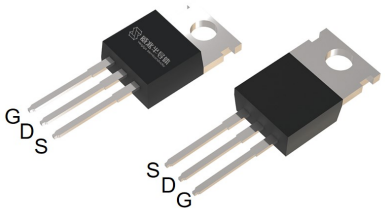
Features

V_{DS}	150	V
$R_{DS(on),TYP}$@ V_{GS}=10 V	9.5	mΩ
I_D	105	A

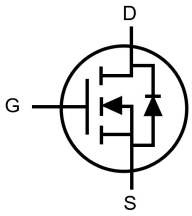
- Enhancement mode
- VitoMOS® Ⅱ Technology
- 100% Avalanche Tested
- Optimized Qg, Qgd, and Qgd/Qgs ratio to minimize switching losses

TO-220AB



Pb-Free RoHS HF Halogen-Free

Part ID	Package Type	Marking	Packing
VST009N15HS-G	TO-220AB	009N15H	50pcs/Tube



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

Symbol	Parameter		Rating	Unit
$V_{(BR)DSS}$	Drain-Source breakdown voltage		150	V
V_{GS}	Gate-Source voltage		±25	V
I_S	Diode continuous forward current	T_C = 25°C	105	A
I_D	Continuous drain current @VGS=10V	T_C = 25°C	105	A
I_D	Continuous drain current @VGS=10V	T_C = 100°C	74	A
I_{DM}	Pulse drain current tested ①	T_C=25°C	348	A
I_{DSM}	Continuous drain current @VGS=10V	T_A=25°C	9	A
		T_A=70°C	7	A
EAS	Avalanche energy, single pulsed ②		576	mJ
P_D	Maximum power dissipation ③	T_C=25°C	288	W
P_{DSM}	Maximum power dissipation ④	T_A=25°C	2.1	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 ⑤	0.43	0.52	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient ⑥	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	150	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current(Tj=25℃)	V_{DS}=150V,V_{GS}=0V	--	--	1	μA
	Zero Gate Voltage Drain Current(Tj=125℃)⑦	V_{DS}=150V,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	2.5	3	3.5	V
$R_{DS(on)}$	Drain-Source On-State Resistance ⑧	V_{GS}=10V, I_D=40A	--	9.5	12	mΩ
		(Tj=100℃) ⑦	--	14	--	mΩ
Dynamic Electrical Characteristics @ T_j = 25°C (unless otherwise stated)						
Ciss	Input Capacitance ⑦	V_{DS}=75V,V_{GS}=0V, f=100KHz	--	4180	--	pF
Coss	Output Capacitance ⑦		--	325	--	pF
Crss	Reverse Transfer Capacitance ⑦		--	10	--	pF
Rg	Gate Resistance ⑦	f=1MHz	--	1.5	--	Ω
Qg	Total Gate Charge ⑦	V_{DS}=75V,I_D=40A, V_{GS}=10V	--	61	--	nC
Qgs	Gate-Source Charge ⑦		--	23	--	nC
Qgd	Gate-Drain Charge ⑦		--	14	--	nC
Switching Characteristics ⑦						
Td(on)	Turn-on Delay Time	V_{DD}=75V, I_D=40A, R_G=3.9Ω, V_{GS}=10V	--	22	--	ns
Tr	Turn-on Rise Time		--	62	--	ns
Td(off)	Turn-Off Delay Time		--	39	--	ns
Tf	Turn-Off Fall Time		--	42	--	ns
Source- Drain Diode Characteristics@ T_j = 25°C (unless otherwise stated)						
V_{SD}	Forward on voltage	I_{SD}=40A,V_{GS}=0V	--	0.90	1	V
Trr	Reverse Recovery Time ⑦	V_{DD}=75V I_{sd}=40A, V_{GS}=0V di/dt=100A/μs	--	107	--	ns
Qrr	Reverse Recovery Charge ⑦		--	391	--	nC

NOTE:

① Single pulse; pulse width ≤ 100μs.

② This is based on starting T_J = 25°C, L = 0.5mH, R_G = 25Ω, I_{AS} = 48A, V_{GS} =10V； 100% FT tested at L = 0.5mH, I_{AS} = 26A.

③ The power dissipation Pd is based on Tj(max), using junction-to-case thermal resistance RθJC.

④ The power dissipation Pdsm is based on Tj(max), using junction-to-ambient thermal resistance RθJA.

⑤ Thermal resistance from junction to soldering point (on the exposed drain pad). These tests are performed on a cool plate.

⑥ These tests are performed with the device mounted on 1 in2 FR-4 board with 2oz. Copper, in a still air environment with TA=25°C.

⑦ Guaranteed by design, not subject to production testing.

⑧ Pulse width ≤ 380μs; duty cycle≤ 2%.

Typical Characteristics

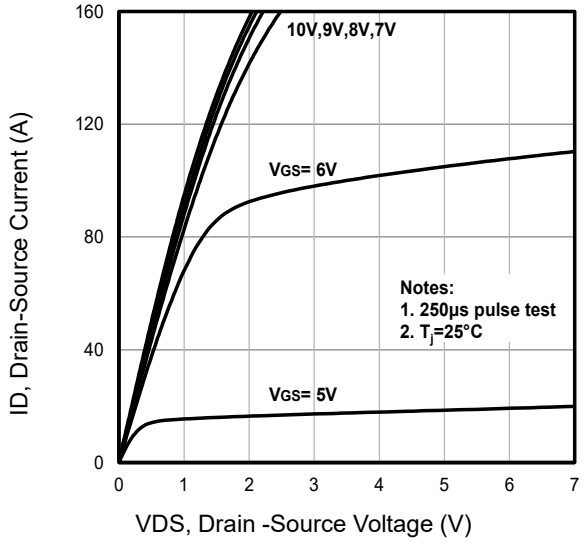


Fig1. Typical Output Characteristics

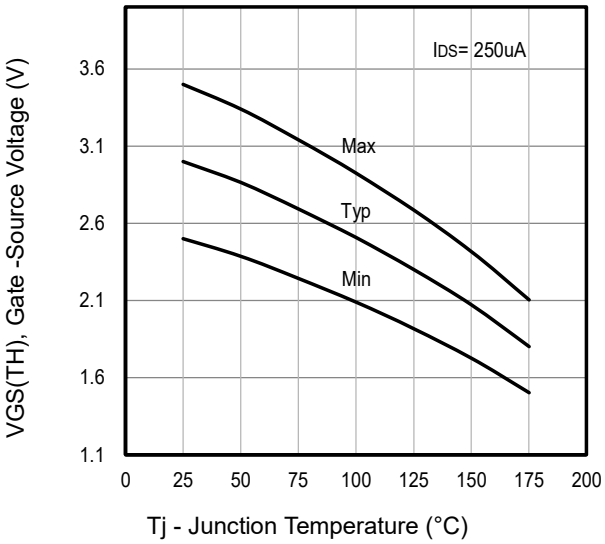


Fig2. Typical $V_{GS(TH)}$ Gate -Source Voltage Vs. Tj

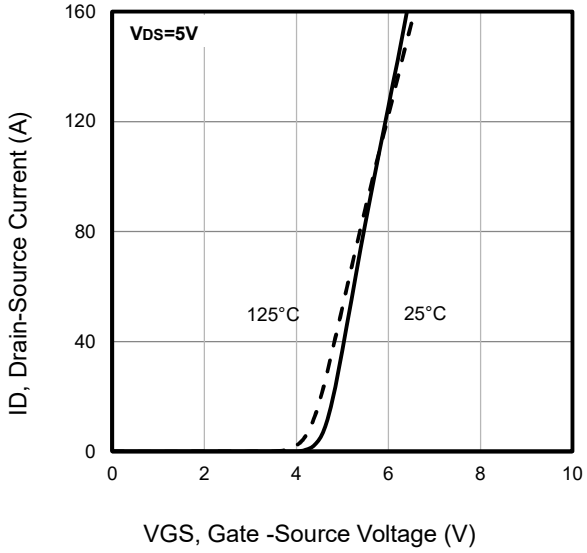


Fig3. Typical Transfer Characteristics

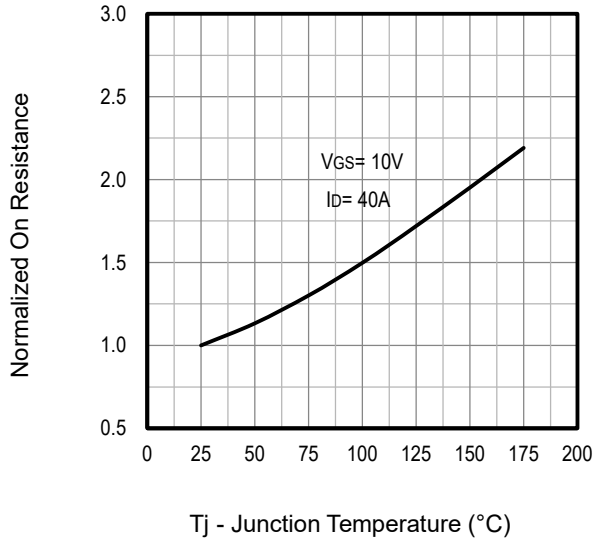


Fig4. Typical Normalized On-Resistance Vs. Tj

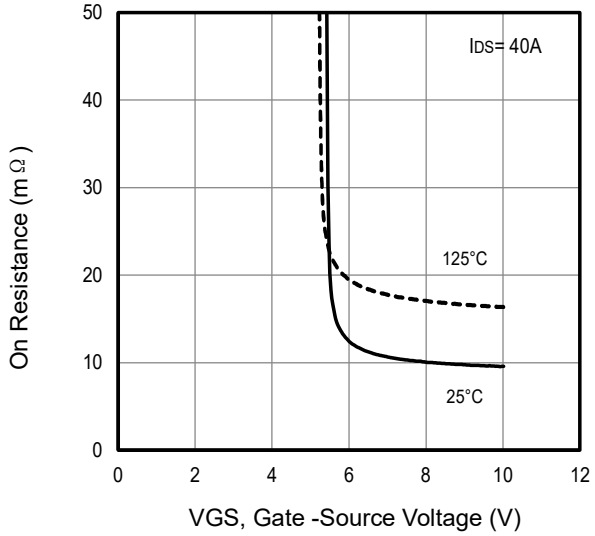


Fig5. Typical On Resistance Vs Gate -Source Voltage

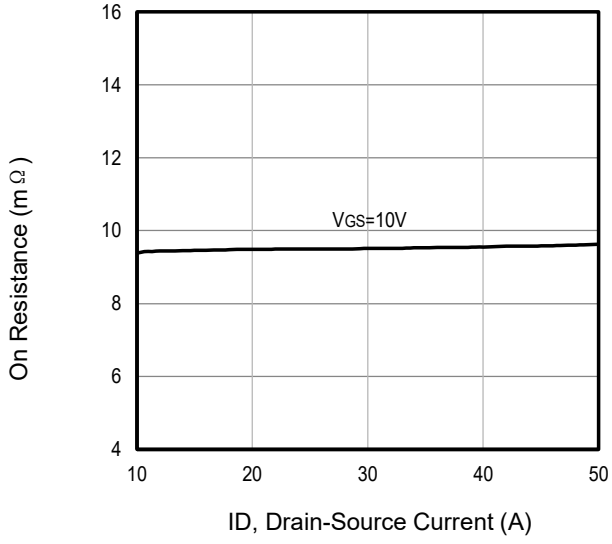


Fig6. Typical On Resistance Vs Drain Current

Typical Characteristics

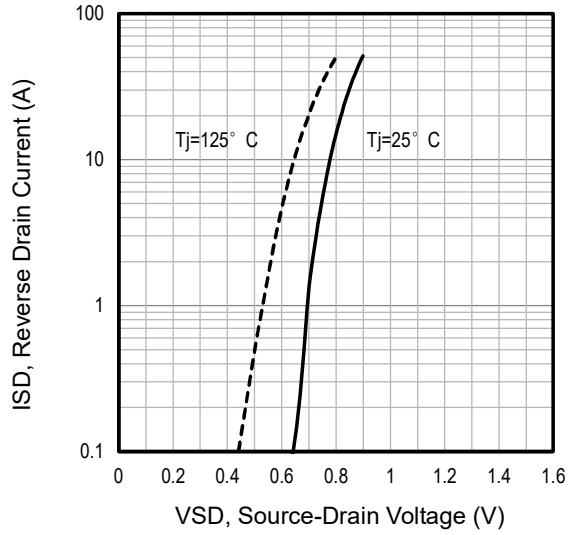


Fig7. Typical Source-Drain Diode Forward Voltage

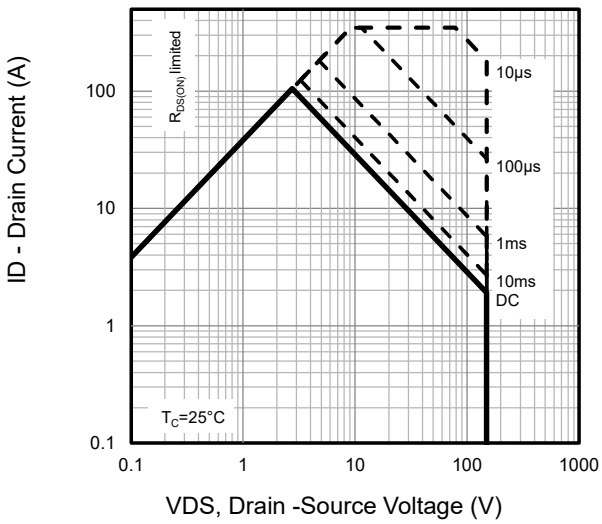


Fig8. Maximum Safe Operating Area

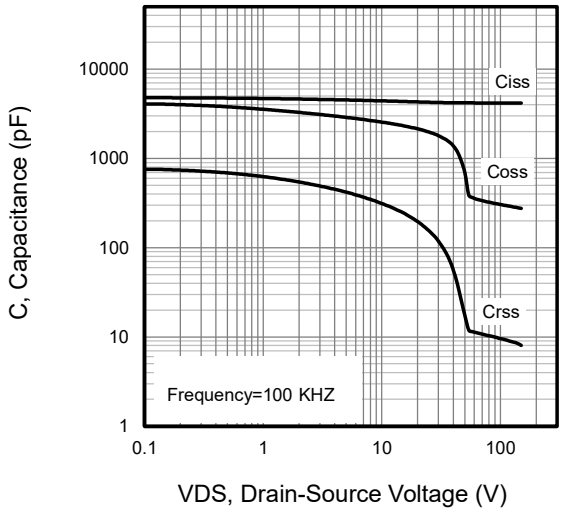


Fig9. Typical Capacitance Vs. Drain-Source Voltage

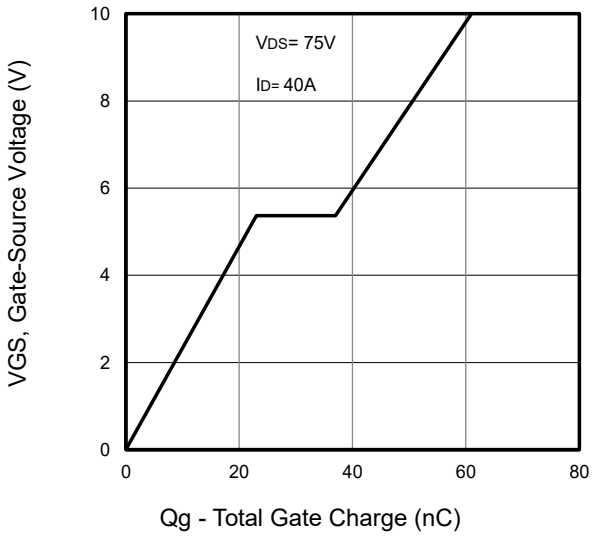


Fig10. Typical Gate Charge Vs. Gate-Source Voltage

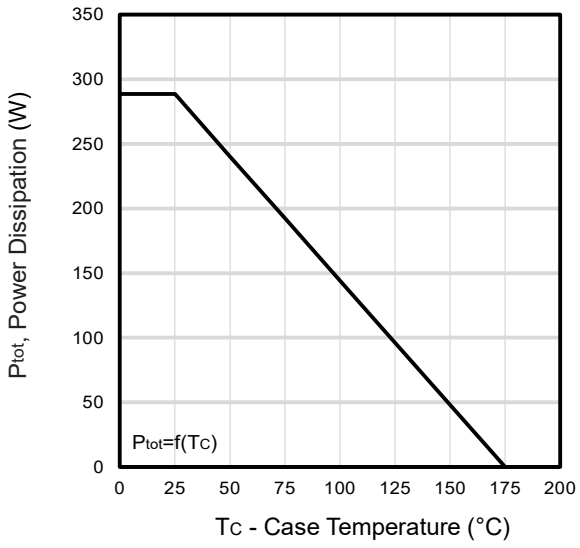


Fig11. Power Dissipation Vs. Case Temperature

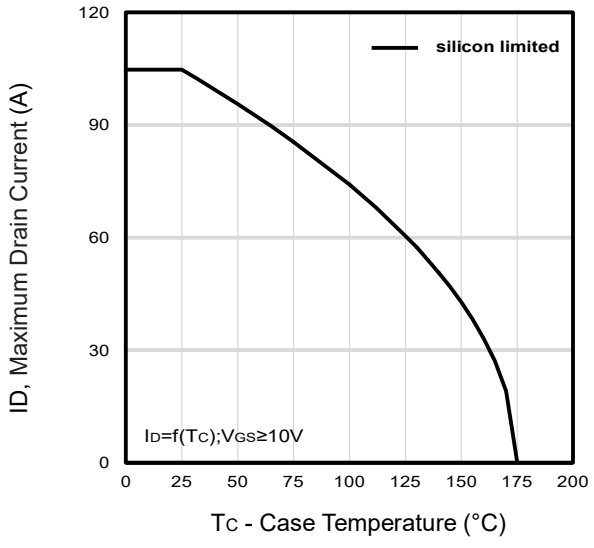


Fig12. Maximum Drain Current Vs. Case Temperature

Typical Characteristics

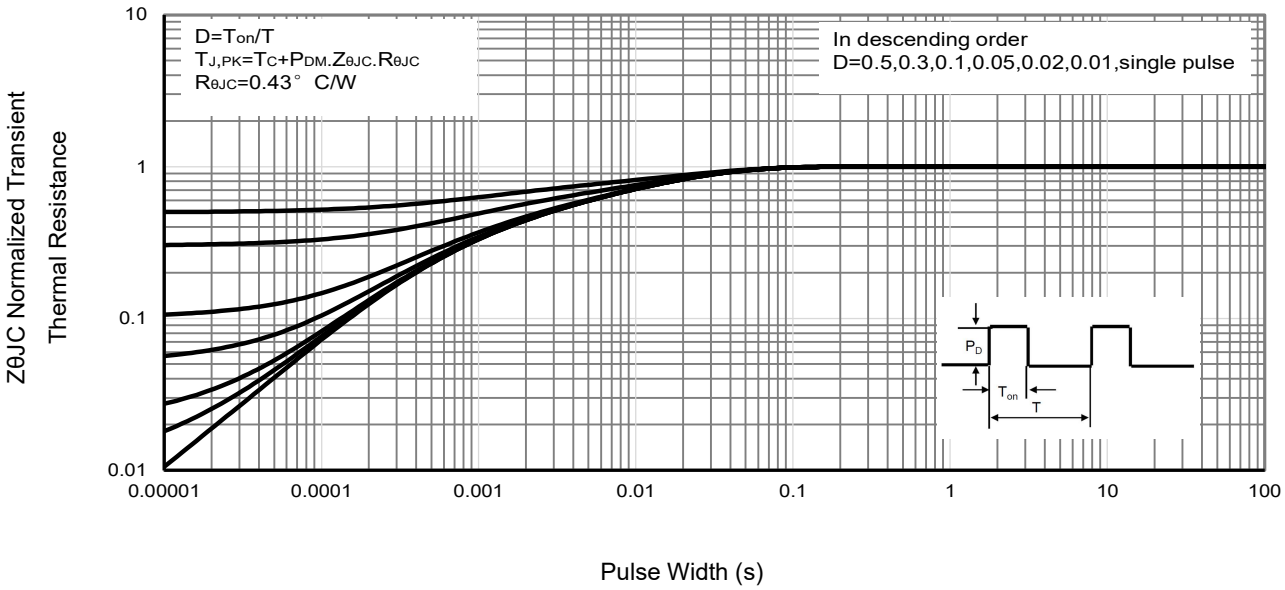


Fig13 . Normalized Maximum Transient Thermal Impedance

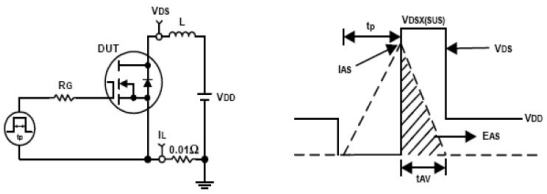


Fig14. Unclamped Inductive Test Circuit and waveforms

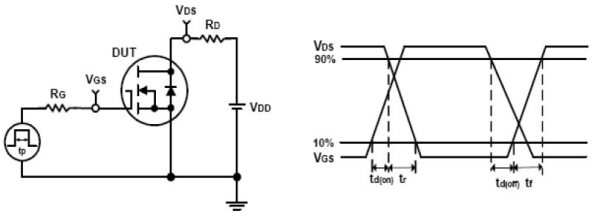
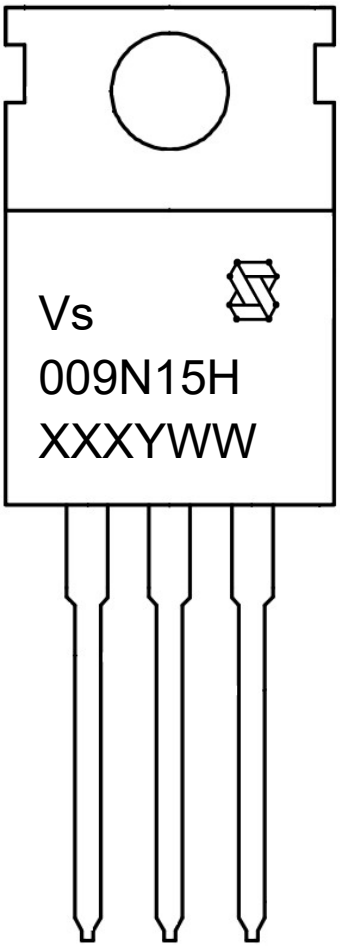


Fig15. Switching Time Test Circuit and waveforms

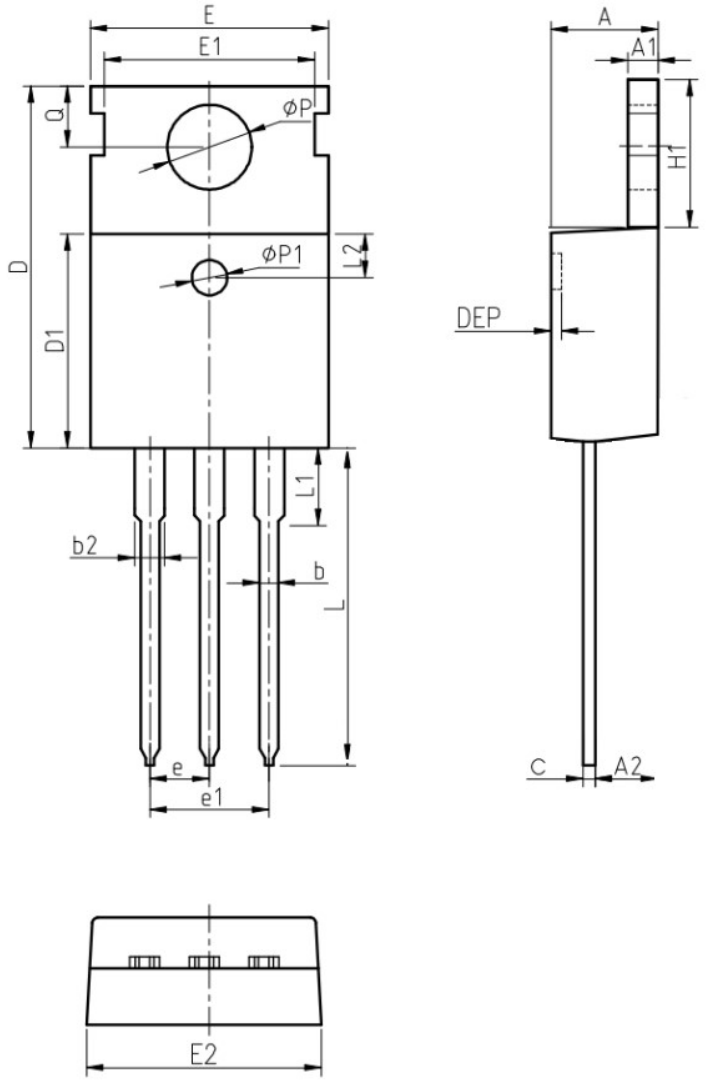
Marking Information



1st line: Vergiga Code（Vs）， Vergiga Logo
2nd line: Part Number（009N15H）
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-220AB Package Outline Data



Symbol	Dimensions (unit: mm)		
	Min	Typ	Max
A	4.30	4.52	4.70
A1	1.15	1.30	1.40
A2	2.20	2.40	2.60
b	0.70	0.80	1.00
b2	1.17	1.32	1.50
c	0.45	0.50	0.61
D	15.30	15.65	15.90
D1	9.00	9.20	9.40
DEP	0.05	0.10	0.25
E	9.66	9.90	10.28
E1	-	8.70	-
E2	9.80	10.00	10.20
ΦP1	1.40	1.50	1.60
e	2.54 BSC		
e1	5.08 BSC		
H1	6.40	6.50	6.80
L	12.70	-	14.27
L1	-	-	3.95
L2	2.40	2.50	2.60
ΦP	3.53	3.60	3.70
Q	2.70	2.80	2.90

Notes:

1. Refer to JEDEC TO-220 variation AB
2. Dimension "D" and "E" do NOT include mold flash. Mold flash shall not exceed 0.127mm per side.