

1-Line Bidirectional ESD Protection Diode



General description

GBLC12CB a 12V bi-directional TVS diode, utilizing leading monolithic silicon technology to provide fast response time and low ESD clamping voltage, making his device an ideal solution for protecting voltage sensitive high-speed data lines. The GBLC12CB has a low capacitance with a typical value at 0.6pF, and complies with the IEC61000-4-2(ESD) standard with $\pm 30\text{kV}$ air and $\pm 30\text{kV}$ contact discharge. It is assembled into a leadfree SOD-323 package. The small size, low capacitance and high ESD surge protection make GBLC12CB an idea choice to protect cell phone, wireless systems, and communication equipment.

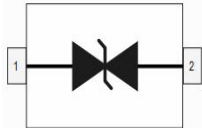
Features and benefits

- Working Voltage 12V
- Ultra Low Capacitance 0.6 pF
- Low leakage current: nA Level
- IEC 61000-4-2 (ESD Air): $\pm 30\text{kV}$
- IEC 61000-4-2 (ESDContact): $\pm 30\text{kV}$
- IEC61000-4-5(Lightning 8/20 μS): 15A
- IEC61000-4-4 (EFT 5/50nS): 40A

Application information

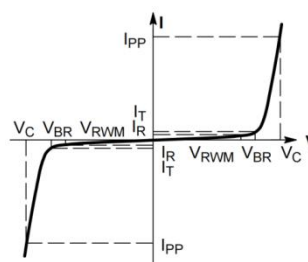
- High- speed data lines
- Smart phones
- USB Ports
- Wireless Systems
- Ethernet 10/100/1000 Base T

Schematic & Pin configuration

Simplified outline	Graphic symbol
	

Portion Electronics Parameter

Symbol	Parameter
I_{PP}	Reverse Peak Pulse Current
V_C	Clamping Voltage @ I_{PP}
V_{RWM}	Working Peak Reverse Voltage
I_R	Reverse Leakage Current @ V_{RWM}
V_{BR}	Breakdown Voltage @ I_T
I_T	V_{BR} Test Current



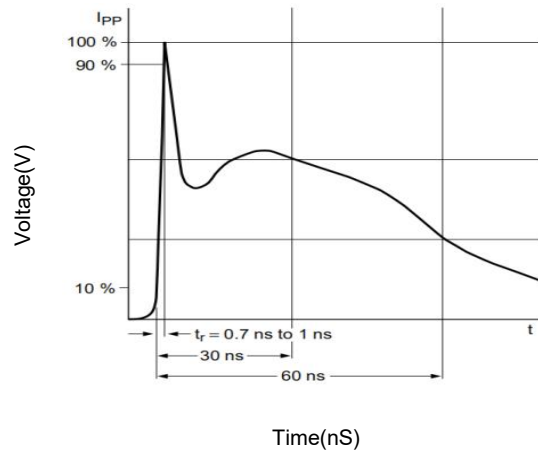
Maximum Ratings ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

Parameter	Symbol	Value	Unit
Peak Pulse Power ($T_p = 8/20\mu\text{s}$)	P_{PPM}	450	W
Rated Peak Pulse Current ($T_p = 8/20\mu\text{s}$)	I_{PPM}	15	A
ESD voltage IEC 61000-4-2 (air discharge)	V_{ESD}	30	kV
ESD voltage IEC 61000-4-2 (contact discharge)	V_{ESD}	30	kV
Maximum lead temperature for soldering during 10s	T_L	260	$^{\circ}\text{C}$
Storage Temperature Range	T_{stg}	-55 to +150	$^{\circ}\text{C}$
Operating Temperature Range	T_J	-40 to +125	$^{\circ}\text{C}$

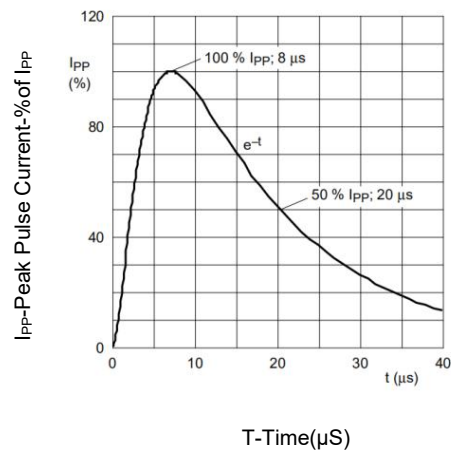
Electrical Characteristics ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

Parameter	Symbol	Min	Typ	Max	Unit	Condition
Reverse Working Voltage	V_{RWM}	--	--	15	V	
Breakdown Voltage	V_{BR}	13	15	17	V	$I_T = 1\text{mA}$
Leakage Current I_{Leak}	I_R	--	--	100	nA	$V_{RWM} = 12\text{V}$
Clamping Voltage	V_C	--	17.5	--	V	$I_{pp} = 1\text{A}, T_p = 8/20\mu\text{s}$
Clamping Voltage	V_C	--	28	30	V	$I_{pp} = 15\text{A}, T_p = 8/20\mu\text{s}$
Junction Capacitance	C_j	--	0.50	0.80	pF	$V_R = 0\text{V}, f = 1\text{MHz}$
Junction Capacitance	C_j	--	0.42	--	pF	$V_R = 12\text{V}, f = 1\text{MHz}$

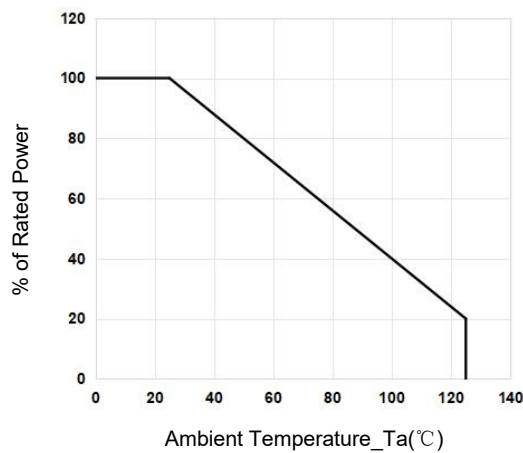
Typical Performance Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise Specified)



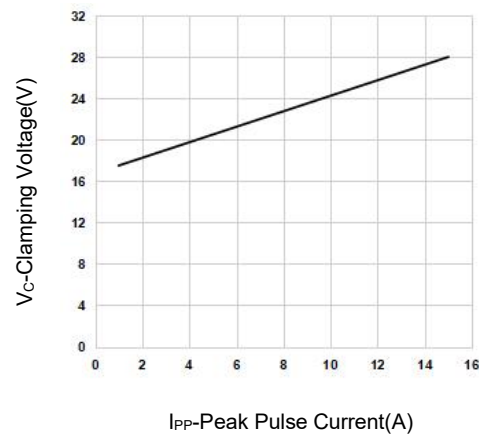
IEC61000-4-2 Pulse Waveform



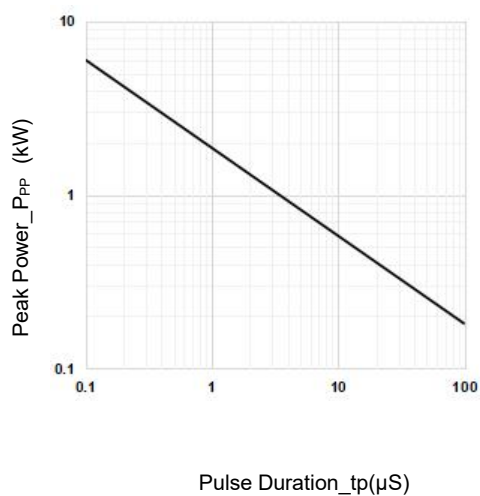
IEC61000-4-5 8X20µs Pulse Waveform



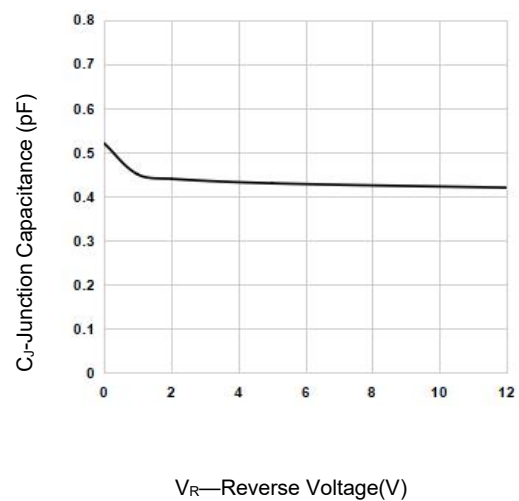
Power Derating Curve



Clamping Voltage vs. Peak Pulse Current



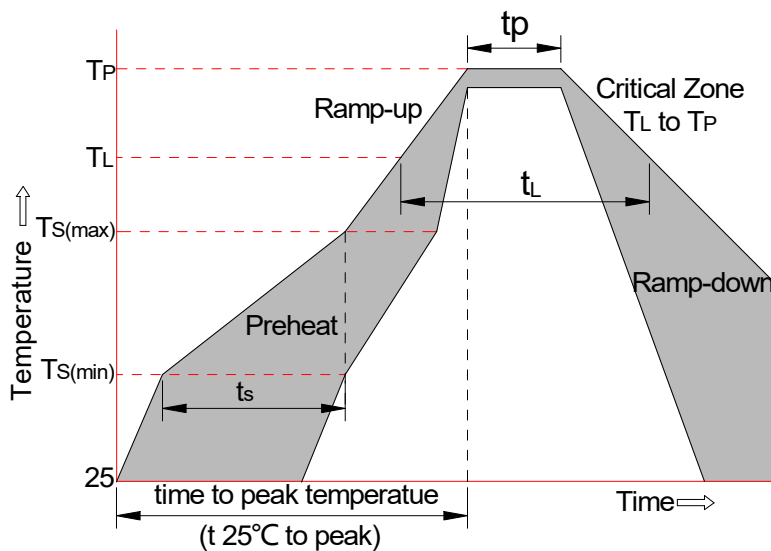
Peak Pulse Power vs. Pulse Time



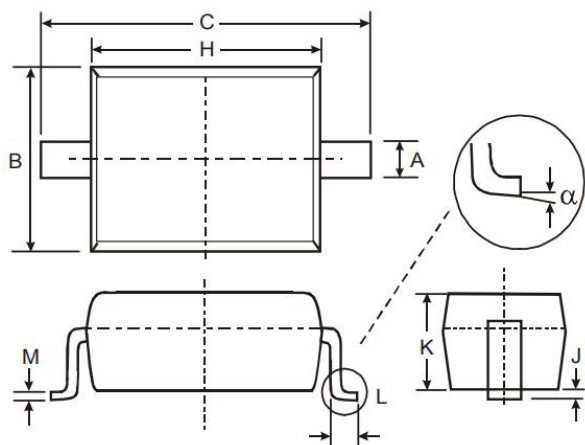
Junction Capacitance vs. Reverse Voltage

Soldering Parameters

Reflow Condition		Pb-Free Assembly
Pre-heat	-Temperature Min ($T_{s(min)}$)	+150°C
	-Temperature Max($T_{s(max)}$)	+200°C
	-Time (Min to Max) (t_s)	60-180 secs.
Average ramp up rate (Liquid us Temp (T_L) to peak)		3°C/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/sec. Max
Reflow	-Temperature(T_L)(Liquid us)	+217°C
	-Temperature(t_L)	60-150 secs.
Peak Temp (T_p)		+260(+0/-5)°C
Time within 5°C of actual Peak Temp (t_p)		30 secs. Max
Ramp-down Rate		6°C/sec. Max
xTime 25°C to Peak Temp (T_P)		8 min. Max
Do not exceed		+260°C

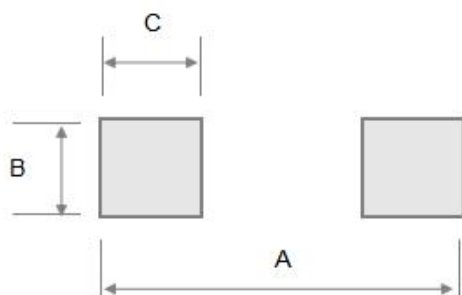


Package Outline Dimensions (SOD323)



SYMBOL	MILLIMETERS	
	MIN	MAX
A	0.25	0.35
B	1.20	1.40
C	2.40	2.70
H	1.60	1.80
J	0.01	0.15
K	0.70	0.90
L	0.20	0.40
M	0.08	0.15
α	0°	8°

Soldering Footprint (mm)



SYMBOL	DIMENSIONS
A	3.20
B	0.80
C	0.80