GHIS100A120S2B1

Si IGBT hybrid module with SiC SBDs

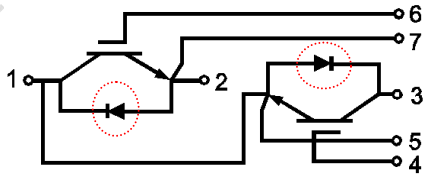
RoHS

Features：

- Low Saturation Voltage: $V_{CE\ (sat)}$ = 1.90V @ I_C = 100A , T_C=25℃
- Low Switching Loss
- SiC SBD for Freewheeling diode: V_F= 1.60V @ I_F = 100A , T_J=25℃
- 100% RBSOA Tested（2×Ic）
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement
- UL E 338085

Applications：

- Welding Machine/ Cutting Machine
- Induction Heating
- Ultrasonic Device
- PV System
- SMPS



Maximum Rated Values of IGBT(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℃	100	A
		T_C = 25℃	200	A
I_{CM}	Repetitive Peak Collector Current	T_J = 175℃	200	A
t_{SC}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation per IGBT	T_C = 25℃ T_{Jmax}=175℃	500	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	IC = 1mA, VCE = VGE		3.5	4.0	5.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 100A, V_{GE} = 15V	T_J = 25℃		1.90	2.10	V
			T_J = 125℃		2.20	2.40	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			10.0		nF
C_{oes}	Output Capacitance				0.54		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	V_{CC} = 600V,I_C =100A, R_G = 33 Ω,V_{GE} = ±15V, Inductive Load	T_J = 25℃		250		ns
			T_J = 125℃		250		
t_r	Rise Time		T_J = 25℃		125		ns
			T_J = 125℃		125		
$t_{d(off)}$	Turn-off Delay Time		T_J = 25℃		600		ns
			T_J = 125℃		625		
t_f	Fall Time		T_J = 25℃		165		ns
			T_J = 125℃		185		
E_{on}	Turn-on Switching Loss		T_J = 25℃		TBD	15.5	mJ
			T_J = 125℃		TBD	16.0	
E_{off}	Turn-off Switching Loss		T_J = 25℃		TBD	3.8	mJ
			T_J = 125℃		TBD	6.1	
Q_g	Total Gate Charge		T_J = 25℃		685		nC
RBSOA	Reverse Bias Safe Operation Area	I_C=200A,V_{CC}=960V,Vp=1200V, Rg = 33Ω, V_{GE}=+15V to 0V, T_J =150°C		Trapezoid			
SCSOA	Short Circuit Safe Operation Area	V_{CC} = 300V, V_{GE} = 15V, T_J = 150℃		10			μs
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-To-Case				0.30		℃/W

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

Symbol	Description	Conditions	Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	T_j=25 °C	1200	V
I_F	Diode Continuous Forward Current	T_C=125 °C, T_j=175 °C	162	A
$I_{F,SM}$	Surge Non-repetitive Forward Current	T_C=125 °C, t_p=8.3 ms sine half wave	500	A
dv/dt	Diode dv/dt Ruggedness	Turn-on slew rate, repetitive	50	V/ns

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

Symbol	Description	Conditions		Min	Typ	Max	Unit
V_R	DC Blocking Voltage	I_R=100 uA		1200			V
V_F	Forward Voltage	I_F = 100A, V_{GE} = 0V	T_J = 25℃		1.6	1.8	V
			T_J = 175℃		2.2	2.7	
I_R	Reverse leakage Current	V_R=1200V	T_J = 25℃		16	500	μA
		V_R=1200V	T_J = 175℃		580		
Q_C	Total Capacitive Charge	V_R=1200V	T_J = 25℃		431		nC
C	Total Capacitance	V_R=1V, f=1 MHz			6349		pF
		V_R=600V, f=1 MHz			370		
		V_R=1200V, f=1 MHz			359		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case				TBD	0.31	℃/W

Module

Symbol	Description		Min	Typ	Max	Unit
V_{iso}	Isolation Voltage(All Terminals Shorted)	f = 50Hz, 1 minute			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)			0.1		℃/W
T	Power Terminals Screw:M5		3.0		5.0	N·m
T	Mounting Screw:M6		4.0		6.0	N·m
G	Weight			180		g

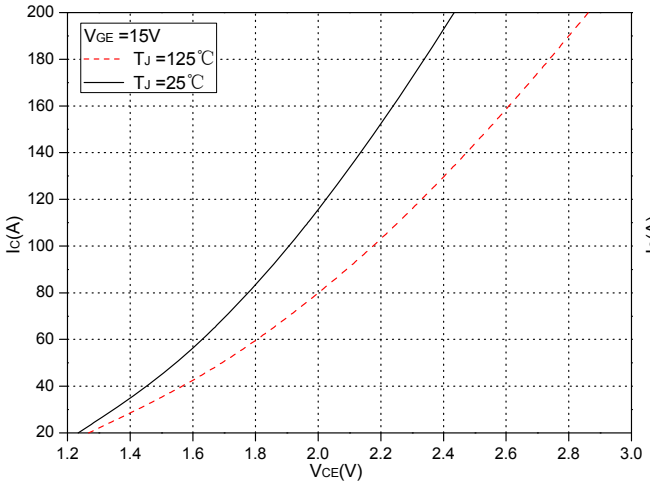


Fig.1 Typical Saturation Voltage Characteristics

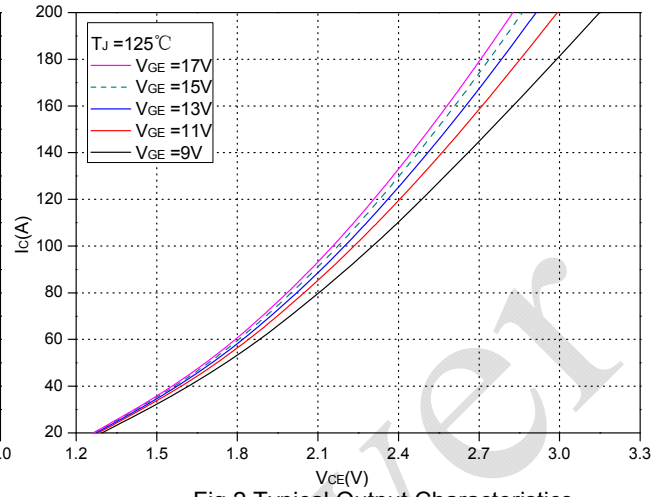


Fig.2 Typical Output Characteristics

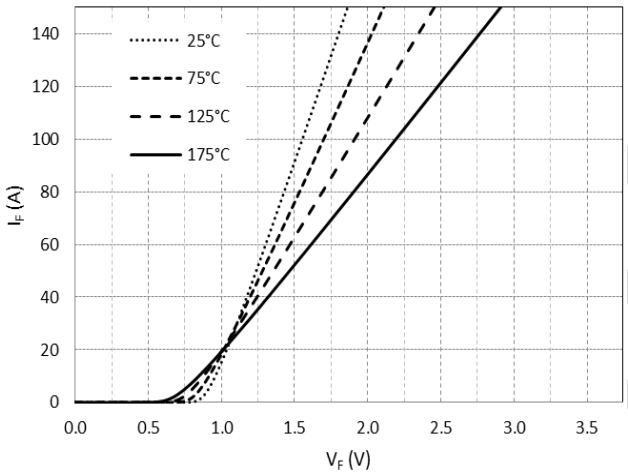


Fig.3 Forward Characteristics of Diode

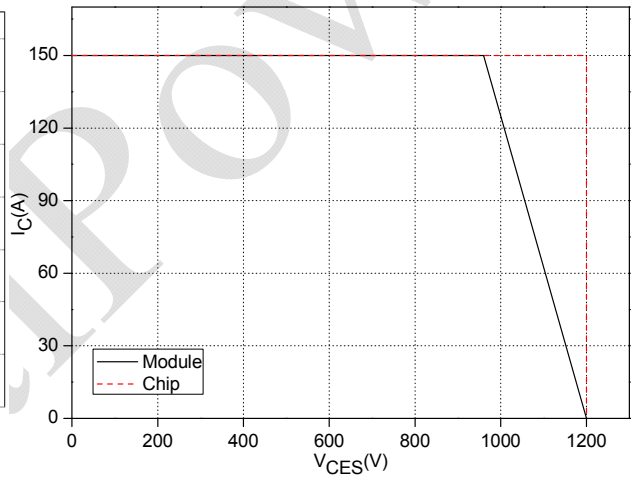


Fig.4 Reverse Bias Safe Operation Area (RBSOA)

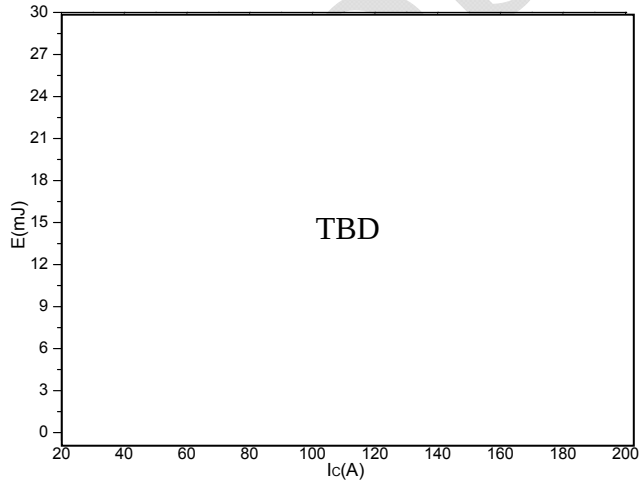


Fig.5 Typical Switching Loss vs. Collector Current

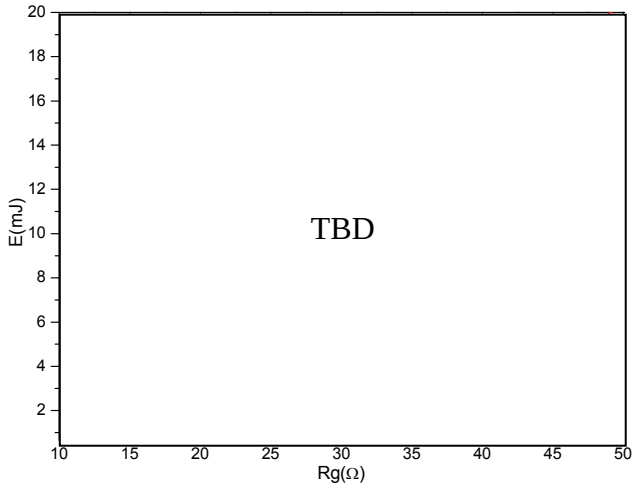


Fig.6 Typical Switching Loss vs. Gate Resistance

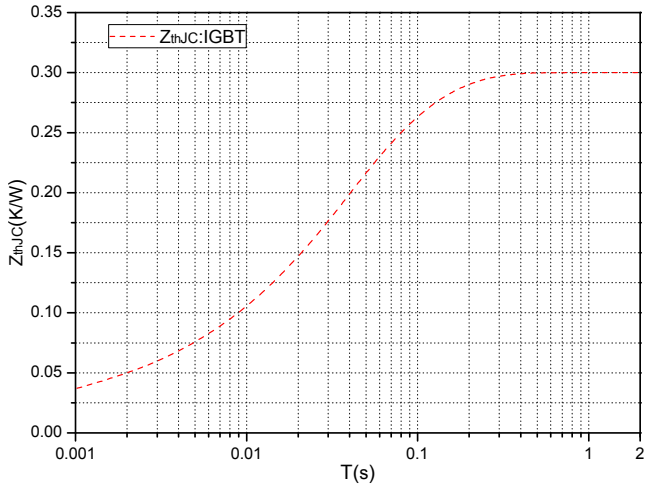


Fig.7 Transient thermal impedance (IGBT)

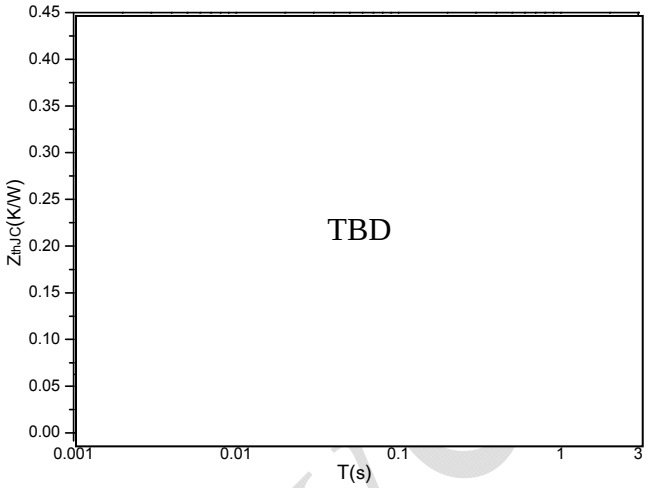


Fig.8 Transient thermal impedance (SiC Diode)

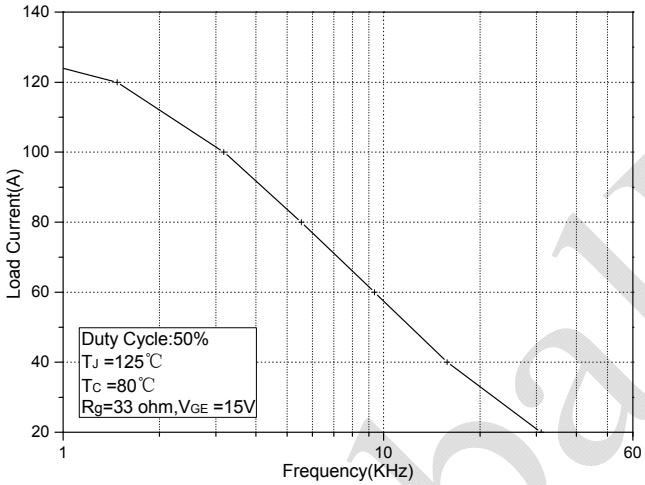


Fig.9 Typical Load Current vs. Frequency

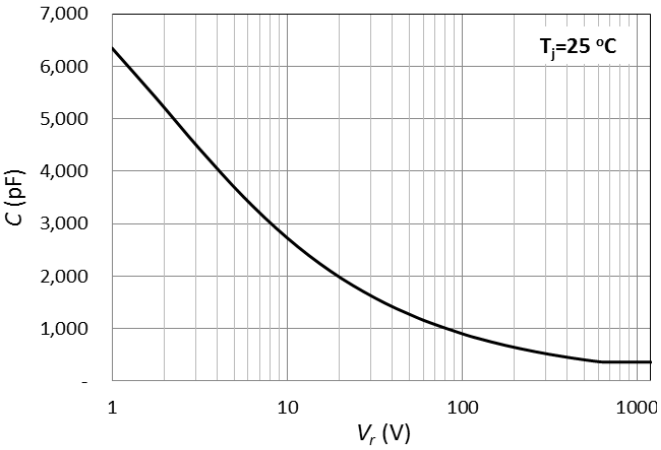


Fig.10 Capacitance Characteristics of Diode

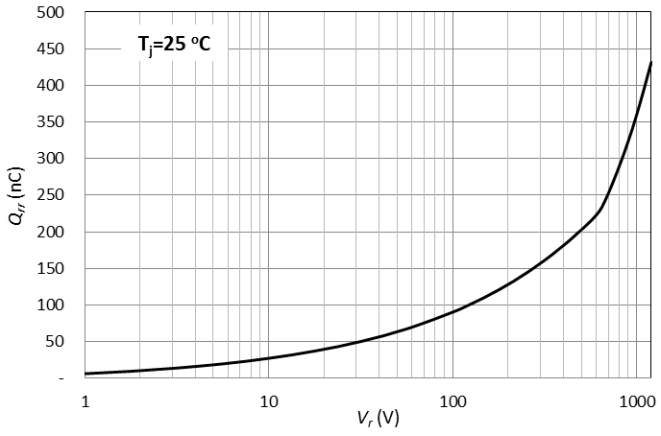


Fig. 11 Diode Recovery Charge

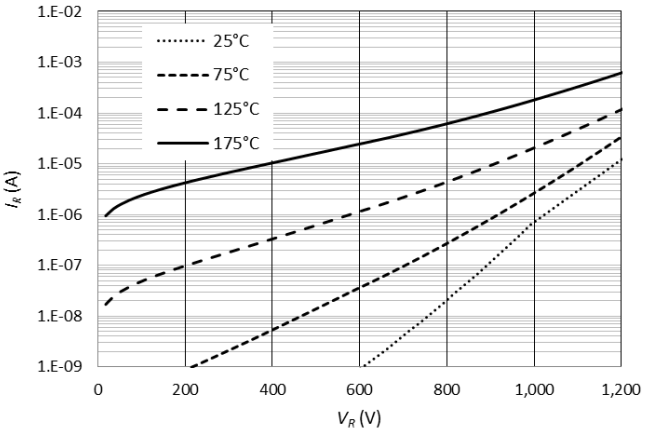
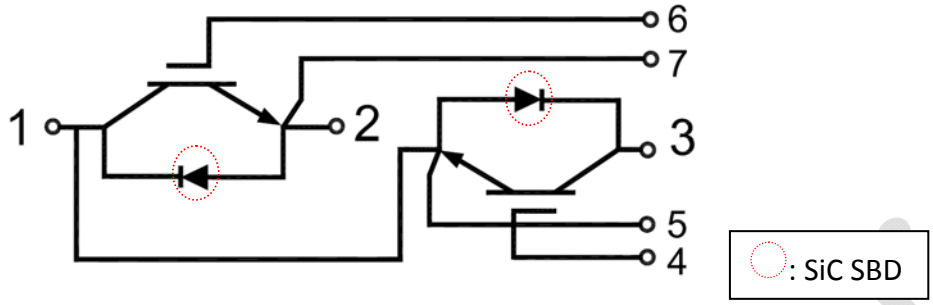
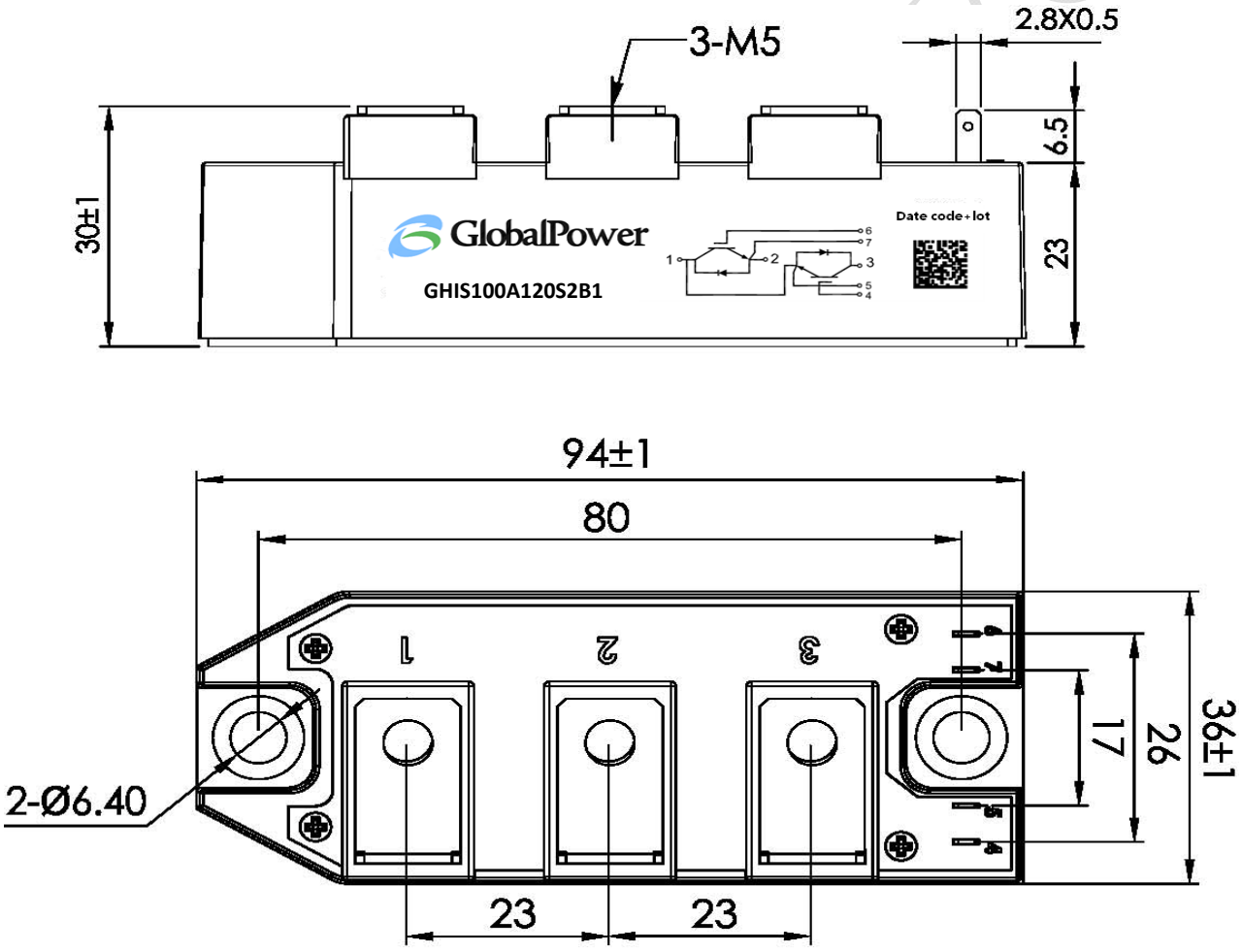


Fig. 12 Diode Leakage Current (Parameterized on T_j)

Internal Circuit:



Package Outline (Unit: mm):



Revision History

Date	Revision	Notes
4/22/2015	0.1	Initial release of preliminary datasheet

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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.

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