Description

The VST06N064 uses **Super Trench** technology that is uniquely optimized to provide the most efficient high frequency switching performance. Both conduction and switching power losses are minimized due to an extremely low combination of $R_{DS(ON)}$ and Q_g. This device is ideal for high-frequency switching and synchronous rectification.

General Features

- V_{DS} =60V, I_D =90A
  $R_{DS(ON)}$ < 6.9mΩ @ V_{GS}=10V　(Typ:6.4mΩ)
- Excellent gate charge x $R_{DS(on)}$ product
- Very low on-resistance $R_{DS(on)}$
- Pb-free lead plating
- 100% UIS tested

Application

- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

TO-220C
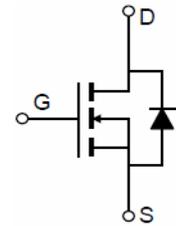
Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
VST06N064-TC	VST06N064	TO-220C	-	-	-

Absolute Maximum Ratings (T_C=25℃ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous (Silicon Limited)	I_D	90	A
Drain Current-Continuous(T_C=100℃)	I_D (100℃)	63.6	A
Pulsed Drain Current	I_{DM}	360	A
Maximum Power Dissipation	P_D	100	W
Derating factor		0.67	W/℃
Single pulse avalanche energy [Note 5]	E_{AS}	320	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Case[Note 2]	$R_{θJC}$	1.50	℃/W

## Electrical Characteristics (T_C=25℃ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250µA	60		-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V,V_{GS}=0V	-	-	1	µA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics [(Note 3)]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250µA	2	3	4	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=45A	-	6.4	6.9	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=45A	-	35	-	S
Dynamic Characteristics [(Note4)]						
Input Capacitance	C_{lss}	V_{DS}=30V,V_{GS}=0V, F=1.0MHz	-	1700	-	PF
Output Capacitance	C_{oss}		-	345	-	PF
Reverse Transfer Capacitance	C_{rss}		-	8	-	PF
Switching Characteristics [(Note 4)]						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=30V,I_D=45A V_{GS}=10V,R_G=4.7Ω	-	8	-	nS
Turn-on Rise Time	t_r		-	2	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	29	-	nS
Turn-Off Fall Time	t_f		-	4	-	nS
Total Gate Charge	Q_g	V_{DS}=30V,I_D=45A, V_{GS}=10V	-	26.9		nC
Gate-Source Charge	Q_{gs}		-	9.4		nC
Gate-Drain Charge	Q_{gd}		-	4.6		nC
Drain-Source Diode Characteristics						
Diode Forward Voltage [(Note 3)]	V_{SD}	V_{GS}=0V,I_S=45A	-		1.2	V
Diode Forward Current [(Note 2)]	I_S		-	-	90	A
Reverse Recovery Time	t_{rr}	T_J = 25°C, I_F = I_S di/dt = 100A/µs [(Note3)]	-	38		nS
Reverse Recovery Charge	Qrr		-	48		nC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300µs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. EAS condition : Tj=25℃,V_{DD}=30V,V_G=10V,L=0.5mH,Rg=25Ω

Test Circuit

1) E$_{AS}$ test Circuit
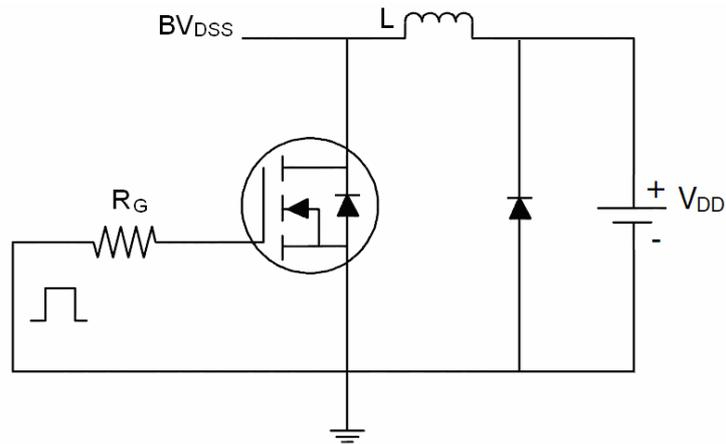
2) Gate charge test Circuit
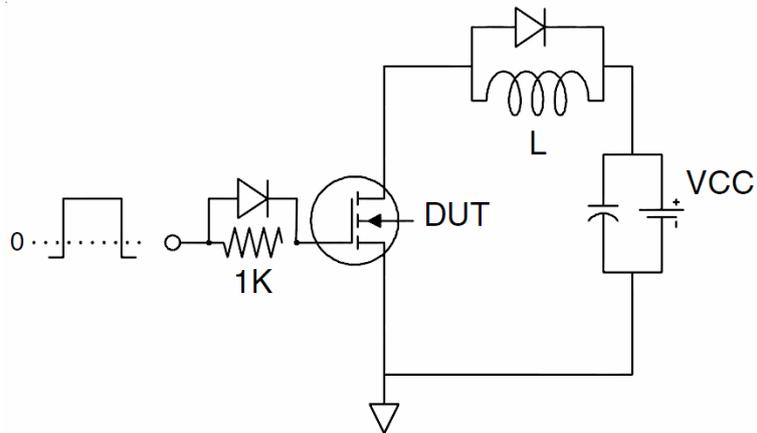
3) Switch Time Test Circuit
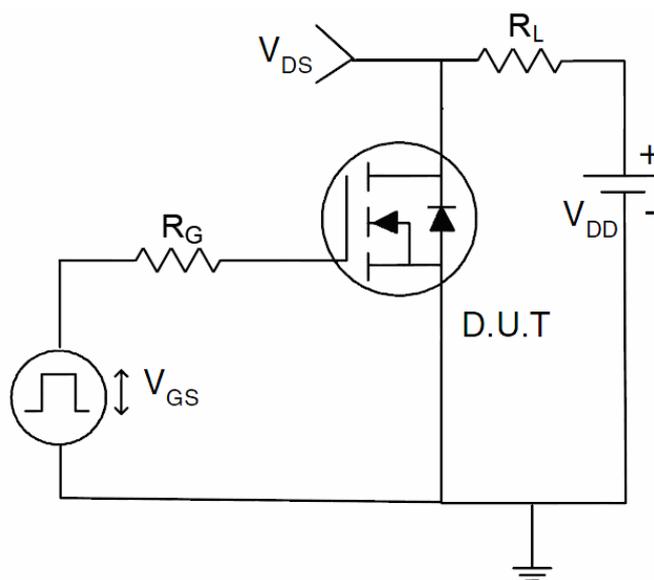
Typical Electrical and Thermal Characteristics
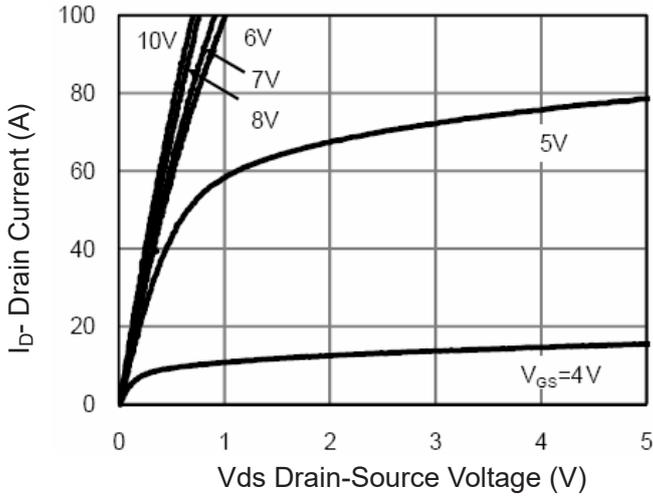
Figure 1 Output Characteristics

Figure 4 Rdson-JunctionTemperature

Figure 2 Transfer Characteristics
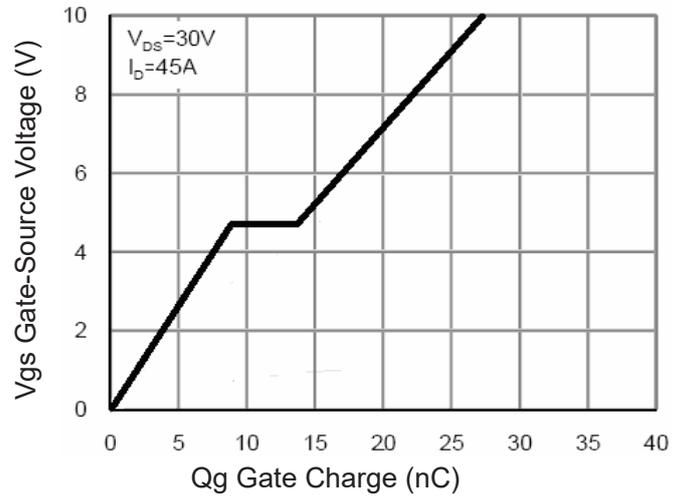
Figure 5 Gate Charge

Figure 3 Rdson- Drain Current
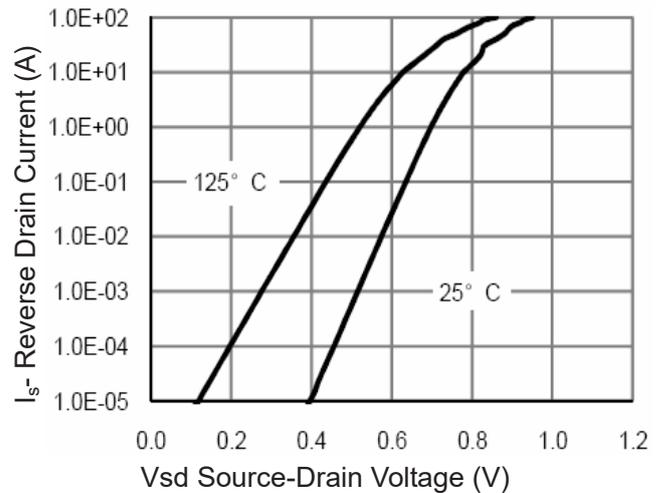
Figure 6 Source- Drain Diode Forward
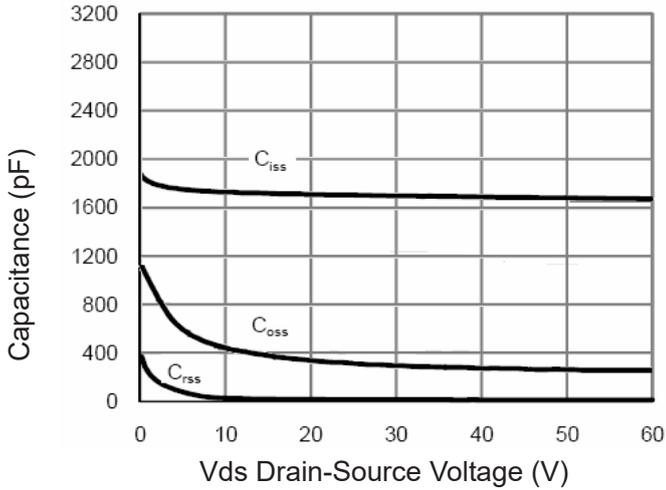
Figure 7 Capacitance vs Vds
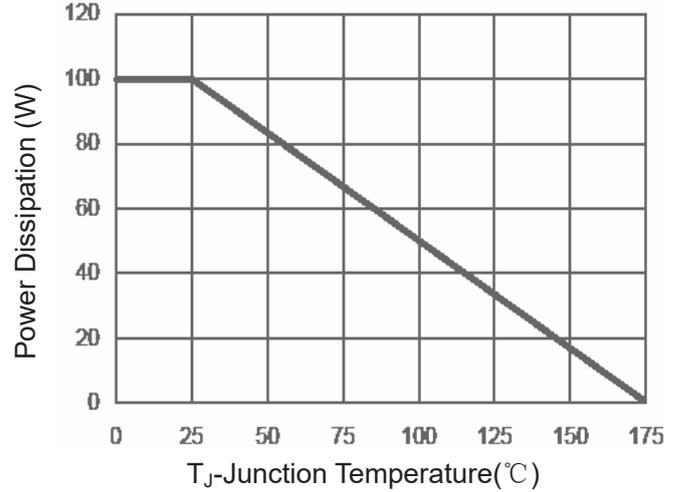
Figure 9 Power De-rating
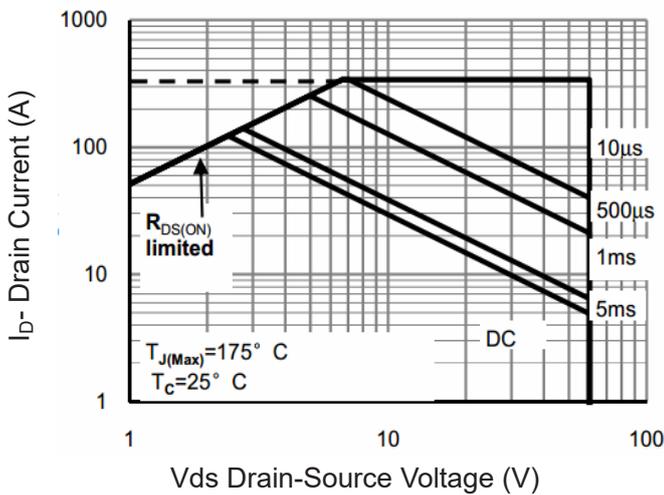
Figure 8 Safe Operation Area
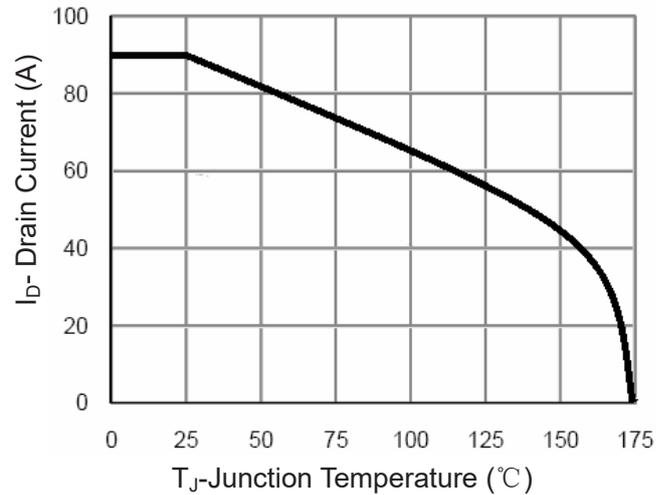
Figure 10 Current De-rating
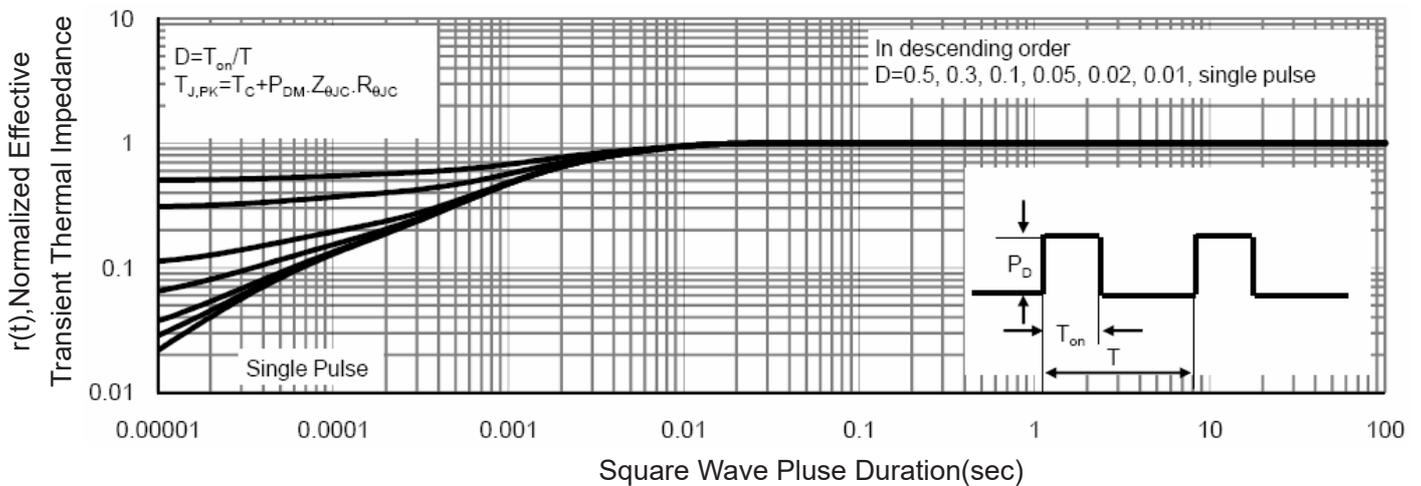
Figure 11 Normalized Maximum Transient Thermal Impedance