

GSID300A125S5C1

6-Pack IGBT Module



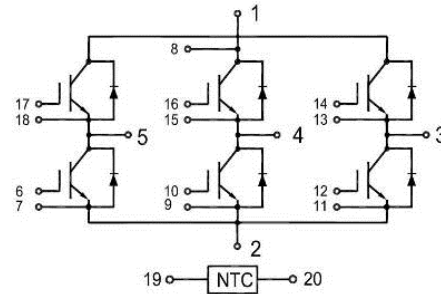
Features:

- Trench & Field Stop IGBT
- Short Circuit Rated 10 μ s
- Low Saturation Voltage: $V_{CE(sat)} = 2.0V @ I_C = 300A, T_J=25^\circ C$
- Low Switching Loss
- 100% RBSOA Tested ($2 \times I_C$)
- Low Stray Inductance
- AlN DBC substrate for better thermal conductivity
- Lead Free, Compliant with RoHS Requirement



Applications:

- High Power Converters
- Motor Drivers
- UPS Systems



IGBT, Inverter

Maximum Rated Values ($T_C=25^\circ C$ unless otherwise specified)

V_{CES}	Collector-Emitter Blocking Voltage		1250	V
V_{GES}	Gate-Emitter Voltage		± 20	V
I_C	Continuous Collector Current	$T_C = 80^\circ C$	300	A
		$T_C = 25^\circ C$	600	A
$I_{CM(1)}$	Peak Collector Current Repetitive	$T_J = 175^\circ C$	600	A
t_{SC}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation per IGBT	$T_C = 25^\circ C$ $T_{Jmax} = 175^\circ C$	2500	W

Electrical Characteristics of IGBT ($T_C=25^\circ\text{C}$ unless otherwise specified)

Static characteristics

Symbol	Description	Conditions	Min	Typ	Max	Unit
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C = 2\text{ mA}, V_{CE} = V_{GE}$	4.5	5.3	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 300\text{A}, V_{GE} = 15\text{V}$	$T_J = 25^\circ\text{C}$	2.00	2.40	V
			$T_J = 125^\circ\text{C}$	2.30		V
			$T_J = 150^\circ\text{C}$			V
I_{CES}	Collector-Emitter Leakage Current	$V_{GE} = 0\text{V}, V_{CE} = V_{CES}, T_J = 25^\circ\text{C}$			1	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{GE} = \pm 20\text{V}, V_{CE} = 0\text{V}, T_J = 25^\circ\text{C}$			400	nA
R_{G_INT}	Internal Gate Resistance			TBD		Ω
C_{ies}	Input Capacitance	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		30.8		nF
C_{oes}	Output Capacitance			2.06		nF
C_{res}	Reverse Transfer Capacitance			1.43		nF

Switching Characteristics

Symbol	Description	Conditions	Switching Characteristics			Unit	
			T_J	Min	Typ		Max
$t_{d(on)}$	Turn-on Delay Time	$V_{CC} = 750\text{V}, I_C = 300\text{A}, R_G = 10\Omega, V_{GE} = \pm 15\text{V}, \text{Inductive Load}$	25°C		899		ns
			125°C		900		
			150°C				
t_r	Rise Time		25°C		198		ns
			125°C		207		
			150°C				
$t_{d(off)}$	Turn-off Delay Time		25°C		783		ns
			125°C		825		
			150°C				
t_f	Fall Time	25°C		123		ns	
		125°C		150			
		150°C					
E_{on}	Turn-on Switching Loss	25°C		50.5		mJ	
		125°C		62.9			
		150°C					

E _{off}	Turn-off Switching Loss	V _{CC} = 750V, I _C = 300A, R _G = 10Ω, V _{GE} = ±15V, Inductive Load	T _J = 25°C	29.6	mJ
			T _J = 125°C	35.9	
			T _J = 150°C		
Q _g	Total Gate Charge		T _J = 25°C	2340	nC
			T _J = 125°C	2360	
			T _J = 150°C		
RBSOA	Reverse Bias Safe Operation Area	I _C =600A, V _{CC} =1050V, V _p =1200V, R _G = 10Ω, V _{GE} =+15V to 0V, T _J =150°C	Trapezoid		
SCSOA	Short Circuit Safe Operation Area	V _{CC} < 750V, V _{GE} = 15V, T _J = 150°C	10		μs
R _{θJC}	IGBT Thermal Resistance: Junction-To-Case			0.06	°C/W

Diode, Inverter

Maximum Rated Values (T_C=25°C unless otherwise specified)

V _{RRM}	Repetitive Peak Reverse Voltage	1200	V
I _F	Diode Continuous Forward Current	300	A
I _{FM}	Repetitive Peak Forward Current	600	A

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

Symbol	Description	Conditions	Min	Typ	Max	Unit
V _{FM}	Forward Voltage	I _F = 300A, V _{GE} = 0V	T _J = 25°C	1.60		V
			T _J = 125°C	1.70		
			T _J = 150°C			
t _{rr}	Reverse Recovery Time	I _F =300A, di/dt = 1213A/μs, V _{rr} = 750V, V _{GE} = -15V	T _J = 25°C	320		ns
			T _J = 125°C	485		
			T _J = 150°C			
I _{rr}	Peak Reverse Recovery Current		T _J = 25°C	166		A
			T _J = 125°C	200		
			T _J = 150°C			
Q _{rr}	Reverse Recovery Charge	T _J = 25°C		32.2		μC

			T _J = 125°C		56.2		
			T _J = 150°C				
E _{rec}	Reverse Recovery Energy		T _J = 25°C		13.7		mJ
			T _J = 125°C		25.3		
			T _J = 150°C				
R _{θJC}	Diode Thermal Resistance: Junction-To-Case				0.099		°C/W

Internal NTC-Thermistor Characteristics

Symbol	Description	Min	Typ	Max	Unit
R ₂₅	T _C =25°C		5		kΩ
ΔR/R	T _C =100°C, R ₁₀₀ =481Ω			±5	%
P ₂₅	T _C =25°C		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	°C
T _{JOP}	Maximum Operating Junction Temperature Range	-40		+150	°C
T _{stg}	Storage Temperature	-40		+125	°C
R _{θCS}	Case-To-Sink (Conductive Grease Applied)		0.02		°C/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
	Base plate: Copper, Isolation substrate: AlN				

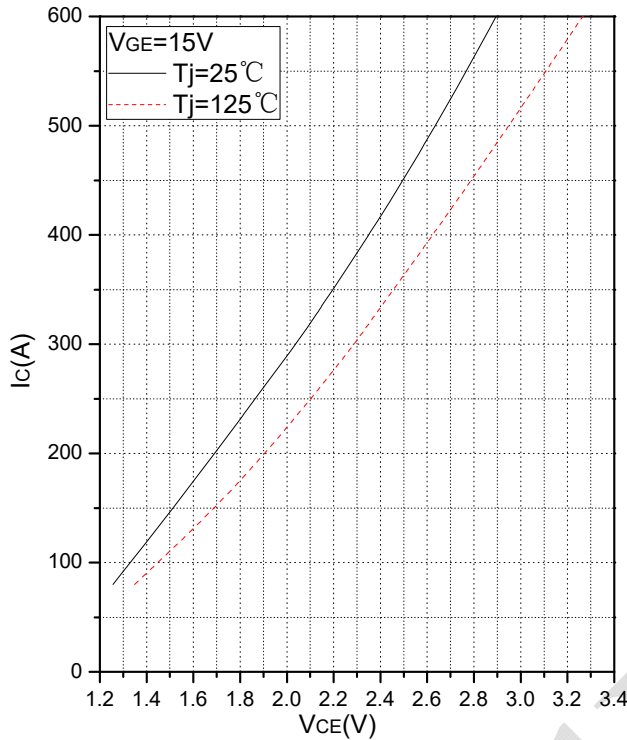


Fig.1 Typical Saturation Voltage Characteristics

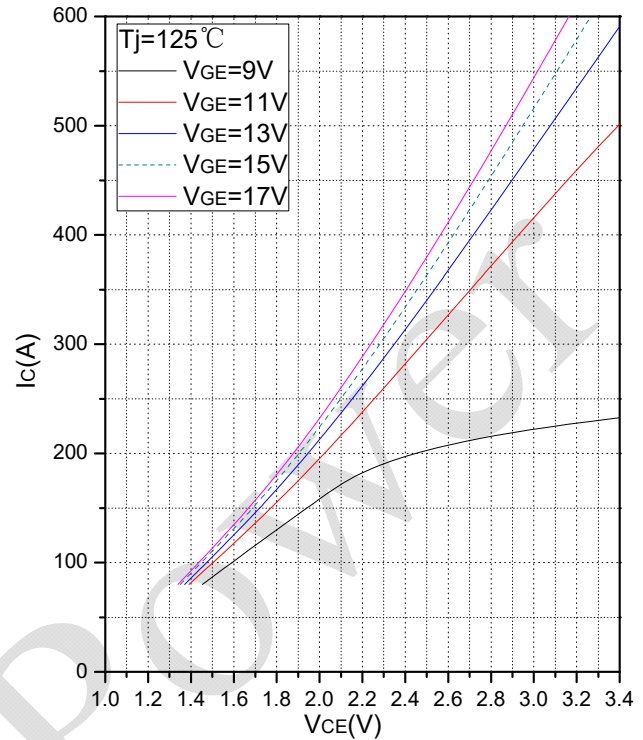


Fig.2 Typical Output Characteristics

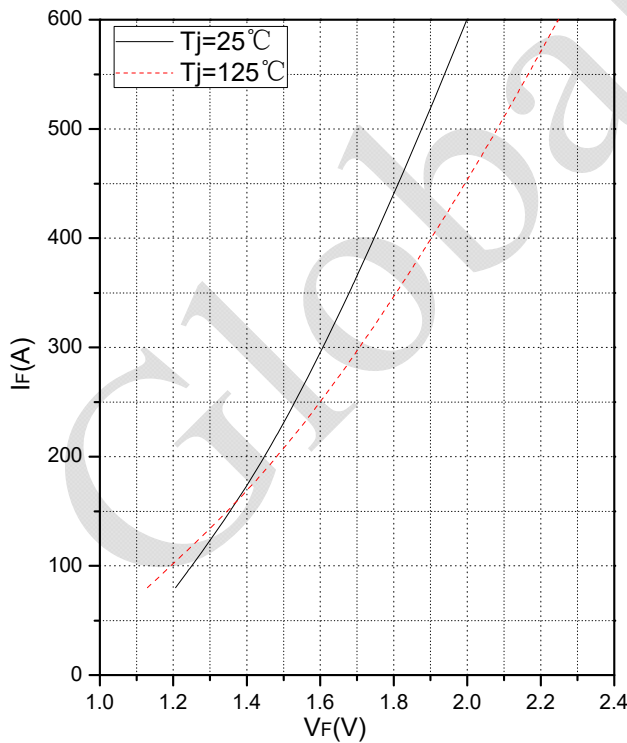


Fig.3 Forward Characteristics of FWD

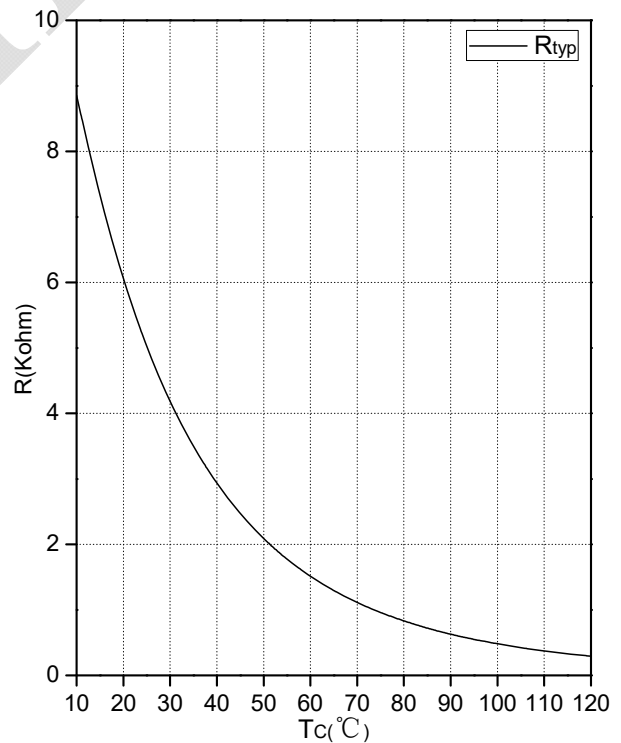


Fig.4 NTC Temperature Characteristics

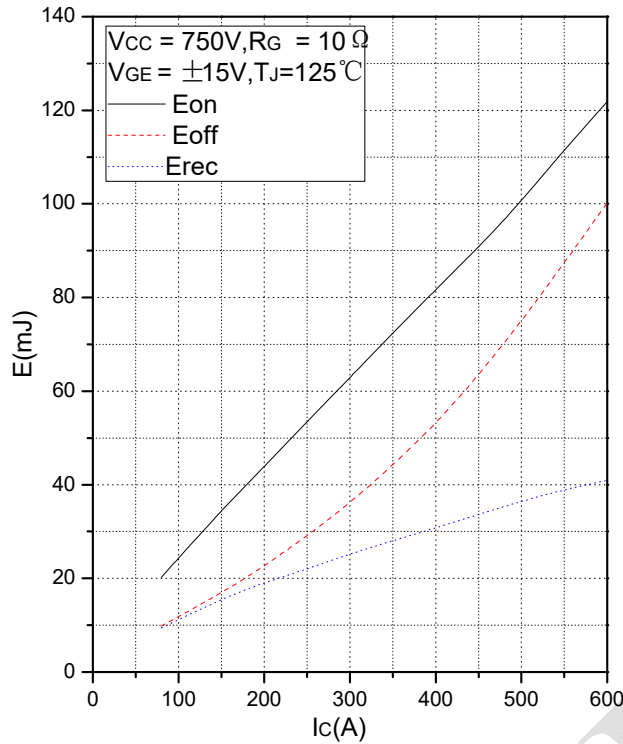


Fig.5 Typical Switching Loss vs. Collector Current

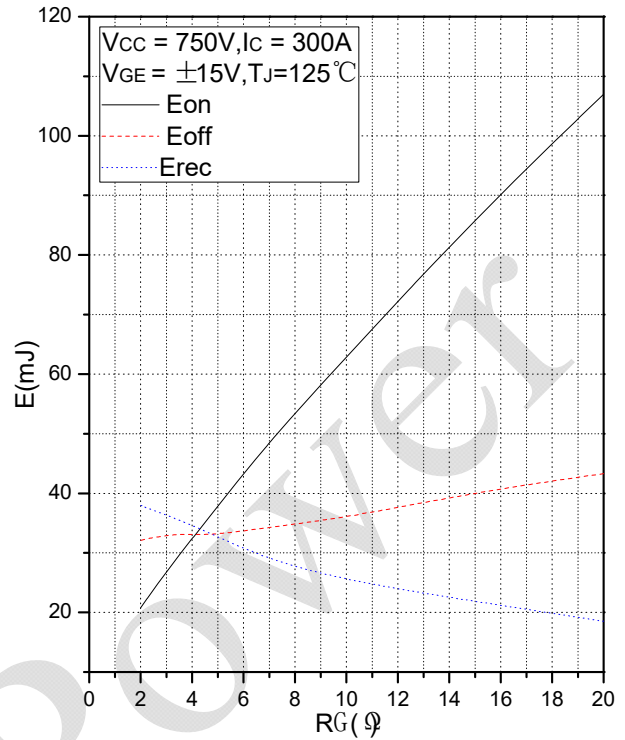


Fig.6 Typical Switching Loss vs. Gate Resistance

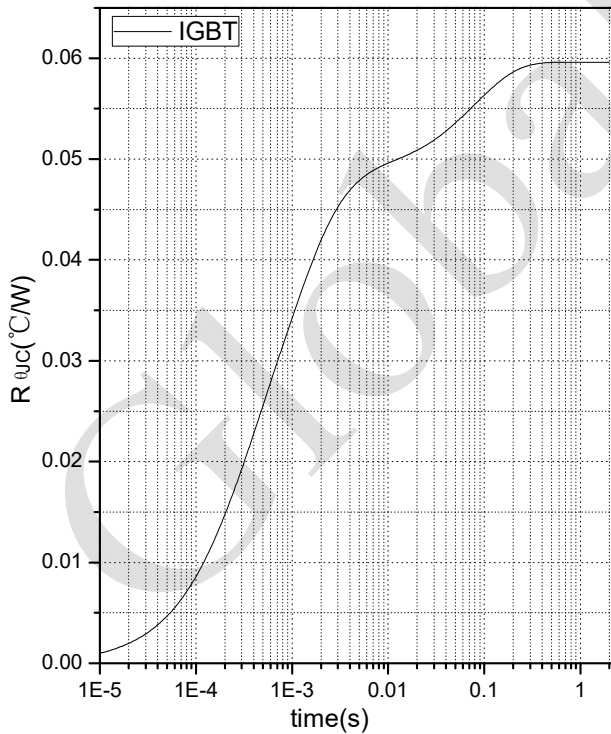


Fig.7 Transient Thermal Impedance (IGBT)

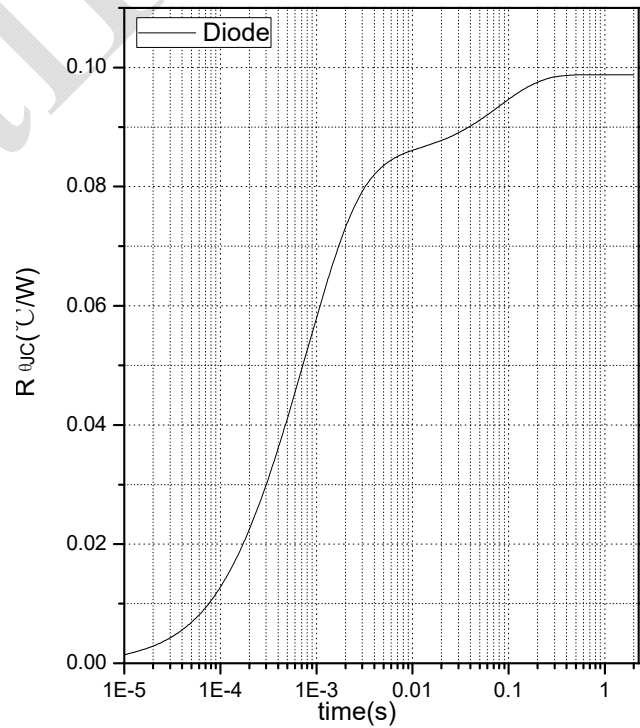


Fig.8 Transient Thermal Impedance (Diode)

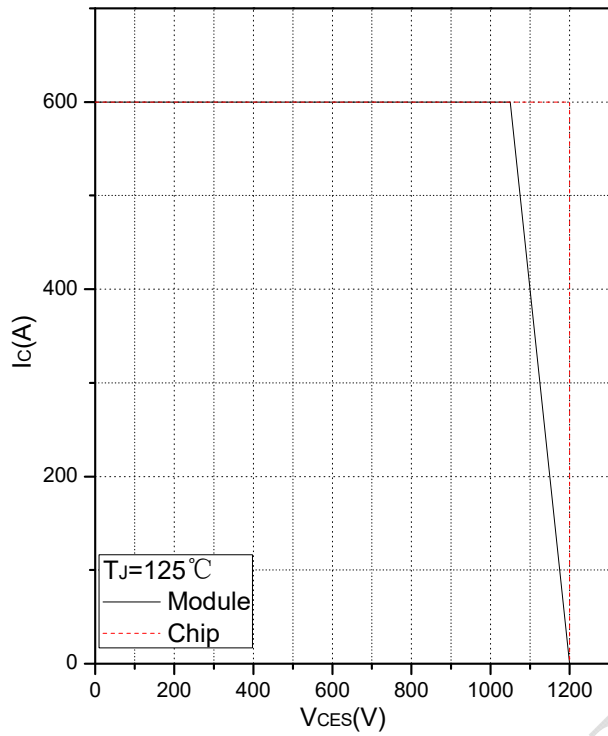
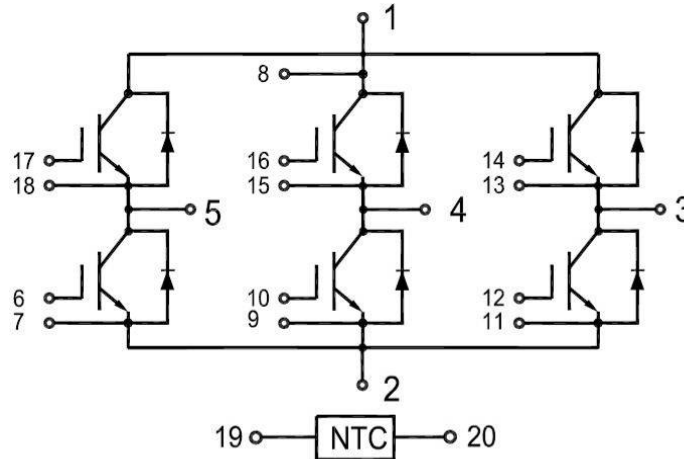
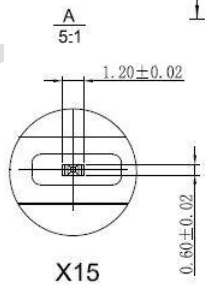
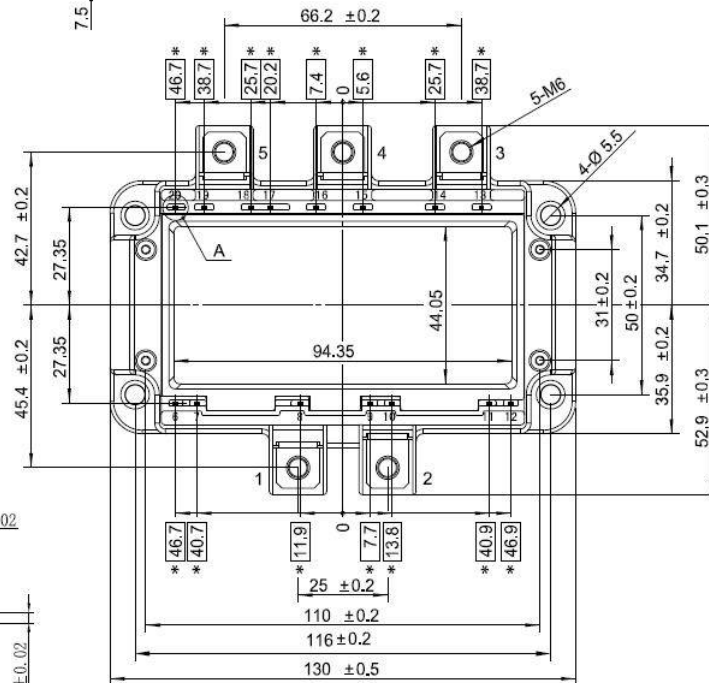
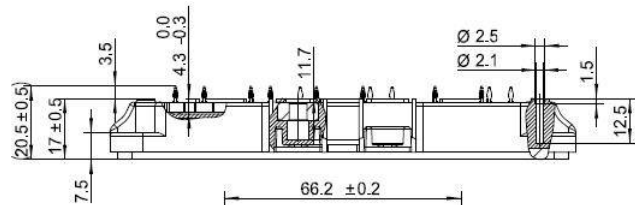
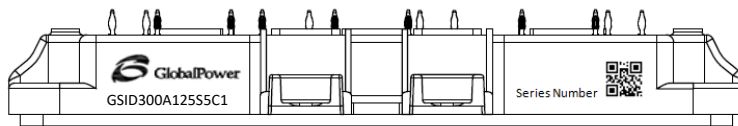


Fig.9 Reverse Bias Safe Operation Area (RBSOA)

Internal Circuit



Package Outline (Unit: mm):



*=all dimensions with tolerance of ± 0.4

Revision History

Date	Revision	Notes
3/30/2017	0.1	Initial release of preliminary datasheet.

Global Power Technologies Group

20692 Prism Place
 Lake Forest, CA 92630
 TEL (949) 207-7500
 FAX (949) 613-7600
 E-mail: info@gptechgroup.com
 Web site: www.gptechgroup.com



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.
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