VSTD065R58ANC

Datasheet

General Description

The VSTD065R58ANC is high voltage MOSFET utilizes charge balance technology to achieve outstanding low on-resistance and lower gate charge. It is engineered to minimize conduction loss, provide superior switching performance and robust avalanche capability. The VSTD065R58ANC is optimized for extreme switching performance to minimize switching loss. It is tailored for high power density applications to meet the highest efficiency standards.

Symbol

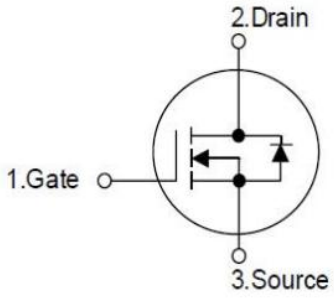


Figure 1 Symbol of VSTD065R58ANC

Features

- Low RDS(ON) & FOM
- $R_{DS(ON)\_max}$ = 0.58Ω@V_{GS} = 10V
- Extremely low switching loss
- Excellent stability and uniformity

Application

- PC Power
- LED lighting
- Telecom Power
- Server Power
- EV Charger
- Solar/UPS

Package Type

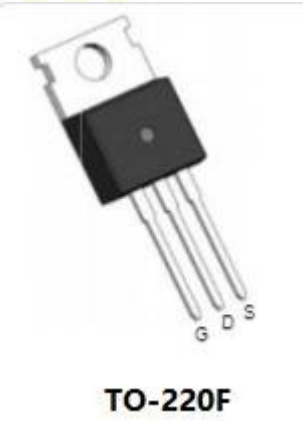


Figure 2 Package Type of VSTD065R58ANC

Ordering Information

Product Name	Package
VSTD065R58ANC	TO220-F

Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DSS}	650	V
Gate-Source Voltage	V_{GSS}	±30	V
Continuous Drain Current Note 1 T_C=25ºC	I_D	8	A
Continuous Drain Current Note 1 T_C=100ºC		5	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 Pulse Current Note 2 T_C=25ºC	$I_{S.pulse}$	24	A
Max Power Dissipation Note 3 T_C=25ºC	P_D	28	W
Avalanche Energy, Single Pulse Note 5	E_{AS}	150	mJ
MOSFET dv/dt ruggedness, VDS=0…480 V	dv/dt	50	V/ns
Reverse diode dv/dt, VDS=0…480 V, ISD≤ID	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	$R_{θJC}$		4.5		ºC/W
Thermal Resistance, Junction-to-Ambient Note4	$R_{θJA}$		62.5		

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 $R_{θJA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with Ta=25 °C.
5) V_{DD}=50 V,V_{GS}=10 V, L=10.8mH, starting T_J=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
			V_{GS}=0V, I_D=250uA,T_J=150 °C	700	750		V
Zero Gate Voltage Drain Current		I_{DSS}	V_{DS}=650V, V_{GS}=0V			1	uA
Gate-Body 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	2.0		4.0	V
Drain-Source On-Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=4A		0.48	0.58	Ω
Drain-Source On-Resistance	T_J= 150 ºC				1.27		
Dynamic Characteristics							
Input Capacitance		C_{ISS}	V_{DS}=50V		587		pF
Output Capacitance		C_{OSS}	V_{GS}=0V		42.1		pF
Reverse Transfer Capacitance		C_{RSS}	f=1MHz		1.8		pF
Turn-on Delay Time		$t_{d(on)}$	V_{DS}=400V		22.4		ns
Rise Time		t_r	I_D=8A		16.5		
Turn-off Delay Time		$t_{d(off)}$	R_G=10Ω		33.4		
Fall Time		t_f	V_{GS}=10V		5.1		
Gate Charge Characteristics							
Gate to Source Charge		Q_{gs}	V_{GS}=10V		3.2		nC
Gate to Drain Charge		Q_{gd}	V_{DS}=400V		5.0		
Gate Charge Total		Q_g	I_D=8A		12.4		
Gate Plateau Voltage		$V_{Plateau}$			6.0		V
Reverse Diode Characteristics							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=0V, I_S=8A			1.2	V
Reverse Recovery Time		t_{rr}	I_S=8A		272.2		ns
Reverse Recovery Charge		Q_{rr}	V_R=400V		2.5		μC
Peak Reverse Recovery Current		I_{rrm}	di/dt=100A/us		20.7		A

Typical Performance Characteristics

Figure 3: Typ. Output Characteristics

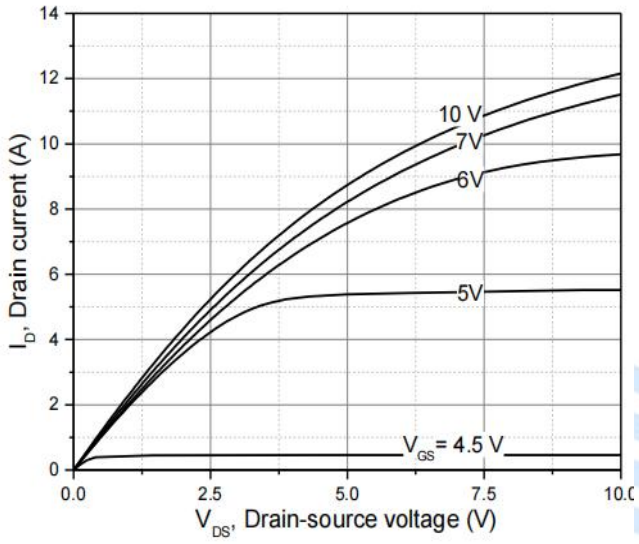


Figure 4: Typ. Transfer Characteristics

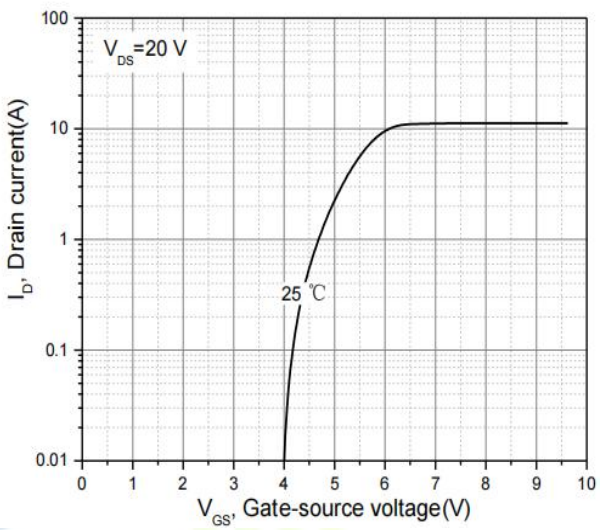


Figure 5: Drain-Source On-State Resistance

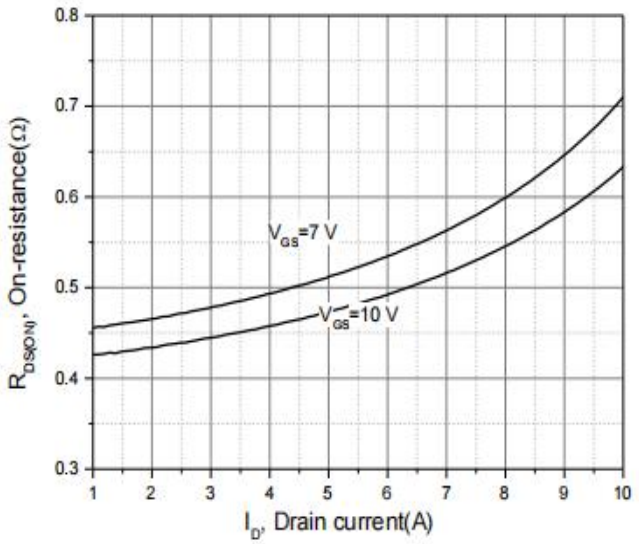


Figure 6: Drain-Source On-State Resistance

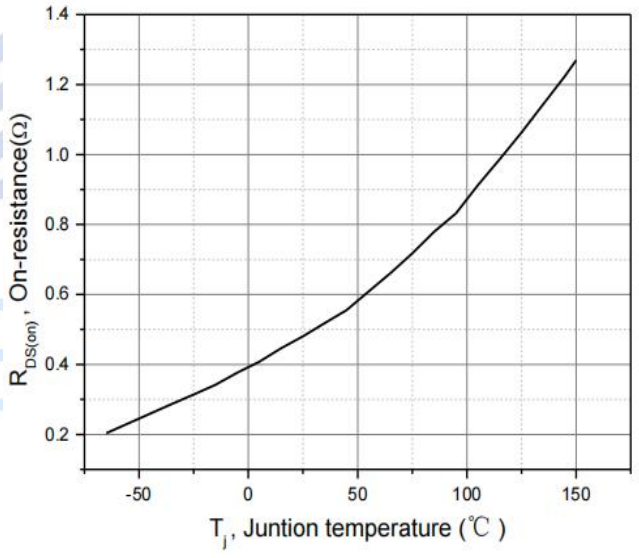


Figure 7: Drain-Source breakdown voltage

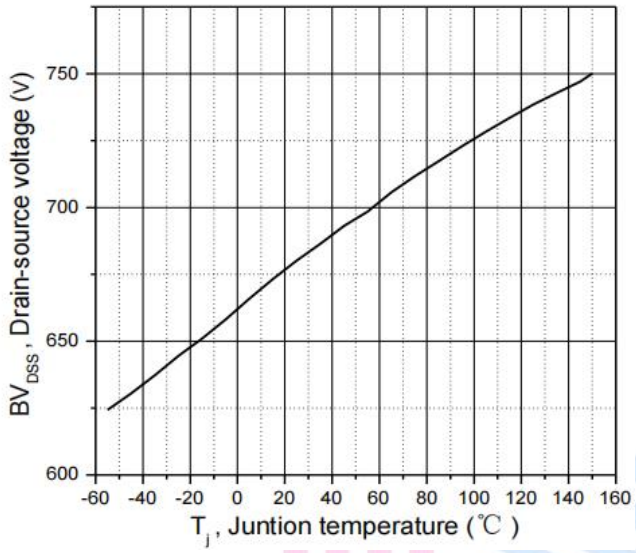


Figure 8: Typ. Gate Charge

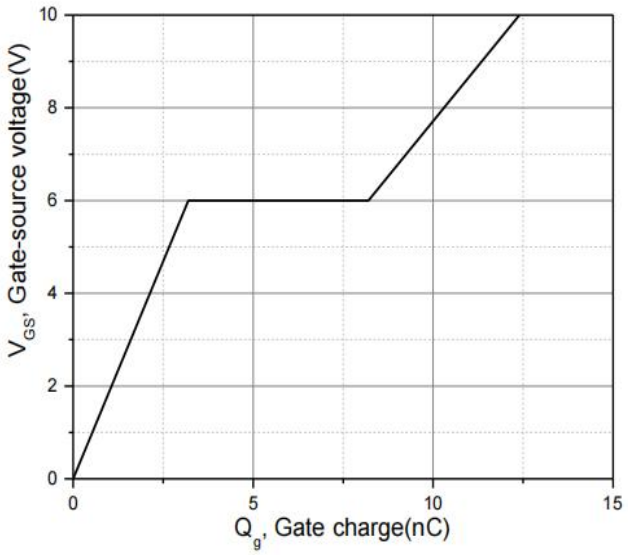


Figure 9: Typ. Capacitances

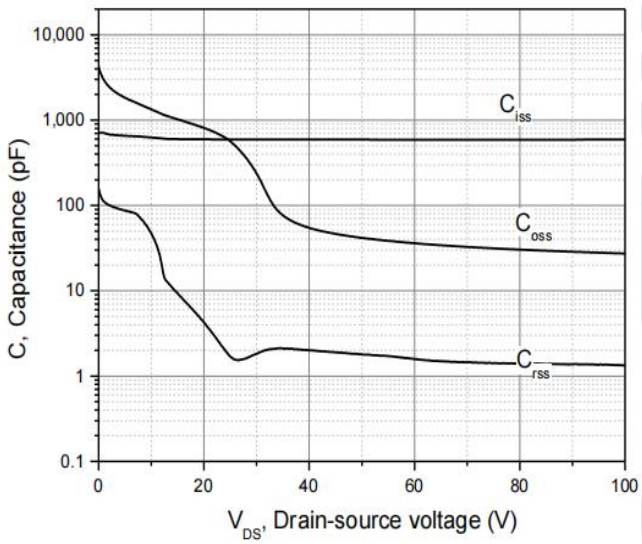


Figure 10: Forward Characteristics of Body Diode

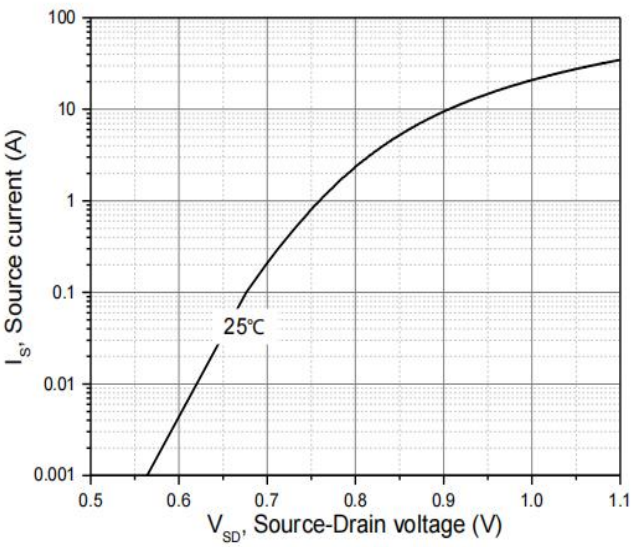


Figure 11: Drain Current

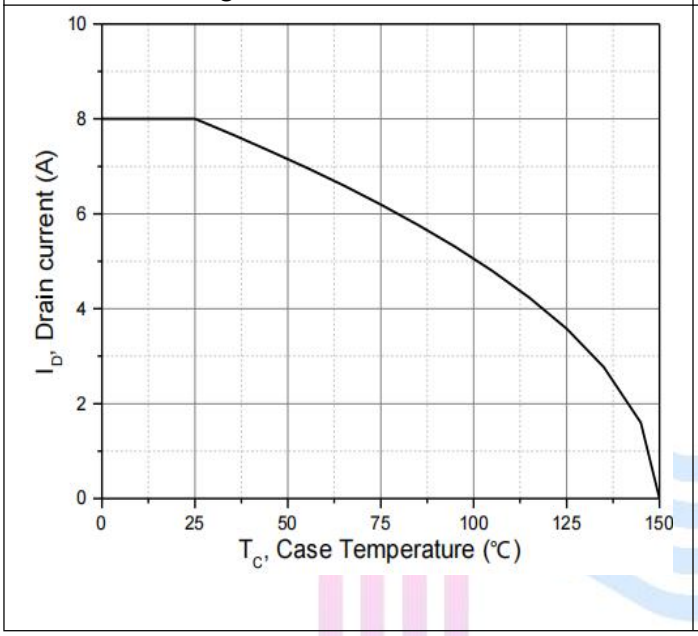
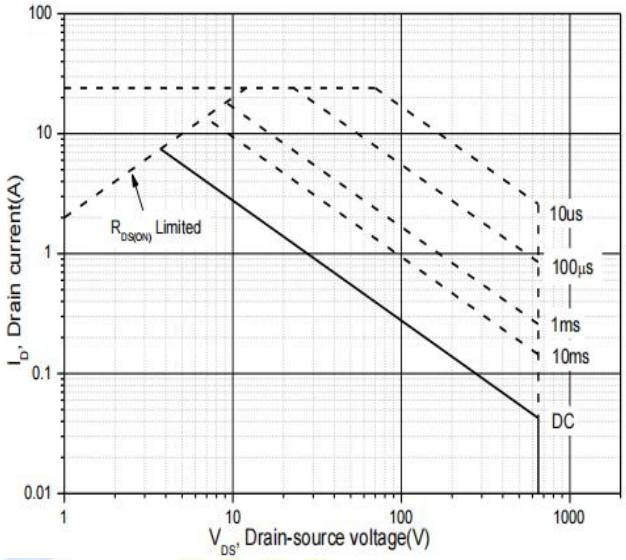
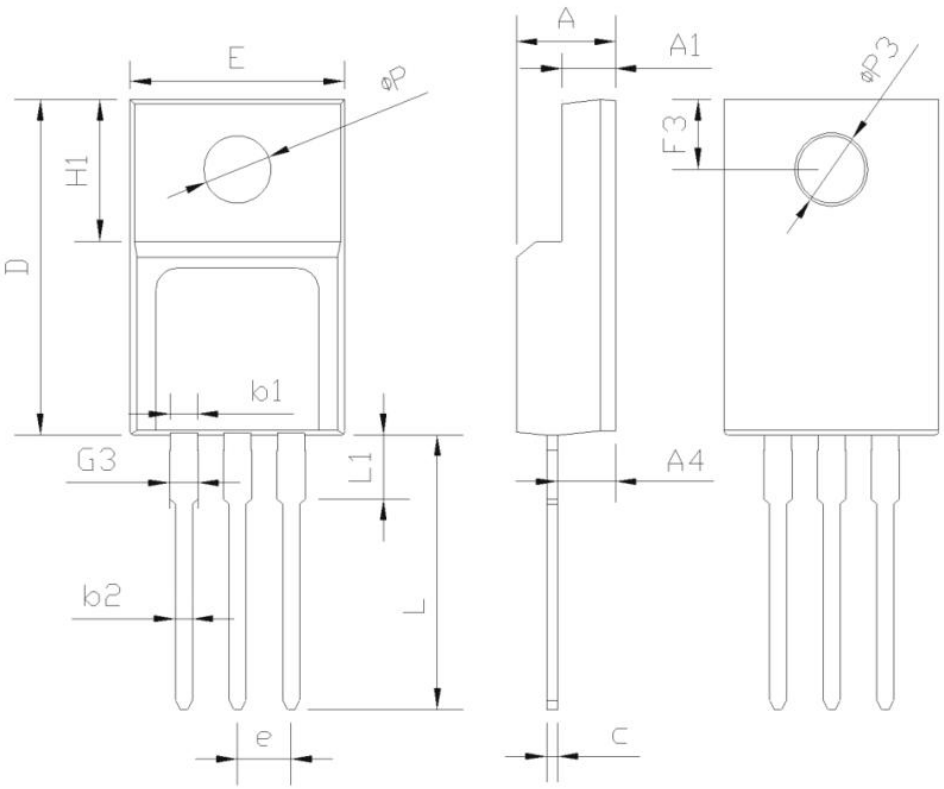


Figure 12: Safe Operating Area T_c= 25 ºC



Mechanical Dimensions(TO220-F Unit:mm)



Symbol	Dimensions(mm)			Symbol	Dimensions(mm)		
	Min.	Typ.	Max.		Min.	Typ.	Max.
E	9.96	10.16	10.36	L	12.68	12.98	13.28
A	4.50	4.70	4.90	L1	2.88	3.03	3.18
A1	2.34	2.54	2.74	ΦP	3.03	3.18	3.38
A4	2.56	2.76	2.96	ΦP3	3.15	3.45	3.65
c	0.40	0.50	0.65	F3	3.15	3.30	3.45
D	15.57	15.87	16.17	G3	1.25	1.35	1.55
H1	6.70REF			b1	1.18	1.28	1.43
e	2.54BSC			b2	0.70	0.80	0.95

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