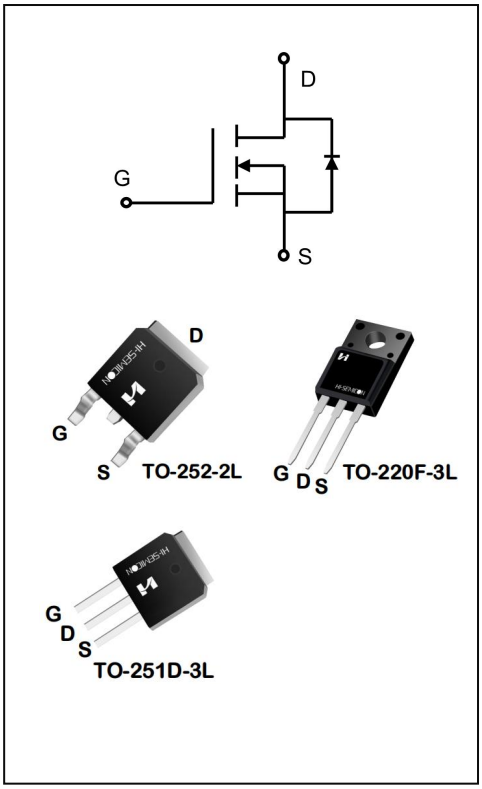
100V 15A N-CHANNEL POWER MOSFET



GENERAL DESCRIPTION

The SGX15N10 uses advanced SGT technology and design to provide excellent $R_{DS(on)}$ with low gate charge.
It can be used in a wide variety applications.

Features

- ◆V_{DS}=100V,I_D=15A
- ◆$R_{DS(on)}$
  TYP:55mΩ@V_{GS}=10V I_D=7.5A

Applications

- ◆Power faction correction (PFC)
- ◆Switched mode power supplies (SMPS)
- ◆Uninterruptible power supply (UPS)
- ◆LED lighting power

ORDERING INFORMATION

Part No.	Package	Marking	Material	Packing
SGU15N10	TO-251D-3L	SGU15N10	Pb Free	Tube
SGD15N10	TO-252-2L	SGD15N10	Pb Free	Reel
SGF15N10	TO-220F-3L	SGF15N10	Pb Free	Tube

ABSOLUTE MAXIMUM RATINGS (T_J=25°C unless otherwise noted)

Characteristics		Symbol	Ratings		Unit
			SGF15N10	SGU/D15N10	
Drain-Source Voltage		V_{DS}	100		V
Gate-Source Voltage		V_{GS}	±20		V
Drain Current	T_C = 25°C	I_D	15		A
	T_C = 100°C		11.5		
Drain Current Pulsed(Note 1)		I_{DM}	60		A
Power Dissipation(T_C=25°C)		P_D	35	68	W
-Derate above 25°C			0.35	0.67	W/℃
Single Pulsed Avalanche Energy (Note 2)		E_{AS}	49		mJ
Operation Junction Temperature Range		T_J	-55～+150		°C
Storage Temperature Range		T_{stg}	-55～+150		°C
Maximum lead temperature for soldering purposes,1/8" from case for 5 seconds		TL	300		℃

THERMAL CHARACTERISTICS

Characteristics	Symbol	MAX		Unit
		SGF15N10	SGU/D15N10	
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.6	3.3	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	62.0	°C/W

ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain -Source Breakdown Voltage	B_{VDSS}	V_{GS}=0V, I_D=250μA	100	--	--	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=100V, V_{GS}=0V	--	--	100	nA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=20V, V_{DS}=0V	--	--	100	nA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=-20V, V_{DS}=0V	--	--	-100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}= V_{DS}, I_D=250μA	1.0	1.9	3.0	V
Static Drain- Source On State Resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=7.5A	--	55	110	mΩ
		V_{GS}=6V, I_D=7.5A	--	62	110	
Dynamic Characteristics						
Gate Resistance	Rg	V_{GS}=0V; f=1.0MHZ	1	1.0	10	Ω
Input Capacitance	C_{iss}	V_{DS}=25V	--	441	--	pF
Output Capacitance	C_{oss}	V_{GS}=0V	--	157	--	
Reverse Transfer Capacitance	C_{rss}	f=1.0MHZ	--	12.8	--	
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=50V, V_{DS}=10V	--	7.6	--	ns
Turn-on Rise Time	t_r	R_G=3Ω; I_D=10A	--	21.5	--	
Turn-off Delay Time	$t_{d(off)}$	(Note 3.4)	--	26.3	--	

Turn-off Fall Time	t_f	V_{DD}=50V, V_{DS}=10V R_G=3Ω; I_D=10A (Note 3.4)	--	9.5	--	ns
Total Gate Charge	Q_g	V_{DS}=50V, I_D=10A V_{GS}=10V (Note 3.4)	--	25	--	nc
Gate-Source Charge	Q_{gs}		--	11.4	--	
Gate-Drain Charge	Q_{gd}		--	3.8	--	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I_S	Integral Reverse P-N Junction Diode in the MOSFET	--	--	15	A
Pulsed Source Current	I_{SM}		--	--	60	
Diode Forward Voltage	V_{SD}	I_S=15A,V_{GS}=0V	--	1.0	1.4	V
Reverse Recovery Time	T_{rr}	I_F=10A,V_R=10V, dIF/dt=100A/μS	--	95	--	ns
Reverse Recovery Charge	Q_{rr}		--	0.6	--	μC

1.Pluse width limited by maximum junction temperature

2.L=0.5mH, V_{DD}=50V, I_D=7A, V_G=10V, R_G=25Ω, starting T_J=25°C

3.Pulse Test: Pulse width ≤300μs, Duty cycle≤2%

4.Essentially independent of operating temperature

Typical Performance Characteristics

Figure 1. Output Characteristics

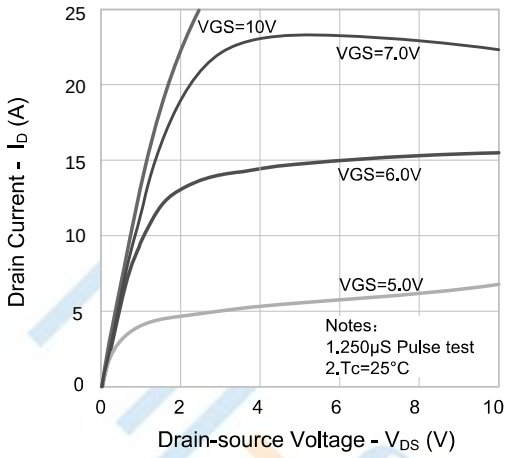


Figure 2. Transfer Characteristics

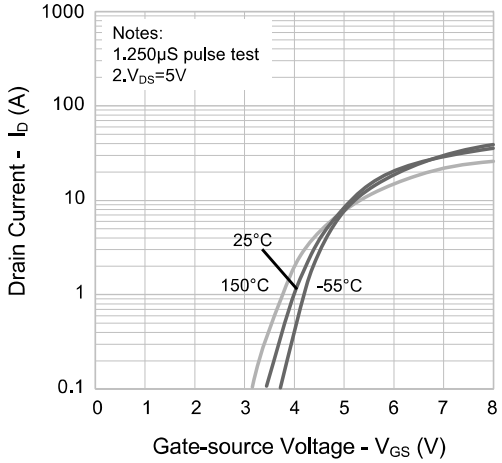


Figure 3. On-resistance vs. Drain Current

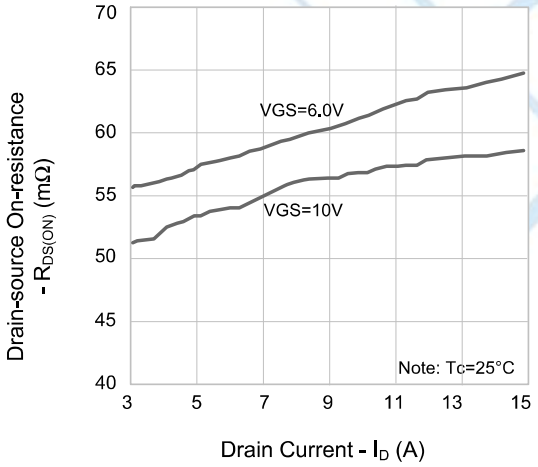


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

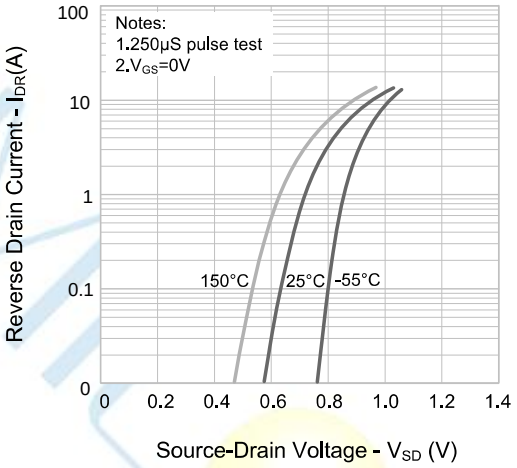


Figure 5. Capacitance Characteristics

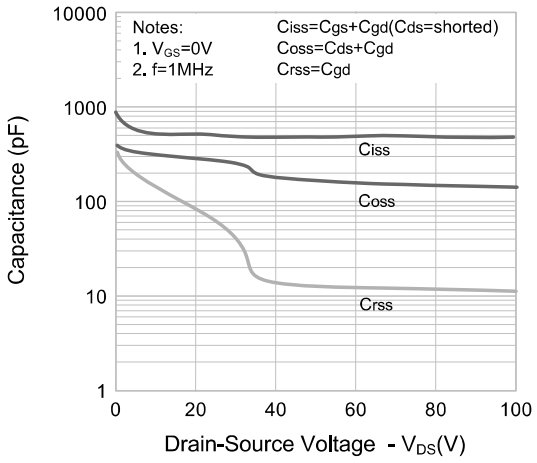
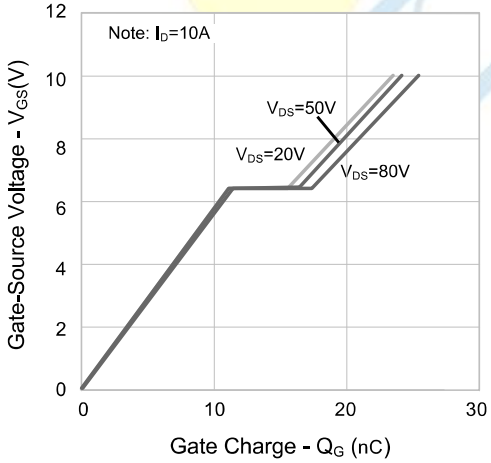


Figure 6. Gate Charge Characteristics



Typical Performance Characteristics

Figure 7. Breakdown Voltage vs. Temperature Characteristics

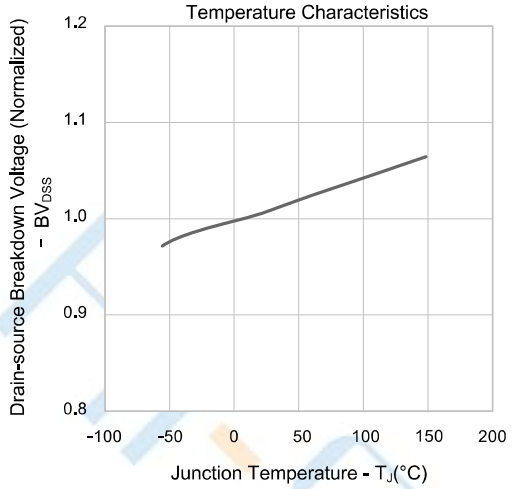


Figure 8. On-resistance vs. Temperature Characteristics

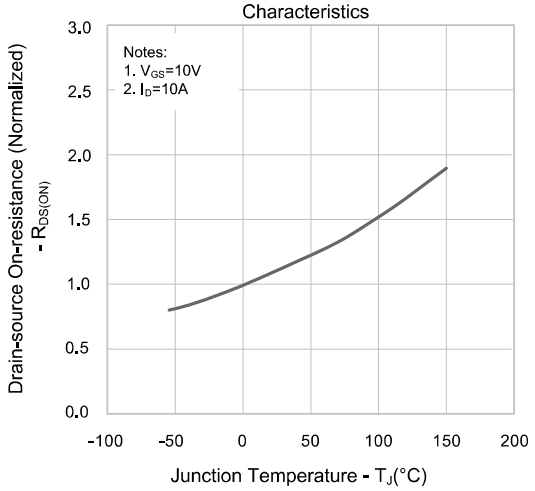
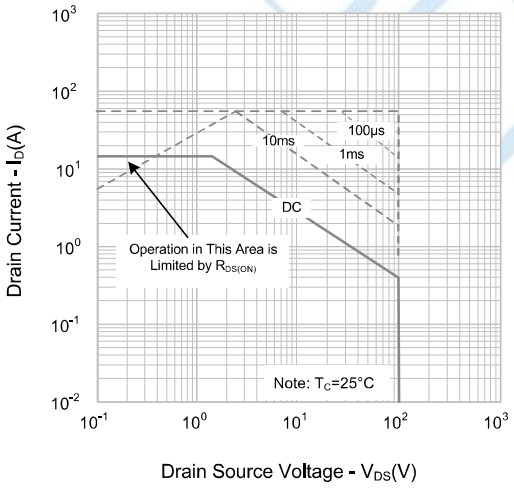
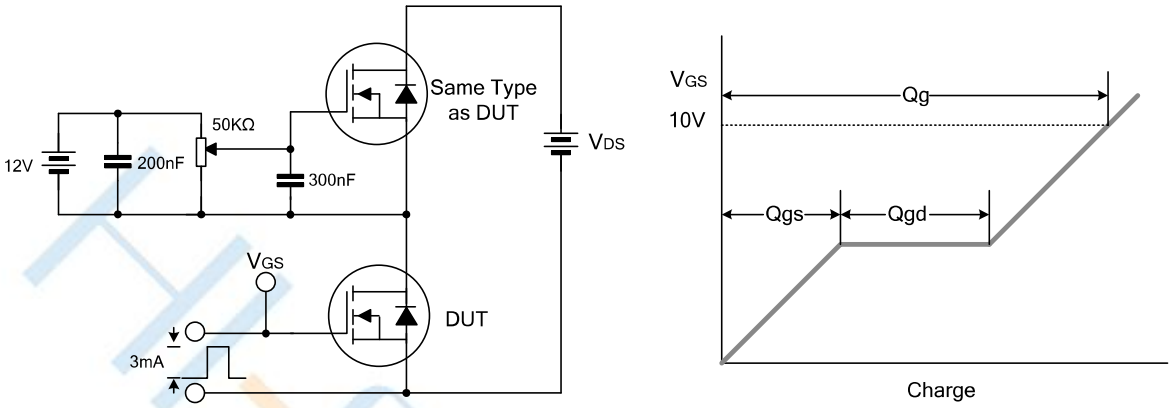


Figure 9. Max. Safe Operating Area

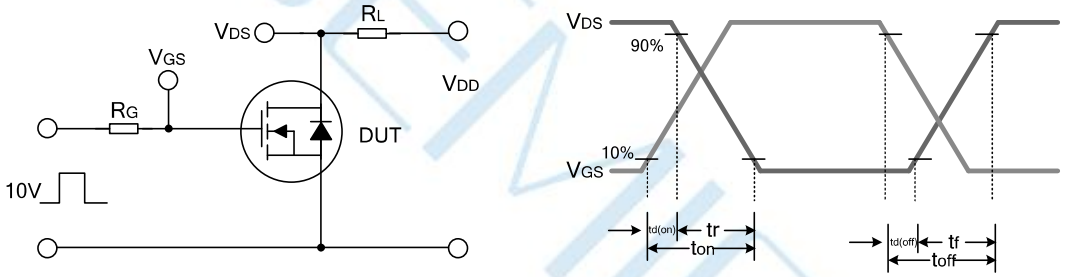


Test Circuit

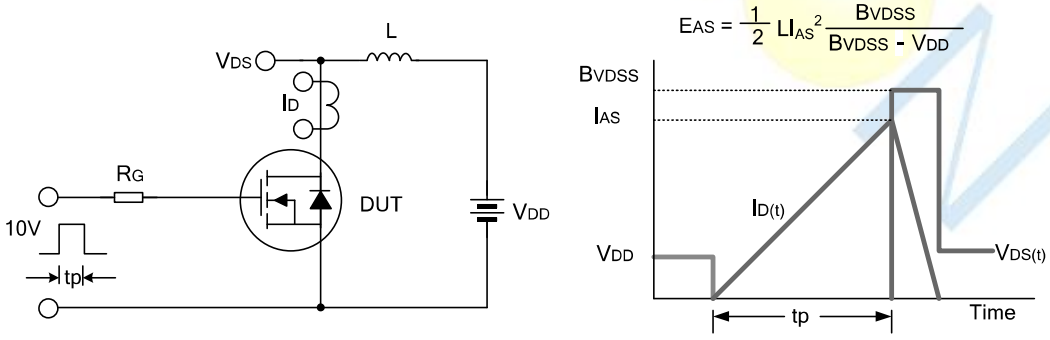
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform

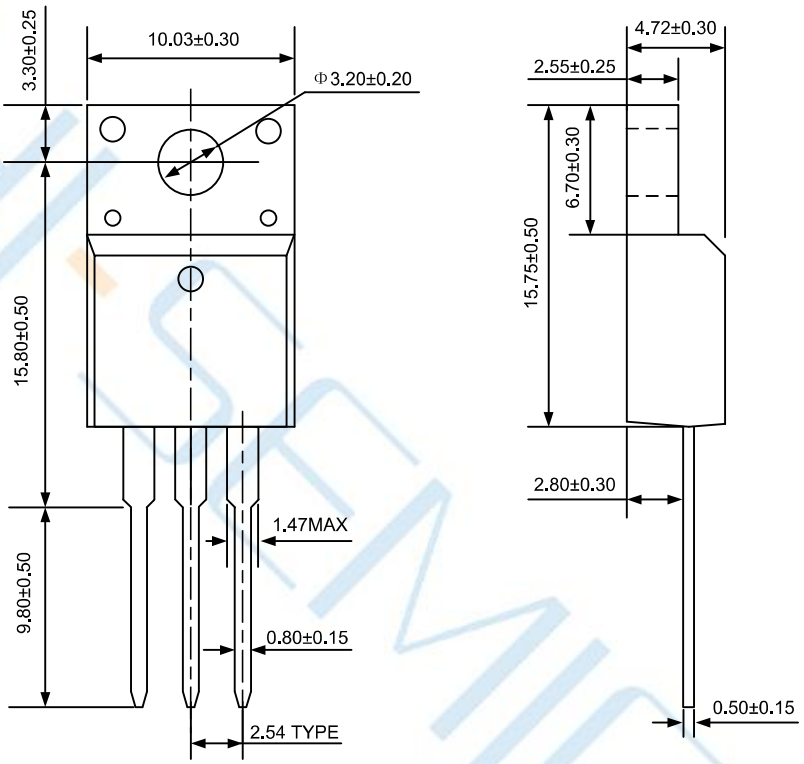


Unclamped Inductive Switching Test Circuit & Waveform



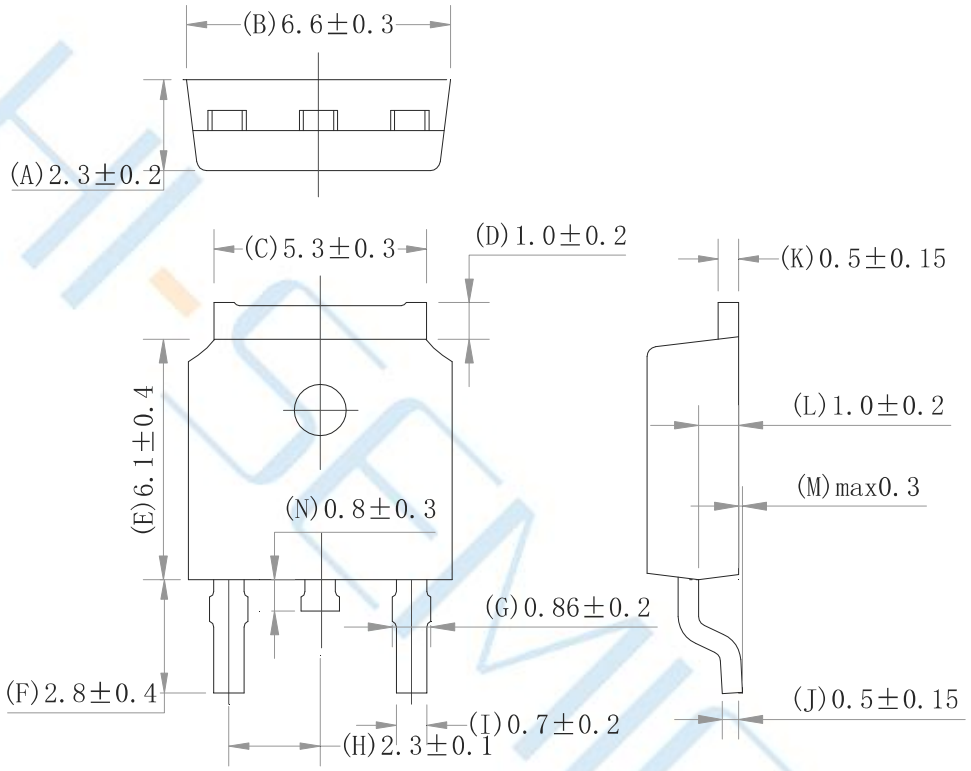
Package Dimensions of TO-220F-3L

Unit:mm



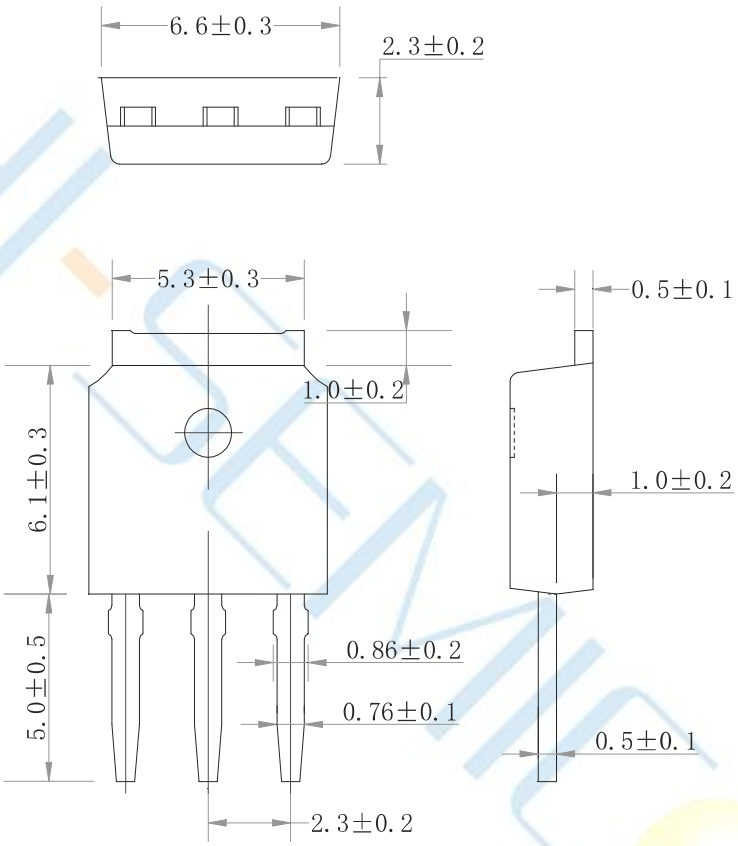
Package Dimensions of TO-252-2L

Unit:mm



Package Dimensions of TO-251D-3L

Unit:mm



Disclaimer:

► Hi-semicon reserves the right to make changes to the information herein for the improvement of the design and performance without further notice! Customers should obtain the latest relevant information before placing orders and should verify that such information is complete and current.

► All semiconductor products malfunction or fail with some probability under special conditions. When using Hi-semicon products in system design or complete machine manufacturing, it is the responsibility of the buyer to comply with the safety standards strictly and take essential measures to avoid situations in which a malfunction or failure of such Hi-semicon products could cause loss of body injury or damage to property.

► Hi-semicon will supply the best possible product for customers!