VFTL010R750NA

Datasheet

75mΩ, 100V, N-Channel Power MOSFET VFTL010R750NA

General Description

$V_{(BR)DSS}$	$R_{DS(ON)\_max}$	I_D
100V	75mΩ@10V	15A
	90mΩ@4.5V	

Symbol

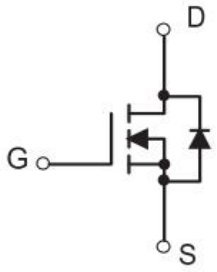


Figure 1 Symbol of VFTL010R750NA

Features

- Low $R_{DS(ON)}$& FOM
- Extremely low switching loss
- Excellent reliability and uniformity
- Fast switching and soft recovery

Package Type

TO-252

Figure 2 Package Type of VFTL010R750NA

Application

- PD charger
- Motor driver
- Switching voltage regulator
- DC-DC converter
- Switched mode power supply

Ordering Information

Product Name	Package
VFTL010R750NA	TO-252

Absolute Maximum Ratings (T_J= 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	15	A
Pulsed Drain Current [Note2]	T_C= 25 ºC	I_{DM}	45	
Continuous diode forward current[Note1]	T_C=25ºC	I_S	15	
Diode pulsed current[Note2]	T_C=25ºC	$I_{S.PULSE}$	45	
Single Pulsed Avalanche Energy[Note5]		E_{AS}	5.5	mJ
Total Power Dissipation[Note3]	T_C= 25 ºC	P_D	36	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 [Note4]	$R_{\theta JA}$		62		ºC/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$		3.5		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
		V_{GS} =-20V, V_{DS}= 0V			-100	
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA	1.2		2.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D= 5A		50	75	mΩ
		V_{GS}=4.5V, I_D= 3A,		60	90	
Gate Resistance	Rg	f=1MHz,Open Drain		28.8		Ω
Dynamic Characteristics						
Input Capacitance	C_{ISS}	V_{DS}=25V		310		pF
Output Capacitance	C_{OSS}	V_{GS}=0V		171		pF
Reverse Transfer Capacitance	C_{RSS}	f=100KHz		16.7		pF
Total Gate Charge	Q_g			6.5		nC
Gate-Source Charge	Q_{gs}	V_{DS}=50V		1.4		
Gate-Drain Charge	Q_{gd}	V_{GS}=10V		1.4		
Gate plateau voltage	$V_{plateau}$	I_D= 5A		3.3		V
Switching Parameters						
Turn-on Delay Time	$t_{d(on)}$	V_{DS}= 50V		14		ns
Turn-on Rise Time	t_r	V_{GS}= 10V		3.2		
Turn-off Delay Time	$t_{d(off)}$	I_D= 5A		36		
Turn-off Fall Time	t_f	R_G=2Ω		14		
Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S= 7A			1.3	V
Reverse Recovery Time	t_{rr}	I_S=5A		36		ns
Reverse Recovery Charge	Q_{rr}	V_R=50V		37		nC
Peak Reverse Recovery Current	I_{rrm}	di/dt=100A/us		1.7		A

Notes :

1. Calculated continuous current based on maximum allowable junction temperature.
2. Repetitive rating; pulse width limited by max. junction temperature.
3. P_D is based on max junction temperature, using junction-case thermal resistance.
4. The value of $R_{\theta JA}$ is measured with the device mounted on 1 in^2 FR-4 board with 2oz Copper, in a still air environment with T_A=25 °C.
5. V_{DD}=30 V, V_{GS} =10 V, L=0.3 mH, starting T_J =25 °C.

Typical Performance Characteristics

Figure 3: Transfer Characteristics

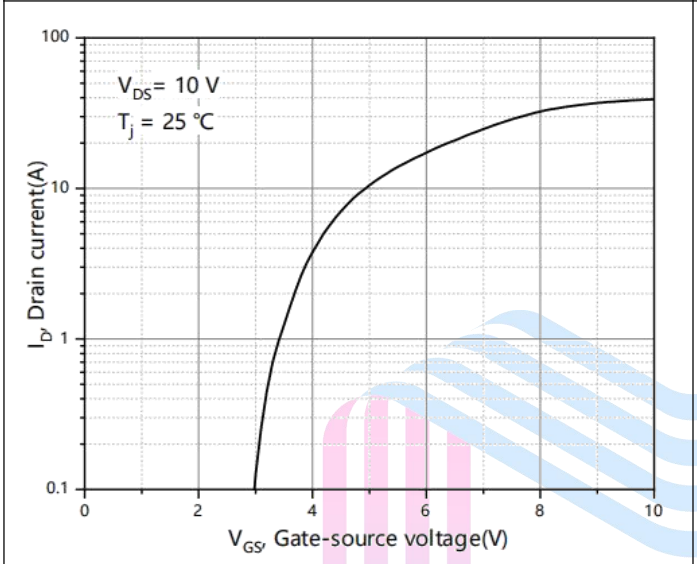


Figure 4: Output Characteristics

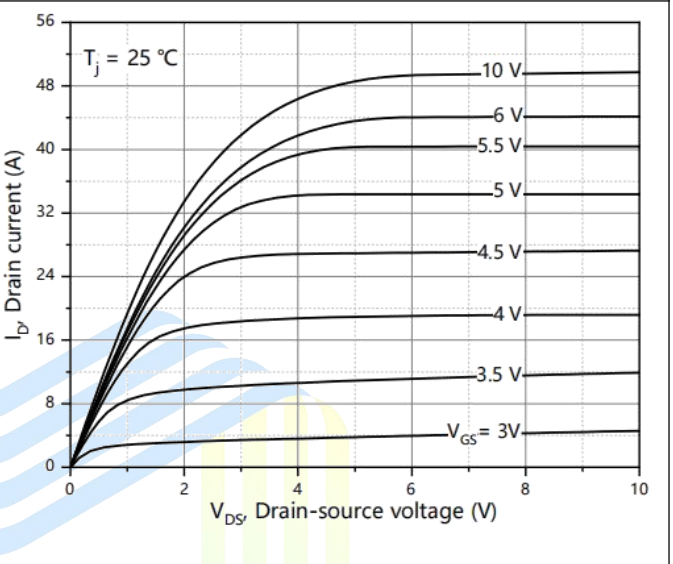


Figure 5: Drain-Source Breakdown Voltage

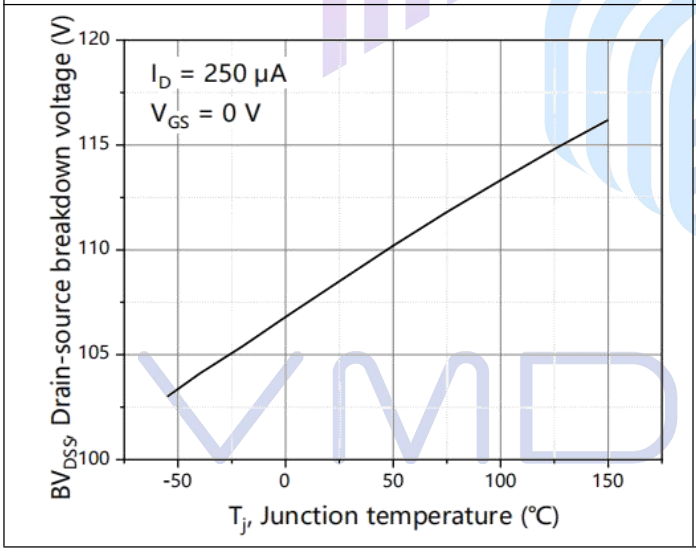


Figure 6: Drain-Source On-Resistance

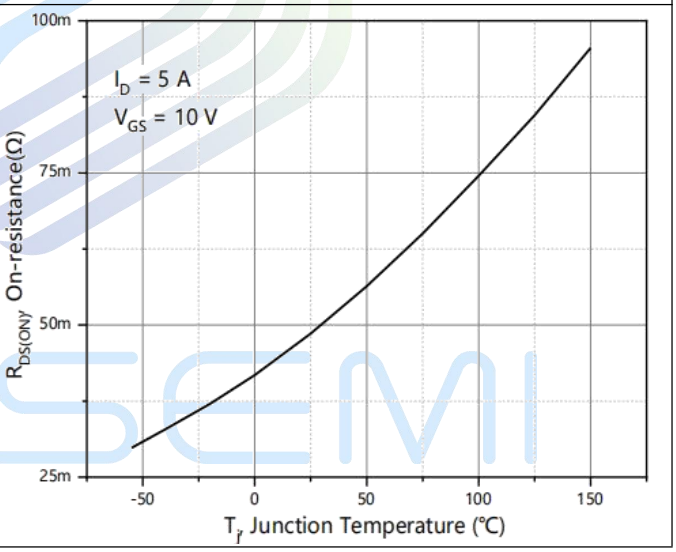


Figure 7: Body Diode Characteristics

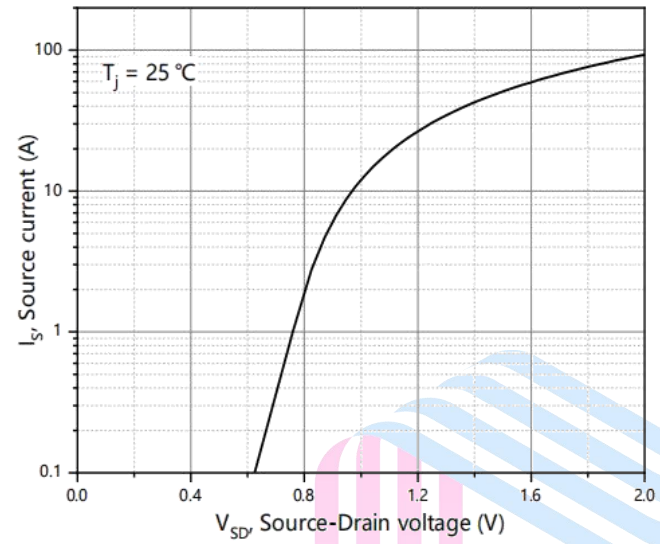


Figure 8: Threshold Voltage

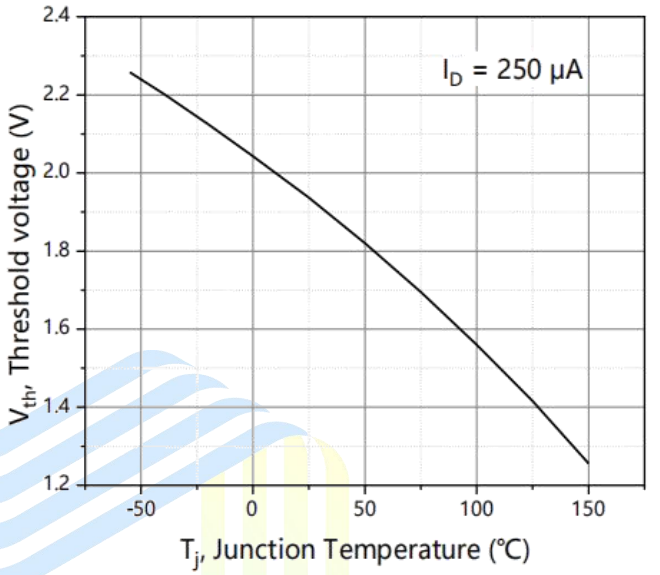


Figure 9: Typical Capacitance

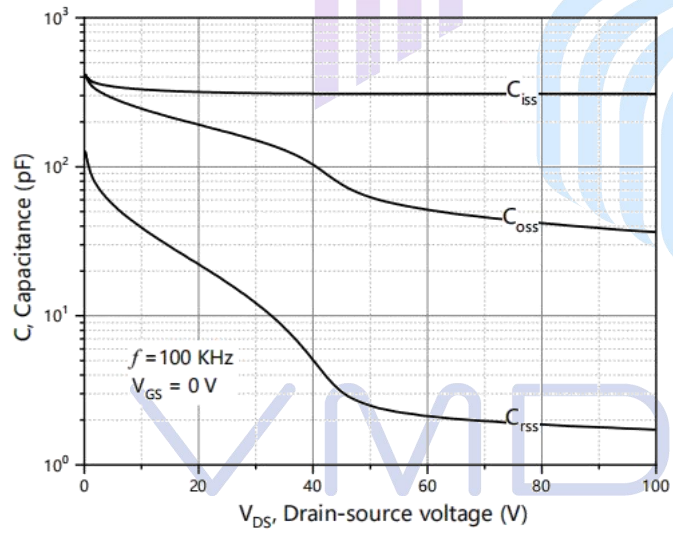


Figure 10: Gate Charge

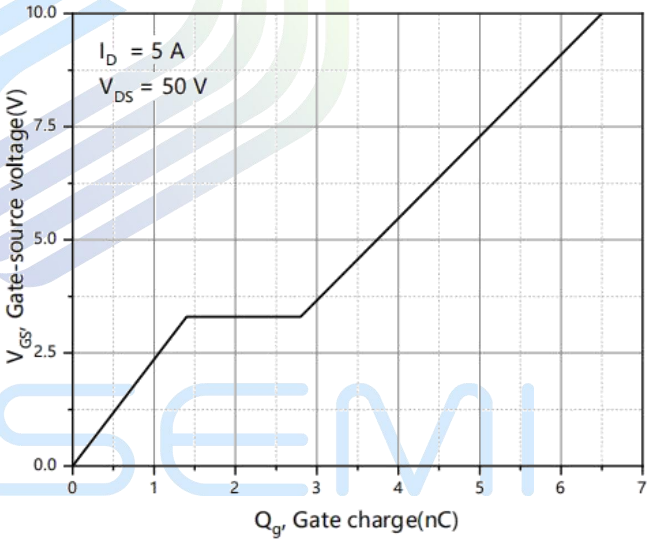


Figure 11: Drain-Source On-Resistance

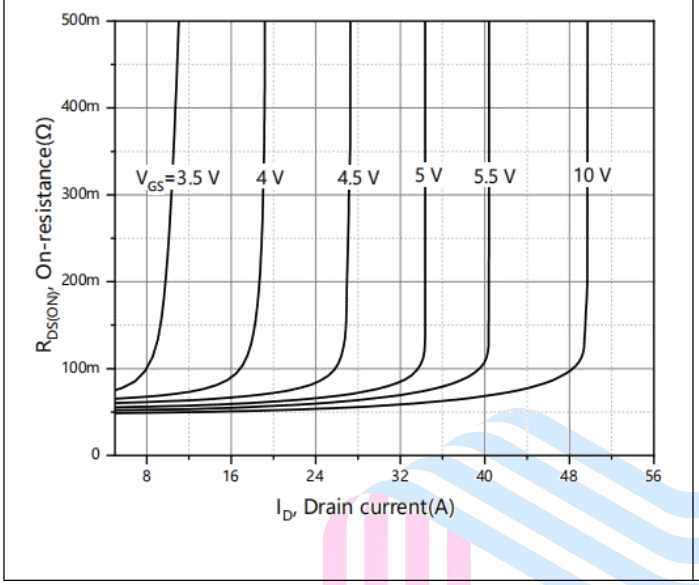


Figure 12: Drain Current

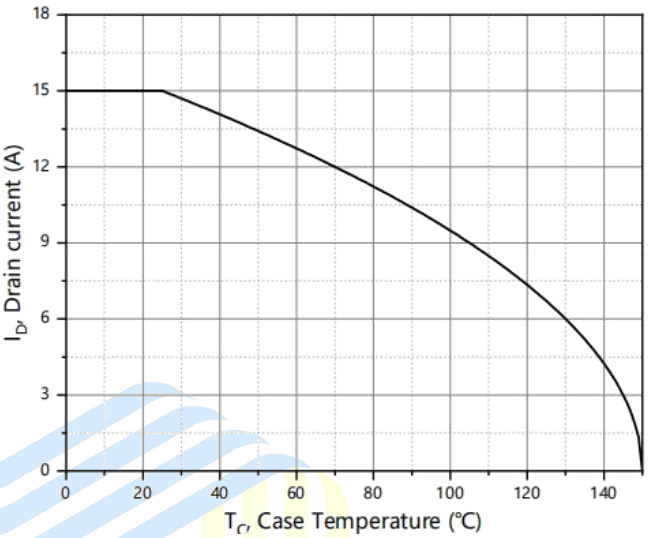


Figure 13: Safe operation area T_C=25 ℃

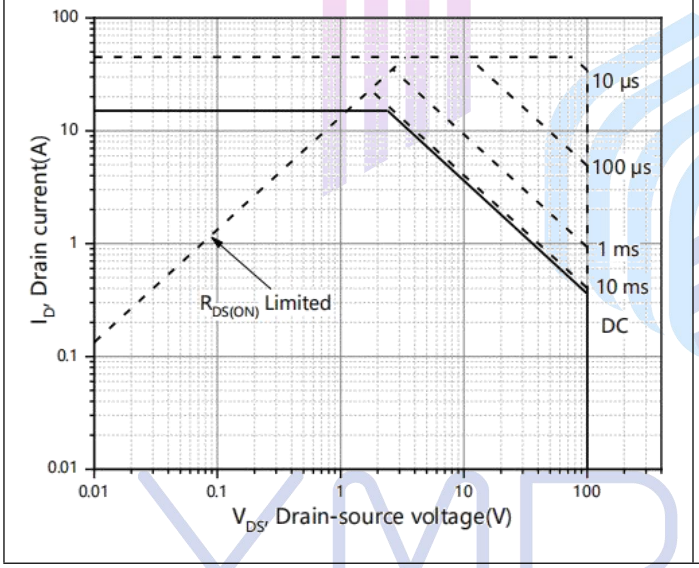
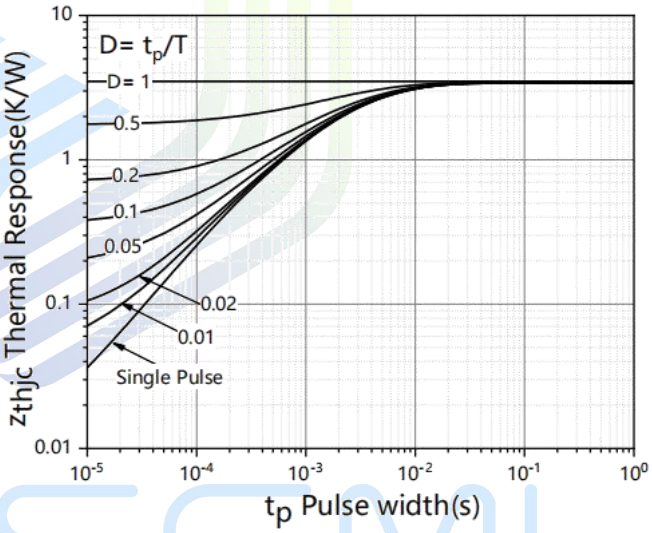
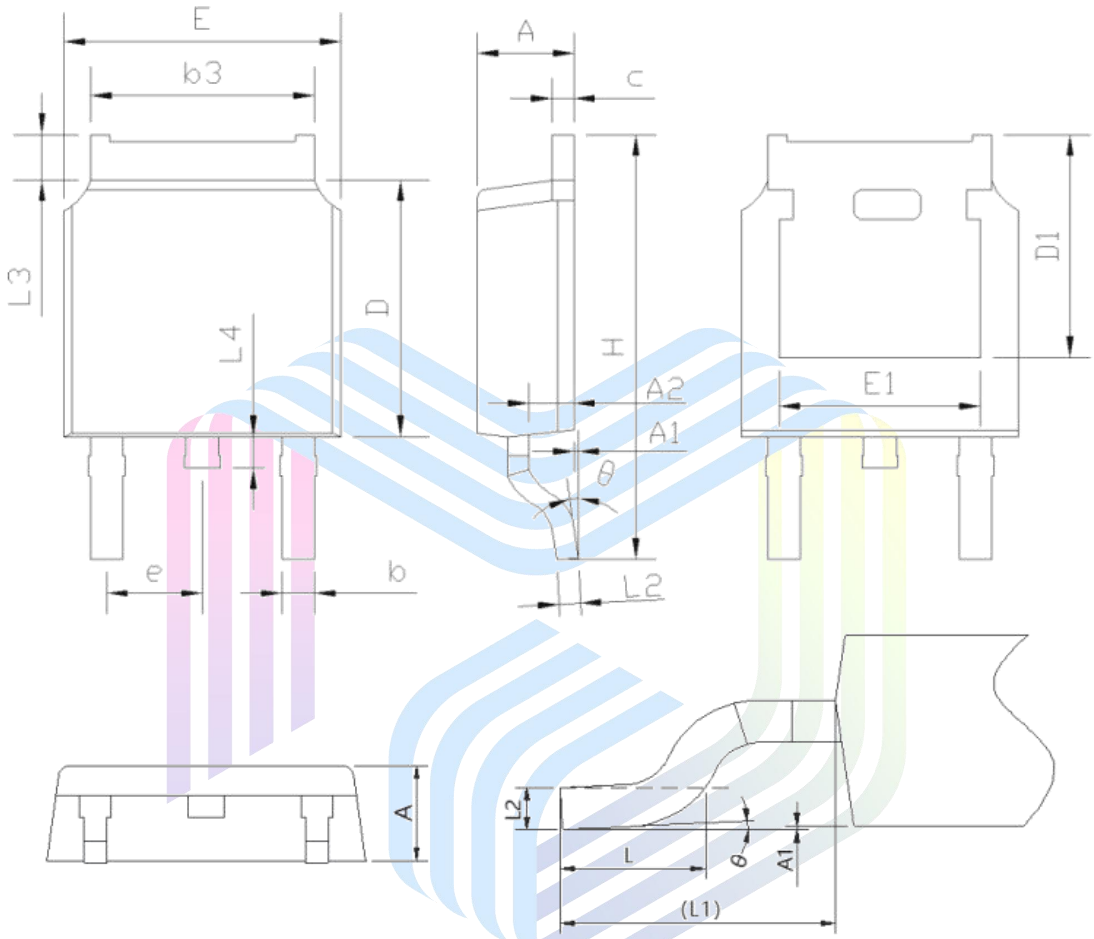


Figure 13: Max. transient thermal impedance



Mechanical Dimensions:

TO-252 Package Information



Symbol	mm		
	Min	Nom	Max
A	2.20	2.30	2.38
A1	0.00	-	0.20
A2	0.97	1.07	1.17
b	0.68	0.78	0.90
b3	5.20	5.33	5.46
c	0.43	0.53	0.61
D	5.98	6.10	6.22
D1	5.30 REF		
E	6.40	6.60	6.73
E1	4.63	-	-
e	2.286 BSC		
H	9.40	10.10	10.50
L	1.38	1.50	1.75
L1	2.90 REF		
L2	0.51 BSC		
L3	0.88	-	1.28
L4	0.50	-	1.00
θ	0°	-	8°

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