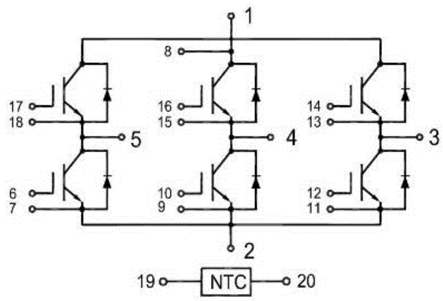
GSID150A120S5C1

6-Pack IGBT Module

Features：

- Short Circuit Rated 10μs
- Low Saturation Voltage: $V_{CE\ (sat)}$ = 1.90V @ I_C = 150A , T_C=25℃
- Low Switching Loss
- 100% RBSOA Tested（2×Ic）
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement



Applications：

- High Power Converters
- Motor Drivers
- UPS Systems

IGBT, Inverter

Maximum Rated Values (T_C=25℃ unless otherwise specified)

V_{CES}	Collector-Emitter Blocking Voltage		1200	V
V_{GES}	Gate-Emitter Voltage		±20	V
I_C	Continuous Collector Current	T_C = 80℃	150	A
		T_C = 25℃	285	A
$I_{CM(1)}$	Peak Collector Current Repetitive	T_J = 175℃	300	A
t_{SC}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation per IGBT	T_C = 25℃ T_{Jmax}=175℃	1087	W

Electrical Characteristics of IGBT (T_C=25℃ unless otherwise specified)

Static characteristics

Symbol	Description	Conditions		Min	Typ	Max	Unit
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C = 1 mA, V_{CE} = V_{GE}		5.0	5.5	6.0	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C =150A, V_{GE} = 15V	T_J = 25℃		1.9	2.10	V
			T_J = 125℃		2.30		V
			T_J = 150℃		2.30		V
I_{CES}	Collector-Emitter Leakage Current	V_{GE} = 0V, V_{CE} = V_{CES}, T_J = 25℃				1	mA
I_{GES}	Gate-Emitter Leakage Current	V_{GE} = ±20V, V_{CE} = 0V, T_J = 25℃				200	nA
C_{ies}	Input Capacitance	V_{CE} = 25V, V_{GE} = 0V , f =1MHz			21.2		nF
C_{oes}	Output capacitance				1.09		nF

Switching Characteristics

Symbol	Description	Conditions		Min	Typ	Max	Unit
$t_{d(on)}$	Turn-on Delay Time	V_{CC} = 600V, I_C = 150A, R_G = 15Ω, V_{GE} = ±15V, Inductive Load	T_J = 25℃		735		ns
			T_J = 125℃		720		
			T_J = 150℃		720		
t_r	Rise Time		T_J = 25℃		180		ns
			T_J = 125℃		190		
			T_J = 150℃		195		
$t_{d(off)}$	Turn-off Delay Time		T_J = 25℃		630		ns
			T_J = 125℃		655		
			T_J = 125℃		675		
t_f	Fall Time		T_J = 25℃		170		ns
			T_J = 125℃		200		
			T_J = 150℃		210		
E_{on}	Turn-on Switching Loss		T_J = 25℃		19.7		mJ
			T_J = 125℃		23.3		
			T_J = 150℃		24.8		
E_{off}	Turn-off Switching Loss		T_J = 25℃		9.3		mJ

			T_J = 125℃		12.7		
			T_J = 150℃		14.7		
Q_g	Total Gate Charge		T_J = 25℃		1650		nC
			T_J = 125℃		1665		
			T_J = 150℃		1672		
RBSOA	Reverse Bias Safe Operation Area	I_C=600A, V_{CC}=1050V, Vp=1200V, Rg = 15Ω, V_{GE}=+15V to 0V, T_J =150°C		Trapezoid			
SCSOA	Short Circuit Safe Operation Area	V_{CC} < 720V, V_{GE} = 15V, T_J = 150℃		10			μs
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-To-Case				0.138		℃/W

Diode, Inverter

Maximum Rated Values (T_C=25℃ unless otherwise specified)

V_{RRM}	Repetitive Peak Reverse Voltage	1200	V
I_F	Diode Continuous Forward Current	150	A
I_{FM}	Repetitive Peak Forward Current	300	A

Electrical Characteristics of FWD (T_C=25℃ unless otherwise specified)

Symbol	Description	Conditions		Min	Typ	Max	Unit
V_{FM}	Forward Voltage	I_F = 150A , V_{GE} = 0V	T_J = 25℃		2.30		V
			T_J = 125℃		2.40		
			T_J = 150℃		2.40		
I_{rr}	Peak Reverse Recovery Current	I_F＝150A, di/dt =900A/μs, V_{rr} = 600V, V_{GE} = -15V	T_J = 25℃		50		A
			T_J = 125℃		65		
			T_J = 150℃		75		
Q_{rr}	Reverse Recovery Charge		T_J = 25℃		7.3		μC
			T_J = 125℃		14.3		
			T_J = 150℃		18.3		
E_{rec}	Reverse Recovery Energy		T_J = 25℃		2.0		mJ
			T_J = 125℃		4.3		

			T_J = 150℃		5.8		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case				0.253		℃/W

Internal NTC-Thermistor Characteristics

Symbol	Description	Min	Typ	Max	Unit
R_{25}	T_C =25℃		5		kΩ
△R/R	T_C =100℃，R_{100} =481Ω			±5	%
P_{25}	T_C =25℃		50		mW
$B_{25/50}$	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298.15K))]$		3380		K
$B_{25/80}$	$R_2=R_{25}\exp[B_{25/80}(1/T_2-1/(298.15K))]$		3440		K

Module

Symbol	Description		Min	Typ	Max	Unit
V_{iso}	Isolation Voltage(All Terminals Shorted)	f = 50Hz, 1minute	2500			V
T_J	Maximum Junction Temperature				175	℃
T_{JOP}	Maximum Operating Junction Temperature Range		-40		+150	℃
T_{stg}	Storage Temperature		-40		+125	℃
$R_{\theta CS}$	Case-To-Sink (Conductive Grease Applied)			0.02		℃/W
M	Mounting Screw:M5		3.0		6.0	N·m
M	Power Terminals Screw: M6		3.0		6.0	N·m
G	Weight			390		g

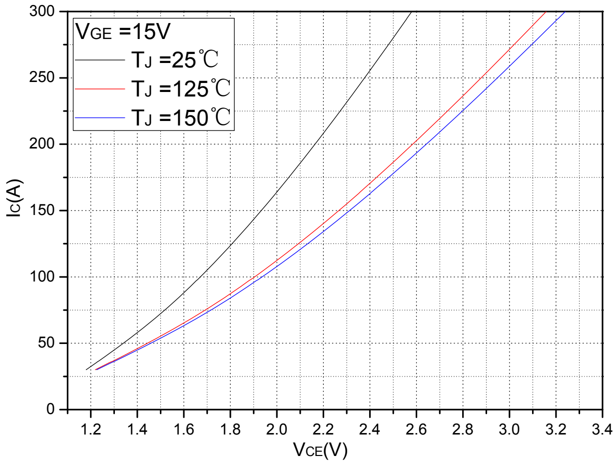


Fig.1 Typical Saturation Voltage Characteristics

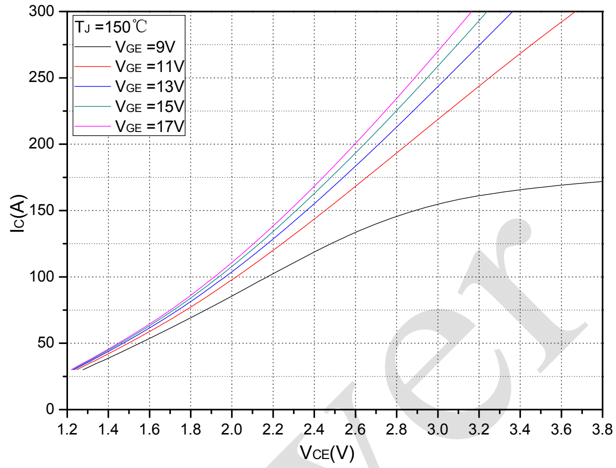


Fig.2 Typical Output Characteristics

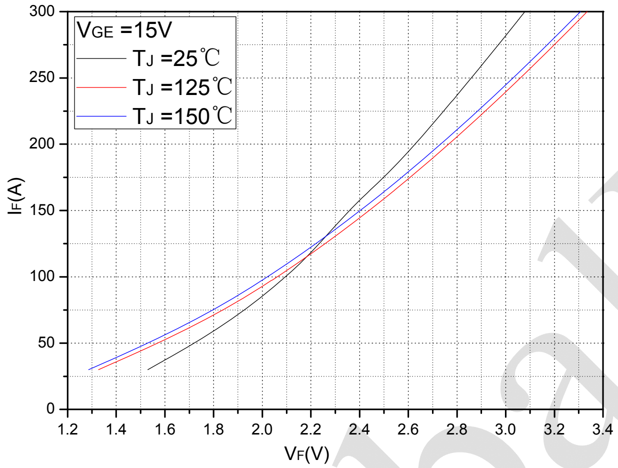


Fig.3 Forward Characteristics of FWD

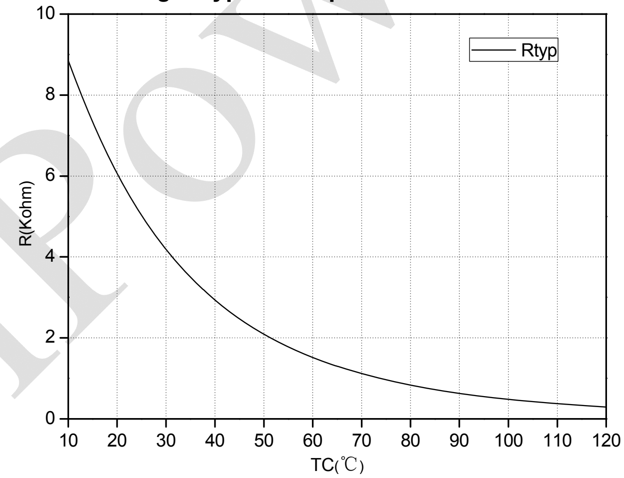


Fig.4 NTC Temperature characteristics

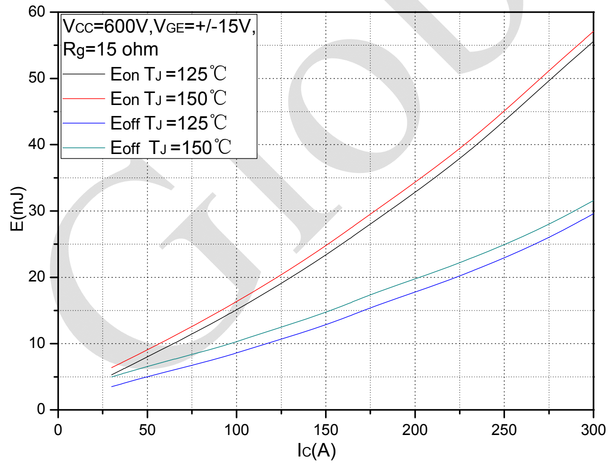


Fig.5 Typical Switching Loss vs. Collector Current

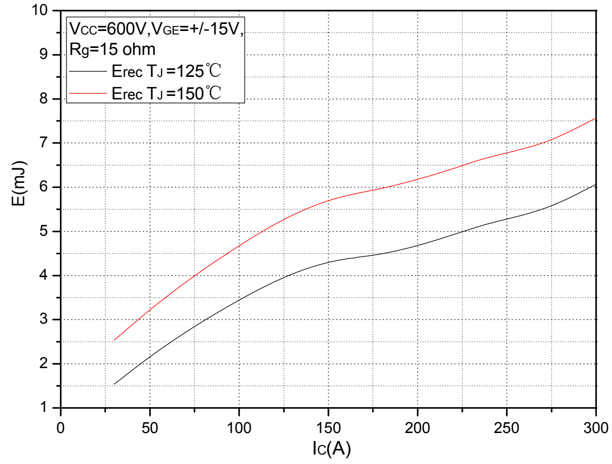


Fig.6 Typical Switching Loss vs. Collector Current

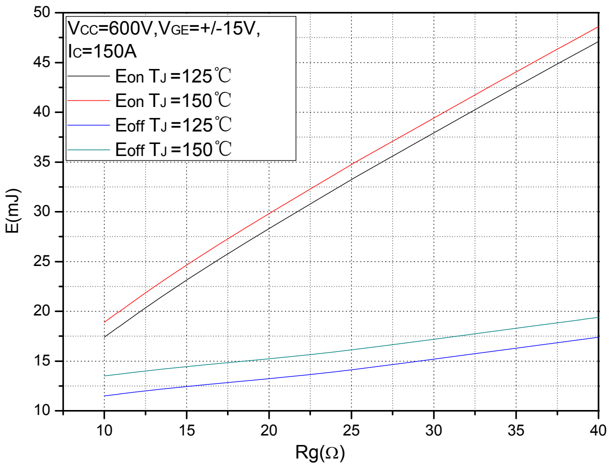


Fig.7 Typical Switching Loss vs. Gate Resistance

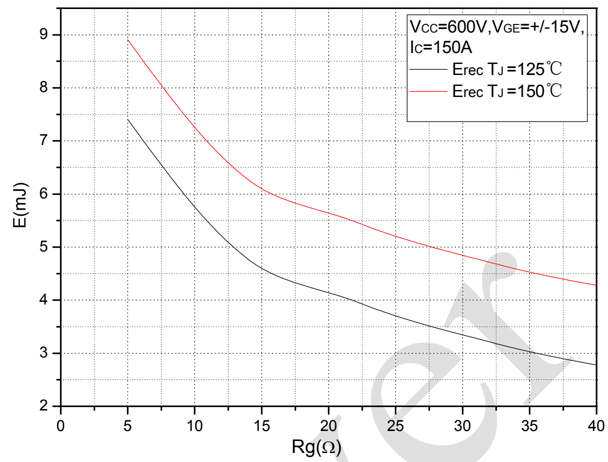


Fig.8 Typical Switching Loss vs. Gate Resistance

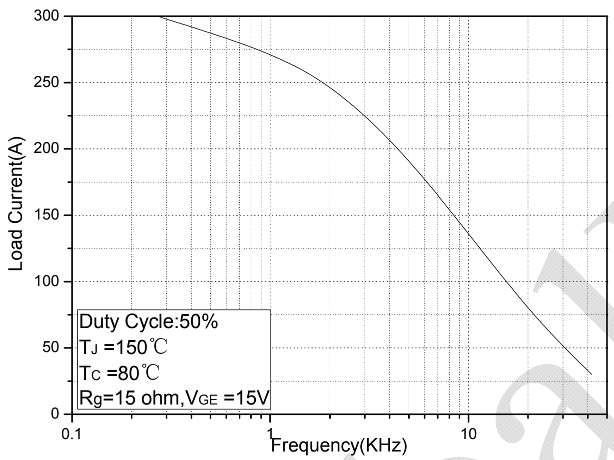


Fig.9 Typical Load Current vs. Frequency

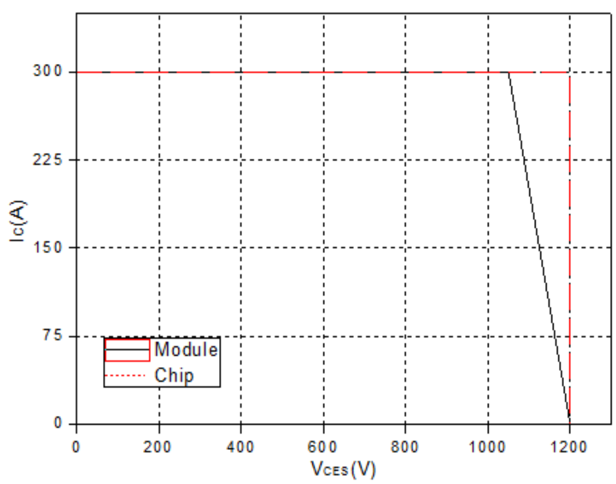


Fig.10 Reverse Bias Safe Operation Area (RBSOA)

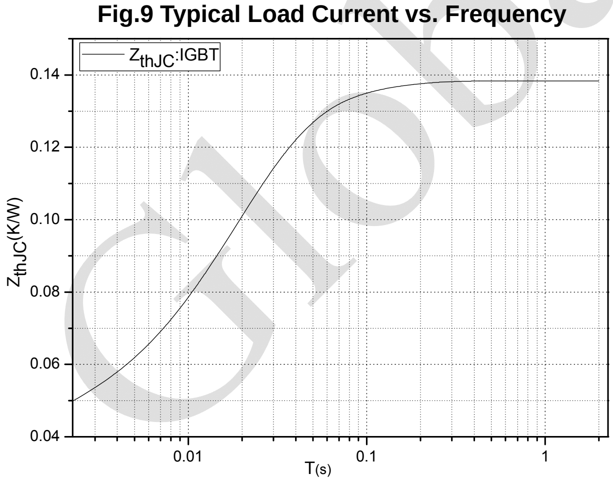


Fig.11 Transient thermal impedance (IGBT)

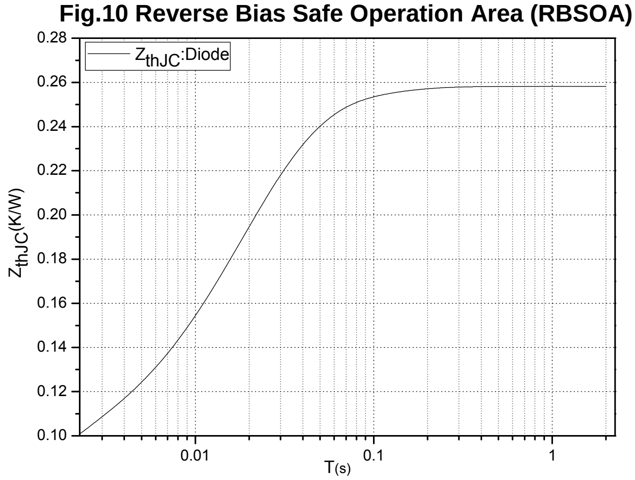


Fig.12 Transient thermal impedance (Diode)

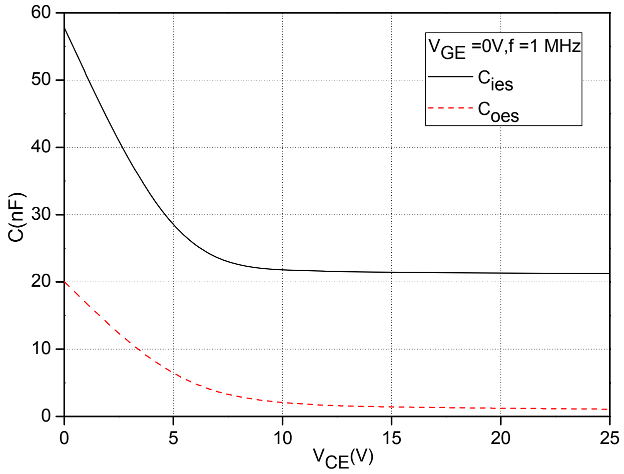
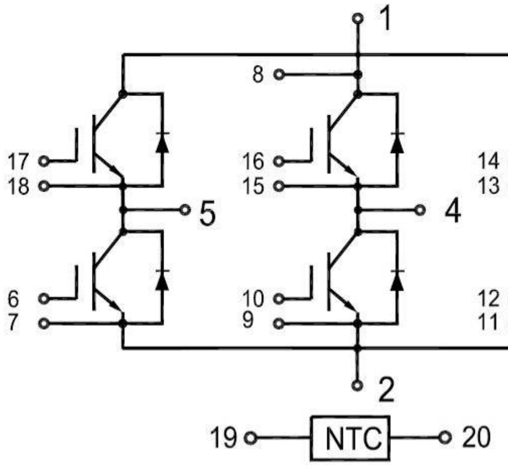
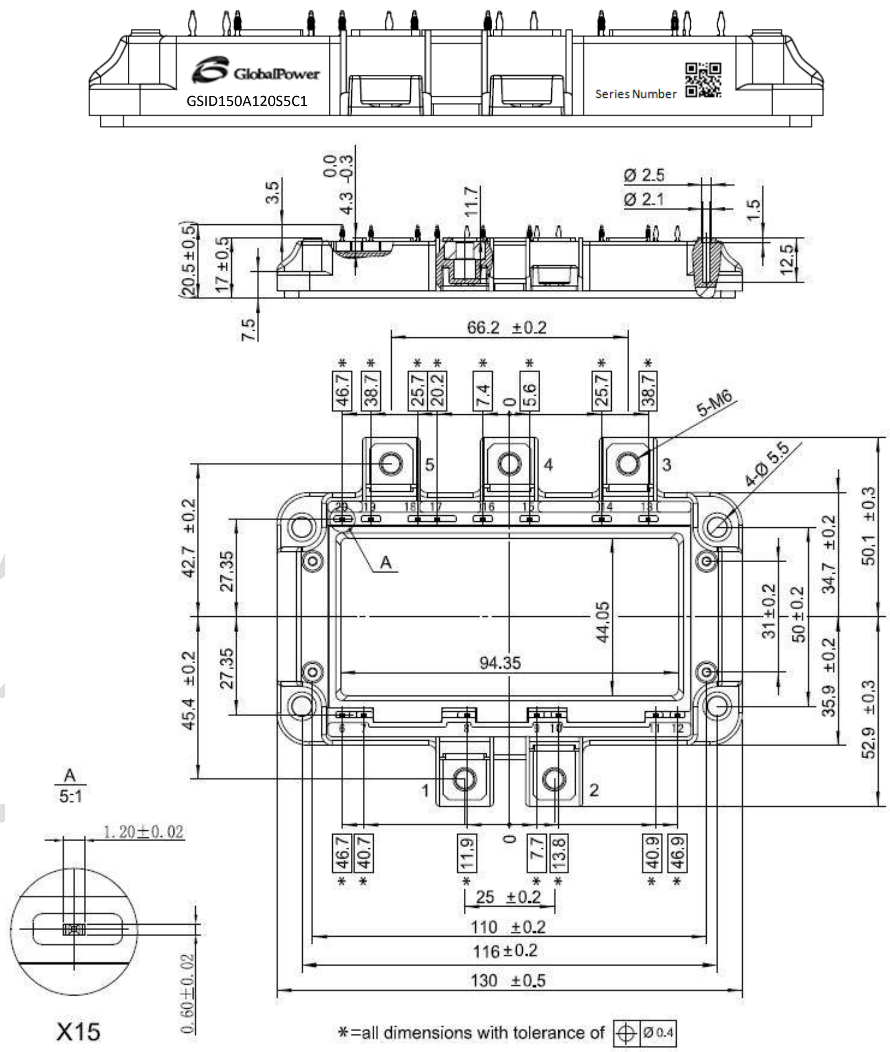


Fig.13 Capacitance Characteristics

Internal Circuit



Package Outline (Unit: mm):



Revision History

Date	Revision	Notes
10/23/2015	0.1	Initial release of preliminary datasheet
11/15/2015	0.2	Add the test data at junction temperature of 150°C.

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Notes

- **RoHS Compliance**
  The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2011/65/EC (RoHS2), as implemented March, 2013. RoHS Declarations for this product can be obtained from the Product Documentation sections of www.gptechgroup.com.

- **REACh Compliance**
  REACh substances of high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, please contact our office at GPTG Headquarters in Lake Forest, California to insure you get the most up-to-date REACh SVHC Declaration.
  REACh banned substance information (REACh Article 67) is also available upon request.

- This product has not been designed or tested for use in, and is not intended for use in, applications implanted into the human body nor in applications in which failure of the product could lead to death, personal injury or property damage, including but not limited to equipment used in the operation of nuclear facilities, life-support machines, cardiac defibrillators or similar emergency medical equipment, aircraft navigation or communication or control systems, or air traffic control.

- To obtain additional technical information or to place an order for this product, please contact us. The information in this datasheet is provided by Global Power Technologies Group. GPTG reserves the right to make changes, corrections, modifications, and improvements of datasheet without notice.