

## Electrostatic Discharged Protection Devices (ESD) Data Sheet

### Description

Brightking's LES16CXXL08 Series have been specifically designed to protect sensitive components which are connected to data and transmission lines from overvoltage caused by electrostatic discharge (ESD), electrical fast transients (EFT), and lightning.

The low capacitance array configuration allows the user to protect eight high-speed data or I/O lines. The high surge capability makes the series suitable for telecommunication systems operating in harsh transient environments.

The low inductance construction minimizes voltage overshoot during high current surges.

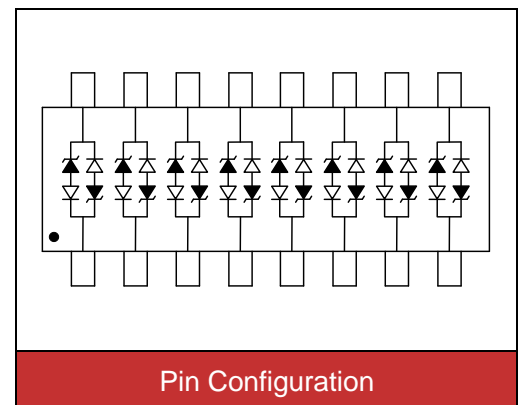


**Contact : ±30kV**  
**Air : ±30kV**



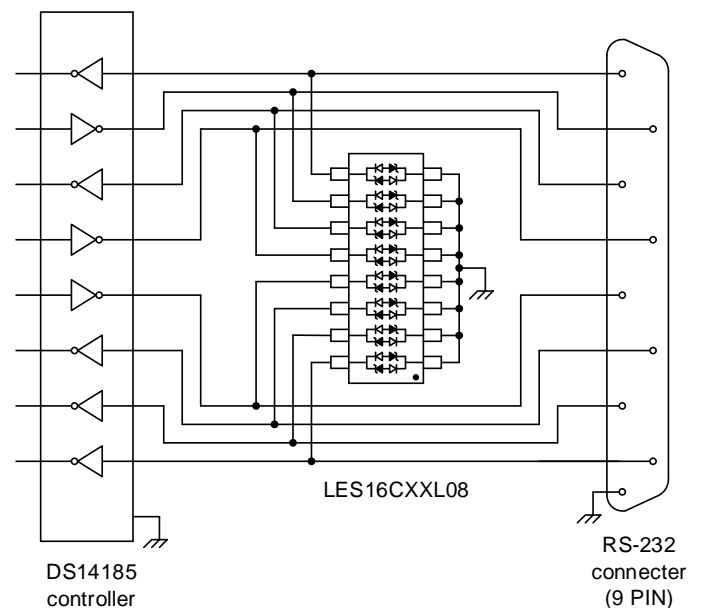
### Features

- IEC61000-4-2 ESD 30KV Air, 30KV contact compliance
- SOIC-16 surface mount package
- Protects eight I/O lines
- Peak power dissipation of 500W under 8/20µs waveform
- Working voltage: 5V12V,15V,24V
- Low leakage current
- Low capacitance and clamping voltage
- Solid-state silicon avalanche technology
- Lead Free/RoHS compliant
- Solder reflow temperature: Pure Tin-Sn, 260~270°C
- Flammability rating UL 94V-0
- Meets MSL level 1, per J-STD-020



### Applications

- Wireless communication circuit
- WAN equipment
- CSU/DSU
- Multiplexers
- Routers
- ISP equipment
- RS-232 (V.28)
- RS-422 (V.11, X.21)
- Ethernet-10/100 base T
- Low-voltage ASICs



## Maximum Ratings

Rating	Symbol	Value	Unit
Peak pulse power (tp=8/20μs waveform)	P <sub>PP</sub>	500	W
ESD voltage (Contact discharge)	V <sub>ESD</sub>	±30	kV
ESD voltage (Air discharge)		±30	
Storage & operating temperature range	T <sub>STG</sub> ,T <sub>J</sub>	-55~+150	°C

## Electrical Characteristics (T<sub>J</sub>=25°C)

LES16C05L08(MARKING:B 16LCC05-8)

Parameter	Symbol	Condition	Min.	Max.	Unit
Reverse stand-off voltage	V <sub>RWM</sub>			5	V
Reverse breakdown voltage	V <sub>BR</sub>	I <sub>BR</sub> =1mA	6		V
Reverse leakage current	I <sub>R</sub>	V <sub>R</sub> =5V Each I/O pin		10	μA
Clamping voltage (tp=8/20μs)	V <sub>C</sub>	I <sub>PP</sub> =1A		9.8	V
Clamping voltage (tp=8/20μs)	V <sub>C</sub>	I <sub>PP</sub> =10A		17	V
Peak pulse current (tp=8/20μs)	I <sub>PP</sub>			20	A
Off state junction capacitance	C <sub>J</sub>	0Vdc,f=1MHz Between I/O pins and GND		15	pF

LES16C12L08(MARKING:B LC12C-8)

Parameter	Symbol	Condition	Min.	Max.	Unit
Reverse stand-off voltage	V <sub>RWM</sub>			12	V
Reverse breakdown voltage	V <sub>BR</sub>	I <sub>BR</sub> =1mA	13.4		V
Reverse leakage current	I <sub>R</sub>	V <sub>R</sub> =12V Each I/O pin		1	μA
Clamping voltage (tp=8/20μs)	V <sub>C</sub>	I <sub>PP</sub> =1A		20	V
Clamping voltage (tp=8/20μs)	V <sub>C</sub>	I <sub>PP</sub> =10A		28	V
Peak pulse current (tp=8/20μs)	I <sub>PP</sub>			15	A
Off state junction capacitance	C <sub>J</sub>	0Vdc,f=1MHz Between I/O pins and GND		3	pF

**LES16C15L08(MARKING:B LC15C-8)**

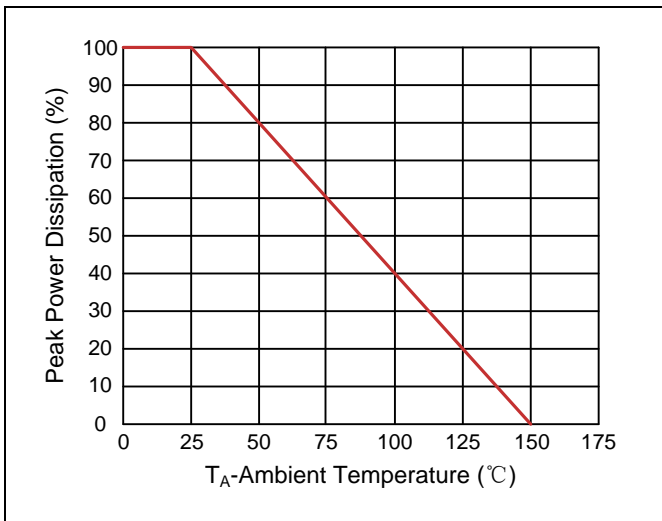
Parameter	Symbol	Condition	Min.	Max.	Unit
Reverse stand-off voltage	$V_{RWM}$			15	V
Reverse breakdown voltage	$V_{BR}$	$I_{BR}=1mA$	16.7		V
Reverse leakage current	$I_R$	$V_R=15V$ Each I/O pin		1	$\mu A$
Clamping voltage (tp=8/20 $\mu s$ )	$V_C$	$I_{PP}=1A$		25	V
Clamping voltage (tp=8/20 $\mu s$ )	$V_C$	$I_{PP}=10A$		35	V
Peak pulse current (tp=8/20 $\mu s$ )	$I_{PP}$			10	A
Off state junction capacitance	$C_J$	0Vdc,f=1MHz Between I/O pins and GND		3	pF

**LES16C24L08(MARKING:B LC24C-8)**

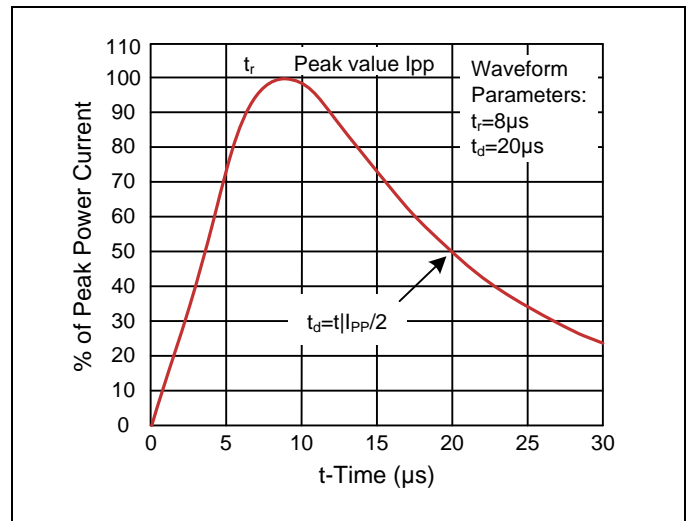
Parameter	Symbol	Condition	Min.	Max.	Unit
Reverse stand-off voltage	$V_{RWM}$			24	V
Reverse breakdown voltage	$V_{BR}$	$I_{BR}=1mA$	26.7		V
Reverse leakage current	$I_R$	$V_R=24V$ Each I/O pin		1	$\mu A$
Clamping voltage (tp=8/20 $\mu s$ )	$V_C$	$I_{PP}=1A$		40	V
Clamping voltage (tp=8/20 $\mu s$ )	$V_C$	$I_{PP}=10A$		57	V
Peak pulse current (tp=8/20 $\mu s$ )	$I_{PP}$			10	A
Off state junction capacitance	$C_J$	0Vdc,f=1MHz Between I/O pins and GND		15	pF

**Typical Characteristics Curves**

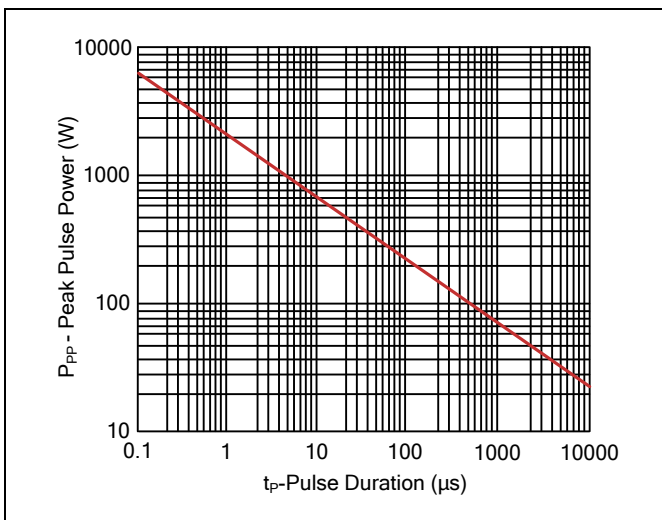
**Figure 1. Power Derating Curve**



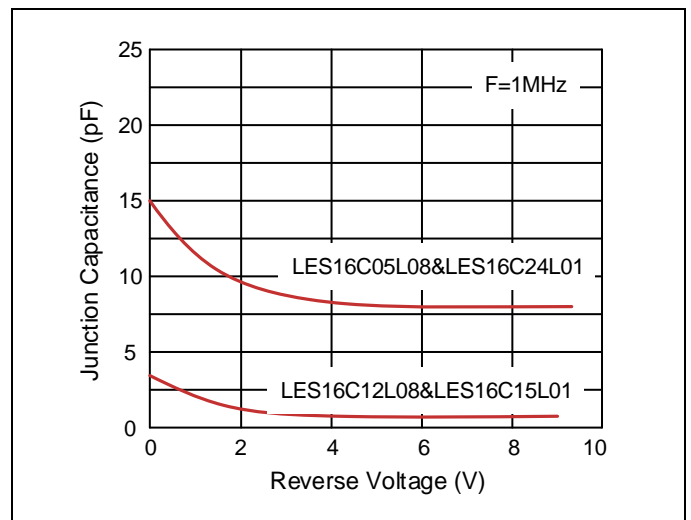
**Figure 2. Pulse Waveforms**



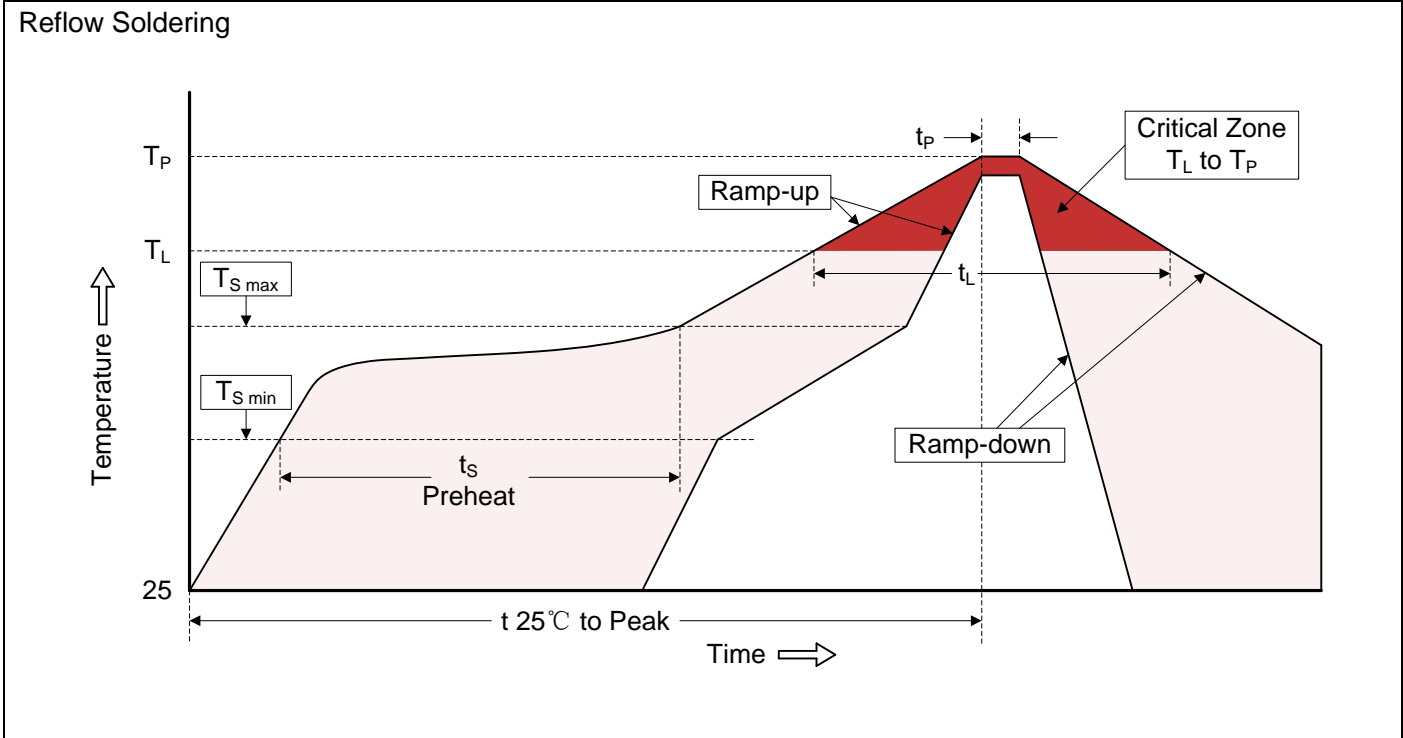
**Figure 3. Non-Repetitive Peak Pulse vs. Pulse Time**



**Figure 4. Capacitance vs. Reverse Voltage**



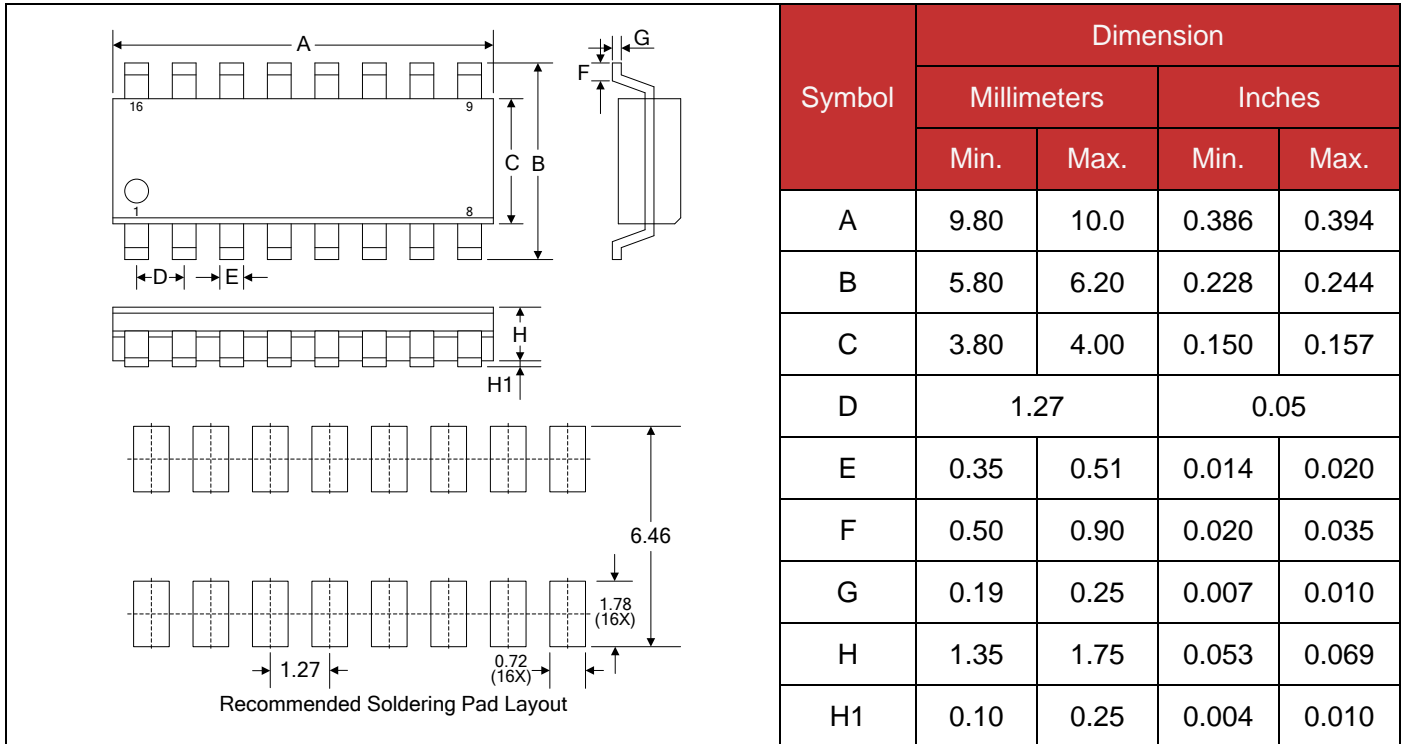
**Recommended Soldering Conditions**



**Recommended Conditions**

Profile Feature	Pb-Free Assembly
Average ramp-up rate ( $T_L$ to $T_P$ )	3°C/second max.
Preheat -Temperature Min ( $T_{S\ min}$ ) -Temperature Max ( $T_{S\ max}$ ) -Time (min to max) ( $t_s$ )	150°C 200°C 60-180 seconds
$T_{S\ max}$ to $T_L$ -Ramp-up Rate	3°C/second max.
Time maintained above: -Temperature ( $T_L$ ) -Time ( $t_L$ )	217°C 60-150 seconds
Peak Temperature ( $T_P$ )	260°C
Time within 5°C of actual Peak Temperature ( $t_p$ )	20-40 seconds
Ramp-down Rate	6°C/second max.
Time 25°C to Peak Temperature	8 minutes max.

**Dimensions (SOIC-16)**



**Packaging**

