

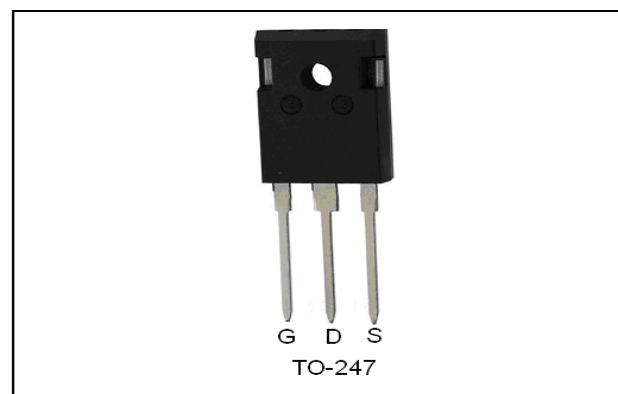
Features

- ◆ Low On-Resistance
- ◆ Fast Switching
- ◆ 100% Avalanche Tested
- ◆ Repetitive Avalanche Allowed up to T_{jmax}
- ◆ Lead-Free, RoHS Compliant

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.

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



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 (T_A) is 25°C, unless otherwise specified.

Symbol	Parameter		Rating	Unit
Common Ratings (Tc=25°C Unless Otherwise Noted)				
VGS	Gate-Source Voltage		±20	V
V(BR)DSS	Drain-Source Breakdown Voltage		100	V
TJ	Maximum Junction Temperature		175	°C
TSTG	Storage Temperature Range		-55 to 175	°C
IS	Maxium Diode Continuous Forward Current	TC=25°C	180	A
Mounted on Large Heat Sink				
IDM	Pulse Drain Current Tested ①	TC=25°C	720	A
ID	Continuous Drain current@VGS=10V	TC=25°C	180	A
PD	Maximum Power Dissipation	TC=25°C	330	W
RθJC	Thermal Resistance-Junction to Case		0.4	°C/W
RθJA	Thermal Resistance Junction-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°C)	V _{DS} =100V,V _{GS} =0V	--	--	1	μA
	Zero Gate Voltage Drain Current(Tc=125°C)	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°C	--	--	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°C,I _{sd} =75A, V _{GS} =0V	--	65	--	nS
Q _{rr}	Reverse Recovery Charge	di/dt=100A/μs		125		nC

NOTE:

- ① Pulse width ≤ 300μs; duty cycles ≤ 2%; 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} =60A, V_{GS} =10V.

Typical Characteristics

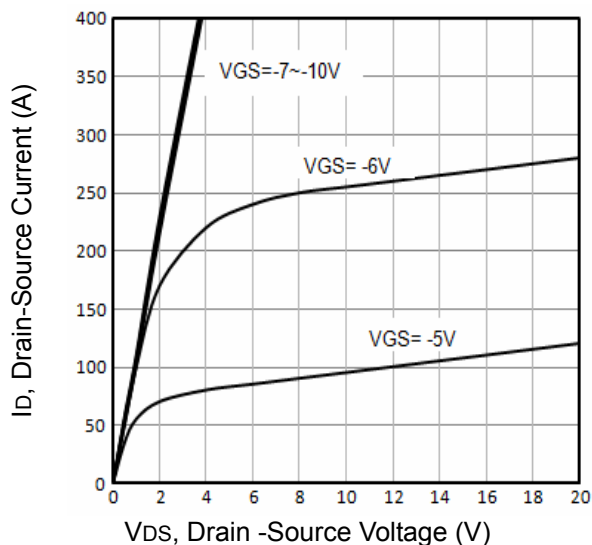


Fig1. Typical Output Characteristics

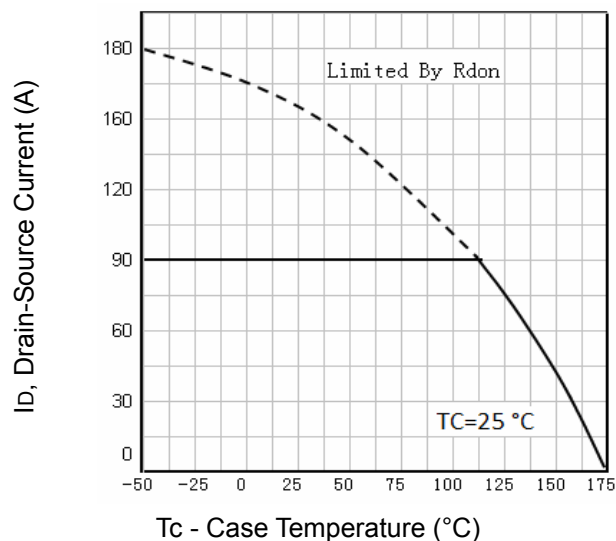


Fig2. Maximum Drain Current Vs. Case Temperature

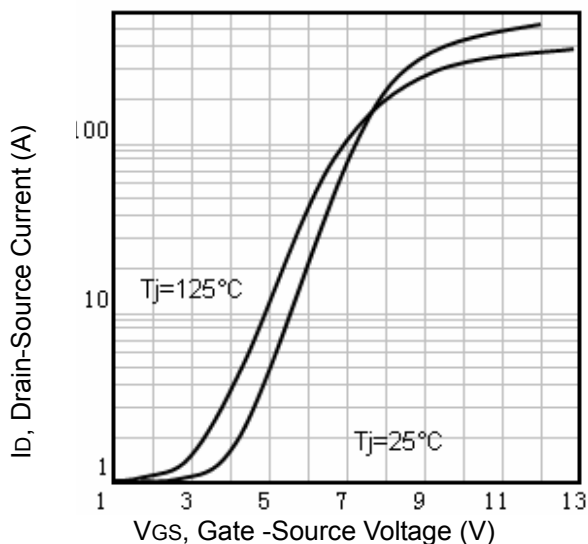


Fig3. Typical Transfer Characteristics

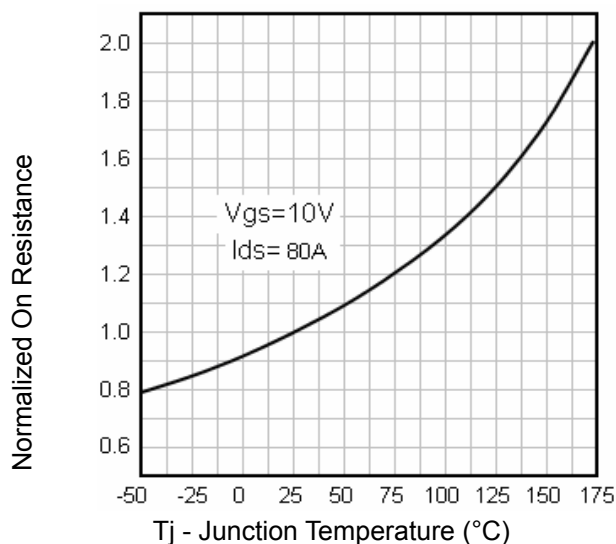


Fig4. Normalized On-Resistance Vs. Temperature

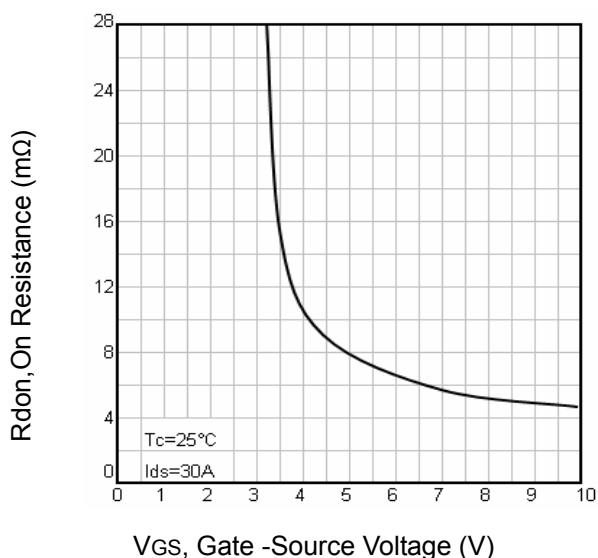


Fig5. Typical On-Resistance Vs. Gate-Source Voltage

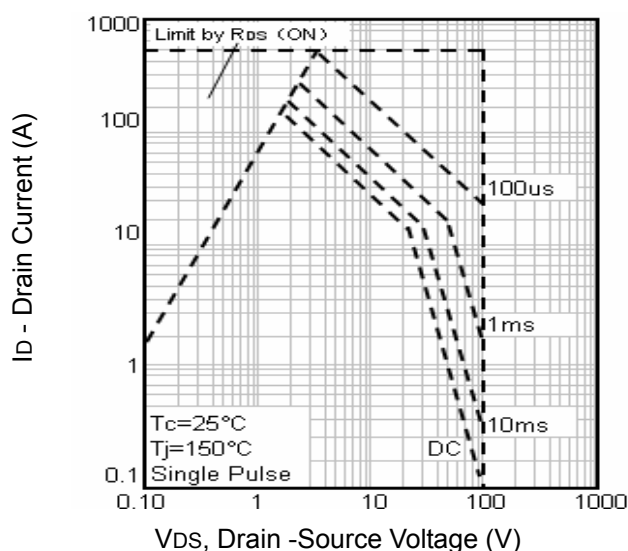


Fig6. Maximum Safe Operating Area

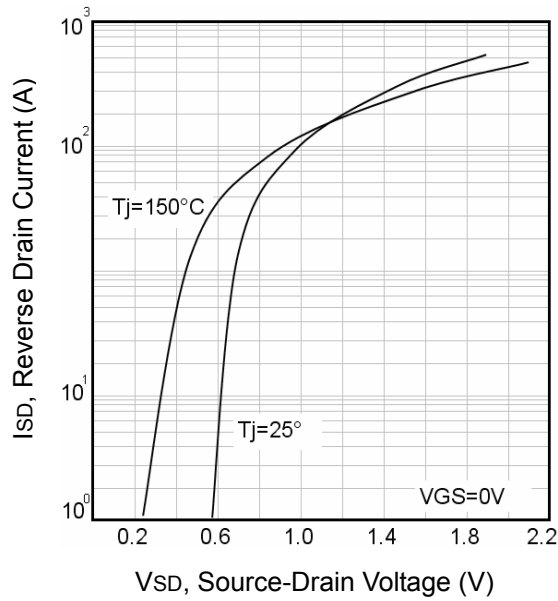


Fig7. Typical Source-Drain Diode Forward Voltage

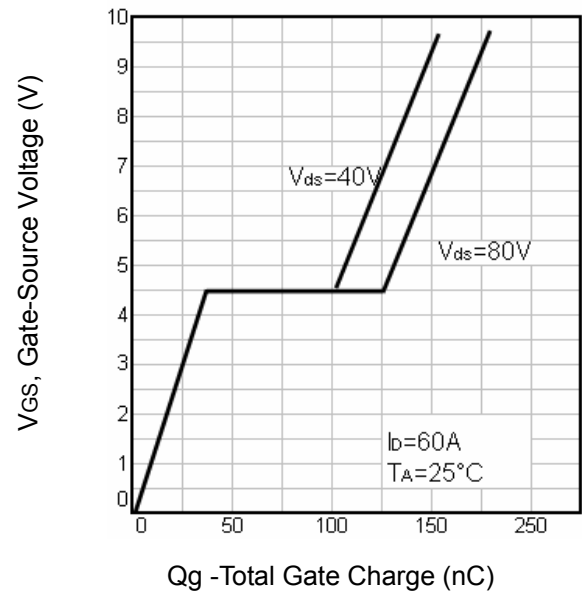


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

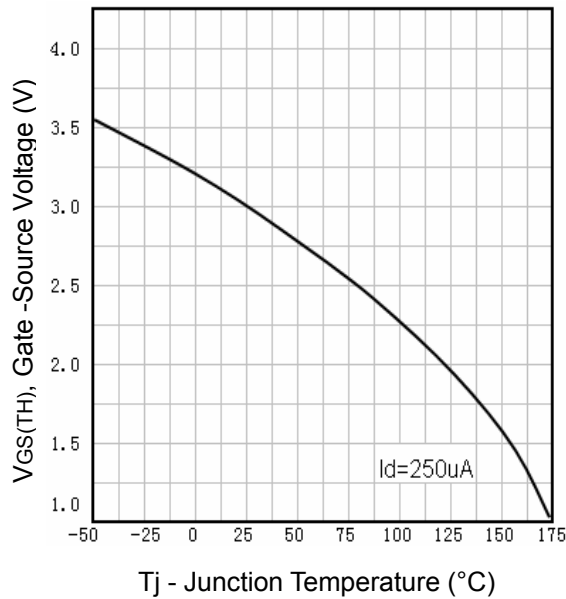


Fig9. Threshold Voltage Vs. Temperature

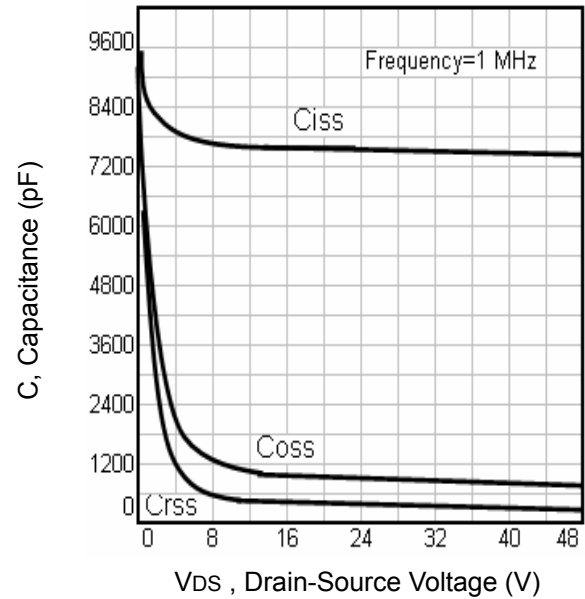


Fig10. Typical Capacitance Vs. Drain-Source Voltage

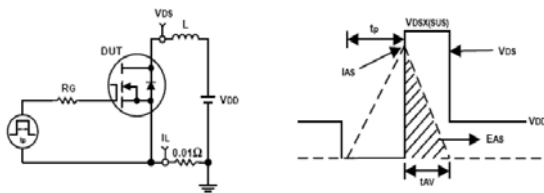


Fig11. Unclamped Inductive Test Circuit and waveforms

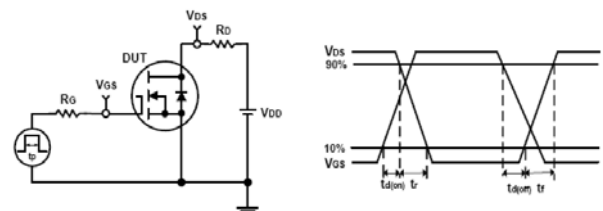
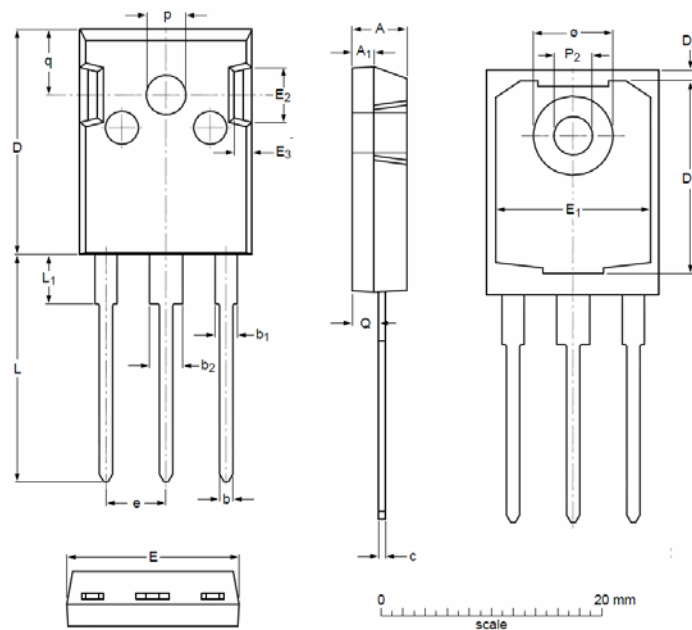


Fig12. Switching Time Test Circuit and waveforms

TO-247 Package Outline



DIMENSIONS (unit : mm)

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	4.70	4.95	5.20	A₁	1.90	1.98	2.10
b	1.00	1.21	1.40	b₁	1.80	2.10	2.20
b₂	2.80	3.03	3.20	c	0.50	0.60	0.70
D	20.30	20.52	20.60	D₁	16.28	16.80	17.68
D₂	0.80	1.00	1.20	E	15.45	15.64	15.72
E₁	13.82	14.00	14.22	E₂	4.80	5.12	5.30
E₃	1.40	1.60	1.80	e	--	5.45	--
L	20.40	20.50	20.90	L₁	4.25	4.37	4.75
P	3.50	3.60	3.70	P₂	3.40	3.52	3.60
Q	2.20	2.48	2.60	q	5.78	5.88	6.18
ø	7.10	7.20	7.30				

Order Information

Product	Marking	Package	Packaging	Min Unit Quantity
VS4110ADT	VS4110ADT	TO-247	30PCS/Tube	600PCS

Customer Service

Sales and Service:

sales@vgsemi.com

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