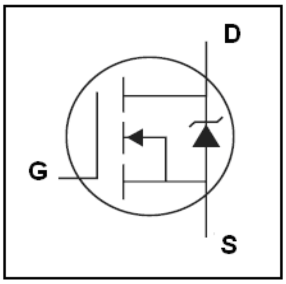
Features

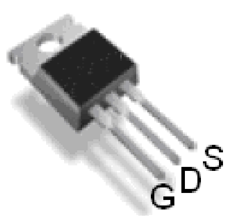
- ♦ Low On-Resistance
- ♦ Fast Switching
- ♦ 100% Avalanche Tested
- ♦ Repetitive Avalanche Allowed up to Tjmax
- ♦ Lead-Free, RoHS Compliant



V_{DSS}	100V
$R_{DS(on)}$	4.5mΩ
I_D	180A

Description

VS4110AT designed by the trench processing techniques to achieve extremely low on-resistance. Additional features of this design are a 175°C junction operating temperature, fast switching speed and improved repetitive avalanche rating . These features combine to make this design an extremely efficient and reliable device for use in Motor applications and a wide variety of other applications.



TO-220AB

Absolute Maximum Ratings

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only;and functional operation of the device at these or any other condition beyond those indicated in the specifications is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability. The thermal resistance and power dissipation ratings are measured under board mounted and still air conditions. Ambient temperature (TA) is 25°C, unless otherwise specified.

Symbol	Parameter		Rating	Unit
Common Ratings (T_C=25°C Unless Otherwise Noted)				
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage		100	V
V_{GS}	Gate-Source Voltage		±20	V
T_J	Maximum Junction Temperature		175	°C
T_{STG}	Storage Temperature Range		-55 to 175	°C
I_S	Maxium Diode Continuous Forward Current	T_C =25°C	180	A
Mounted on Large Heat Sink				
I_{DM}	Pulse Drain Current Tested ①	T_C =25°C	650	A
I_D	Continuous Drain current @V_{GS}=10V	T_C =25°C	180	A
P_D	Maximum Power Dissipation	T_C =25°C	350	W
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case		0.35	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient		62.5	°C/W
Drain-Source Avalanche Ratings				
EAS	Avalanche Energy, Single Pulsed ②		900	mJ

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	120	--	V
I_{DSS}	Zero Gate Voltage Drain Current(Tc=25℃)	V_{DS}=100V,V_{GS}=0V	--	--	1	μA
	Zero Gate Voltage Drain Current(Tc=125℃)	V_{DS}=100V,V_{GS}=0V	--	--	100	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V,V_{DS}=0V	--	--	±100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	2	--	4	V
$R_{DS(ON)}$	Drain-Source On-State Resistance③	V_{GS}=10V, I_D=80A	--	4.5	5.5	mΩ
gfs	Forward Transconductance	V_{DS}= 10V, I_D=70A	--	120	--	S
Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	V_{DS}=50V,V_{GS}=0V, f=1MHz	--	8950	--	pF
C_{oss}	Output Capacitance		--	620	--	pF
C_{rss}	Reverse Transfer Capacitance		--	245	--	pF
Q_g	Total Gate Charge	V_{DS}=50V,I_D=75A, V_{GS}=10V	--	150	--	nC
Q_{gs}	Gate-Source Charge		--	36	--	nC
Q_{gd}	Gate-Drain Charge		--	40	--	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=60V, I_D=30A, R_G=2.8Ω, V_{GS}=10V	--	26	--	nS
t_r	Turn-on Rise Time		--	70	--	nS
$t_{d(off)}$	Turn-Off Delay Time		--	76	--	nS
t_f	Turn-Off Fall Time		--	90	--	nS
Source- Drain Diode Characteristics@ T_J = 25°C (unless otherwise stated)						
I_{SD}	Source-drain current(Body Diode)	T_c=25℃	--	--	160	A
V_{SD}	Forward on voltage	I_{SD}=80A,V_{GS}=0V	--	0.89	1.3	V
t_{rr}	Reverse Recovery Time	T_j=25℃,I_{sd}=75A, V_{GS}=0V di/dt=100A/μs	--	65	--	nS
Q_{rr}	Reverse Recovery Charge		--	125	--	nC

NOTE:

① Pulse width ≤ 300μs; duty cycle≤ 2%; pulse width limited by max. junction temperature.

②Limited by TJmax, starting T_J = 25°C, L = 0.5mH, RG = 25Ω, IAS =60A, VGS =10V.

Typical Characteristics

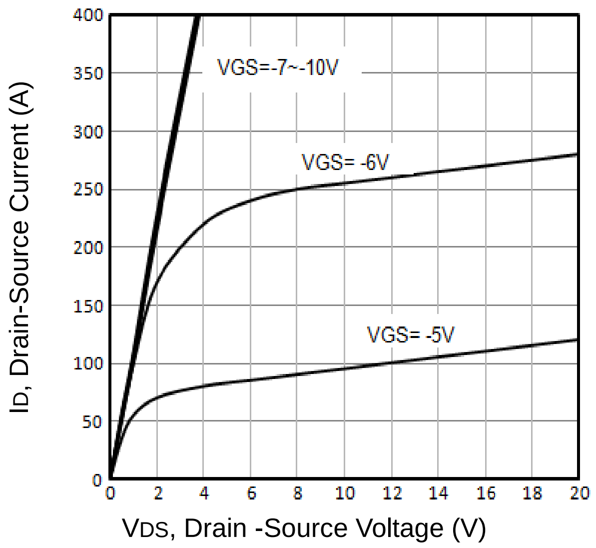


Fig1. Typical Output Characteristics

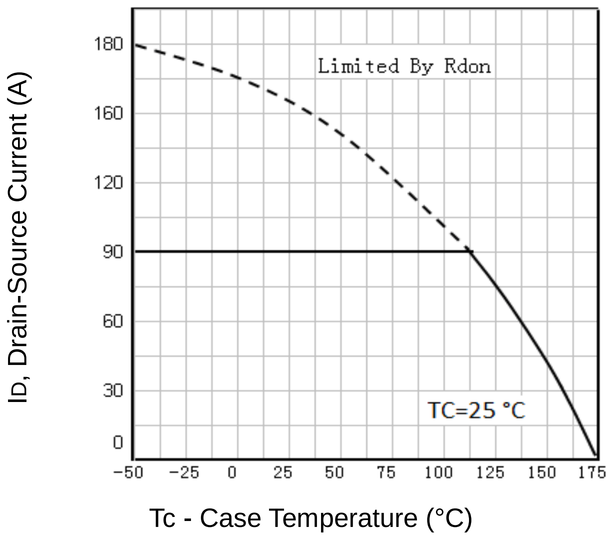


Fig2. Maximum Drain Current Vs.Case Temperature

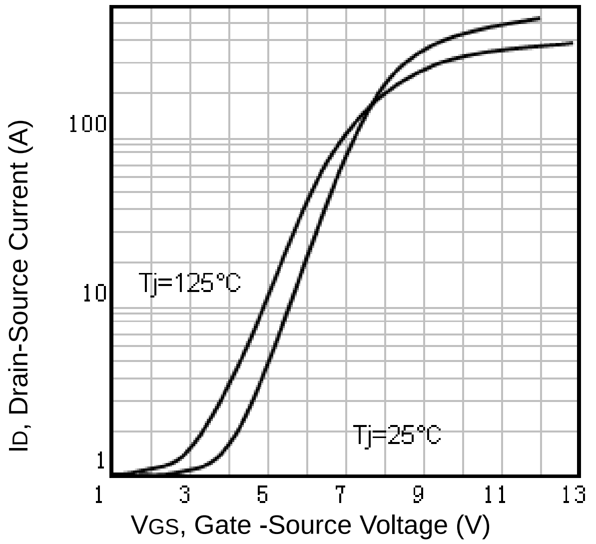


Fig3. Typical Transfer Characteristics

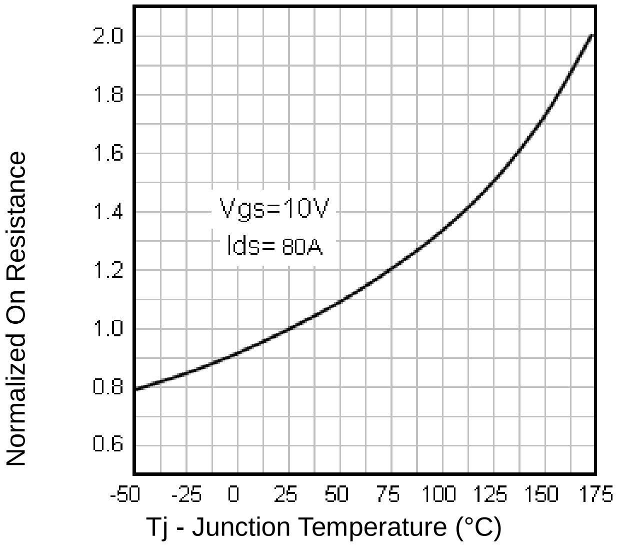


Fig4. Normalized On-Resistance Vs. Temperature

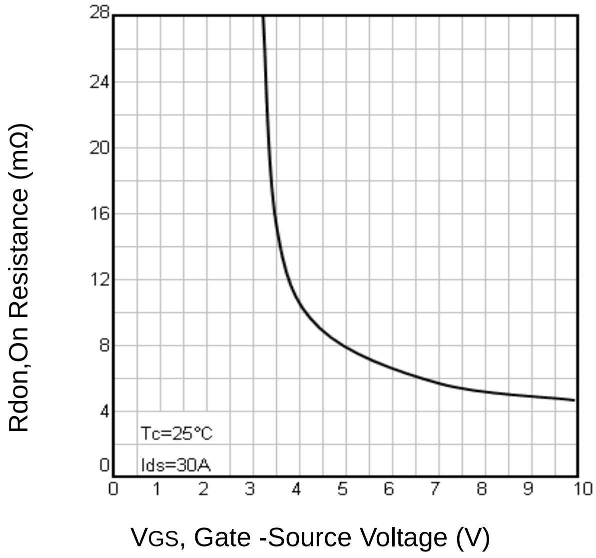


Fig5. Typical On-Resistance Vs. Gate -Source Voltage

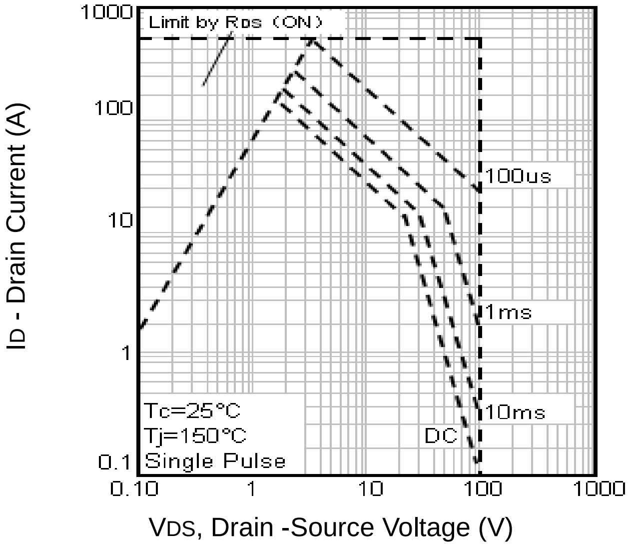


Fig6. Maximum Safe Operating Area

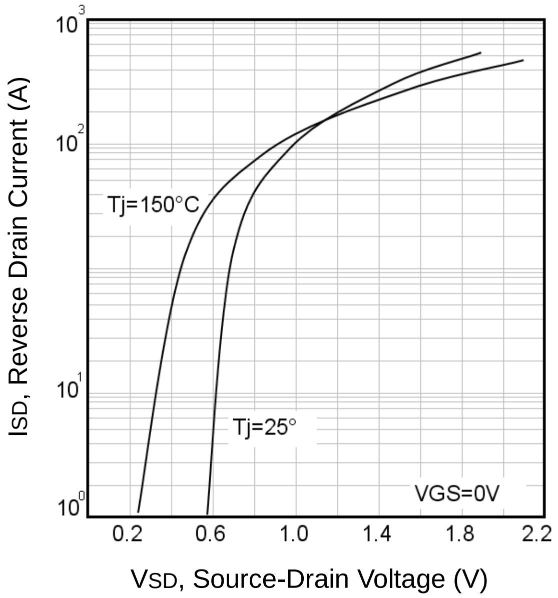


Fig7. Typical Source-Drain Diode Forward Voltage

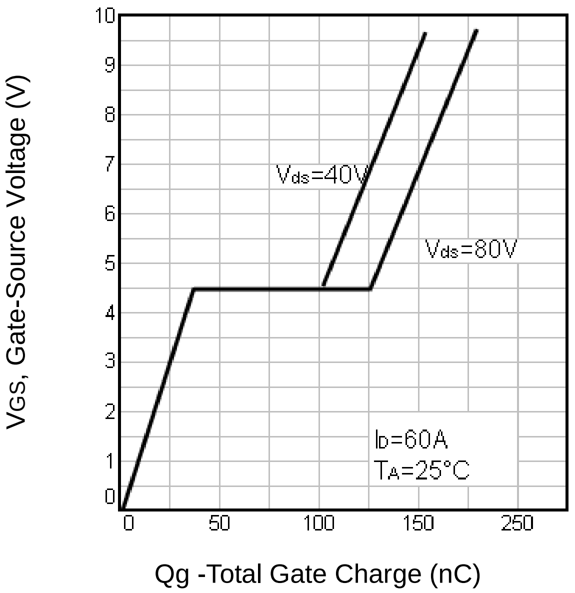


Fig8. Typical Gate Charge Vs.Gate-Source Voltage

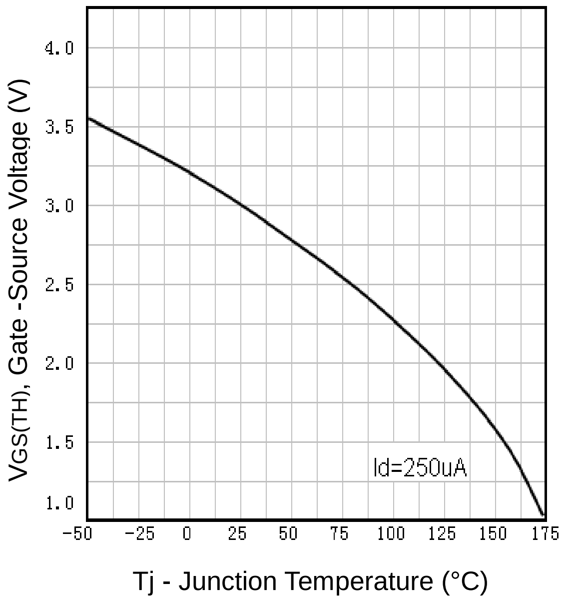


Fig9. Threshold Voltage Vs. Temperature

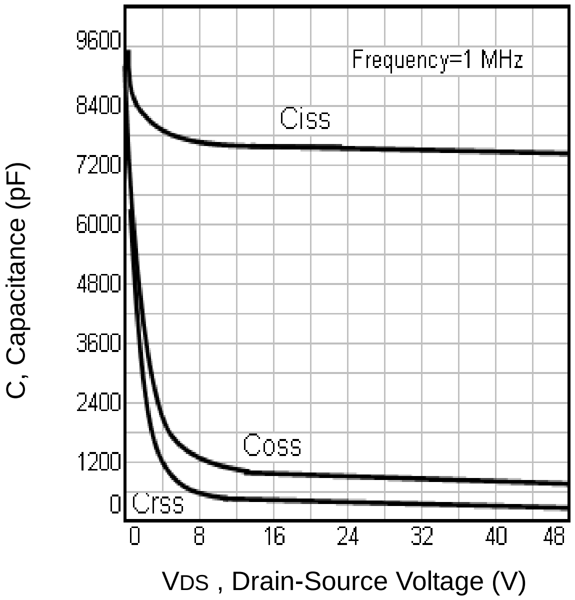


Fig10. Typical Capacitance Vs.Drain-Source Voltage

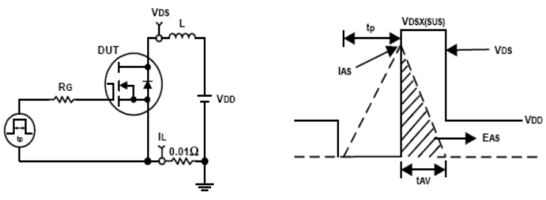


Fig11. Unclamped Inductive Test Circuit and waveforms

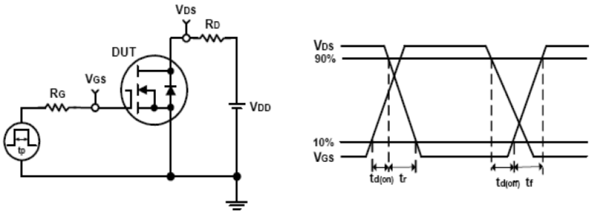
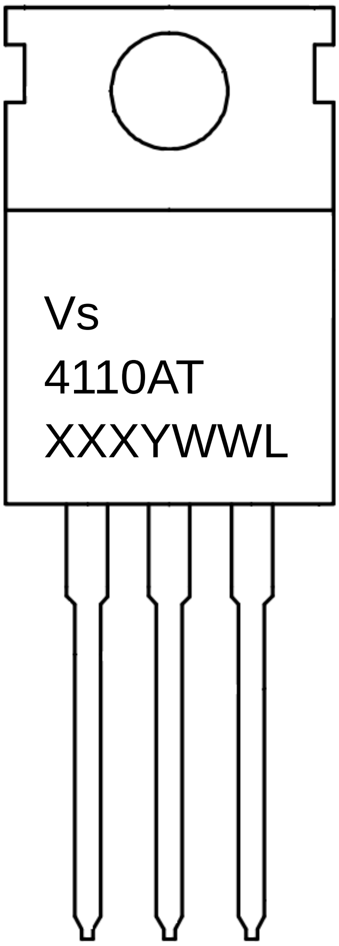


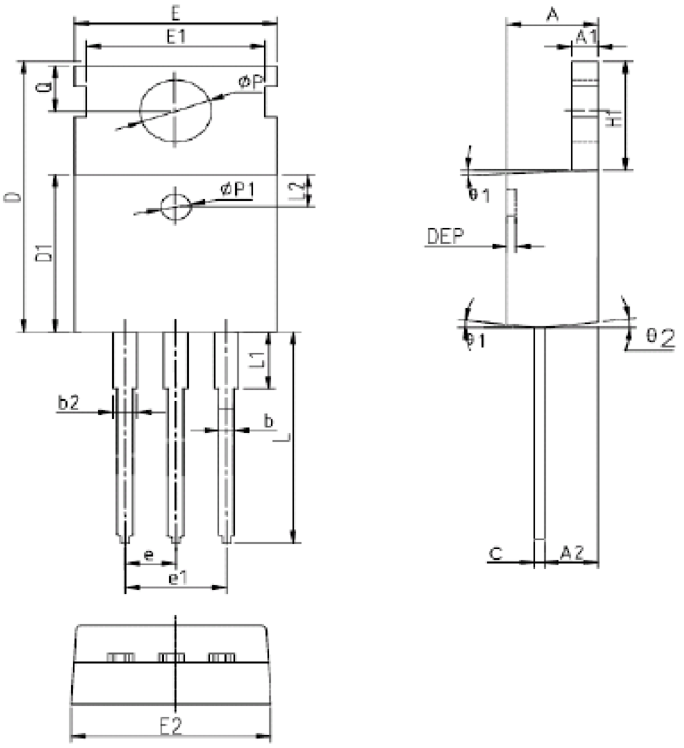
Fig12. Switching Time Test Circuit and waveforms

Marking Information



1st line： Vanguard Code（Vs）
2nd line： Part Number（4110AT）
3rd line： Date code （XXXYWWL）
- XXX： Wafer Lot Number
- Y： Year Code， e.g. E means 2017
- WW： Week Code
- L： Class

TO-220 Package Outline



SYMBOL	MM		
	MIN	NOM	MAX
A	4.40	4.57	4.70
A1	1.27	1.30	1.33
A2	2.35	2.40	2.50
b	0.77	-	0.90
b2	1.23	-	1.36
C	0.48	0.50	0.52
D	15.40	15.60	15.80
D1	9.00	9.10	9.20
DEP	0.05	0.10	0.20
E	9.70	9.90	10.10
E1	-	8.70	-
E2	9.80	10.00	10.20
Øp1	1.40	1.50	1.60
e	2.54BSC		
e1	5.08BSC		
H1	6.40	6.50	6.60
L	12.75	-	13.17
L1	-	-	3.95
L2	2.50REF.		
Øp	3.57	3.60	3.63
Q	2.73	2.80	2.87
θ1	5°	7°	9°
θ2	1°	3°	5°

Order Information

Product	Marking	Package	Packaging	Min Unit Quantity
VS4110AT	4110AT	TO-220	50PCS/Tube	1000PCS

Customer Service

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