
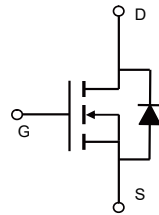


<p>Description</p> <p>These N-Channel enhancement mode power field effect transistors are using split gate trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and with stand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.</p> <p>Features</p> <ul style="list-style-type: none"> ◆ 100V, 12.6A, $R_{DS(on),max} = 9.8m\Omega @ V_{GS} = 10V$ ◆ Improved dv/dt capability ◆ Fast switching ◆ 100% EAS Guaranteed ◆ Green device available <p>Applications</p> <ul style="list-style-type: none"> ◆ Motor Drives ◆ UPS ◆ DC-DC Converter 	<p>Product Summary</p> <table border="0"> <tr> <td>V_{DSS}</td> <td>100V</td> </tr> <tr> <td>$R_{DS(on),max} @ V_{GS}=10V$</td> <td>9.8m$\Omega$</td> </tr> <tr> <td>$I_D$</td> <td>12.6A</td> </tr> </table> <p>Pin Configuration</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>SOP-8</p> </div> <div style="text-align: center;">  <p>Schematic</p> </div> </div>	V_{DSS}	100V	$R_{DS(on),max} @ V_{GS}=10V$	9.8m Ω	I_D	12.6A
V_{DSS}	100V						
$R_{DS(on),max} @ V_{GS}=10V$	9.8m Ω						
I_D	12.6A						

Absolute Maximum Ratings $T_C = 25^\circ C$ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	100	V
Continuous drain current ($T_A = 25^\circ C$) ($T_A = 100^\circ C$)	I_D	12.6	A
		8	A
Pulsed drain current ¹⁾	I_{DM}	37.8	A
Gate-Source voltage	V_{GSS}	± 20	V
Avalanche energy ²⁾	E_{AS}	3.2	mJ
Power Dissipation	P_D	3.1	W
Storage Temperature Range	T_{STG}	-55 to +150	$^\circ C$
Operating Junction Temperature Range	T_J	-55 to +150	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	24	$^\circ C/W$
Thermal Resistance Junction-to-Ambient	$R_{\theta JA}$	40	$^\circ C/W$

Package Marking and Ordering Information

Device	Device Package	Marking
VST10N098-S8	SOP-8	VST10N098-S8

Electrical Characteristics
 $T_J = 25^\circ\text{C}$ unless otherwise noted

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static characteristics						
Drain-source breakdown voltage	BV_{DSS}	$V_{GS}=0\text{ V}, I_D=250\mu\text{A}$	100	---	---	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1.2	1.7	2.5	V
Drain-source leakage current	I_{DSS}	$V_{DS}=100\text{ V}, V_{GS}=0\text{ V}$	---	---	1	μA
Gate leakage current, Forward	I_{GSSF}	$V_{GS}=20\text{ V}, V_{DS}=0\text{ V}$	---	---	100	nA
Gate leakage current, Reverse	I_{GSSR}	$V_{GS}=-20\text{ V}, V_{DS}=0\text{ V}$	---	---	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=10\text{ V}, I_D=11.5\text{ A}$	---	7.4	9.8	m Ω
		$V_{GS}=4.5\text{ V}, I_D=9.5\text{ A}$	---	9.6	13	m Ω
Forward transconductance	g_{fs}	$V_{DS}=5\text{ V}, I_D=11.5\text{ A}$	---	46.5	---	S
Dynamic characteristics						
Input capacitance	C_{iss}	$V_{DS}=50\text{ V}, V_{GS}=0\text{ V},$ $F=1\text{ MHz}$	---	2553	---	pF
Output capacitance	C_{oss}		---	308	---	
Reverse transfer capacitance	C_{rss}		---	13.5	---	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=50\text{ V}, V_{GS}=10\text{ V}, I_D=11.5\text{ A}$ $R_G=3\Omega$	---	9.3	---	ns
Rise time	t_r		---	4.2	---	
Turn-off delay time	$t_{d(off)}$		---	35.8	---	
Fall time	t_f		---	6.2	---	
Gate charge characteristics						
Gate to source charge	Q_{gs}	$V_{DS}=50\text{ V}, I_D=11.5\text{ A},$ $V_{GS}=10\text{ V}$	---	8.5	---	nC
Gate to drain charge	Q_{gd}		---	3.8	---	
Gate charge total	Q_g		---	38	---	
Drain-Source diode characteristics and Maximum Ratings						
Continuous Source Current	I_S		---	---	2.5	A
Pulsed Source Current ³⁾	I_{SM}		---	---	7.5	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0\text{ V}, I_S=11.5\text{ A}, T_J=25^\circ\text{C}$	---	---	1.2	V
Reverse recovery time	t_{rr}	$I_F=11.5\text{ A}, dI_F/dt=100\text{ A}/\mu\text{s}$	---	28.5	---	ns
Reverse recovery charge	Q_{rr}		---	123	---	nC

Notes:

1: Repetitive Rating: Pulse width limited by maximum junction temperature.

 2: $V_{DD}=25\text{ V}, V_{GS}=10\text{ V}, L=0.1\text{ mH}, I_{AS}=8\text{ A}$, Starting $T_J=25^\circ\text{C}$.

 3: Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2\%$.

Electrical Characteristics Diagrams

Figure 1. Typ. Output Characteristics

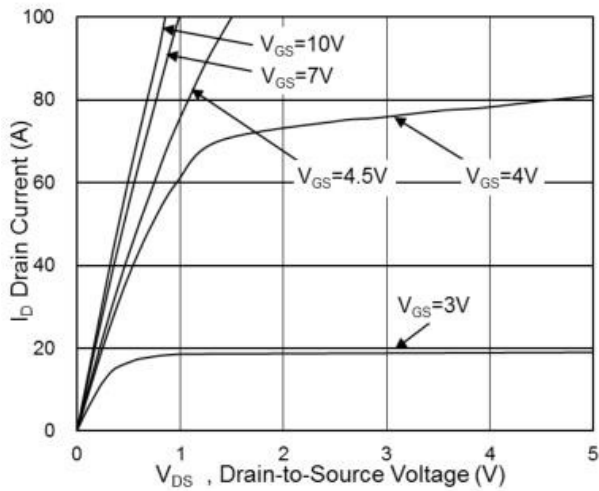


Figure 2. Transfer Characteristics

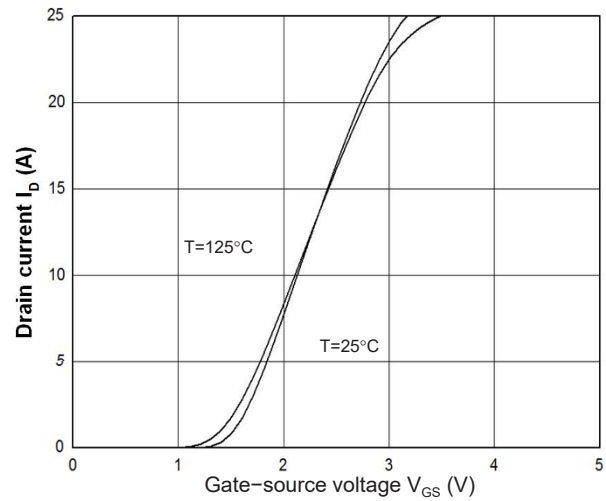


Figure 3. Capacitance Characteristics

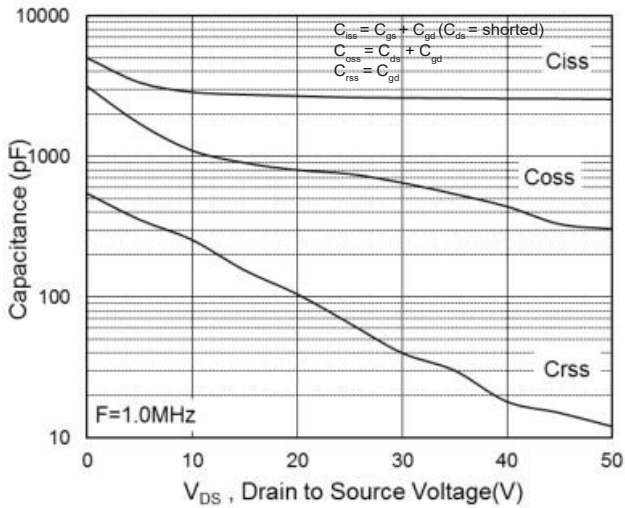


Figure 4. Gate Charge Waveform

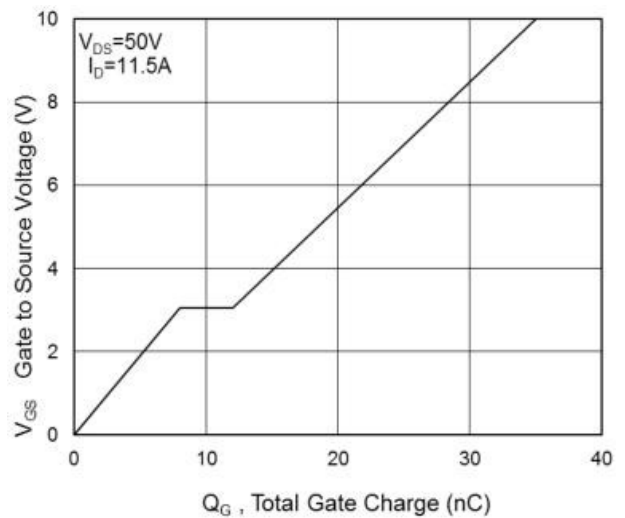


Figure 5. Body-Diode Characteristics

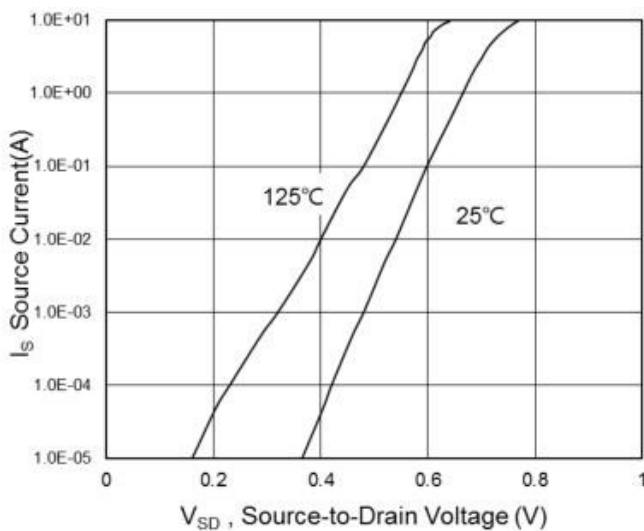


Figure 6. Rdson-Drain Current

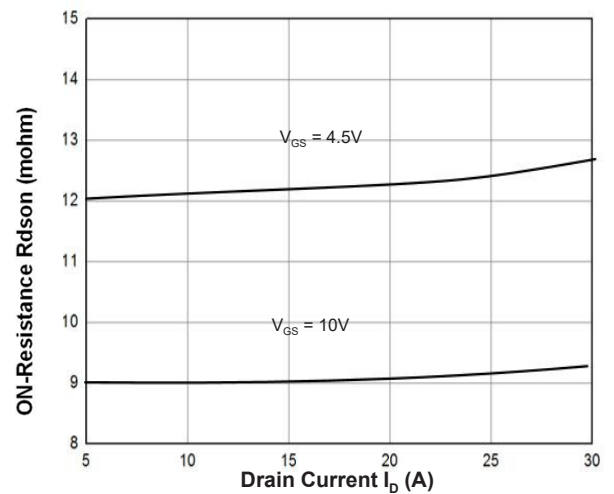


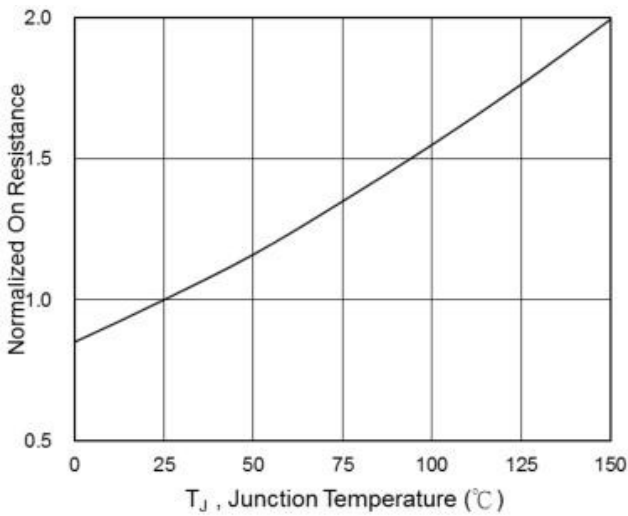
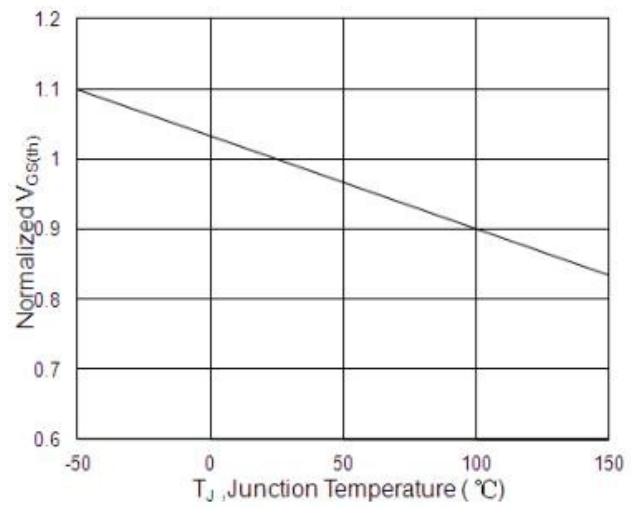
Figure 7. R_{ds(on)}-Junction Temperature

 Figure 8. V_{GS(th)}-Junction Temperature


Figure 9. On-Resistance vs. Gate-to-Source voltage

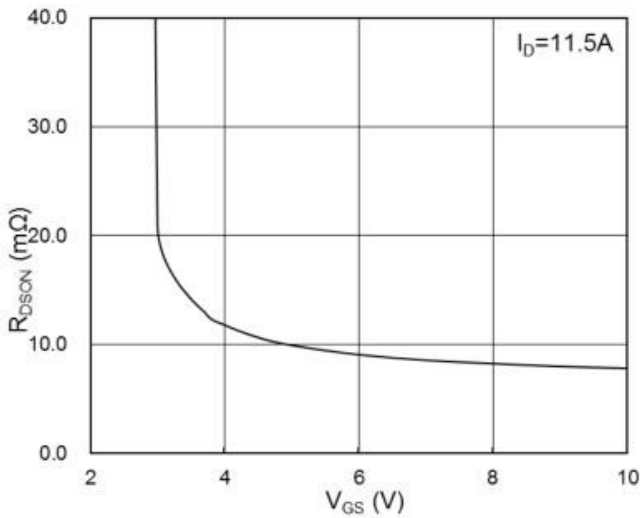
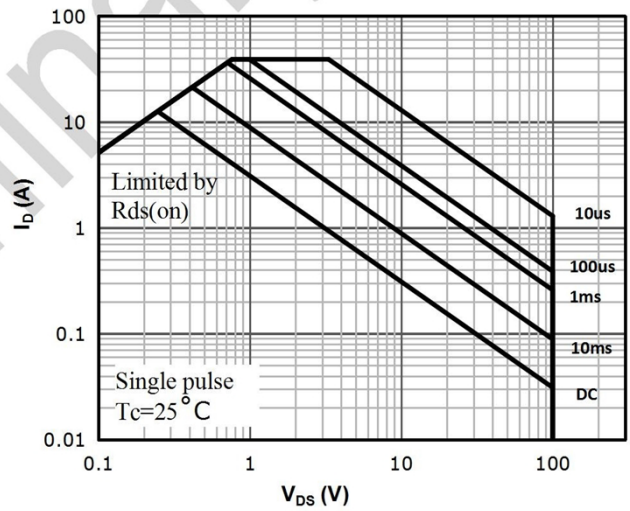
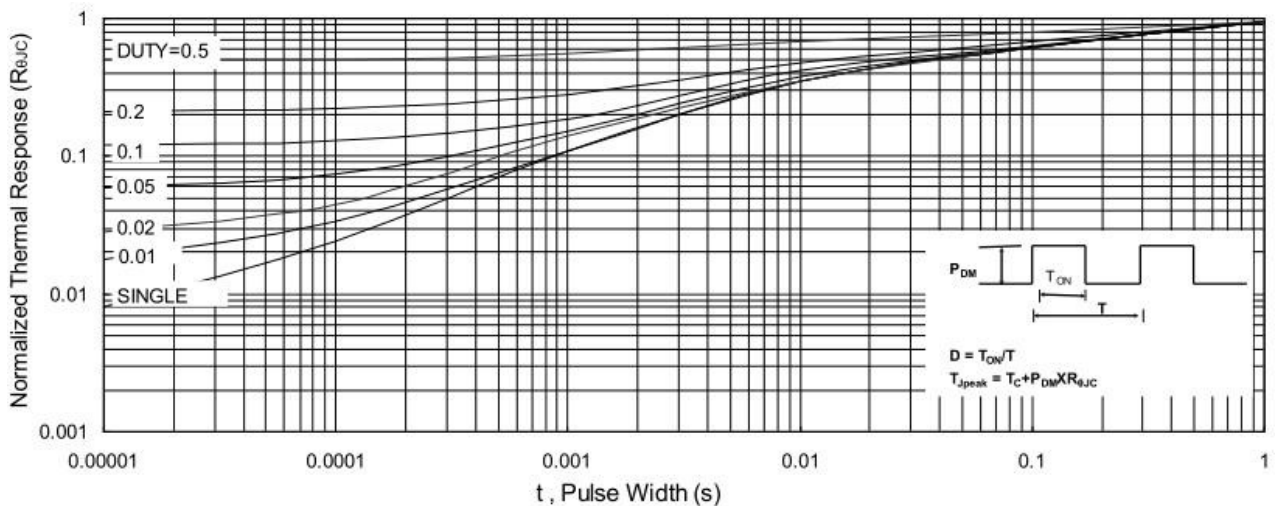
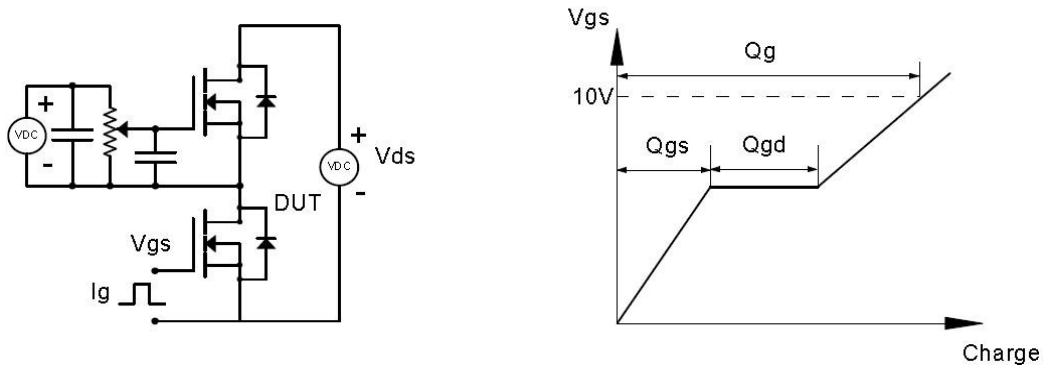


Figure 10: Safe Operating Area

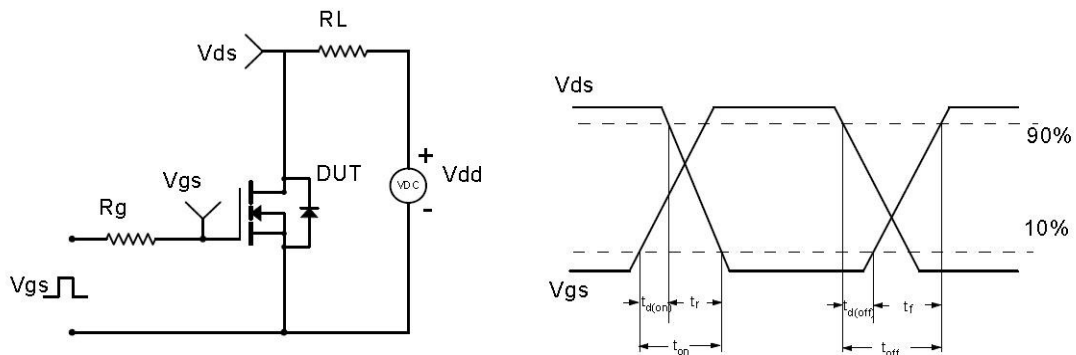

 Figure 11. Normalized Maximum Transient Thermal Impedance (R_{thJC})


Test Circuit & Waveform

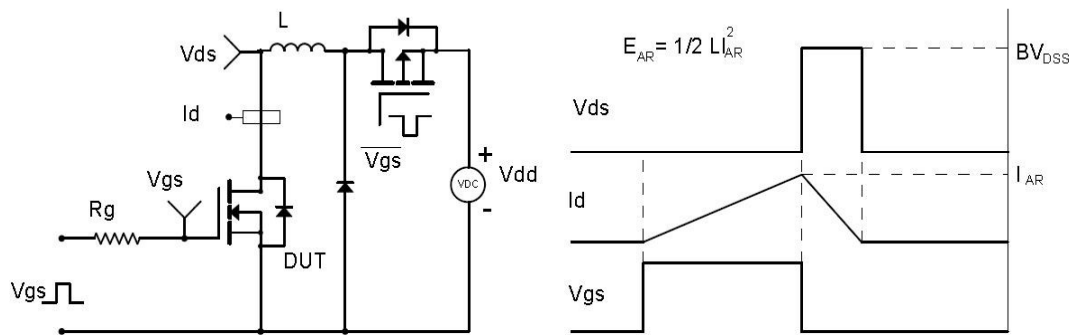
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

