

**Features**

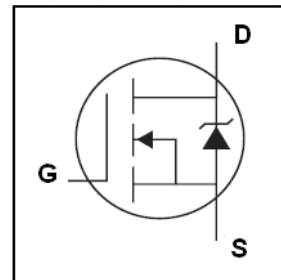
- ◆ Low On-Resistance
- ◆ Fast Switching
- ◆ 100% Avalanche Tested
- ◆ Repetitive Avalanche Allowed up to Tjmax
- ◆ Lead-Free, RoHS Compliant

**Description**

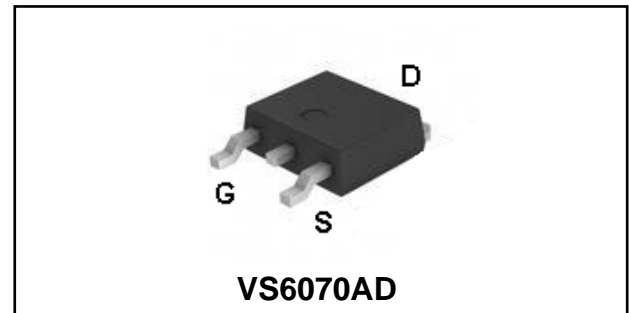
VS6070AD designed by the trench processing techniques to achieve extremely low on-resistance. Additional features of this design are a 175°C junction operating temperature, fast switching speed and improved repetitive avalanche rating . These features combine to make this design an extremely efficient 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 (TA) is 25°C, unless otherwise specified.



$V_{DSS} \geq 60V$
$R_{DS(on)} = 6.5m\Omega$
$I_D = 70A$



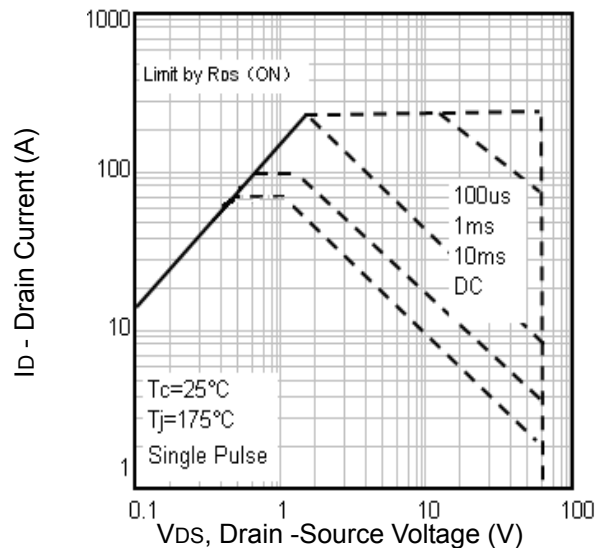
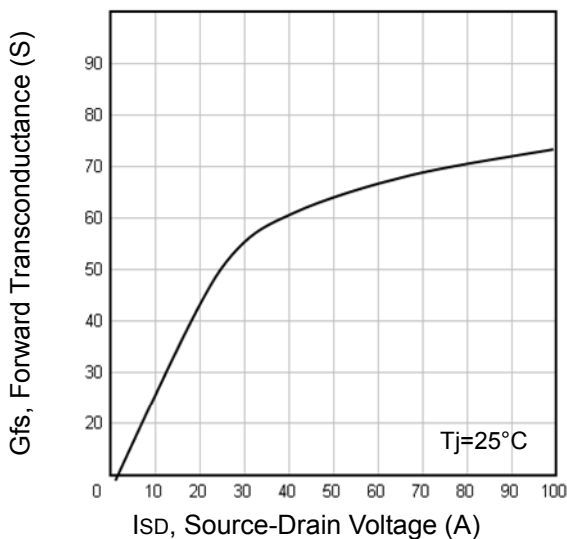
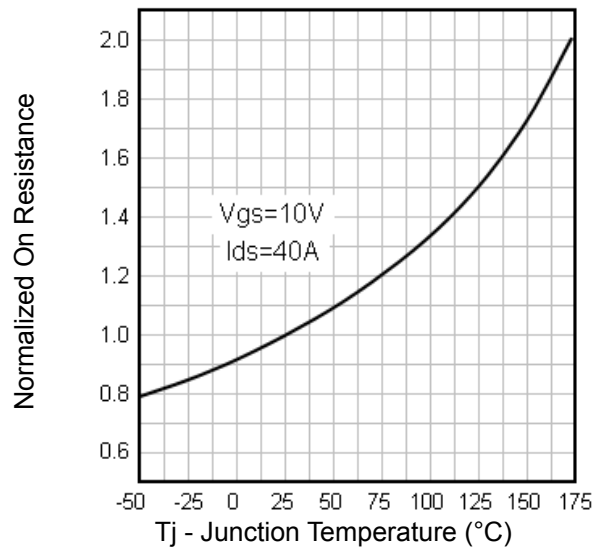
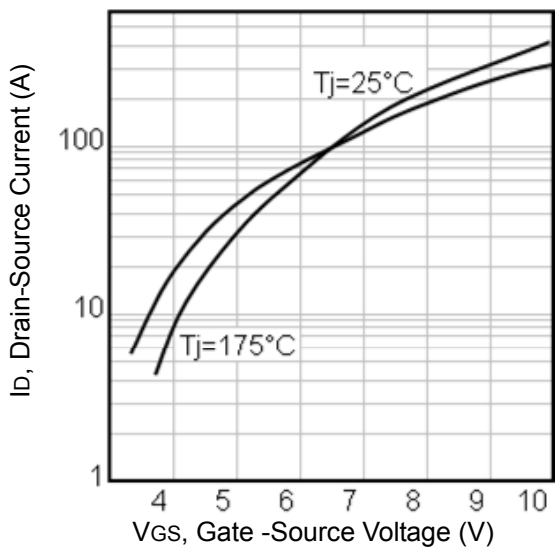
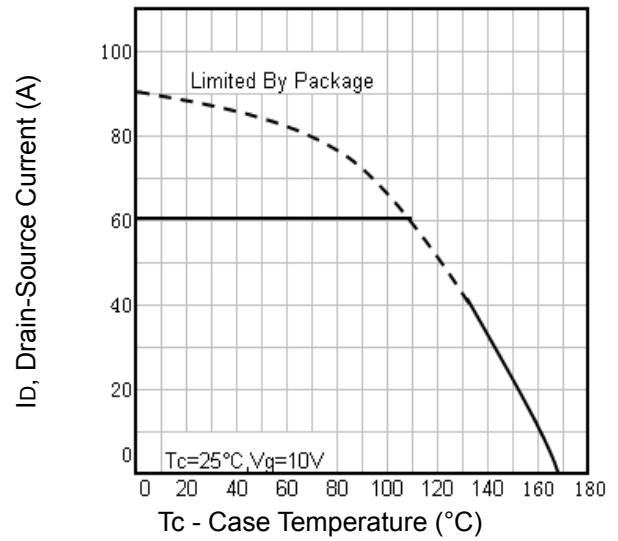
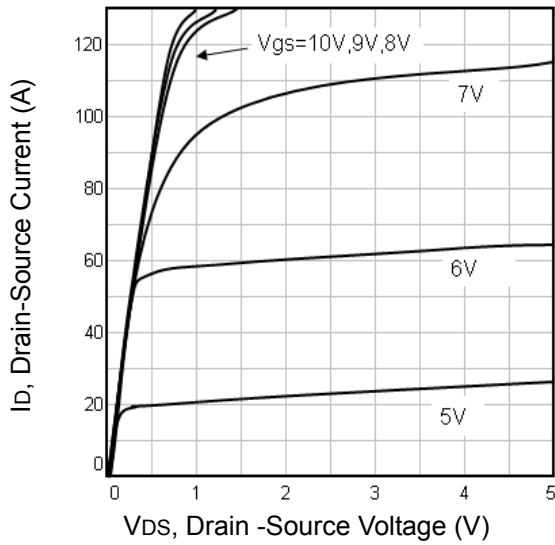
Symbol	Parameter	Rating	Unit	
<b>Common Ratings (Tc=25°C Unless Otherwise Noted)</b>				
V <sub>GS</sub>	Gate-Source Voltage	±20	V	
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	60	V	
T <sub>J</sub>	Maximum Junction Temperature	175	°C	
T <sub>STG</sub>	Storage Temperature Range	-55 to 175	°C	
I <sub>S</sub>	Diode Continuous Forward Current	T <sub>C</sub> = 25°C	70	A
<b>Mounted on Large Heat Sink</b>				
I <sub>DM</sub>	Pulse Drain Current Tested ①	T <sub>C</sub> = 25°C	280	A
I <sub>D</sub>	Continuous Drain current@VGS=10V	T <sub>C</sub> = 25°C	70	A
P <sub>D</sub>	Maximum Power Dissipation	T <sub>C</sub> = 25°C	128	W
R <sub>θJC</sub>	Thermal Resistance-Junction to Case		0.9	°C/W
R <sub>θJA</sub>	Thermal Resistance Junction-Ambient		62.5	°C/W
<b>Drain-Source Avalanche Ratings</b>				
EAS	Avalanche Energy, Single Pulsed ②		156	mJ

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
<b>Static Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V I <sub>D</sub> =250μA	60	--	--	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current(Tc=25°C)	V <sub>DS</sub> =60V,V <sub>GS</sub> =0V	--	--	1	μA
	Zero Gate Voltage Drain Current(Tc=100°C)	V <sub>DS</sub> =60V,V <sub>GS</sub> =0V	--	--	100	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±20V,V <sub>DS</sub> =0V	--	--	±100	nA
V <sub>GS(TH)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> ,I <sub>D</sub> =250μA	2	3	4	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance <sup>③</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =35A	--	6.5	8	mΩ
<b>Dynamic Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =30V,V <sub>GS</sub> =0V, f=1MHz	--	2950	--	pF
C <sub>oss</sub>	Output Capacitance		--	600	--	pF
C <sub>riss</sub>	Reverse Transfer Capacitance		--	320	--	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =48V,I <sub>D</sub> =35A, V <sub>GS</sub> =10V	--	90	--	nC
Q <sub>gs</sub>	Gate-Source Charge		--	12	--	nC
Q <sub>gd</sub>	Gate-Drain Charge		--	35	--	nC
<b>Switching Characteristics</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> =30V, I <sub>D</sub> =1A, R <sub>G</sub> =6.8Ω, V <sub>GS</sub> =10V	--	15	--	nS
t <sub>r</sub>	Turn-on Rise Time		--	14	--	nS
t <sub>d(off)</sub>	Turn-Off Delay Time		--	28	--	nS
t <sub>f</sub>	Turn-Off Fall Time		--	25	--	nS
<b>Source- Drain Diode Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
I <sub>SD</sub>	Source-drain current(Body Diode)	T <sub>c</sub> =25°C	--	--	70	A
V <sub>SD</sub>	Forward on voltage	I <sub>SD</sub> =35A,V <sub>GS</sub> =0V	--	--	1.3	V
t <sub>rr</sub>	Reverse Recovery Time	T <sub>J</sub> =25°C,I <sub>sd</sub> =35A, V <sub>GS</sub> =0V di/dt=100A/μs	--	63	--	nS
Q <sub>rr</sub>	Reverse Recovery Charge		--	85	--	nC

**NOTE:**

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Limited by T<sub>Jmax</sub>, starting T<sub>J</sub> = 25°C, L = 0.5mH,R<sub>G</sub> = 25Ω, I<sub>AS</sub> = 25A, V<sub>GS</sub> = 10V. Part not recommended for use above this value
- ③ Pulse width ≤ 300μs; duty cycle ≤ 2%.

**Typical Characteristics**



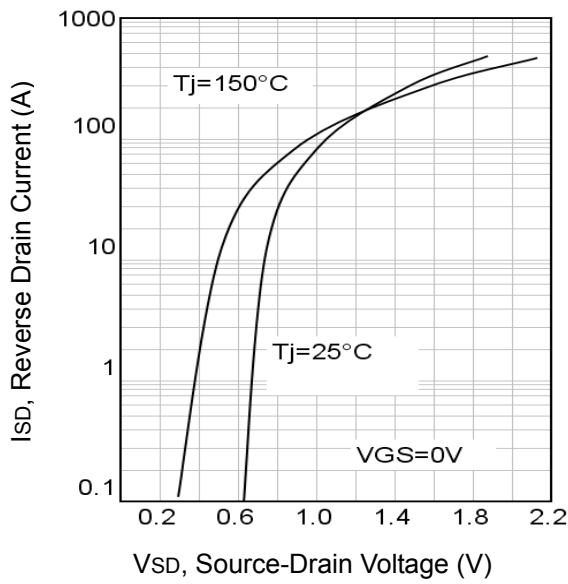


Fig7. Typical Source-Drain Diode Forward Voltage

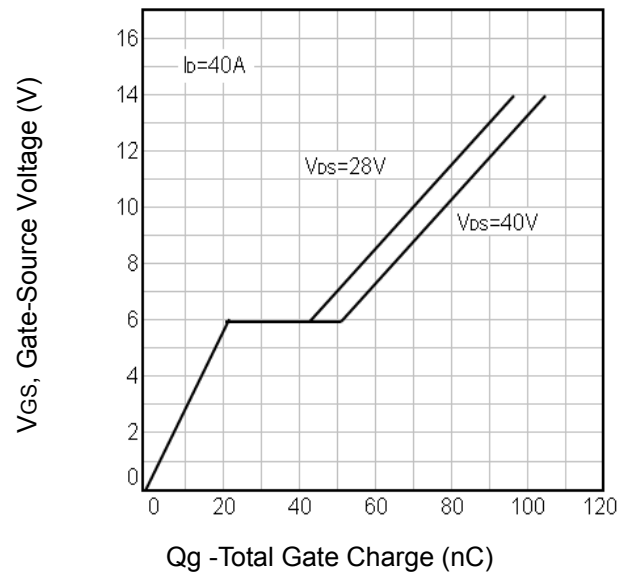


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

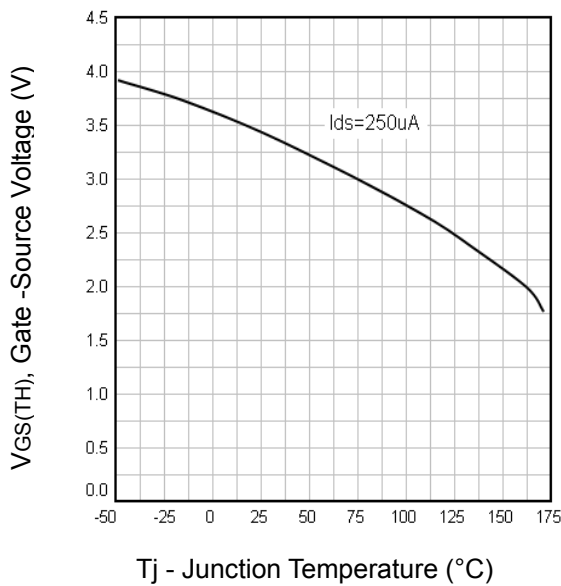


Fig9. Threshold Voltage Vs. Temperature

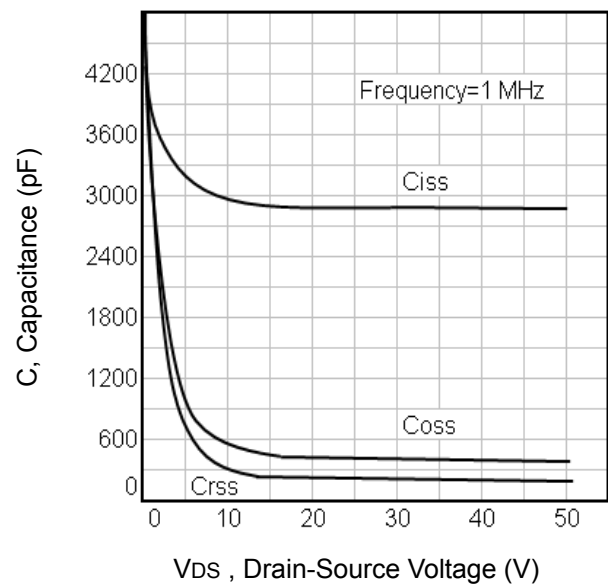


Fig10. Typical Capacitance Vs. Drain-Source Voltage

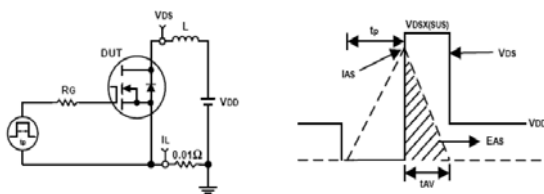


Fig11. Unclamped Inductive Test Circuit and waveforms

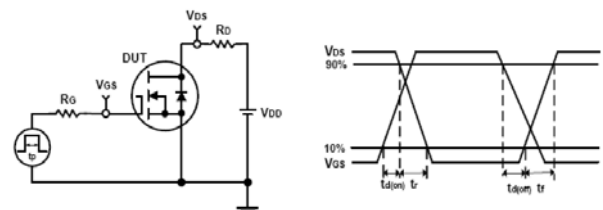
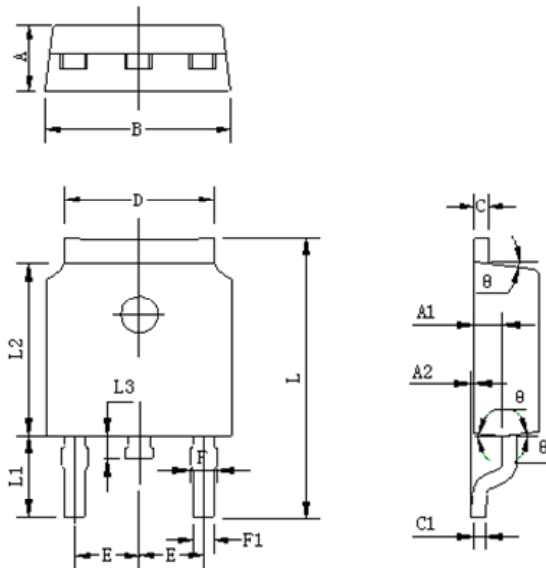


Fig12. Switching Time Test Circuit and waveforms

**TO-252 Outline Data**


Symbol	Dimensions In Millimeters		
	Min	Nom	Max
A	2.250	2.300	2.350
A1	0.960	1.010	1.060
A2	0.050	0.100	0.150
B	6.050	6.600	6.650
C	0.460	0.508	0.580
C1	0.508	0.508	0.508
D	5.310	5.320	5.330
E	2.186	2.286	2.386
F	0.075	0.085	0.095
F1	0.660	0.760	0.860
L	9.800	9.825	10.400
L1	2.90REF		
L2	6.050	6.100	6.150
L3	0.790	0.800	0.810
$\theta$	7°	7°	7°

**Order Information**

Product	Marking	Package	Packaging	Min Unit Quantity
VS6070AD	VS6070AD	TO-252	2500PCS/Reel	5000PCS

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