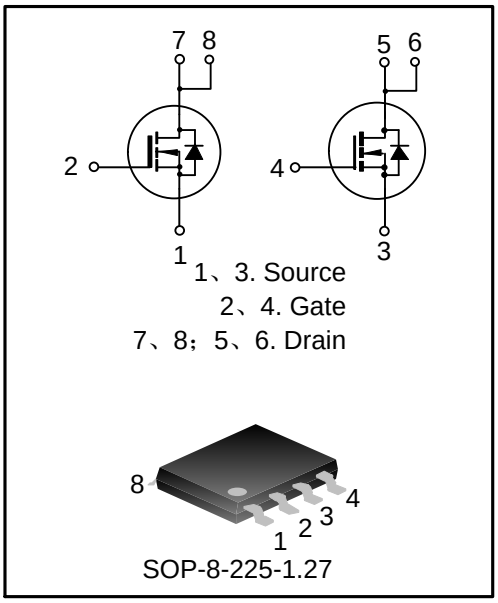
10A, 40V N-CHANNEL MOSFET

DESCRIPTION

SVT1040SA is an N-channel enhancement mode power MOS field effect transistor which is produced using Trench Mos technology. The improved trench stripe cell and the improved guard ring terminal have been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

These devices are widely used in UPS, DC-DC converters.



FEATURES

- 10A, 40V, $R_{DS(on)(typ.)}$=15mΩ@V_{GS}=10V
- Low gate charge
- Low Crss
- Fast switching
- Improved dv/dt capability

ORDERING INFORMATION

Part No.	Package	Marking	Hazardous substance control	Packing
SVT1040SA	SOP-8-225-1.27	SVT1040	Halogen free	Tube
SVT1040SATR	SOP-8-225-1.27	SVT1040	Halogen free	Tape & reel

ABSOLUTE MAXIMUM RATINGS (PER DEVICE, UNLESS OTHERWISE NOTED, T_J=25°C)

Characteristics		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current	T_C=25°C	I_D	10	A
	T_C=100°C		6.3	
Drain Current Pulsed		I_{DM}	40	A
Power Dissipation (T_C=25°C)		P_D	3.2	W
-Derate above 25°C			0.03	W/°C
Single Pulsed Avalanche Energy (Note 1)		E_{AS}	98	mJ
Operation Junction Temperature Range		T_J	-55～+150	°C
Storage Temperature Range		T_{stg}	-55～+150	°C

THERMAL CHARACTERISTICS

Characteristics	Symbol	Ratings	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	39	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	85	°C/W

ELECTRICAL CHARACTERISTICS (PER DEVICE, UNLESS OTHERWISE NOTED, T_C=25°C)

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Drain -Source Breakdown Voltage	B_{VDSS}	V_{GS}=0V, I_D=250μA	40	--	--	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=40V, V_{GS}=0V	--	--	1.0	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	--	--	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}= V_{DS}, I_D=250μA	1.0	--	2.0	V
Static Drain- Source On State Resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=10A	--	9.0	13	mΩ
		VGS=4.5V, ID=10A		11	16	mΩ
Input Capacitance	C_{iss}	f=1MHz, V_{GS}=0V, V_{DS}=25V	--	1870	--	pF
Output Capacitance	C_{oss}		--	156	--	
Reverse Transfer Capacitance	C_{rss}		--	136	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=20V, V_{GS}=10V, R_G=3.3Ω, I_D=10A (Note 2,3)	--	8.2	--	ns
Turn-on Rise Time	t_r		--	52	--	
Turn-off Delay Time	$t_{d(off)}$		--	55	--	
Turn-off Fall Time	t_f		--	19	--	
Total Gate Charge	Q_g	V_{DD}=20V, I_D=10A, V_{GS}=10V (Note 2,3)	--	38	--	nC
Gate-Source Charge	Q_{gs}		--	7.4	--	
Gate-Drain Charge	Q_{gd}		--	6.7	--	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS(PER DEVICE)

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I_S	Integral Reverse P-N Junction Diode in the MOSFET	--	--	10	A
Pulsed Source Current	I_{SM}		--	--	40	
Diode Forward Voltage	V_{SD}	I_S=10A, V_{GS}=0V	--	--	1.4	V
Reverse Recovery Time	T_{rr}	I_S=10A, V_{GS}=0V, V_R=40V, d_{IF}/dt=100A/μs	--	14	--	ns
Reverse Recovery Charge	Q_{rr}		--	7.7	--	nC

Notes:

1. L=1mH, I_{AS}=14A, V_{DD}=25V, R_G=20Ω,starting T_J=25°C;
2. Pulse Test: Pulse width ≤300μs, Duty cycle≤2%;
3. Essentially independent of operating temperature.

TYPICAL CHARACTERISTICS (PER DEVICE)

Figure 1. Output Characteristics

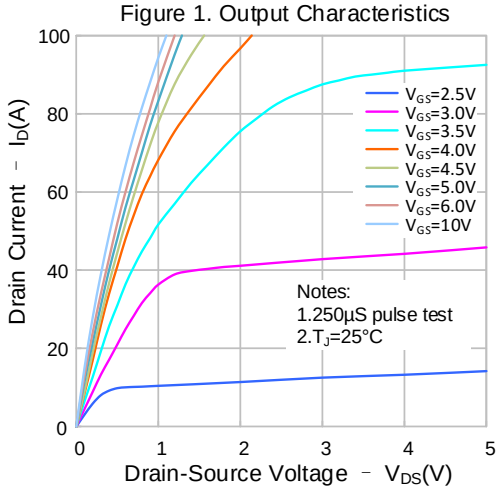


Figure 2. Transfer Characteristics

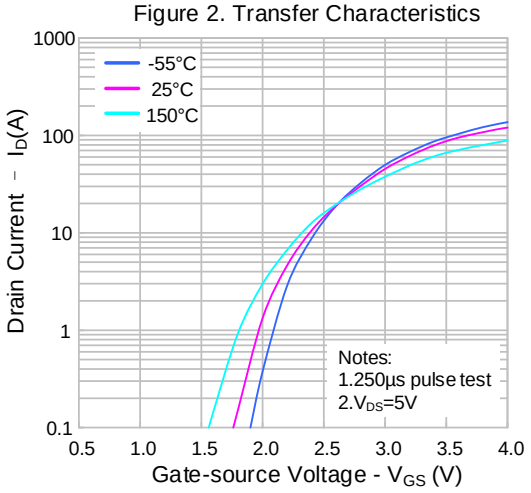


Figure 3. On-resistance vs. Drain Current

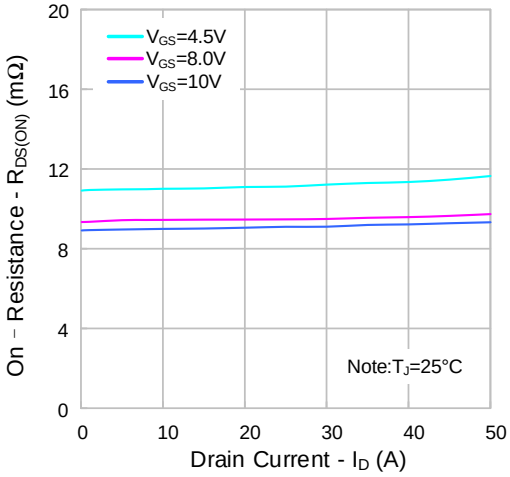


Figure 4. On-resistance vs. Gate-source Voltage

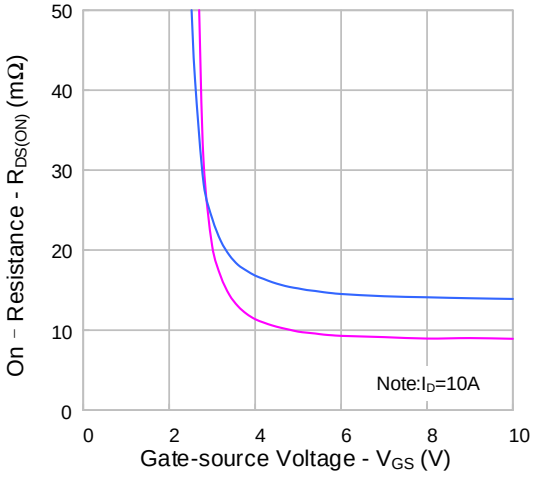


Figure 5. Gate-source Turn-on Voltage vs. Temperature Characteristics

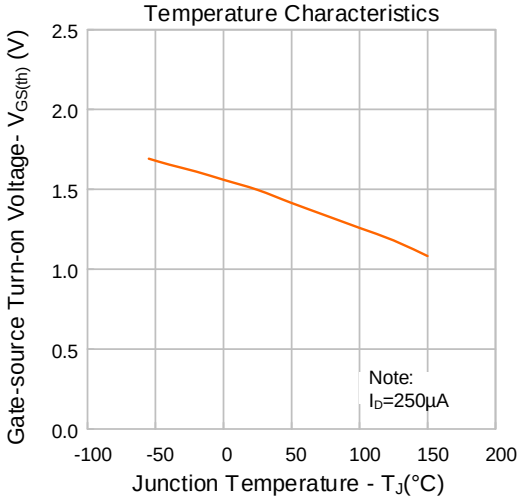
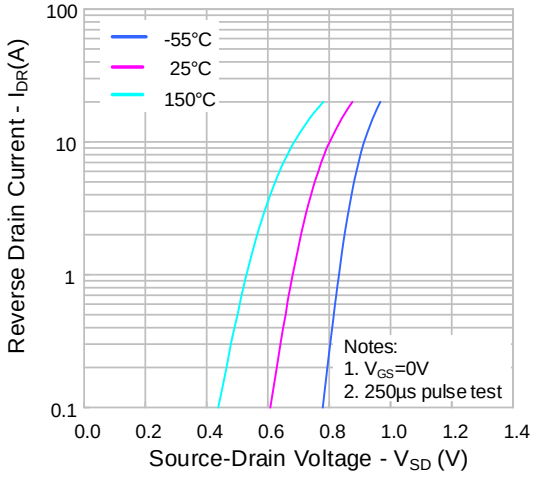


Figure 6. Body Diode Forward Voltage Variation vs. Source Current and Temperature



TYPICAL CHARACTERISTICS (CONTINUED)

Figure 7. Capacitance Characteristics

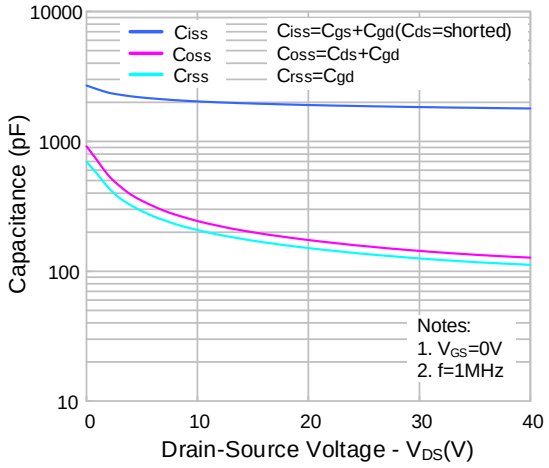


Figure 8. Gate Charge

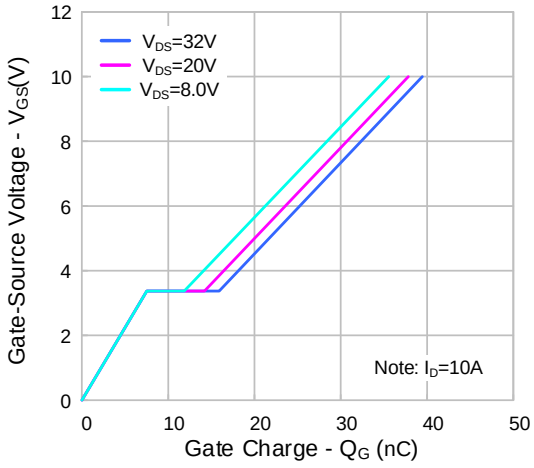


Figure 9. Breakdown Voltage Variation vs. Temperature

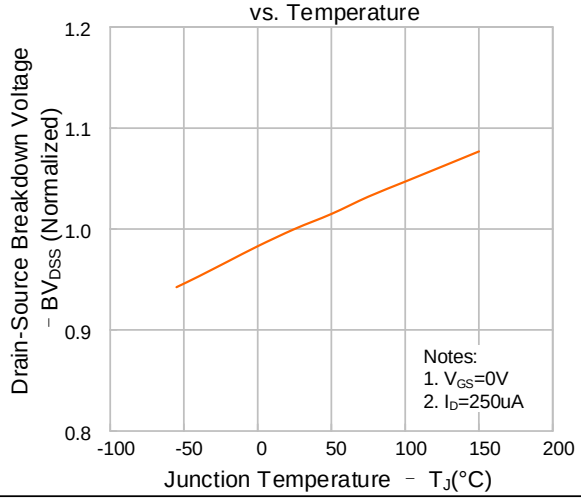


Figure 10. On-resistance Variation vs. Temperature

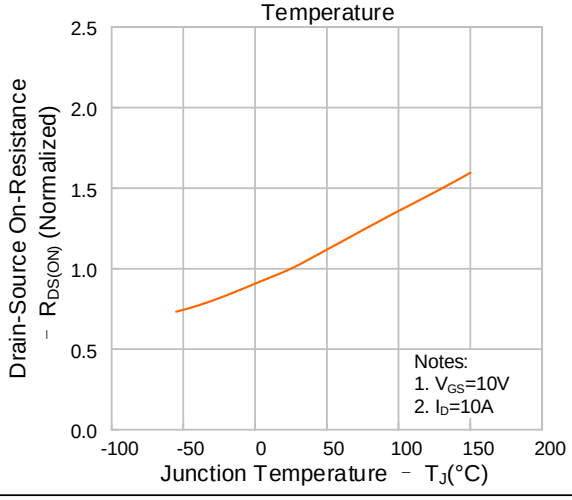


Figure 11. Max. Safe Operating Area

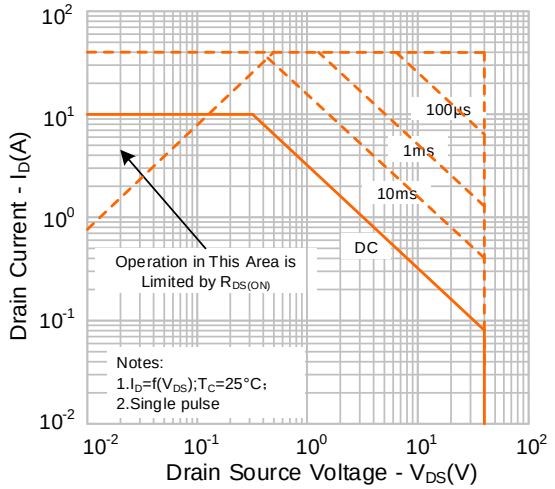
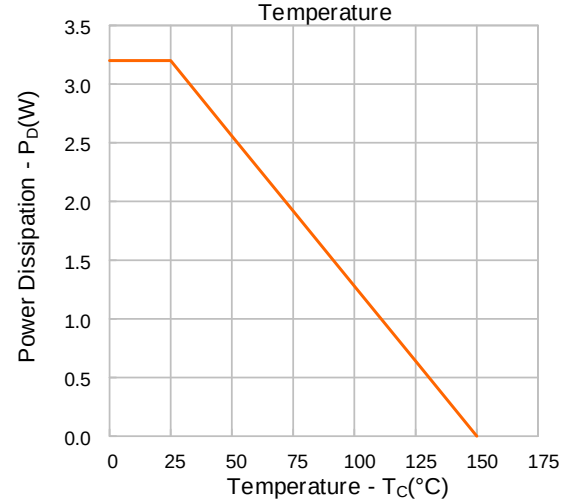
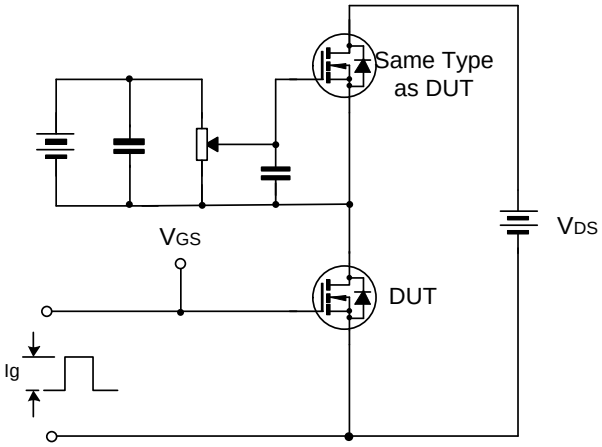


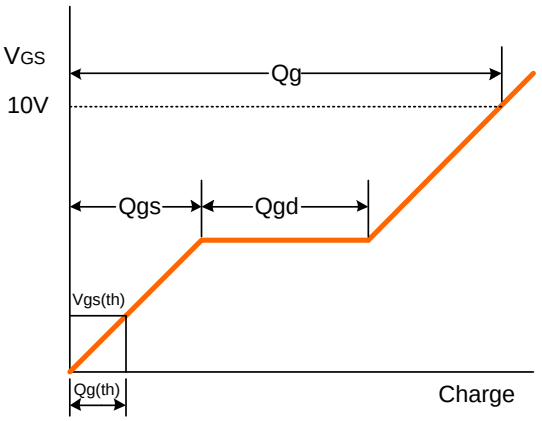
Figure 12. Power Dissipation vs. Case Temperature



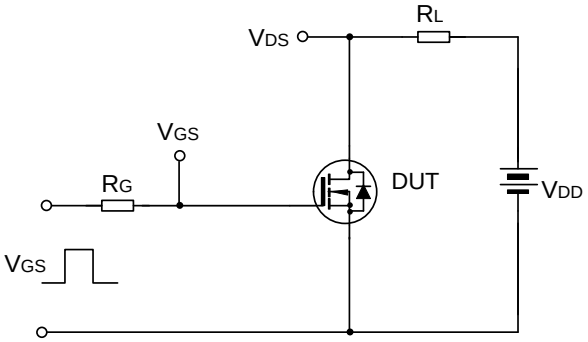
TYPICAL TEST CIRCUIT

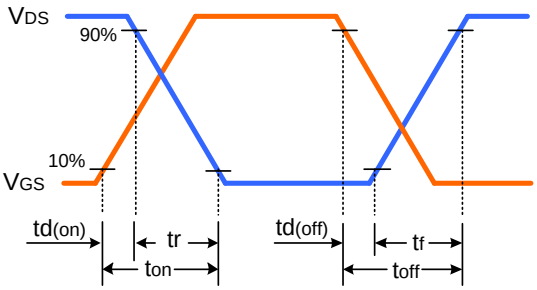
Gate Charge Test Circuit & Waveform



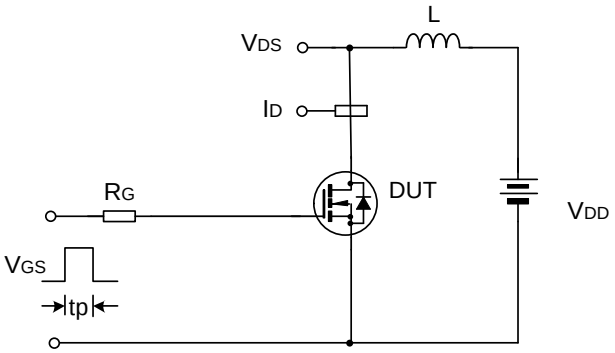


Resistive Switching Test Circuit & Waveform

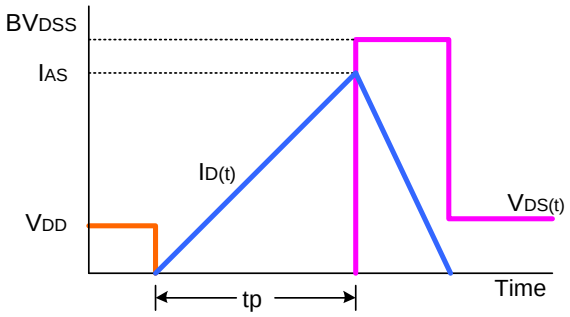




Unclamped Inductive Switching Test Circuit & Waveform

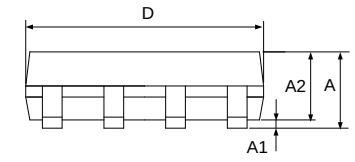


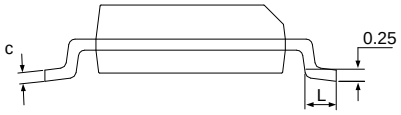
$$E_{AS} = \frac{1}{2} LI_{AS}^2 \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

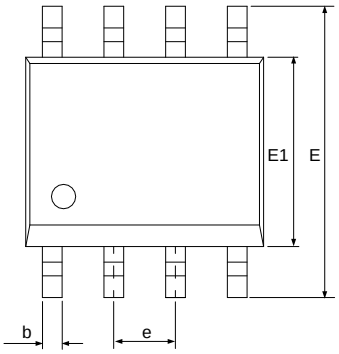


PACKAGE OUTLINE

SOP-8-225-1.27 **UNIT: mm**







SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	1.35	1.55	1.75
A1	0.05	0.15	0.25
A2	1.25	—	1.65
b	0.32	0.42	0.52
c	0.15	0.20	0.26
D	4.70	4.90	5.30
E	5.60	6.00	6.40
E1	3.60	3.90	4.20
e	1.27BSC		
L	0.30	—	1.27

Important notice :

1. **The instructions are subject to change without notice！**
2. **Customers should obtain the latest relevant information before placing orders and should verify that such information is complete and current. Please read the instructions carefully before using our products, including the circuit operation precautions.**
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Rev.: 1.2

Revision History:

1. Update the curve
2. Update electrical characteristics
3. Update electrical diagram and typical test circuit
4. Update package outline
5. Update important notice

Rev.: 1.1

Revision History:

1. Modify the Circuit symbol

Rev.: 1.0

Revision History:

1. First release