

Features

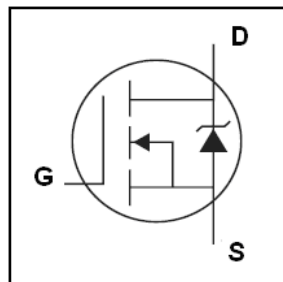
- ◆ Low On-Resistance
- ◆ Fast Switching
- ◆ 100% Avalanche Tested
- ◆ Repetitive Avalanche Allowed up to T_{jmax}
- ◆ Lead-Free, RoHS Compliant

Description

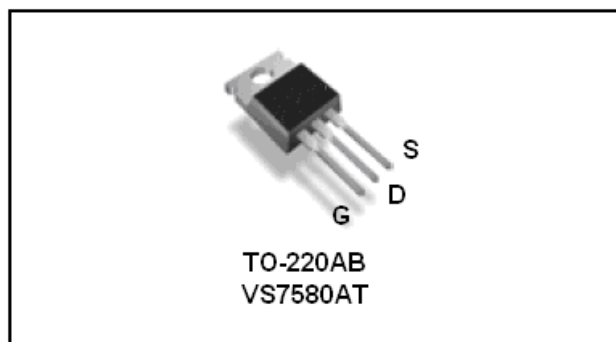
VS7580AT designed by the trench processing techniques to achieve extremely low on-resistance. Additional features of this design are a 175°C junction operating temperature, fast switching speed and improved repetitive avalanche rating . These features combine to make this design an extremely efficient and reliable device for use in Automotive applications and a wide variety of other applications.

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.



$V_{DSS} \geq 75V$
$R_{DS(on)} = 6.5m\Omega$
$I_D = 83A$



Symbol	Parameter		Rating	Unit
Common Ratings (Tc=25°C Unless Otherwise Noted)				
V _{GS}	Gate-Source Voltage		±20	V
V _{(BR)DSS}	Drain-Source Breakdown Voltage		75	V
T _J	Maximum Junction Temperature		175	°C
T _{STG}	Storage Temperature Range		-55 to 175	°C
I _S	Diode Continuous Forward Current	T _C =25°C	83	A
Mounted on Large Heat Sink				
I _{DM}	Pulse Drain Current Tested ①	T _C =25°C	330	A
I _D	Continuous Drain current@VGS=10V	T _C =25°C	83	A
P _D	Maximum Power Dissipation	T _C =25°C	175	W
R _{θJC}	Thermal Resistance-Junction to Case		0.85	°C/W
R _{θJA}	Thermal Resistance Junction-Ambient		62.5	°C/W
Drain-Source Avalanche Ratings				
EAS	Avalanche Energy, Single Pulsed ②		325	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	75	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current(Tc=25°C)	V _{DS} =75V,V _{GS} =0V	--	--	1	μA
	Zero Gate Voltage Drain Current(Tc=125°C)	V _{DS} =75V,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	3	4	V
R _{DS(ON)}	Drain-Source On-State Resistance①	V _{GS} =10V, I _D =40A	--	6.5	8	mΩ
Dynamic Electrical Characteristics @ T _J = 25°C (Unless otherwise stated)						
C _{iss}	Input Capacitance	V _{DS} =48V,V _{GS} =0V, f=1MHz	--	3460	--	pF
C _{oss}	Output Capacitance		--	400	--	pF
C _{rss}	Reverse Transfer Capacitance		--	175	--	pF
Q _g	Total Gate Charge	V _{DS} =37.5V,I _D =40A, V _{GS} =10V	--	58	--	nC
Q _{gs}	Gate-Source Charge		--	14	--	nC
Q _{gd}	Gate-Drain Charge		--	16	--	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} =37.5V, I _D =20A, R _G =6.8Ω, V _{GS} =10V	--	12	--	nS
t _r	Turn-on Rise Time		--	35	--	nS
t _{d(off)}	Turn-Off Delay Time		--	50	--	nS
t _f	Turn-Off Fall Time		--	28	--	nS
Source- Drain Diode Characteristics@ T _J = 25°C (Unless otherwise stated)						
V _{SD}	Forward on voltage	I _{SD} =40A,V _{GS} =0V	--	--	1.3	V
t _{rr}	Reverse Recovery Time	T _J =25°C,I _{sd} =40A, V _{GS} =0V	--	48	--	nS
Q _{rr}	Reverse Recovery Charge	di/dt=100A/μs		92		nC

NOTE:

①Pulse width ≤ 300μs; duty cycle≤ 2%.

② Limited by T_{Jmax}, starting T_J = 25°C, L = 0.5mH,R_G = 25Ω, I_{AS} = 28A, V_{GS} =10V. Part not recommended for use above this value

Typical Characteristics

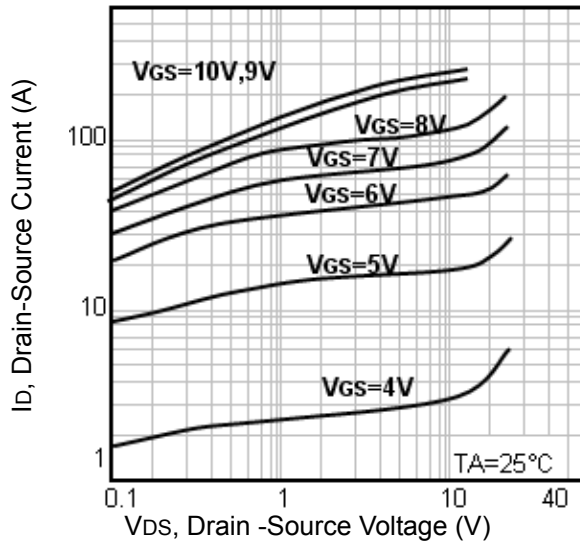


Fig1. Typical Output Characteristics

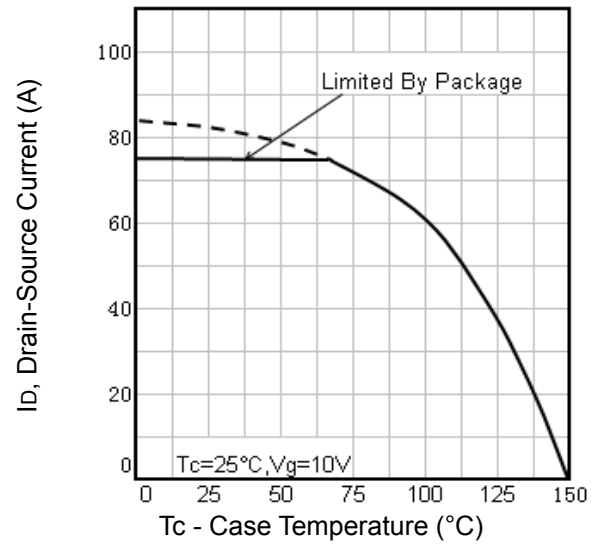


Fig2. Maximum Drain Current Vs. Case Temperature

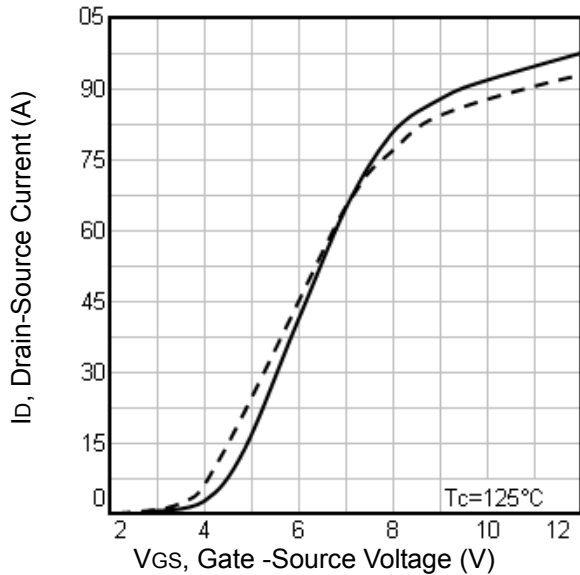


Fig3. Typical Transfer Characteristics

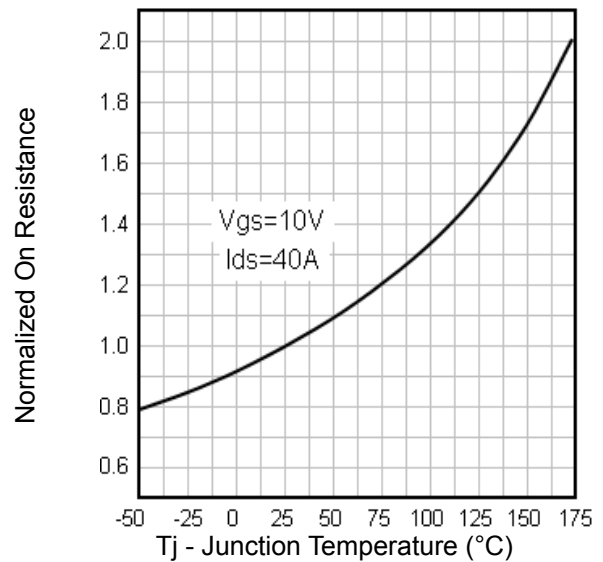


Fig4. Normalized On-Resistance Vs. Temperature

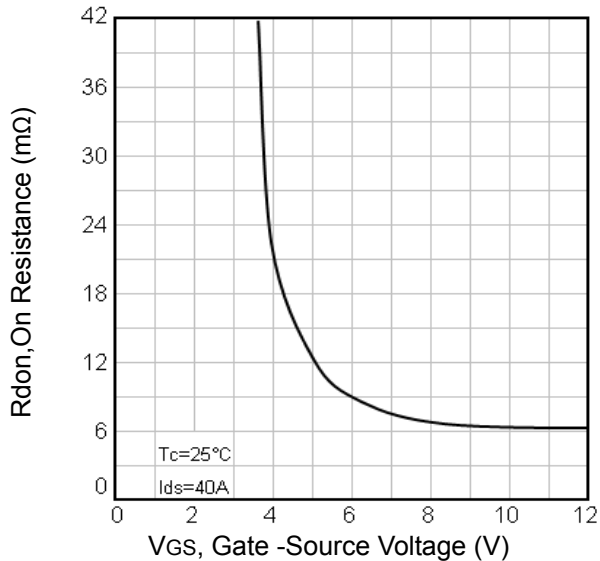


Fig5. Typical On-Resistance Vs. Gate-Source Voltage

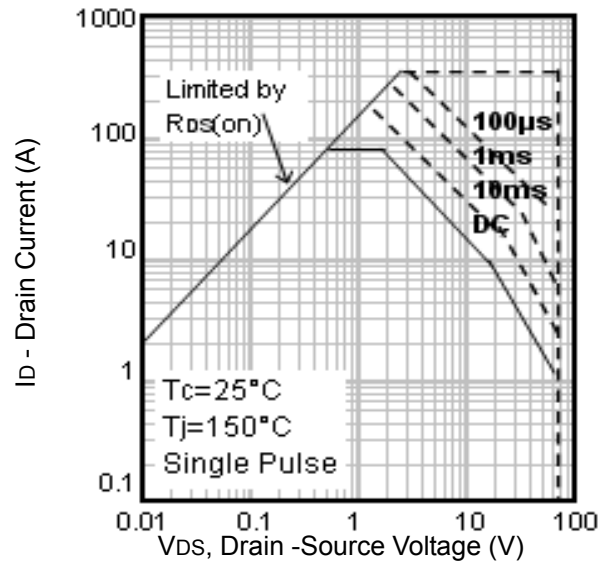


Fig6. Maximum Safe Operating Area

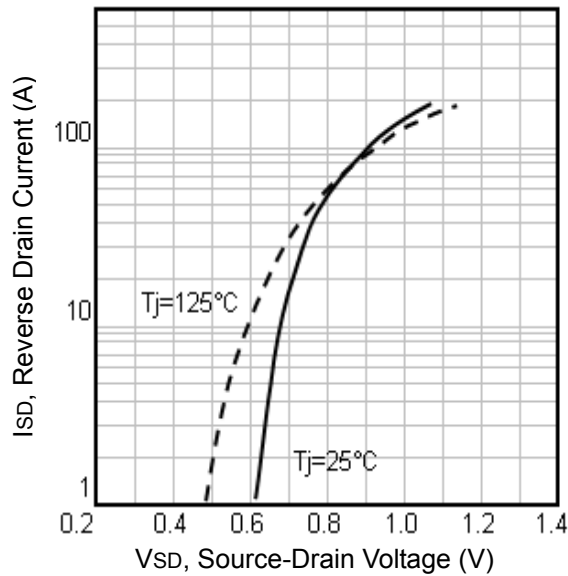


Fig7. Typical Source-Drain Diode Forward Voltage

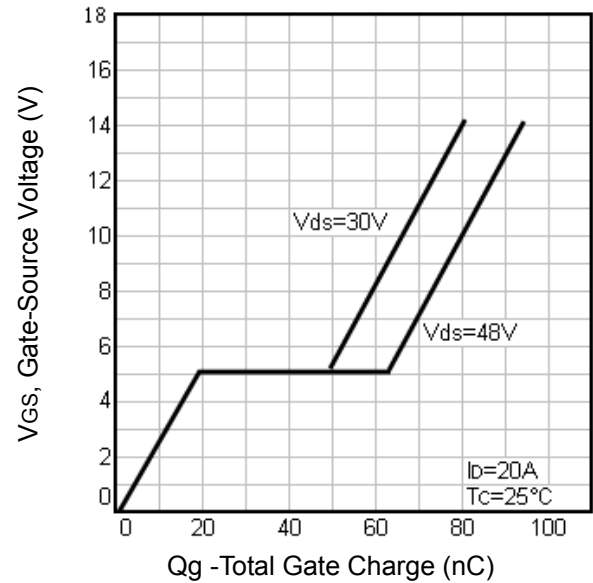


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

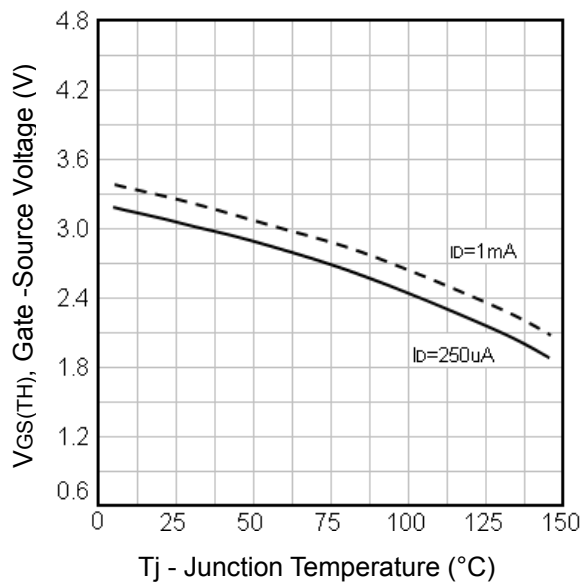


Fig9. Threshold Voltage Vs. Temperature

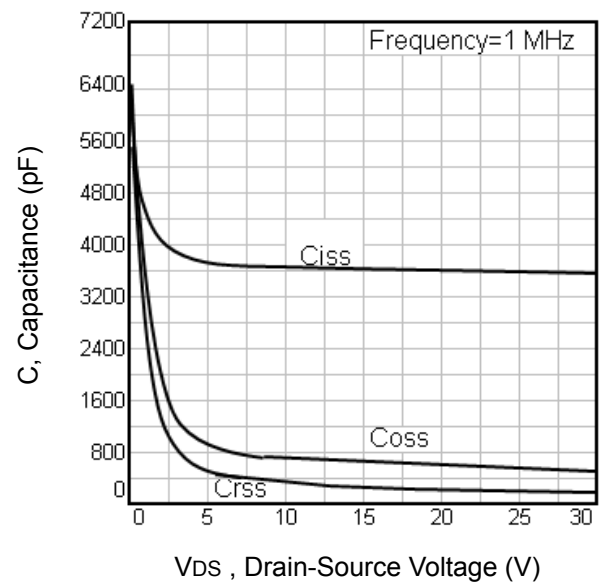


Fig10. Typical Capacitance Vs. Drain-Source Voltage

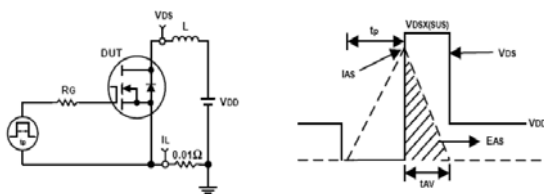


Fig11. Unclamped Inductive Test Circuit and waveforms

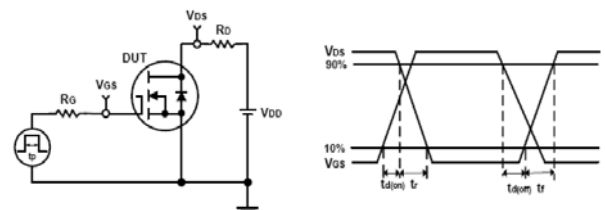
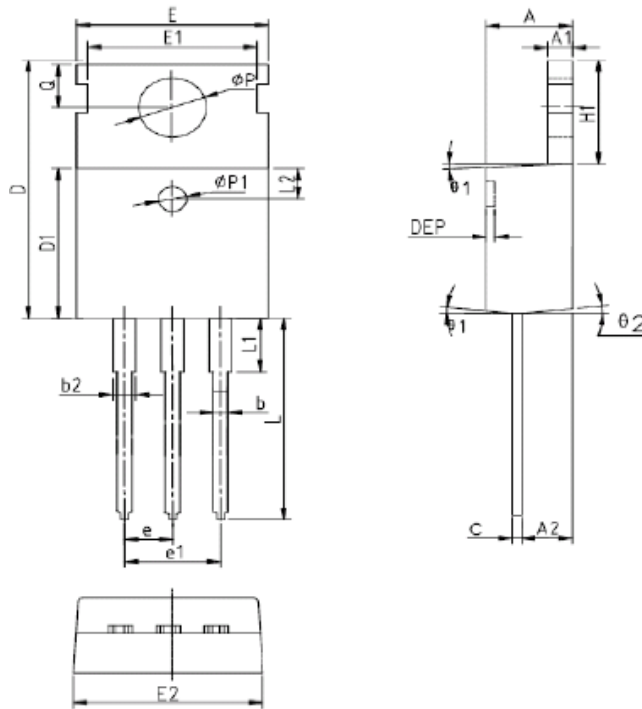


Fig12. Switching Time Test Circuit and waveforms

TO-220AB Package Outline



SYMBOL	MM			INCH			SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX		MIN	NOM	MAX	MIN	NOM	MAX
A	4.40	4.57	4.70	0.173	0.180	0.185	$\theta p1$	1.40	1.50	1.60	0.055	0.059	0.063
A1	1.27	1.30	1.33	0.050	0.051	0.052	e	2.54BSC			0.1BSC		
A2	2.35	2.40	2.50	0.093	0.094	0.098	e1	5.08BSC			0.2BSC		
b	0.77	-	0.90	0.030	-	0.035	H1	6.40	6.50	6.60	0.252	0.256	0.260
b2	1.23	-	1.36	0.048	-	0.054	L	12.75	-	13.17	0.502	-	0.519
C	0.48	0.50	0.52	0.019	0.020	0.021	L1	-	-	3.95	-	-	0.156
D	15.40	15.60	15.80	0.606	0.614	0.622	L2	2.50REF.			0.098REF.		
D1	9.00	9.10	9.20	0.354	0.358	0.362	θp	3.57	3.60	3.63	0.141	0.142	0.143
DEP	0.05	0.10	0.20	0.002	0.004	0.008	Q	2.73	2.80	2.87	0.107	0.110	0.113
E	9.70	9.90	10.10	0.382	0.389	0.398	$\theta 1$	5°	7°	9°	5°	7°	9°
E1	-	8.70	-	-	0.343	-	$\theta 2$	1°	3°	5°	1°	3°	5°
E2	9.80	10.00	10.20	0.386	0.394	0.401							

Order Information

Product	Marking	Package	Packaging	Min Unit Quantity
VS7580AT	VS7580AT	TO-220AB	50PCS/Tube	1000PCS

Customer Service

Sales and Service:

sales@vgsemi.com

Shen Zhen Vanguard Semiconductor CO., LTD

TEL: (86-755) -26902410

FAX: (86-755) -26907027

WEB: www.vgsemi.com