

## Electrostatic Discharged Protection Devices (ESD) Data Sheet

### Description

Brightking's LES08CXXL04 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 of the series allows the user to protect four 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.

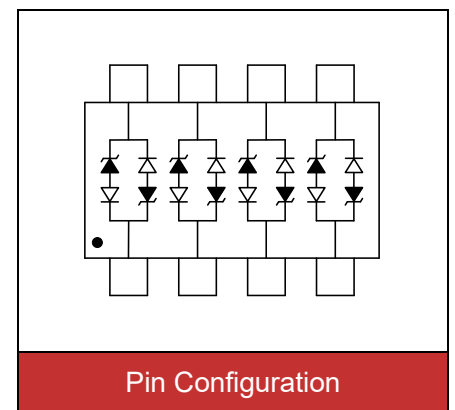


Contact :  $\pm 30\text{kV}$   
Air :  $\pm 30\text{kV}$



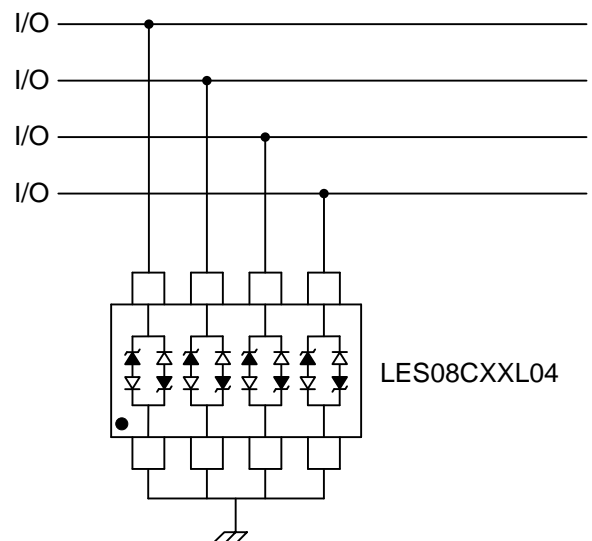
### Features

- IEC61000-4-2 ESD 30KV Air, 30KV contact compliance
- SOIC-08 surface mount package
- Protects four I/O lines
- Peak power dissipation of 500W under 8/20 $\mu\text{s}$  waveform
- Working voltage: 5V, 15V and 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 $^{\circ}\text{C}$
- Flammability rating UL 94V-0
- Meets MSL level 1, per J-STD-020



### Applications

- Multi-Mode transceiver protection
- WAN equipment
- CSU/DSU
- Multiplexers
- Routers
- 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)

LES08C05L04 (Marking: B LC05C-4)

Parameter	Symbol	Condition	Min.	Typ.	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>				25	A
Off state junction capacitance	C <sub>J</sub>	0Vdc, f=1MHz Between I/O pins and GND			15	pF

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

LES08C15L04 (Marking: B LC15C-4)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Reverse stand-off voltage	V <sub>RWM</sub>				15	V
Reverse breakdown voltage	V <sub>BR</sub>	I <sub>BR</sub> =1mA	16.7			V
Reverse leakage current	I <sub>R</sub>	V <sub>R</sub> =15V each I/O pin			1	μA
Clamping voltage (tp=8/20μs)	V <sub>C</sub>	I <sub>PP</sub> =1A			24	V
Clamping voltage (tp=8/20μs)	V <sub>C</sub>	I <sub>PP</sub> =10A			30	V
Peak pulse current (tp=8/20μs)	I <sub>PP</sub>				10	A
Off state junction capacitance	C <sub>J</sub>	0Vdc, f=1MHz Between I/O pins and GND			15	pF

LES08C24L04 (Marking: B LC24C-4)

Parameter	Symbol	Condition	Min.	Typ.	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 $\mu s$ )	$V_C$	$I_{PP}=1A$			43	V
Clamping voltage (tp=8/20 $\mu s$ )	$V_C$	$I_{PP}=10A$			49	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

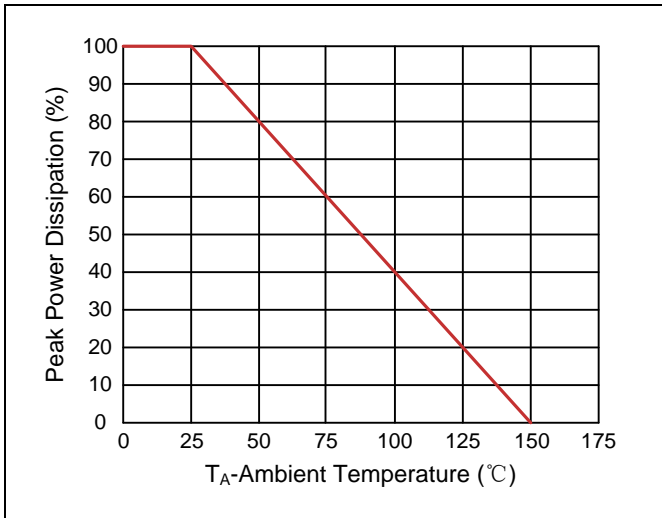


Figure 2. Pulse Waveforms

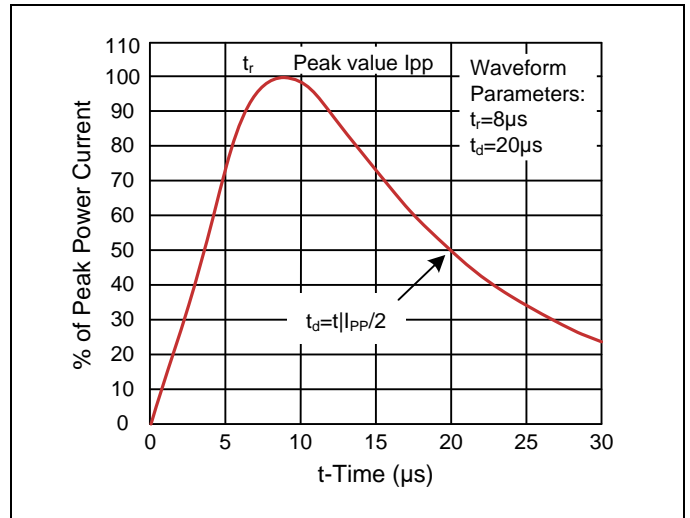


Figure 3. Non-Repetitive Peak Pulse vs. Pulse Time

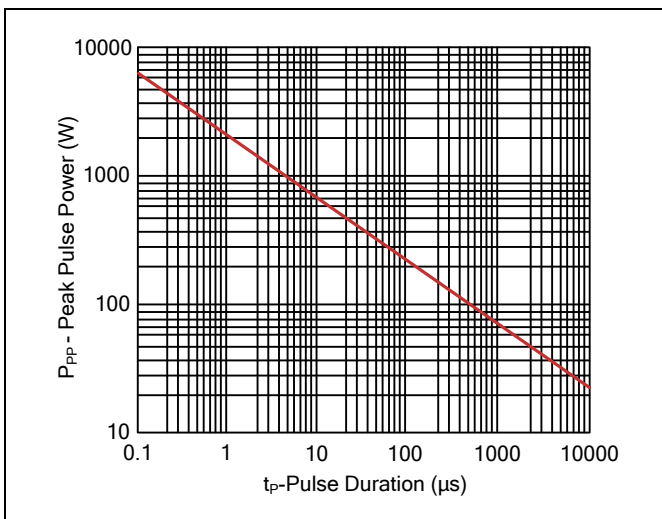
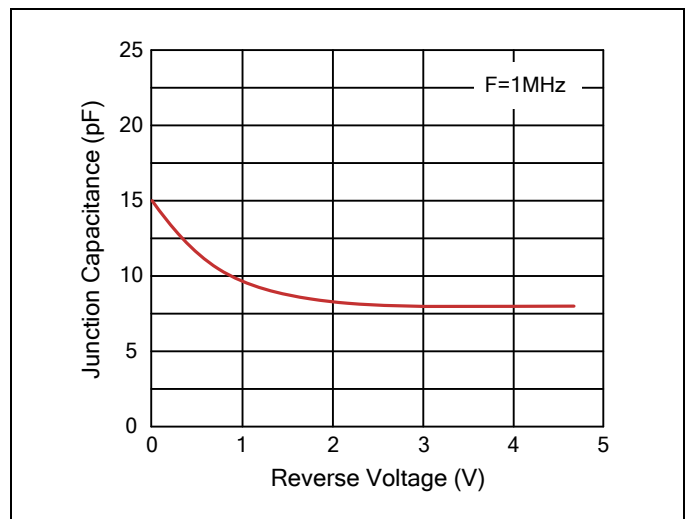
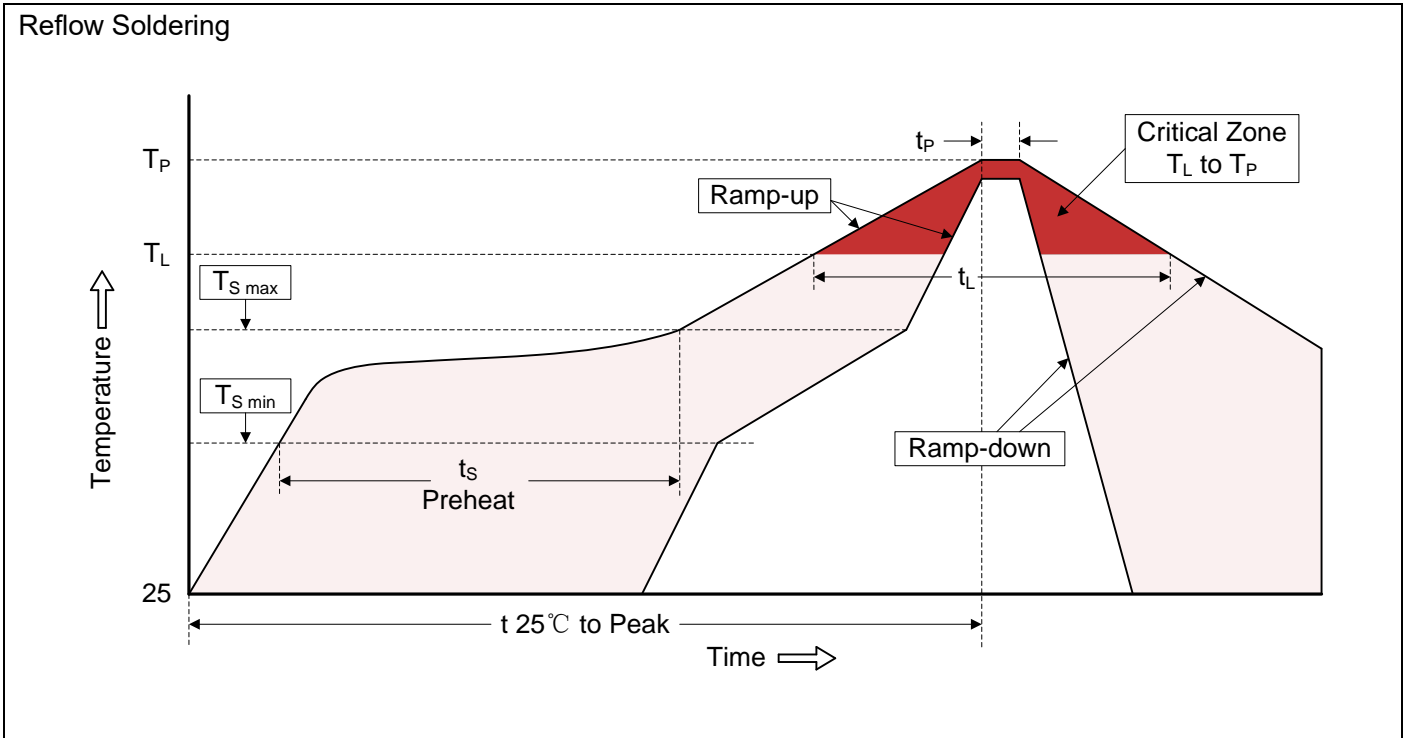


Figure 4. Capacitance vs. Reverse Voltage



**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-08)**

<p>Recommended Soldering Pad Layout</p>	Dimension				
	Symbol	Millimeters		Inches	
		Min.	Max.	Min.	Max.
	A	4.80	5.00	0.189	0.197
B	5.80	6.20	0.228	0.244	
C	3.80	4.00	0.150	0.157	
D	1.27		0.050		
E	0.33	0.51	0.013	0.020	
F	0.40	1.27	0.016	0.050	
G	0.19	0.25	0.007	0.010	
H	1.35	1.75	0.053	0.069	
H1	0.10	0.25	0.004	0.010	
H2	1.45		0.057		

**Packaging**

<p><b>Tape</b></p>	Symbol	Dimension (mm)
	W	12.00±0.30
	P0	4.00±0.10
	P1	8.00±0.10
	P2	2.00±0.10
	D0	Φ1.55±0.10
	D1	Φ1.55±0.05
	E	1.75±0.10
	F	5.50±0.10
	A	6.50±0.10
	B	5.40±0.10
	K	2.00±0.10
	t	0.30±0.05

<p><b>Reel</b></p>	D	Φ330.0±3.0
	D2	Φ13.0
	W1	13.5
	Quantity: 2500PCS	