

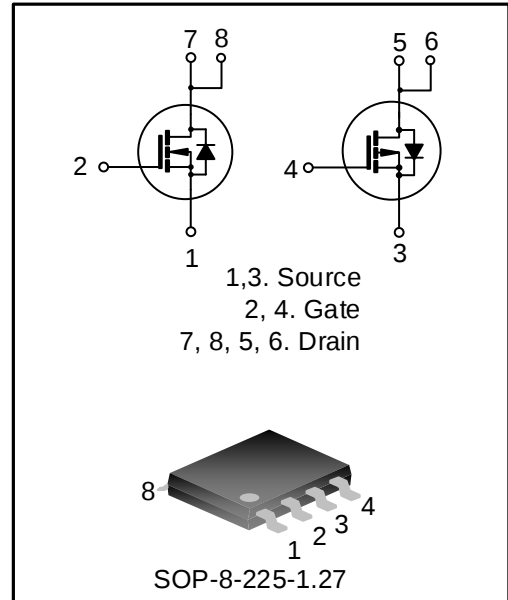
30V N+P CHANNEL MOSFET

DESCRIPTION

SVT4607SA is a N+P channel enhancement mode power MOS field effect transistor which is produced using Silan's LVMOS technology. The improved process and cell structure have been especially tailored to minimize on-state resistance, provide superior switching performance and high avalanche breakdown tolerance. These devices are widely used in UPS, Power Management for Inverter Systems.

FEATURES

- ♦ Low gate charge
- ♦ Low Crss
- ♦ Fast switching
- ♦ Improved dv/dt capability
- ♦ 100% avalanche tested
- ♦ Pb-free lead plating
- ♦ RoHS compliant



KEY PERFORMANCE PARAMETERS

Characteristics	Ratings		Unit
	N-channel	P-channel	
V_{DS}	30	-30	V
$V_{GS(th)}$	1.0~2.5	-1.5~-2.5	V
$R_{DS(on) \cdot max}$	23	38	mΩ
I_D	7	-6.5	A
$Q_{g,typ}$	6.7	6.2	nC

ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing Type
SVT4607SA	SOP-8-225-1.27	4607SA	Halogen free	Tube
SVT4607SATR	SOP-8-225-1.27	4607SA	Halogen free	Tape & Reel

ABSOLUTE MAXIMUM RATINGS (UNLESS OTHERWISE NOTED, $T_J=25^{\circ}\text{C}$)

N-channel

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Drain-Source Voltage	V_{DS}	--	30	--	--	V
Gate-Source Voltage	V_{GS}	--	-20	--	20	V
Drain Current	I_D	$T_C=25^{\circ}\text{C}$	--	--	7.0	A
		$T_C=100^{\circ}\text{C}$	--	--	6.0	A
Drain Current Pulsed (Note 1)	I_{DM}	$T_C=25^{\circ}\text{C}$	--	--	28	A
Power Dissipation (Note 2)	P_D	$T_C=25^{\circ}\text{C}$	--	--	2.8	W
Single Pulsed Avalanche Energy	E_{AS}	$L=0.1\text{mH}$, $V_{DD}=24\text{V}$, $R_G=25\Omega$, starting temperature $T_J=25^{\circ}\text{C}$	--	--	14	mJ
Single Pulsed Current	I_{AS}	--	--	--	17	A
Operation Junction Temperature Range	T_J	--	-55	--	150	$^{\circ}\text{C}$
Storage Temperature Range	T_{stg}	--	-55	--	150	$^{\circ}\text{C}$

P-channel

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Drain-Source Voltage	V_{DS}	--	-30	--	--	V
Gate-Source Voltage	V_{GS}	--	-20	--	20	V
Drain Current	I_D	$T_C=25^{\circ}\text{C}$	--	--	-6.5	A
		$T_C=100^{\circ}\text{C}$	--	--	-5.0	A
Drain Current Pulsed (Note 1)	I_{DM}	$T_C=25^{\circ}\text{C}$	--	--	-26	A
Power Dissipation (Note 2)	P_D	$T_C=25^{\circ}\text{C}$	--	--	2.8	W
Single Pulsed Avalanche Energy	E_{AS}	$L=0.1\text{mH}$, $V_{DD}=24\text{V}$, $R_G=25\Omega$, starting temperature $T_J=25^{\circ}\text{C}$	--	--	45	mJ
Single Pulsed Current	I_{AS}	--	--	--	-30	A
Operation Junction Temperature Range	T_J	--	-55	--	150	$^{\circ}\text{C}$
Storage Temperature Range	T_{stg}	--	-55	--	150	$^{\circ}\text{C}$

THERMAL CHARACTERISTICS

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Thermal Resistance, Junction-case, Bottom	$R_{\theta JC}$	--	--	--	45	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-ambient	$R_{\theta JA}$	--	--	--	62.5	$^{\circ}\text{C/W}$
Soldering Temperature(SMD)	T_{sold}	Reflow soldering: 10 ± 1 sec, 3times Wave soldering: 10^{+2}_0 sec, 1time	--	--	260	$^{\circ}\text{C}$

N-channel ELECTRICAL CHARACTERISTICS (UNLESS OTHERWISE NOTED, $T_J=25^{\circ}\text{C}$)

Static characteristics

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Drain-source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30	--	--	V
Drain-source Leakage Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	--	--	1.0	μA
		$V_{DS}=30V, V_{GS}=0V, T_J=125^{\circ}\text{C}$	--	0.2	--	
Gate-source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	--	--	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.0	--	2.5	V
Static Drain-source On State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=4.0A$	--	18	23	$m\Omega$
		$V_{GS}=4.5V, I_D=2.0A$	--	27	36	$m\Omega$
Gate Resistance	R_g	$f=1\text{MHz}$	--	3.7	--	Ω

Dynamic characteristics

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Input Capacitance	C_{iss}	$f=1\text{MHz}, V_{GS}=0V, V_{DS}=25V$	--	575	--	pF
Output Capacitance	C_{oss}		--	67	--	
Reverse Transfer Capacitance	C_{rss}		--	60	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=20V, V_{GS}=10V, R_G=3.3\Omega, I_D=5.0A$ (Notes 3, 4)	--	4.4	--	ns
Turn-on Rise Time	t_r		--	28	--	
Turn-off Delay Time	$t_{d(off)}$		--	21	--	
Turn-off Fall Time	t_f		--	12	--	
Total Gate Charge	Q_g	$V_{DD}=15V, V_{GS}=4.5V, I_D=6.0A$ (Notes 3, 4)	--	6.7	--	nC
Gate-source Charge	Q_{gs}		--	2.7	--	
Gate-drain Charge	Q_{gd}		--	2.7	--	
Gate-plateau Voltage	$V_{plateau}$		--	3.5	--	V

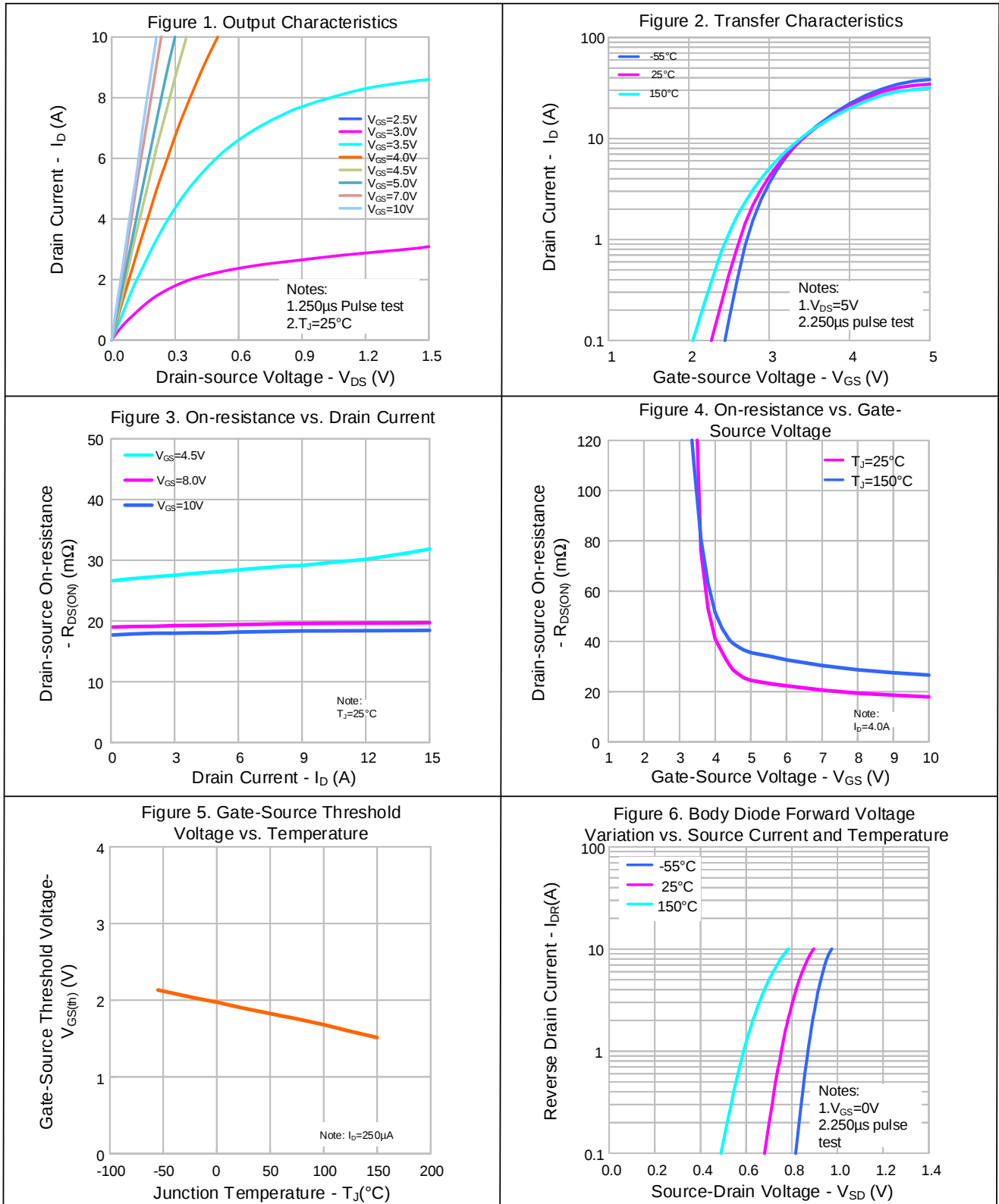
Reverse diode characteristics

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Continuous Source Current	I_S	$T_C=25^{\circ}\text{C}$, Integral Reverse P-N Junction Diode in the MOSFET	--	--	7.0	A
Pulsed Source Current	$I_{S, \text{ pulse}}$		--	--	28	
Diode Forward Voltage	V_{SD}	$I_S=4.0\text{A}$, $V_{GS}=0\text{V}$	--	--	1.4	V
Reverse Recovery Time	T_{rr}	$I_S=6.0\text{A}$, $V_{GS}=0\text{V}$, $dI_F/dt = 100\text{A}/\mu\text{s}$ (Note 3)	--	8.8	--	ns
Reverse Recovery Charge	Q_{rr}		--	3.3	--	nC

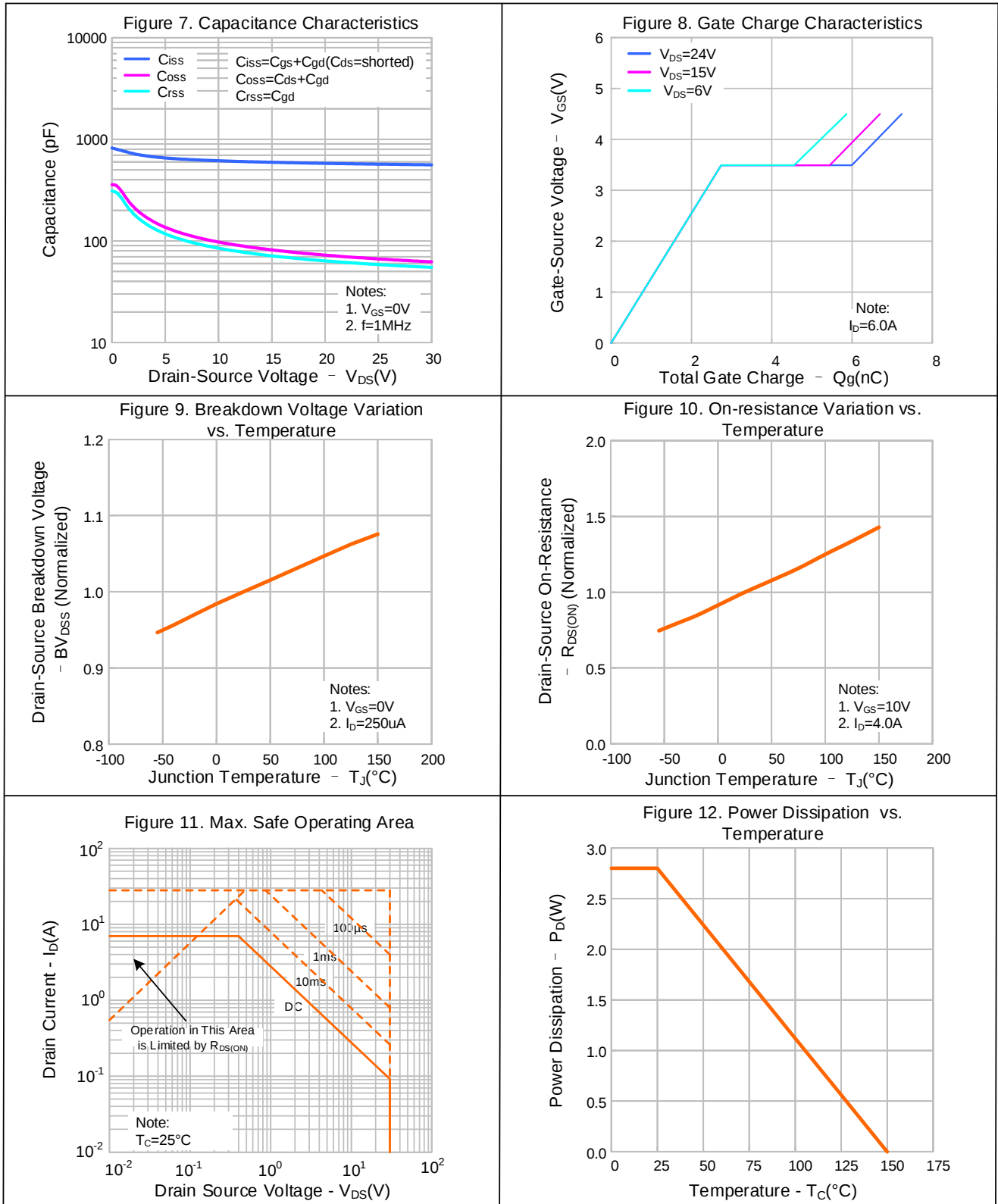
Notes:

1. Pulse time $5\mu\text{s}$;
2. The dissipation power will change with temperature, derating above 25°C : $0.02\text{W}/^{\circ}\text{C}$;
3. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycles $\leq 2\%$;
4. Essentially independent of operating temperature.

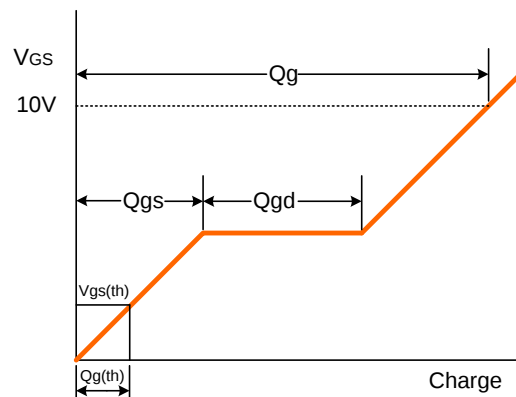
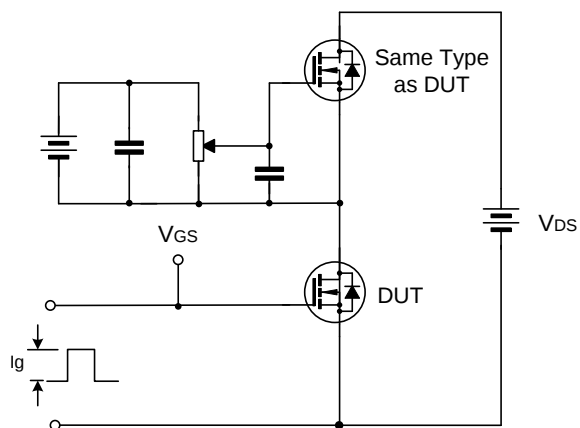
TYPICAL CHARACTERISTICS



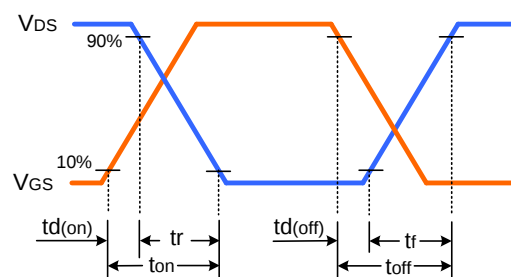
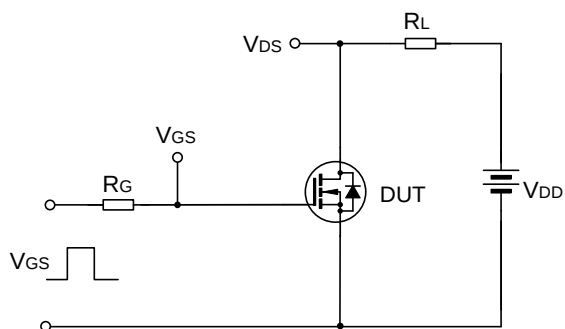
TYPICAL CHARACTERISTICS (CONTINUED)



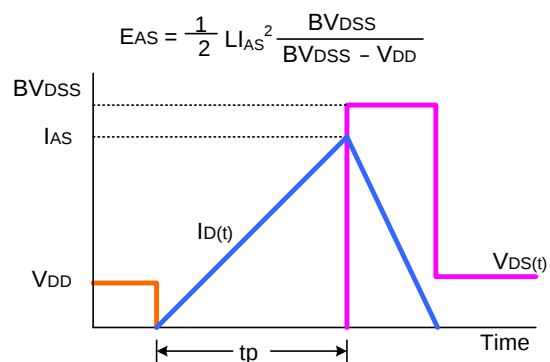
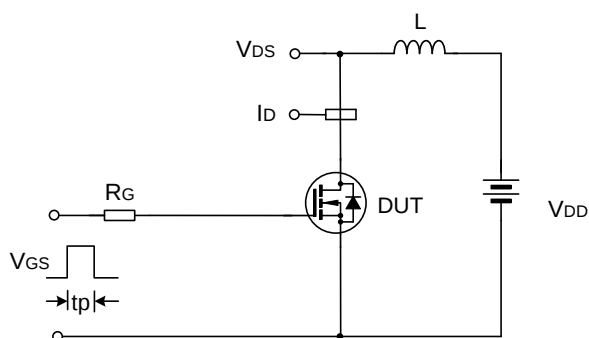
N-CHANNEL TYPICAL TEST CIRCUIT



Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching Test Circuit & Waveform

P-CHANNEL ELECTRICAL CHARACTERISTICS (UNLESS OTHERWISE NOTED, $T_J=25^{\circ}\text{C}$)
Static characteristics

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Drain-source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-30	--	--	V
Drain-source Leakage Current	I_{DSS}	$V_{DS}=-30V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	--	--	-1.0	μA
		$V_{DS}=-30V, V_{GS}=0V, T_J=125^{\circ}\text{C}$	--	-0.3	--	
Gate-source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	--	--	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.5	--	-2.5	V
Static Drain-source On State Resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-6.5A$	--	24	38	$m\Omega$
		$V_{GS}=-4.5V, I_D=-5.0A$	--	57	64	$m\Omega$

Dynamic characteristics

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Input Capacitance	C_{iss}	$f=1\text{MHz}, V_{GS}=0V, V_{DS}=-25V$	--	645	--	pF
Output Capacitance	C_{oss}		--	91	--	
Reverse Transfer Capacitance	C_{rss}		--	64	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-20V, V_{GS}=-10V, R_G=3.3\Omega, I_D=-5.0A$ (Notes 3, 4)	--	3.3	--	ns
Turn-on Rise Time	t_r		--	34	--	
Turn-off Delay Time	$t_{d(off)}$		--	46	--	
Turn-off Fall Time	t_f		--	49	--	
Total Gate Charge	Q_g	$V_{DD}=-15V, V_{GS}=-4.5V, I_D=-6.0A$ (Notes 3, 4)	--	6.2	--	nC
Gate-source Charge	Q_{gs}		--	3.5	--	
Gate-drain Charge	Q_{gd}		--	1.5	--	
Gate-plateau Voltage	$V_{plateau}$		--	4.1	--	V

Reverse diode characteristics

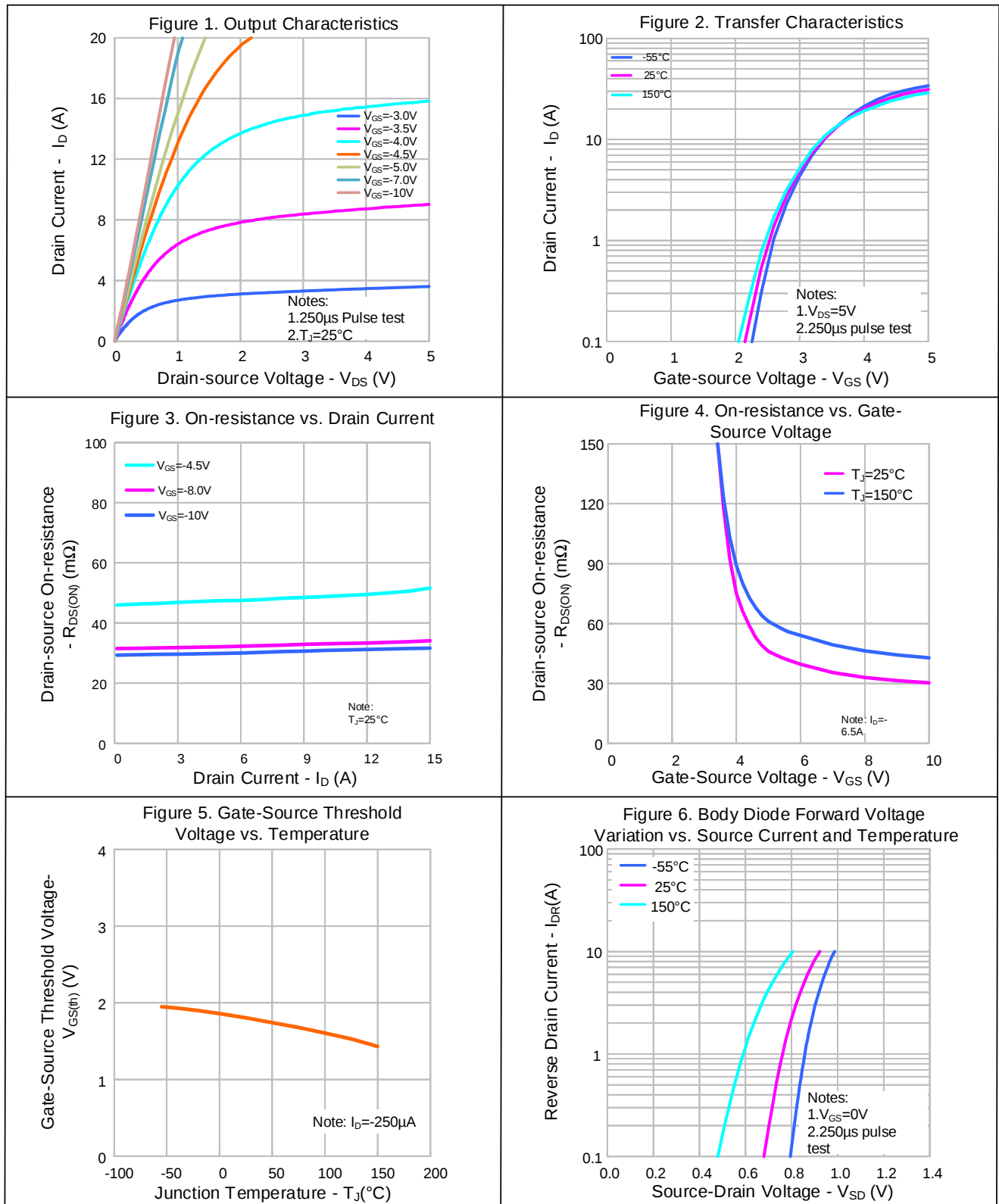
Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Continuous Source Current	I_S	$T_C=25^{\circ}\text{C}$, Integral Reverse P-N Junction Diode in the MOSFET	--	--	-6.5	A
Pulsed Source Current	$I_{S, pulse}$		--	--	-26	
Diode Voltage Drop	V_{SD}	$I_S=-1.0A, V_{GS}=0V$	--	--	-1.4	V
Reverse Recovery Time	T_{rr}	$I_S=-6.0A, V_{GS}=0V, V_R=-30V, di_F/dt=100A/\mu s$ (Note 3)	--	11	--	ns
Reverse Recovery Charge	Q_{rr}		--	4.9	--	nC



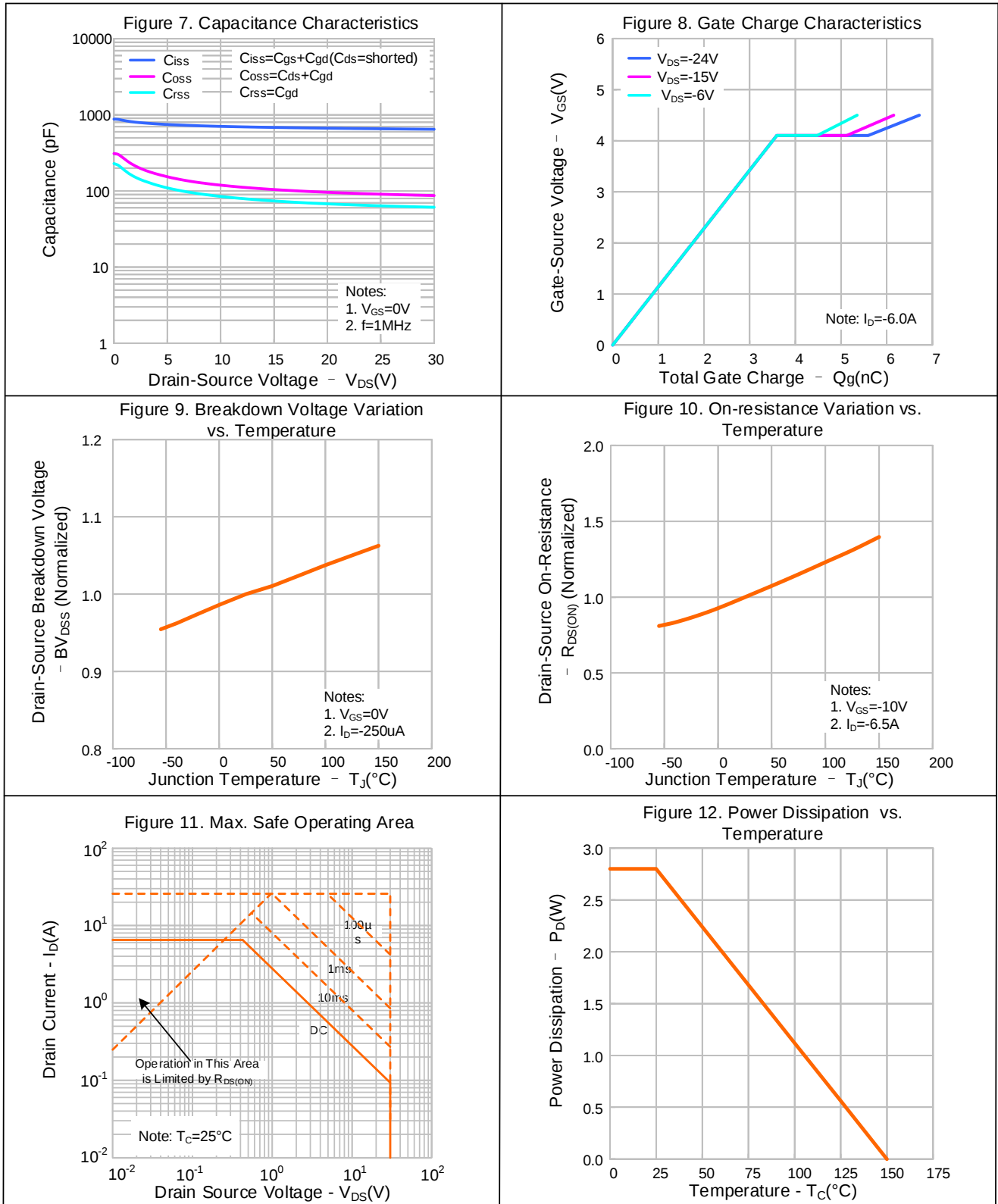
Notes:

1. Pulse time 5 μ s;
2. The dissipation power will change with temperature, derating above 25°C: 0.02W/°C;
3. Pulse Test: Pulse width $\leq$ 300 μ s, Duty cycle $\leq$ 2%;
4. Essentially independent of operating temperature.

TYPICAL CHARACTERISTICS

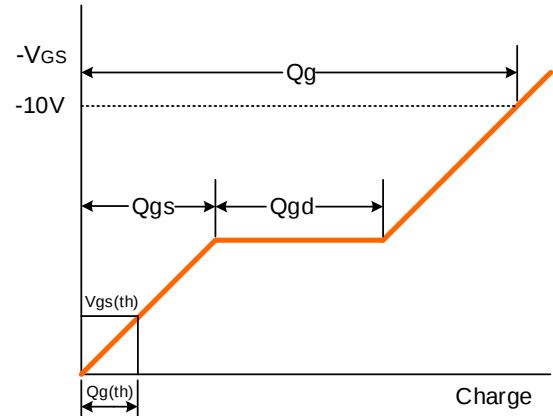
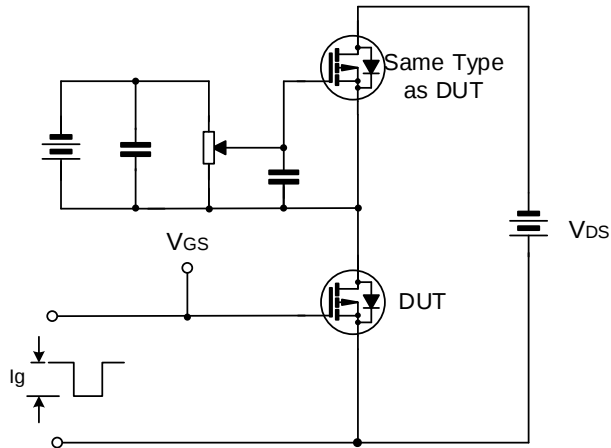


TYPICAL CHARACTERISTICS (CONTINUED)

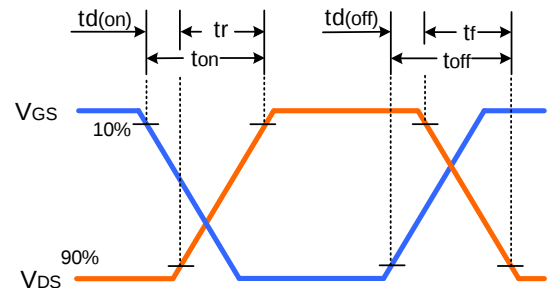
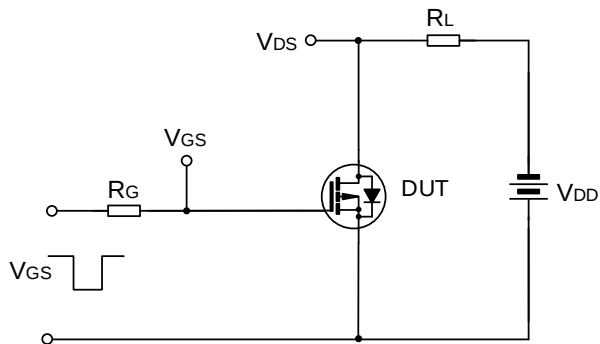


P-CHANNEL TYPICAL TEST CIRCUIT

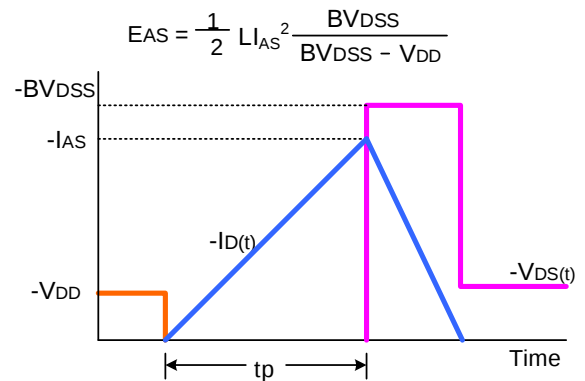
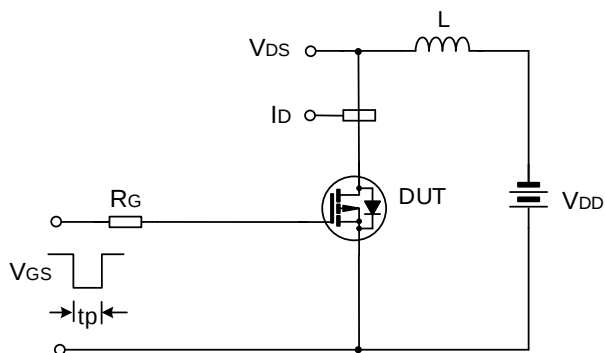
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



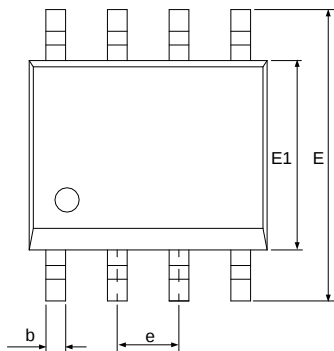
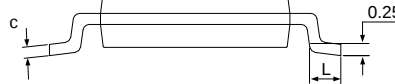
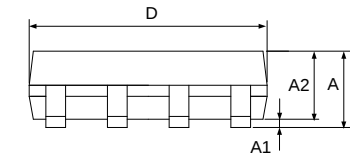
EAS Test Circuit & Waveform



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.
3. Our products are consumer electronic products or the other civil electronic products.
4. When using our products, please do not exceed the maximum rating of the products, otherwise the reliability of the whole machine will be affected. There is a certain possibility of failure or malfunction of any semiconductor product under specific conditions. The buyer is responsible for complying with safety standards and taking safety measures when using our products for system design, sample and whole machine manufacturing, so as to avoid potential failure risk that may cause personal injury or property loss.
5. It is strongly recommended to identify the trademark when buying our products. Please contact us if there is any question.
6. Product promotion is endless, our company will wholeheartedly provide customers with better products!
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Rev.: 1.0

Revision History:

1. First release
