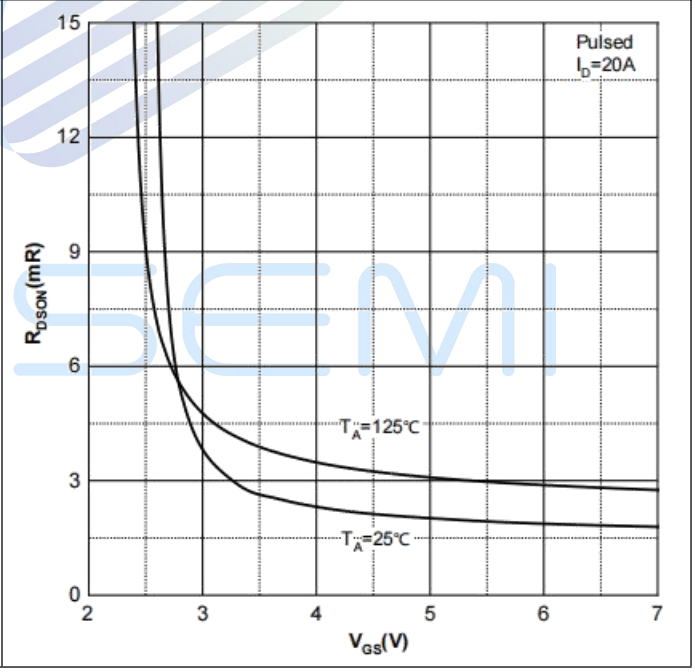


Figure 7: Body Diode Characteristics

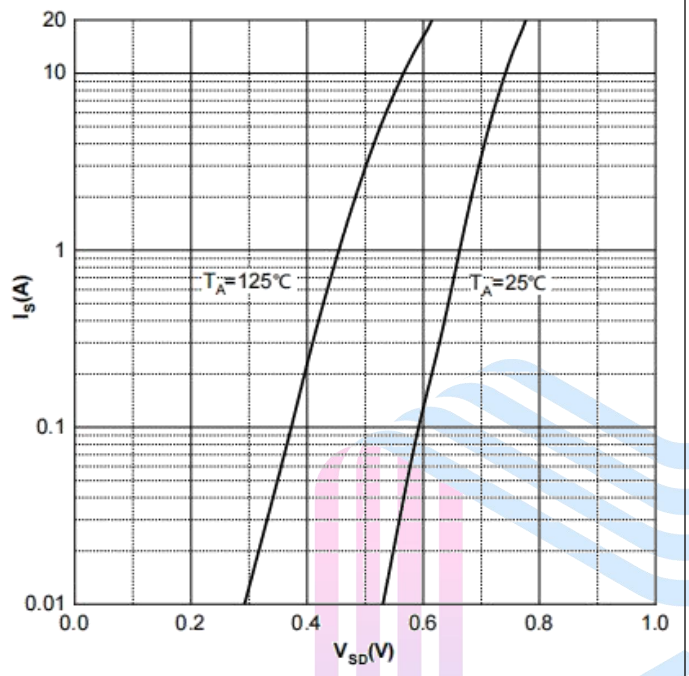


Figure 8: Threshold Voltage

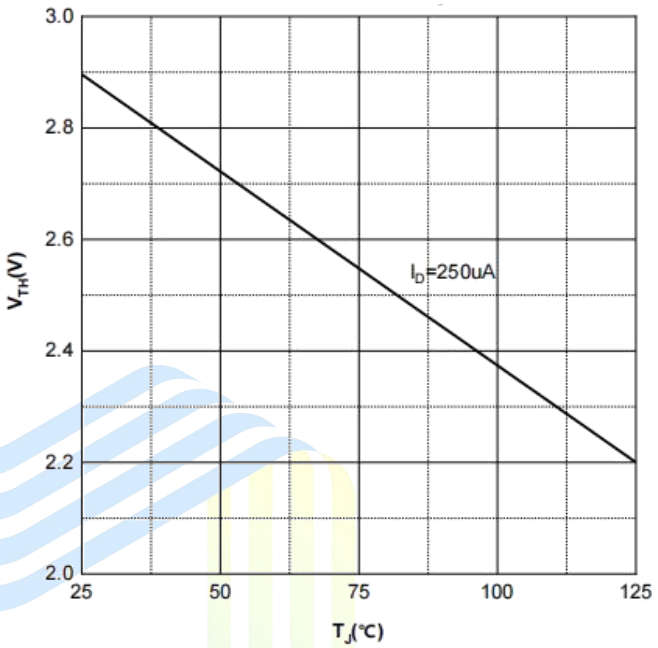


Figure 9: Typical Capacitance

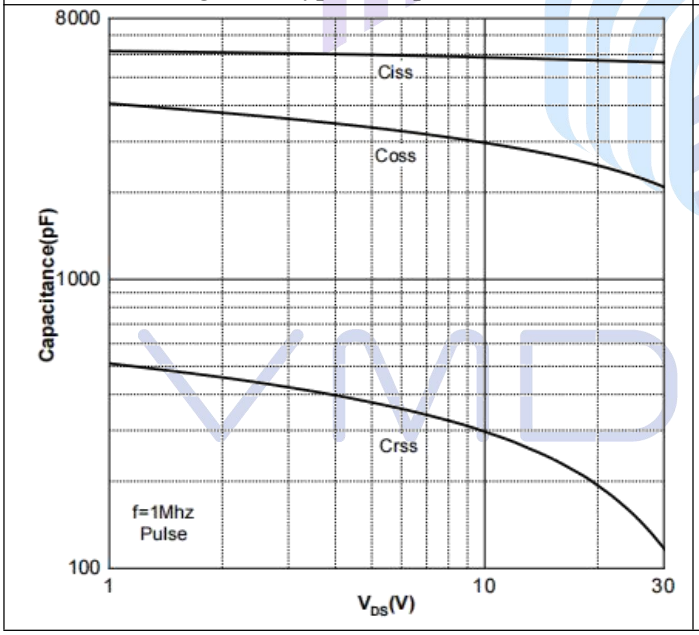


Figure 10: Safe Operation Area

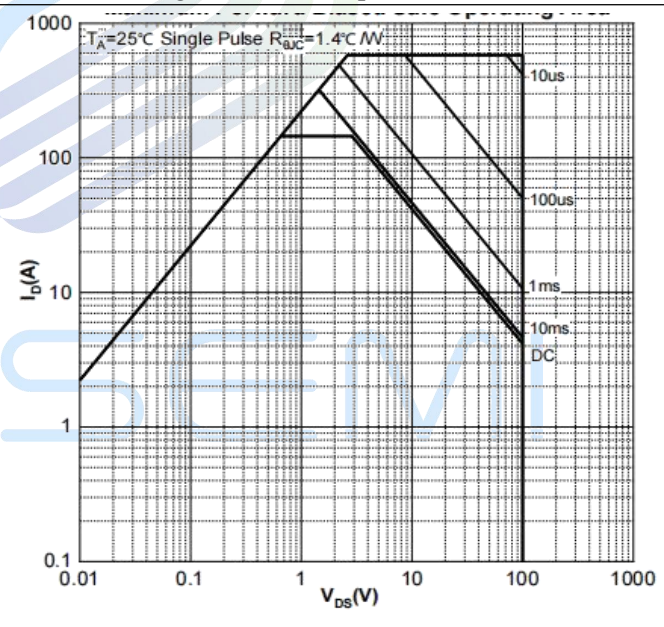
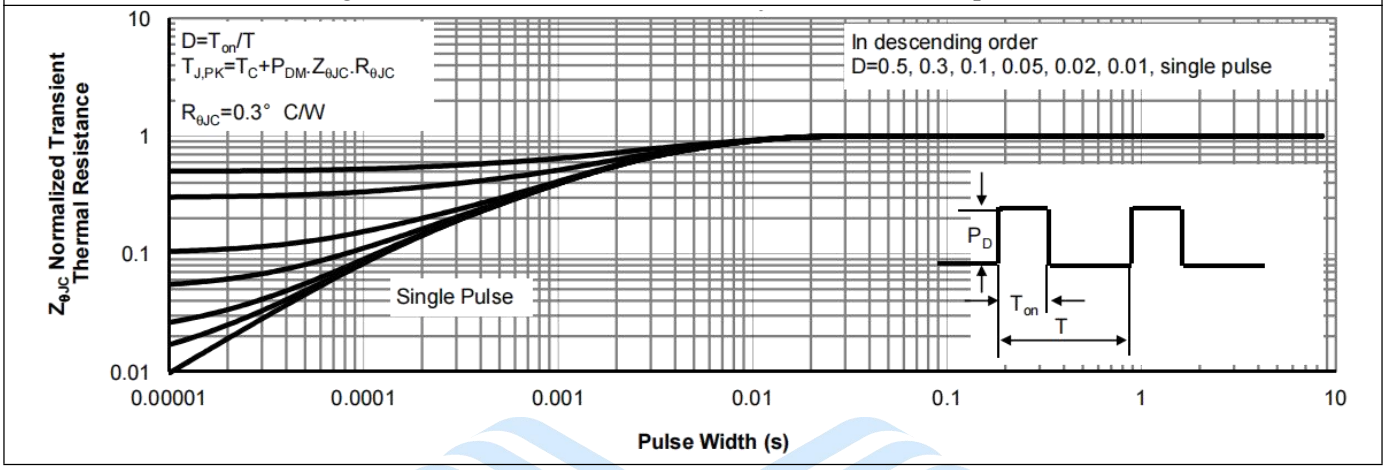
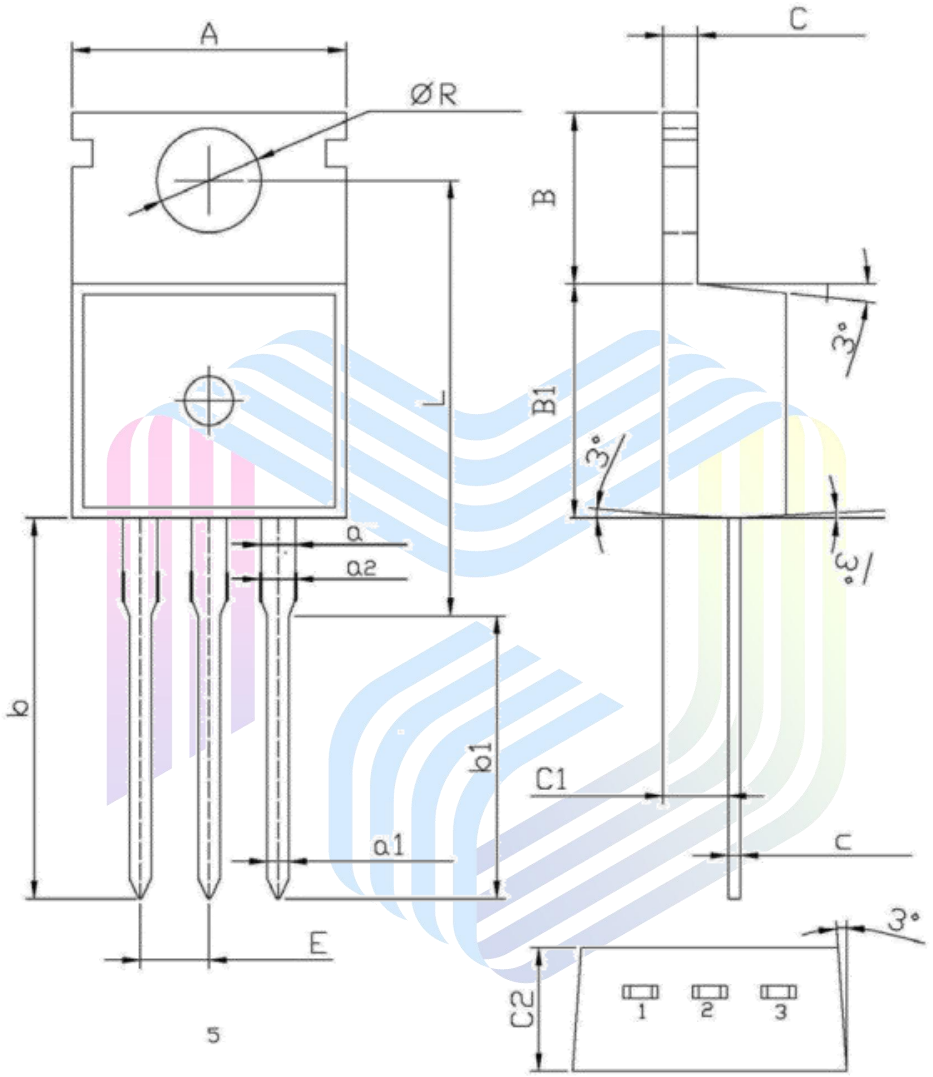


Figure 11: Normalized Maximum Transient Thermal Impedance



Mechanical Dimensions:

TO-220-3L-C Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	9.800	10.200	0.386	0.402
R	3.560	3.640	0.140	0.143
L	15.700	16.100	0.618	0.634
b	12.600	13.600	0.496	0.535
b1	9.600	10.600	0.378	0.417
a	1.220	1.320	0.048	0.052
E	2.340	2.740	0.092	0.108
a2	1.250	1.450	0.049	0.057
C	1.200	1.400	0.047	0.055
B	6.300	6.700	0.248	0.264
B1	9.000	9.400	0.354	0.370
C1	2.200	2.600	0.087	0.102
a1	0.700	0.900	0.028	0.035
c	0.400	0.600	0.016	0.024
C2	4.300	4.700	0.169	0.185

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