

Features

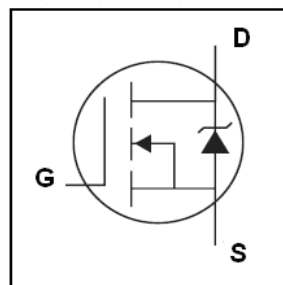
- ◆ Low On-Resistance
- ◆ Fast Switching
- ◆ 100% Avalanche Tested
- ◆ Repetitive Avalanche Allowed up to T_{jmax}
- ◆ Lead-Free, RoHS Compliant

Description

VS6888AT 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.



$$V_{DSS} \geq 65V$$

$$R_{DS(on)} = 6.0m\Omega$$

$$I_D = 88A$$



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		65	V
TJ	Maximum Junction Temperature		175	°C
TSTG	Storage Temperature Range		-55 to 175	°C
IS	Diode Continuous Forward Current	TC =25°C	100	A
Mounted on Large Heat Sink				
IDM	Pulse Drain Current Tested ①	TC =25°C	330	A
ID	Continuous Drain current@VGS=10V	TC =25°C	88	A
PD	Maximum Power Dissipation	TC =25°C	160	W
RθJC	Thermal Resistance-Junction to Case		0.9	°C/W
RθJA	Thermal Resistance Junction-Ambient		62.5	°C/W
Drain-Source Avalanche Ratings				
EAS	Avalanche Energy, Single Pulsed ②		330	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	65	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current(T _C =25°C)	V _{DS} =65V,V _{GS} =0V	--	--	1	μA
	Zero Gate Voltage Drain Current(T _C =125°C)	V _{DS} =65V,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 Resistance③	V _{GS} =10V, I _D =35A	--	6	8	mΩ
g _{fs}	Forward Transconductance	V _{DS} = 25V, I _D =30A	--	65	--	S
Dynamic Electrical Characteristics @ T _J = 25°C (unless otherwise stated)						
C _{iss}	Input Capacitance	V _{DS} =30V,V _{GS} =0V, f=1MHz	--	2860	--	pF
C _{oss}	Output Capacitance		--	400	--	pF
C _{rss}	Reverse Transfer Capacitance		--	230	--	pF
Q _g	Total Gate Charge	V _{DS} =30V,I _D =40A, V _{GS} =10V	--	70	--	nC
Q _{gs}	Gate-Source Charge		--	13	--	nC
Q _{gd}	Gate-Drain Charge		--	22	--	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} =30V, I _D =1A, R _G =6.8Ω, V _{GS} =10V	--	15	--	nS
t _r	Turn-on Rise Time		--	14	--	nS
t _{d(off)}	Turn-Off Delay Time		--	28	--	nS
t _f	Turn-Off Fall Time		--	25	--	nS
Source- Drain Diode Characteristics@ T _J = 25°C (unless otherwise stated)						
I _{SD}	Source-drain current(Body Diode)	T _C =25°C	--	--	88	A
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	--	65	--	nS
Q _{rr}	Reverse Recovery Charge	di/dt=100A/μs		85		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} = 28A, V_{GS} = 10V. Part not recommended for use above this value
- ③ Pulse width ≤ 300μs; duty cycle ≤ 2%.

Typical Characteristics

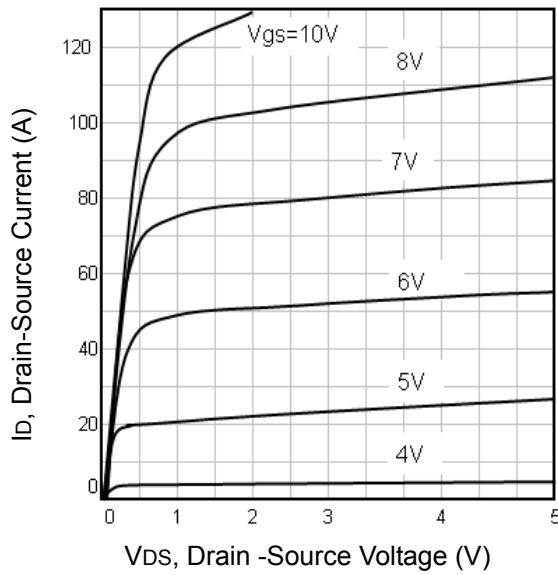


Fig1. Typical Output Characteristics

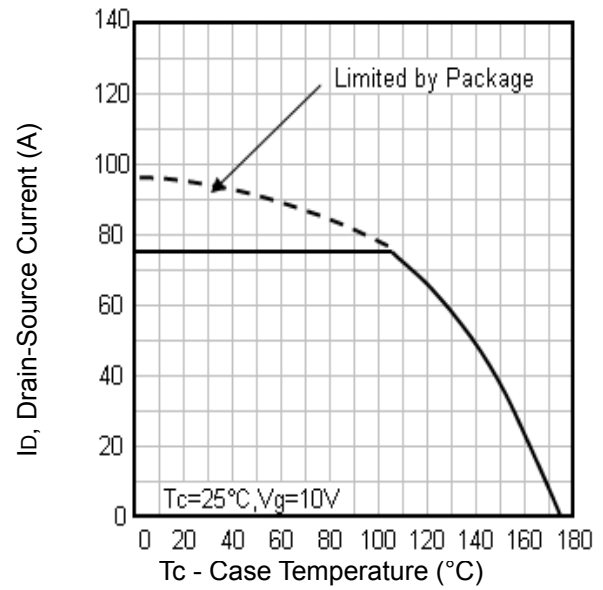


Fig2. Maximum Drain Current Vs. Case Temperature

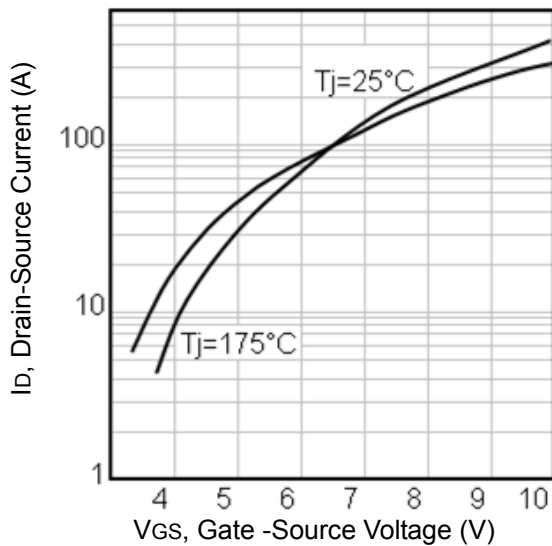


Fig3. Typical Transfer Characteristics

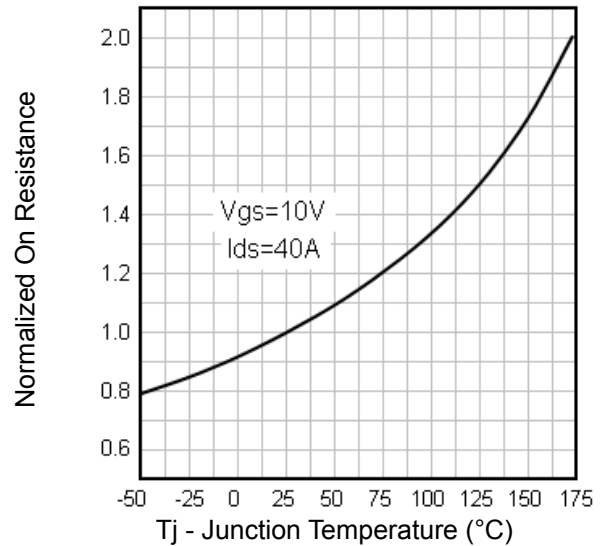


Fig4. Normalized On-Resistance Vs. Temperature

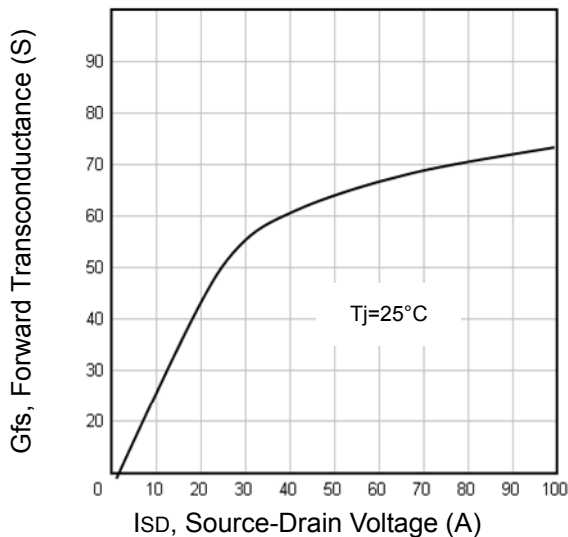


Fig5. Typical Forward Transconductance Vs. Drain Current

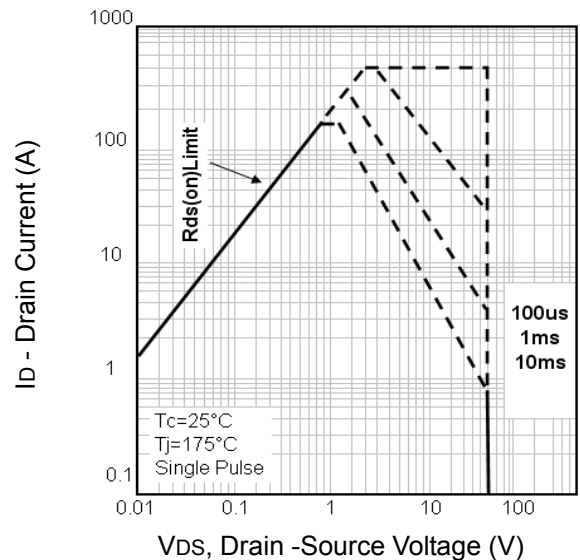


Fig6. Maximum Safe Operating Area

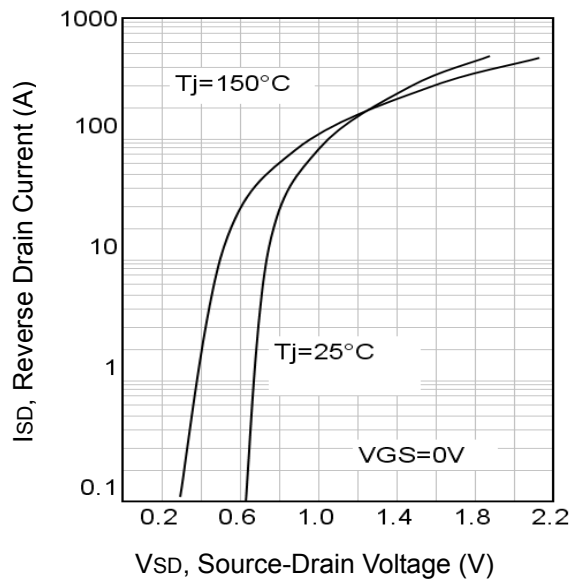


Fig7. Typical Source-Drain Diode Forward Voltage

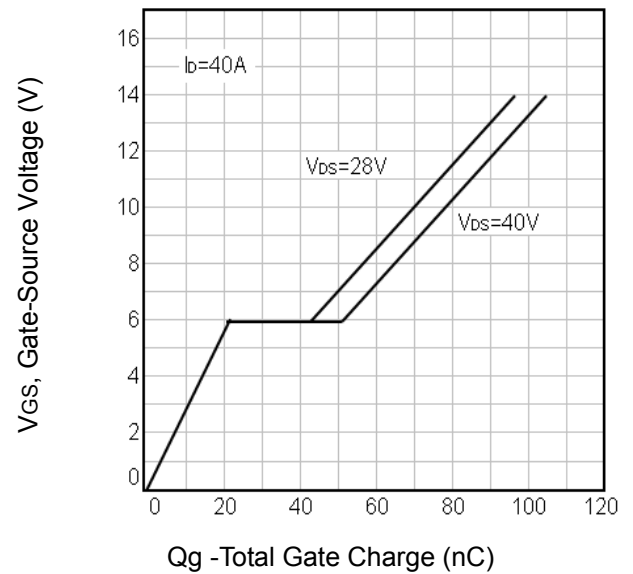


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

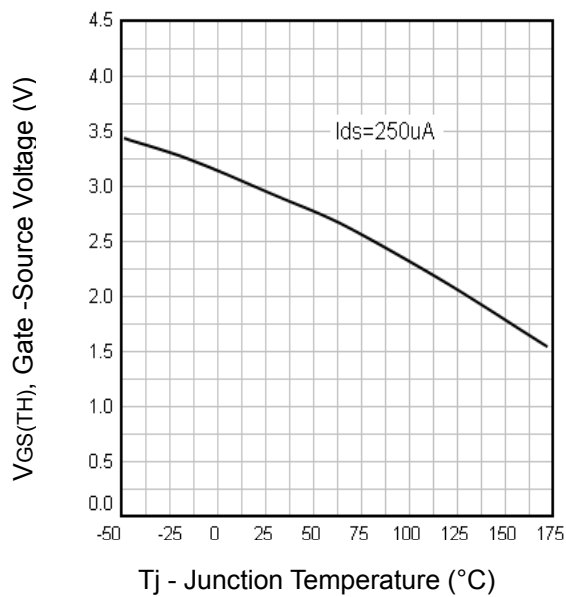


Fig9. Threshold Voltage Vs. Temperature

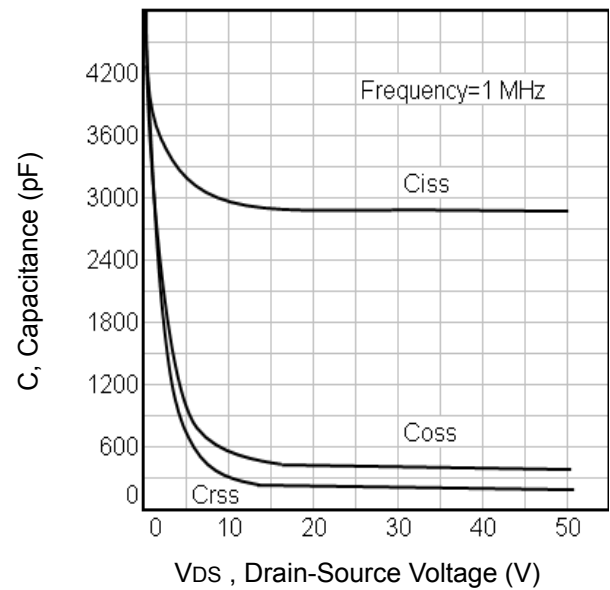


Fig10. Typical Capacitance Vs. Drain-Source Voltage

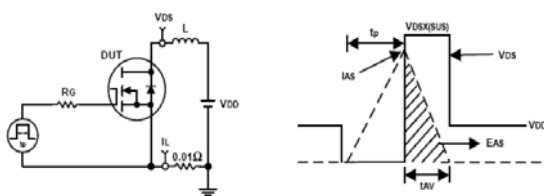


Fig11. Unclamped Inductive Test Circuit and waveforms

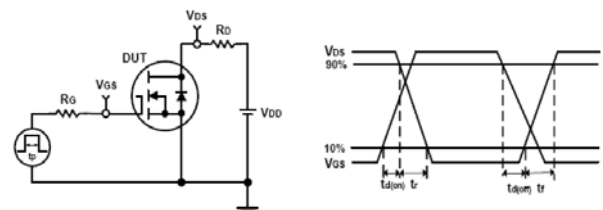
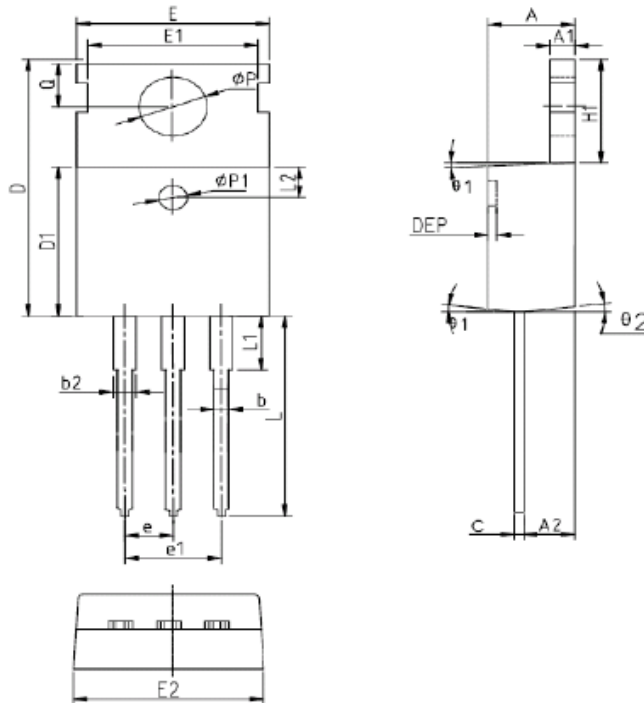


Fig12. Switching Time Test Circuit and waveforms

TO-220 Package Outline



SYMBOL	MILIMETERS		
	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
$\phi p1$	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.		
ϕp	3.57	3.60	3.63
Q	2.73	2.80	2.87
$\theta 1$	5°	7°	9°
$\theta 2$	1°	3°	5°

Order Information

Product	Marking	Package	Packaging	Min Unit Quantity
VS6888AT	VS6888AT	TO-220AB	50PCS/Tube	1000PCS

Customer Service

Sales and Service:

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