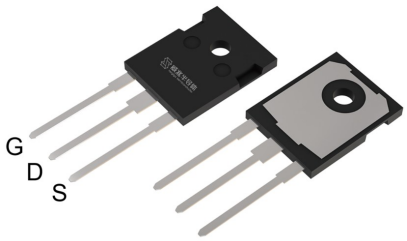
Features

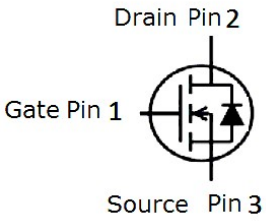
- Enhancement mode
- Very Low on-resistance $R_{DS(on)}$
- Fast Switching and High efficiency
- 100% Avalanche test

V_{DS}	100	V
$R_{DS(on),TYP}$@ V_{GS}=10 V	2.6	mΩ
I_D	320	A

TO-247



Pb-Free RoHS HF Halogen-Free



Part ID	Package Type	Marking	Packing
VS320N10AU	TO-247	320N10A	30pcs/Tube

Maximum ratings, at T_A =25°C, unless otherwise specified

Symbol	Parameter		Rating	Unit
$V_{(BR)DSS}$	Drain-Source breakdown voltage		100	V
V_{GS}	Gate-Source voltage		±25	V
I_S	Diode continuous forward current	T_C=25°C	320	A
I_D	Continuous drain current @VGS=10V	T_C=25°C	320	A
		T_C=100°C	226	A
I_{DM}	Pulse drain current tested ①	T_C=25°C	1280	A
I_{DSM}	Continuous drain current @VGS=10V	T_A=25°C	23	A
		T_A=70°C	18	A
EAS	Avalanche energy, single pulsed ②		625	mJ
P_D	Maximum power dissipation	T_C=25°C	500	W
		T_C=100°C	250	W
P_{DSM}	Maximum power dissipation ③	T_A=25°C	2.5	W
		T_A=70°C	1.6	W
T_{STG},T_J	Storage and Junction Temperature Range		-55 to 175	°C

Thermal Characteristics

Symbol	Parameter	Typical	Max	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.3	0.36	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	50	60	°C/W

Electrical Characteristics

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
Static Electrical Characteristics @ T_j=25°C (unless otherwise stated)						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	100	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=100V,V_{GS}=0V	--	--	1	μA
	Zero Gate Voltage Drain Current(T_j=125℃)	V_{DS}=100V,V_{GS}=0V	--	--	100	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±25V,V_{DS}=0V	--	--	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	2.6	3.1	3.6	V
$R_{DS(on)}$	Drain-Source On-State Resistance ④	V_{GS}=10V, I_D=120A	--	2.6	3.1	mΩ
		T_j=100℃	--	3.9	--	mΩ
Dynamic Electrical Characteristics @ T_j = 25°C (unless otherwise stated)						
Ciss	Input Capacitance	V_{DS}=30V,V_{GS}=0V, f=1MHz	23480	31305	41635	pF
Coss	Output Capacitance		1000	1335	1775	pF
Crss	Reverse Transfer Capacitance		325	430	570	pF
Rg	Gate Resistance	f=1MHz	0.2	0.7	5	Ω
Qg	Total Gate Charge	V_{DS}=50V,I_D=80A, V_{GS}=10V	--	452	600	nC
Qgs	Gate-Source Charge		--	131	174	nC
Qgd	Gate-Drain Charge		--	119	179	nC
Switching Characteristics						
Td(on)	Turn-on Delay Time	V_{DD}=50V, I_D=80A, R_G=3Ω, V_{GS}=10V	--	77	--	ns
Tr	Turn-on Rise Time		--	142	--	ns
Td(off)	Turn-Off Delay Time		--	190	--	ns
Tf	Turn-Off Fall Time		--	137	--	ns
Source- Drain Diode Characteristics@ T_j= 25°C (unless otherwise stated)						
V_{SD}	Forward on voltage	I_{SD}=120A,V_{GS}=0V	--	0.9	1.2	V
Trr	Reverse Recovery Time	T_j=25℃,I_{sd}=80A, V_{GS}=0V di/dt=100A/μs	--	63	--	ns
Qrr	Reverse Recovery Charge		--	144	--	nC

NOTE: ① Repetitive rating; pulse width limited by max junction temperature.

② Limited by T_{Jmax}, starting T_J = 25°C, L =0.5mH, R_G = 25Ω, I_{AS} =50A, V_{GS} =10V. Part not recommended for use above this value

③ The power dissipation P_{DSM} is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150°C.

④ Pulse width ≤ 380μs; duty cycle≤ 2%.

Typical Characteristics

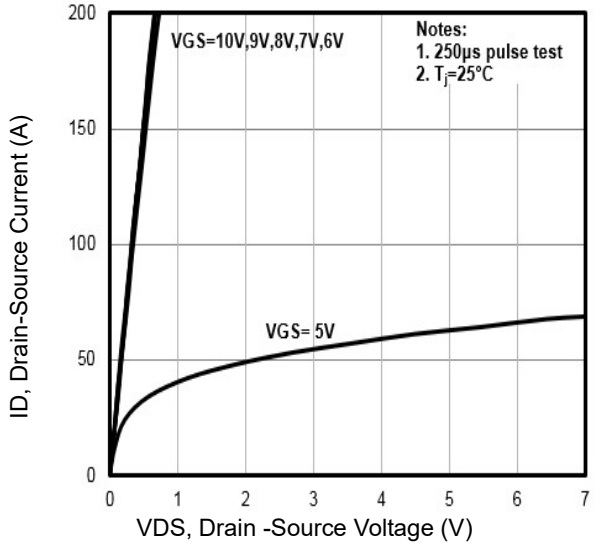


Fig1. Typical Output Characteristics

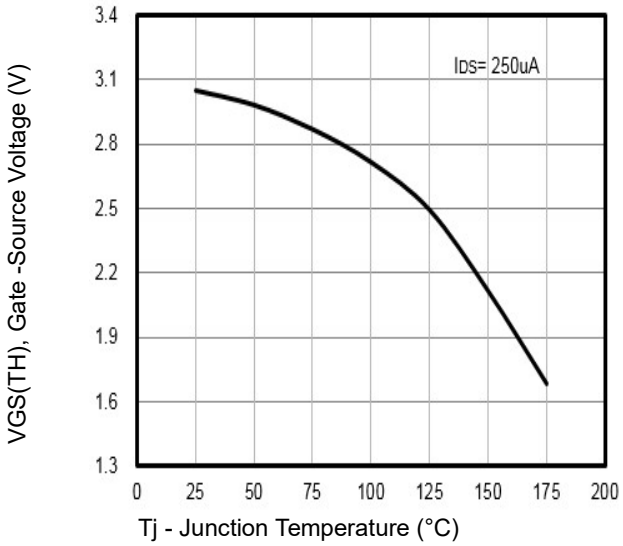


Fig2. $V_{GS(TH)}$ Gate -Source Voltage Vs.Tj

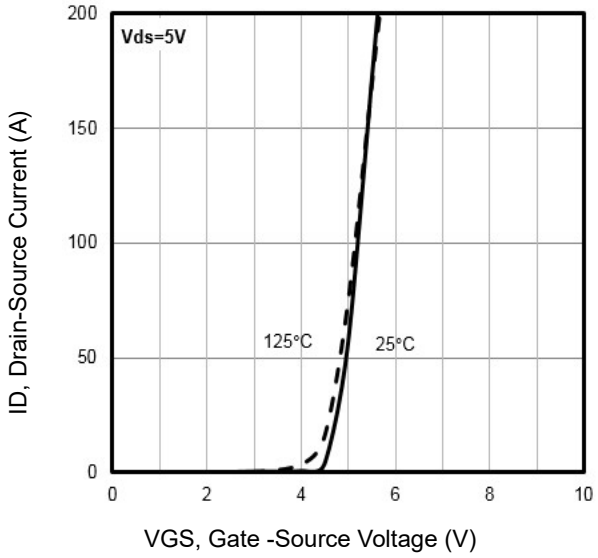


Fig3. Typical Transfer Characteristics

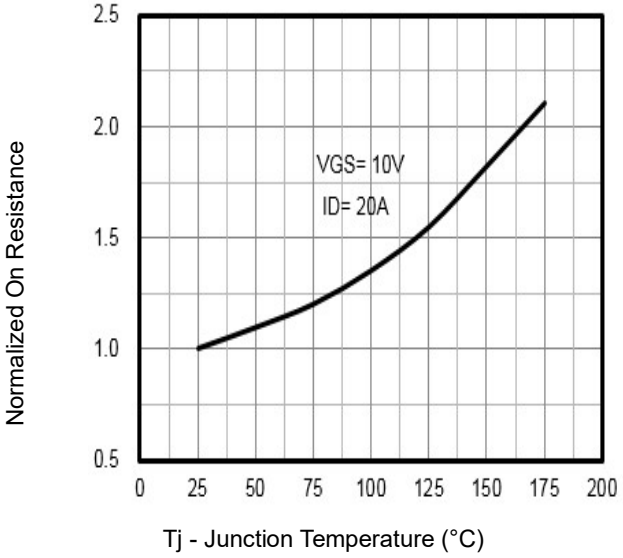


Fig4. Normalized On-Resistance Vs. Tj

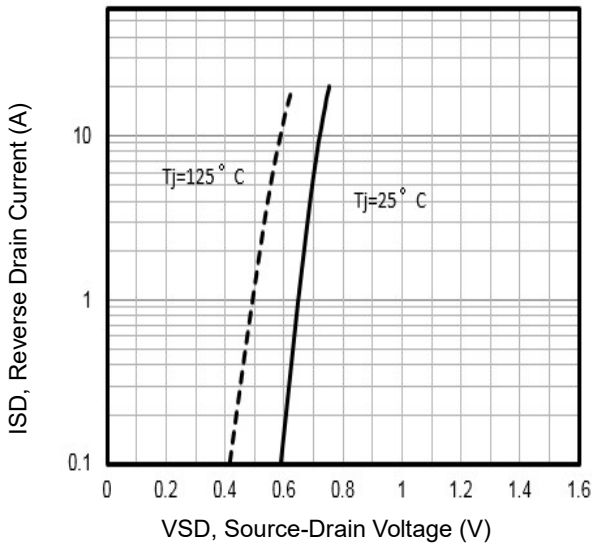


Fig5. Typical Source-Drain Diode Forward Voltage

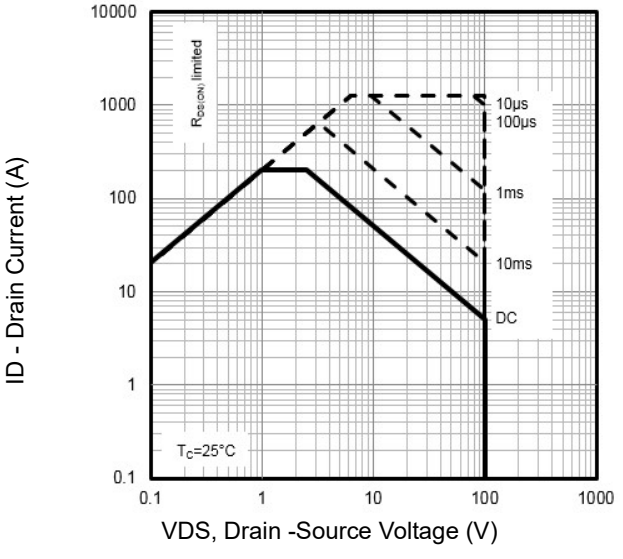


Fig6. Maximum Safe Operating Area

Typical Characteristics

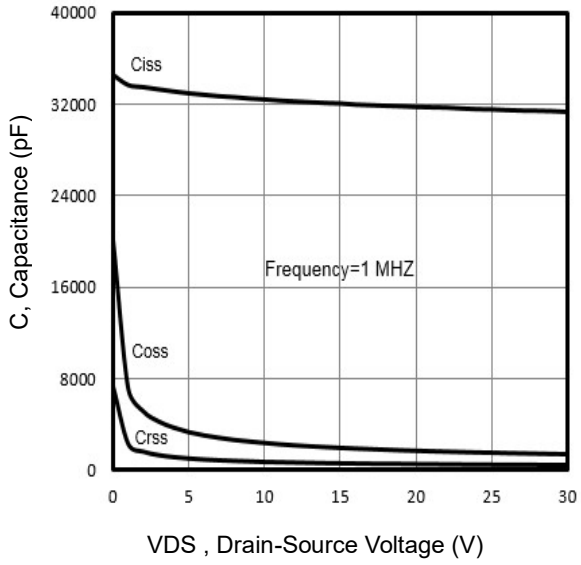


Fig7. Typical Capacitance Vs.Drain-Source Voltage

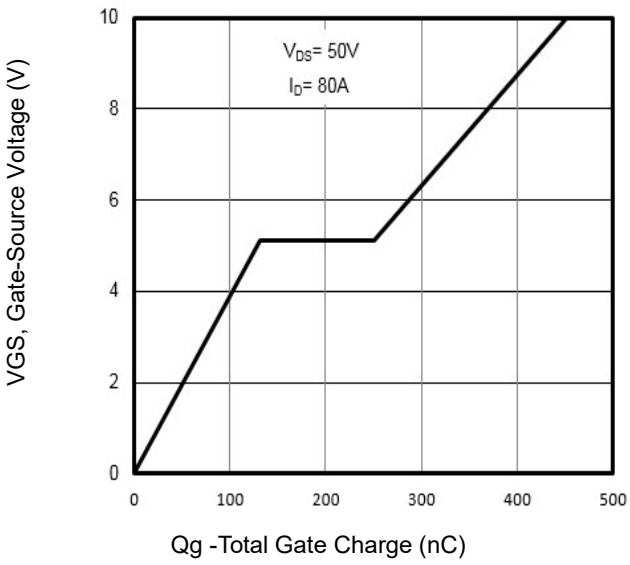


Fig8. Typical Gate Charge Vs.Gate-Source Voltage

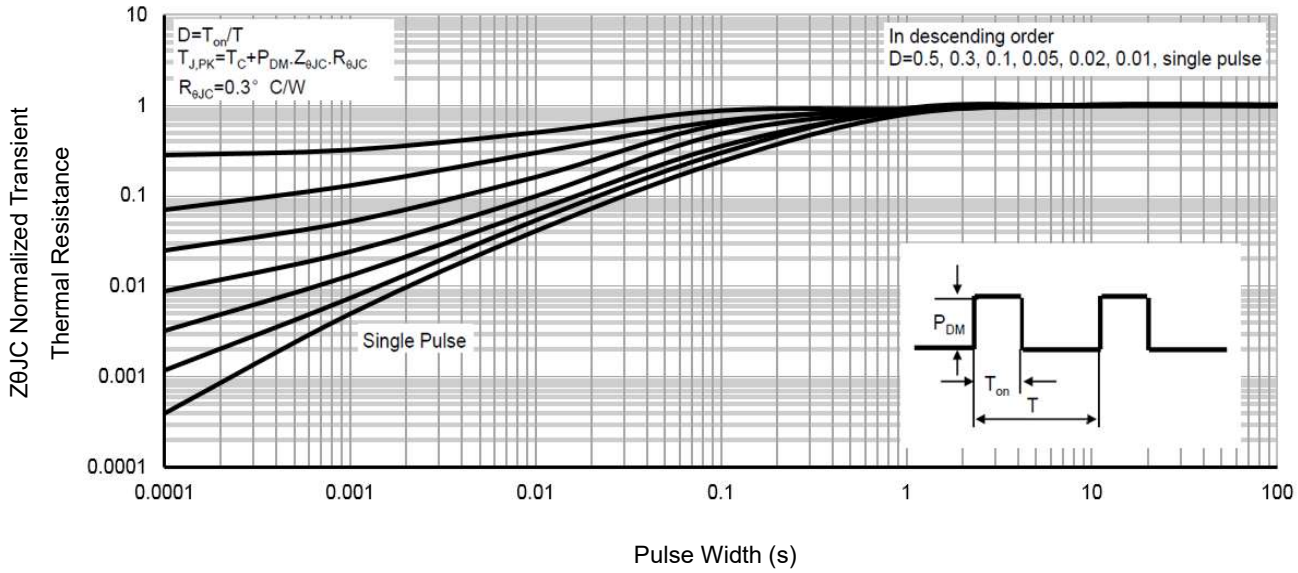


Fig9. Normalized Maximum Transient Thermal Impedance

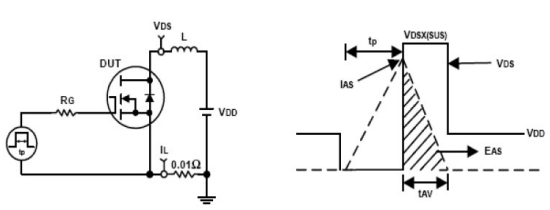


Fig10. Unclamped Inductive Test Circuit and waveforms

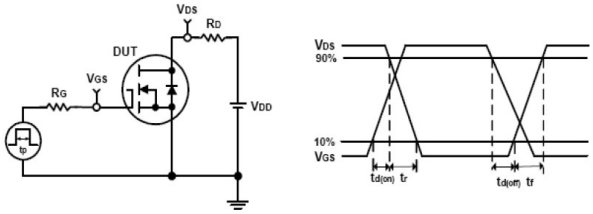
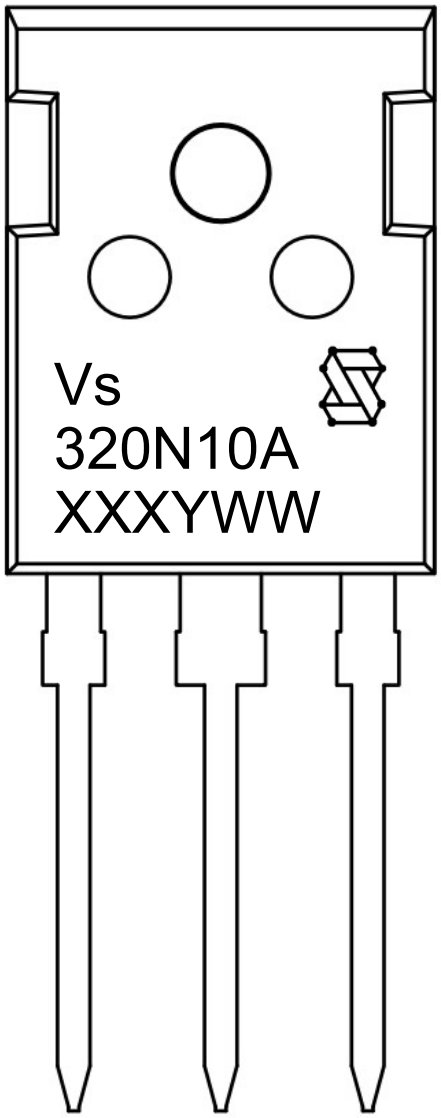


Fig11. Switching Time Test Circuit and waveforms

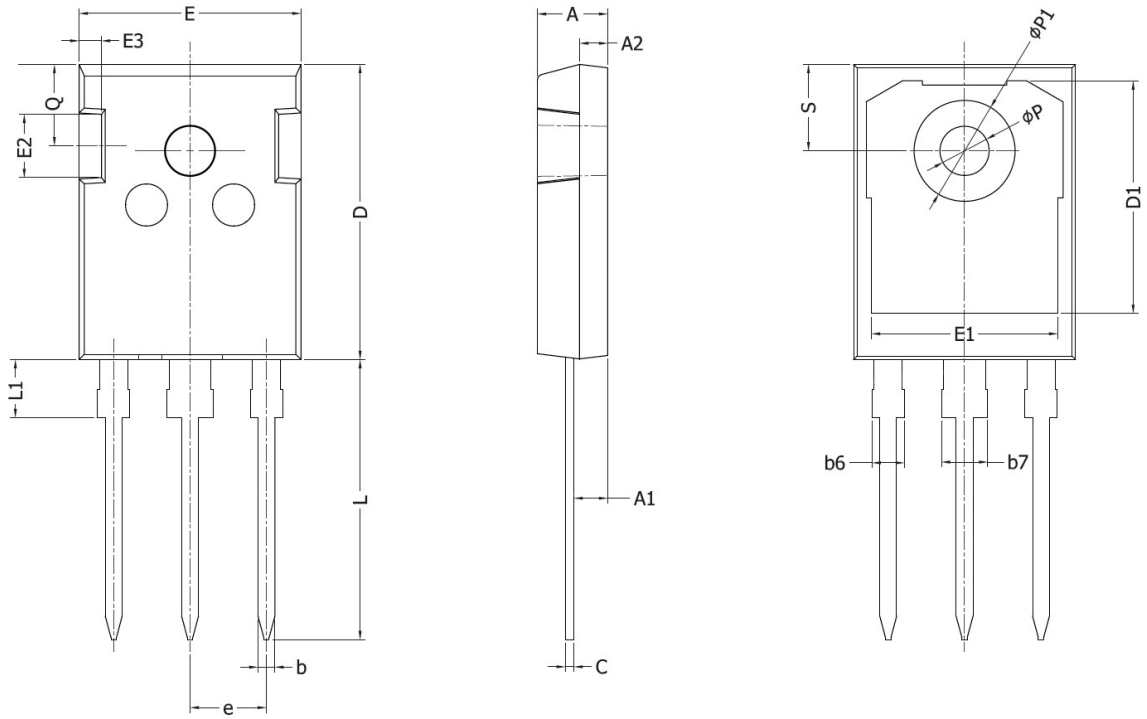
Marking Information



1st line: Vergiga Code（Vs）， Vergiga Logo
2nd line: Part Number（320N10A）
3rd line: Date code （XXXYWW）
XXX: Wafer Lot Number Code , code changed with Lot Number
Y: Year Code , refer to table below
WW: Week Code (01 to 53)

Code	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T
Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030

TO-247 Package Outline Data



Symbol	Dimensions (unit: mm)		
	Min	Nom	Max
A	4.80	5.00	5.20
A1	2.21	2.41	2.59
A2	1.85	2.00	2.15
b	1.11	1.21	1.36
b6	1.91	--	2.21
b7	2.91	--	3.21
C	0.51	0.61	0.75
D	20.80	21.00	21.30
D1	16.25	16.55	16.85
E	15.50	15.80	16.10
E1	13.00	13.30	13.60
E2	4.40	--	5.20
E3	1.50	1.60	1.70
e	5.44 BSC		
L	19.80	19.92	20.22
L1	--	--	4.30
ΦP	3.40	3.60	3.80
ΦP1	7.00	--	7.40
Q	5.60	5.80	6.00
S	6.05	6.15	6.25

Notes:

1. **Package Reference: JEDEC TO-247, Variation AD.**
2. **All Dimensions Are In mm.**
3. **Slot Required, Notch May Be Rounded**
4. **Dimension D & E Do Not Include Mold Flash. Mold Flash Shall Not Exceed 0.127mm Pre Side.**
5. **Thermal Pad Contour Optional Within Dimension D1 & E1.**
6. **Lead Finish Uncontrolled In L1.**

Customer Service

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