VSTD065R59ANA

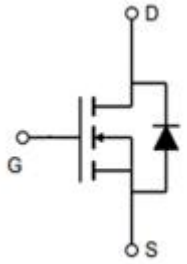
Datasheet

590mΩ, 650V, N-Channel Power MOSFET VSTD065R59ANA

General Description

$V_{(BR)DSS}$	$R_{DS(ON)\_max}$	I_D
650V	590mΩ@10V	8A

Symbol

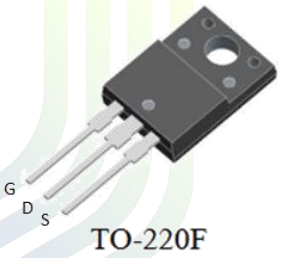


Symbol of VSTD065R59ANA

Features

- Extremely low switching loss
- Excellent stability and uniformity
- RoHS and Halogen-Free Compliant

Package Type



TO-220F

Package Type of VSTD065R59ANA

Application

- PC power
- LED lighting
- Telecom power
- Server power
- Solar/UPS

Ordering Information

Product Name	Package	Marking
VSTD065R59ANA	TO-220F	STD065R59ANA

Absolute Maximum Ratings

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	8	A
Pulsed Drain Current Note 2, T_C=25ºC	$I_{D,\ pulse}$	24	A
Continuous Diode Forward Current Note 1, T_C=25ºC	I_S	8	A
Diode Pulsed Current Note 2, T_C=25ºC	$I_{S,\ pulse}$	24	A
Max Power Dissipation Note 3, T_C=25ºC	P_D	62.8	W
Avalanche Current, Single Pulse Note 4	I_{AS}	4.87	A
Avalanche Energy, Single Pulse Note4	E_{AS}	127.9	mJ
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	15	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	$R_{\theta JC}$		1.99		ºC/W
Thermal Resistance, Junction-to-Ambient Note5	$R_{\theta JA}$		62		

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}=50V, V_{GS}=10V, L=10.8mH, starting T_A=25 °C.

Note5: When mounted on 1 inch square copper board, t≤10sec. The value in any given application depends on the user's specific board design.

Electrical Characteristics (T_A= 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			1	uA
Gate-Source Leakage Current	Forward	I_{GSSF}	V_{GS}=30V, V_{DS}=0V			100	nA
	Reverse	I_{GSSR}	V_{GS}=-30V, V_{DS}=0V			-100	
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250uA	2		4	V
Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=4A		560	590	mΩ
Gate Resistance		R_G	F=1MHz, Open Drain		3.8		Ω
Dynamic Characteristics							
Input Capacitance		C_{iss}	V_{DS}=50V		501.1		pF
Output Capacitance		C_{oss}	V_{GS}=0V		40.23		pF
Reverse Transfer Capacitance		C_{rss}	f=1MHz		1.9		pF
Turn-on Delay Time		$t_{d(on)}$	V_{DS}=380V		12.2		ns
Rise Time		t_r	I_D=8A		12.2		
Turn-off Delay Time		$t_{d(off)}$	R_G=25Ω		35.5		
Fall Time		t_f	V_{GS}=10V		7.6		
Gate Charge Characteristics							
Gate to Source Charge		Q_{gs}	V_{DS}=480V		3.5		nC
Gate to Drain Charge		Q_{gd}	I_D=8A		5.4		
Gate Charge Total		Q_g	V_{GS}=0 to 10V		11.3		
Gate Plateau Voltage		$V_{Plateau}$			5.97		V
Reverse Diode Characteristics							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=0V, I_S=1A		0.75		V
Reverse Recovery Time		t_{rr}	V_R=480V		339.8		ns
Reverse Recovery Charge		Q_{rr}	I_S=8A		2.7		uC
Peak Reverse Recovery Current		I_{rrm}	di/dt=100A/us		15.5		A

Electrical Characteristics Diagrams

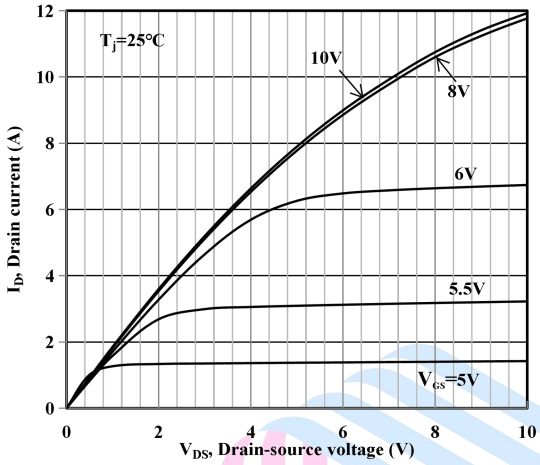


Figure 1. Typ. output characteristics

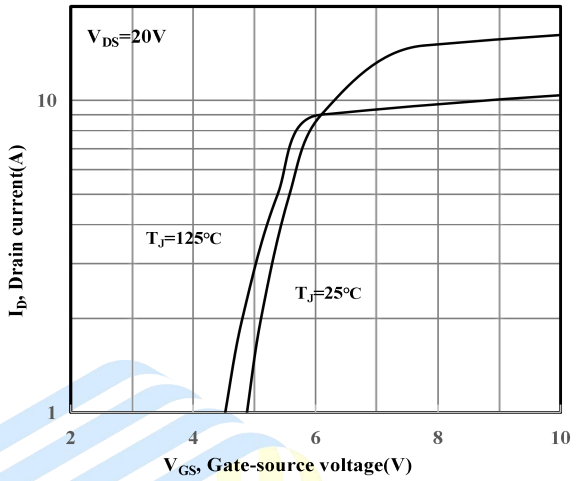


Figure 2. Typ. transfer characteristics

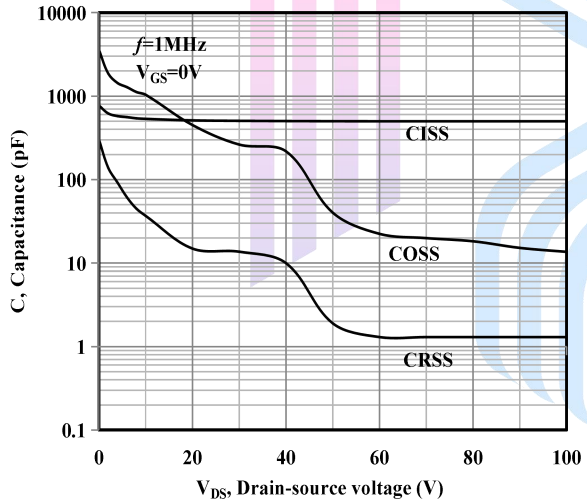


Figure 3. Typ. Capacitances

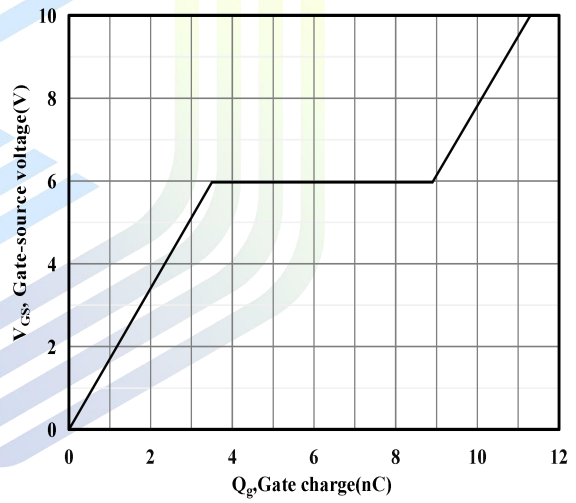


Figure 4. Typ. gate charge

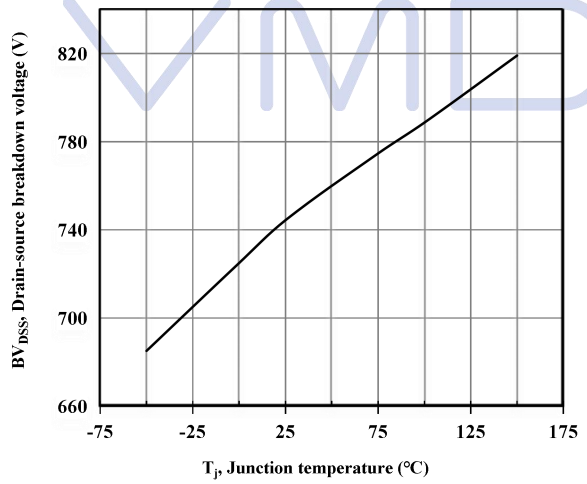


Figure 5. Drain-source breakdown voltage

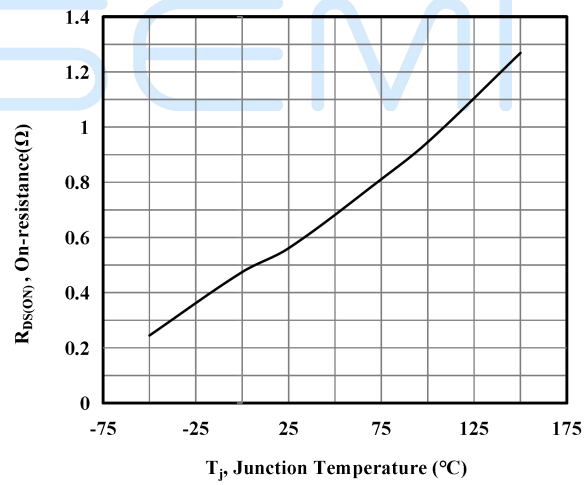


Figure 6. Drain-source on-state resistance

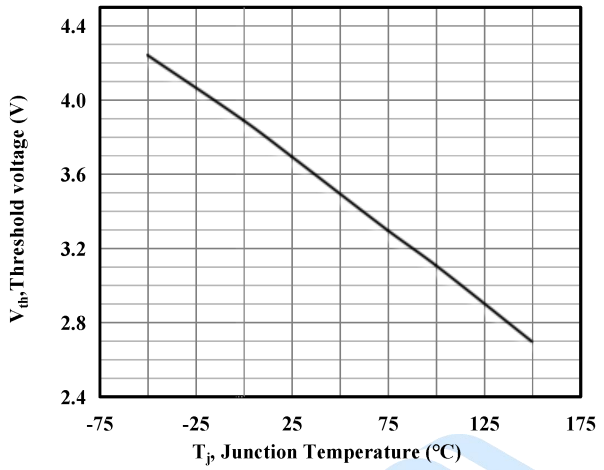


Figure 7. Threshold voltage

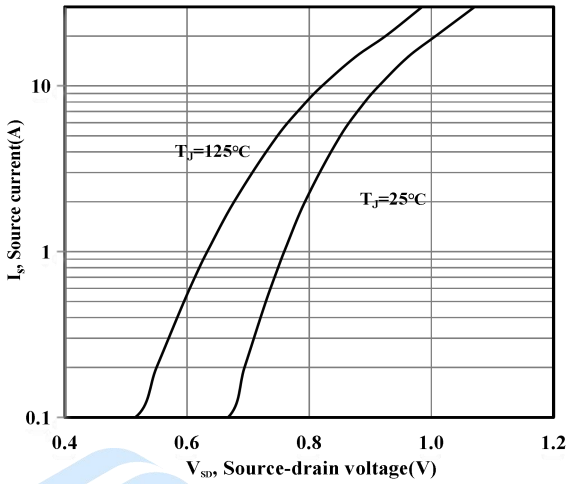


Figure 8. Forward characteristic of body diode

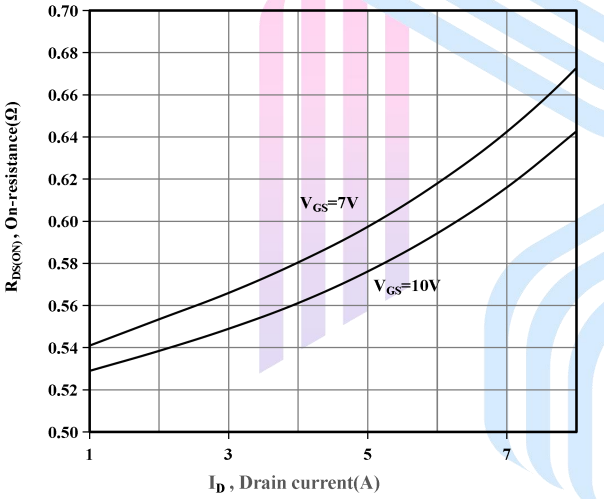


Figure 9. Drain-source on-state resistance

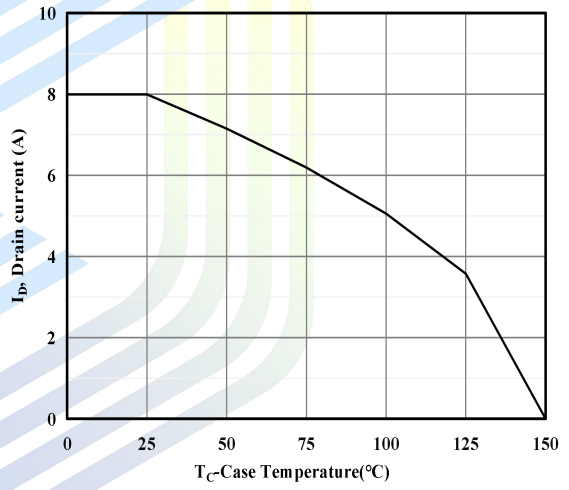


Figure 10. Drain current Derating

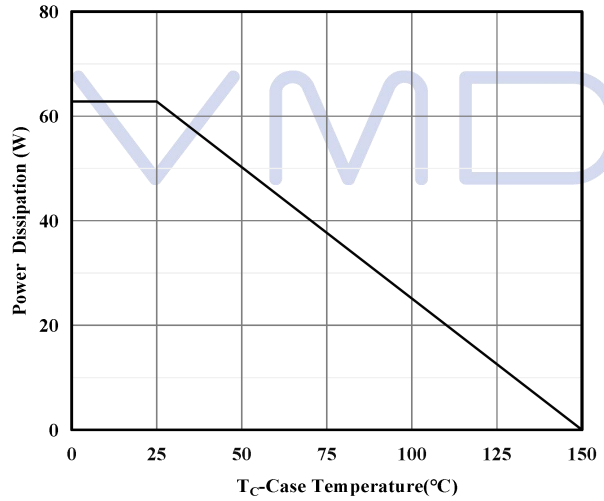


Figure 11. Power Dissipation

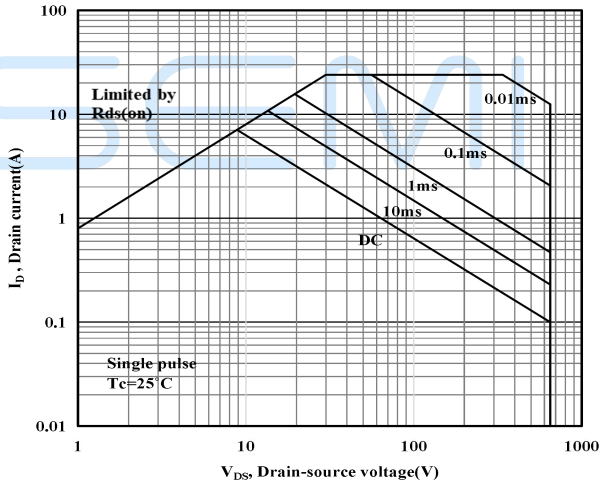


Figure 12. Safe operation area T_C=25℃

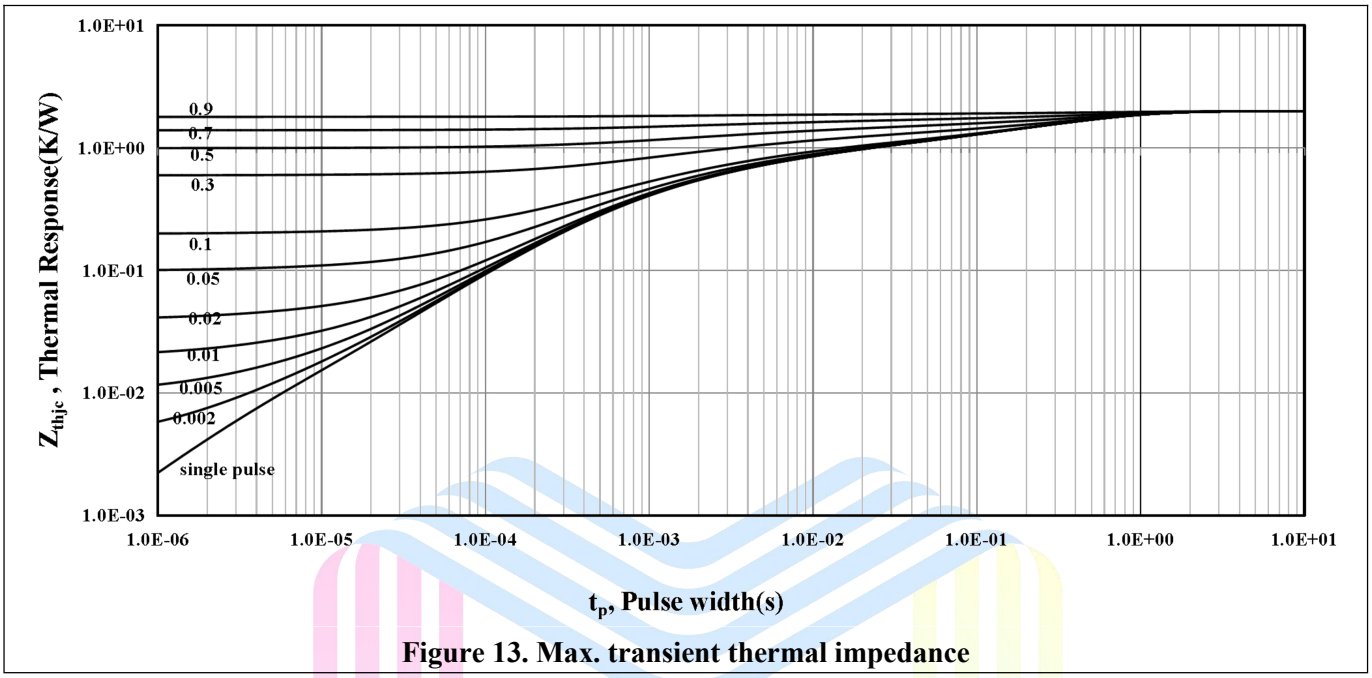
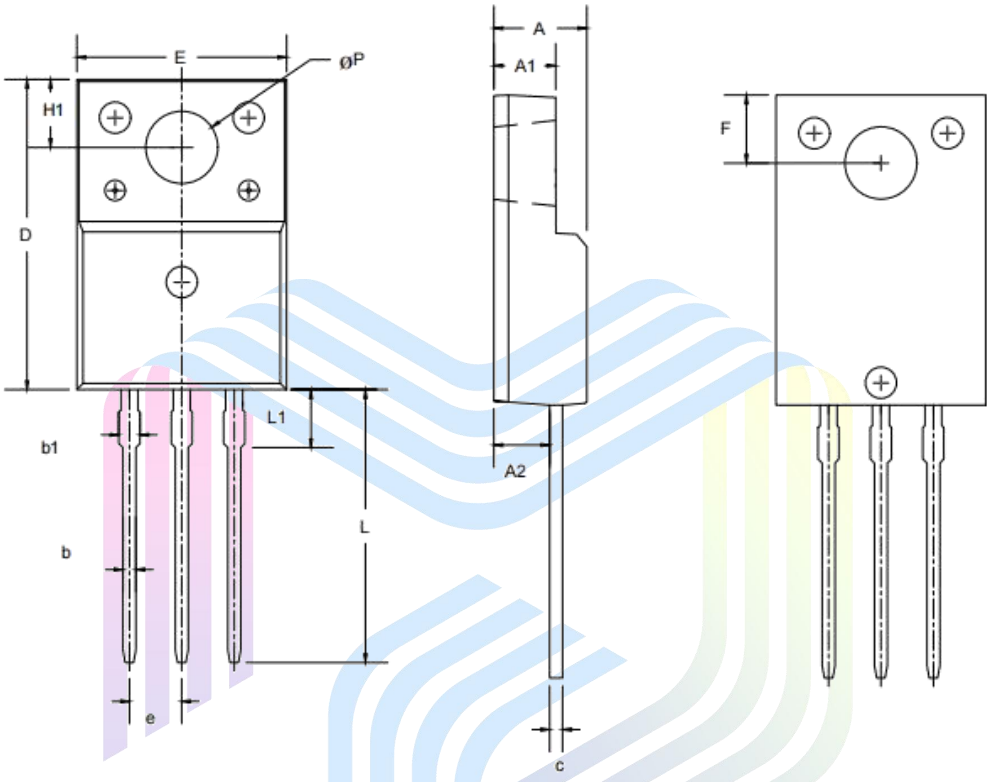


Figure 13. Max. transient thermal impedance

Mechanical Dimensions

TO-220F Package Information



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	MAX
A	4.50	4.90
A1	2.30	2.80
A2	2.50	2.90
b	0.70	0.95
b1	1.08	1.55
c	0.40	0.70
D	15.00	16.17
E	9.50	10.50
e	2.54BSC	
F	2.80	3.65
H1	6.7REF	
L	12.50	13.50
L1	2.90	3.90
ΦP	2.90	3.40

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