

Thermal Solutions for LED

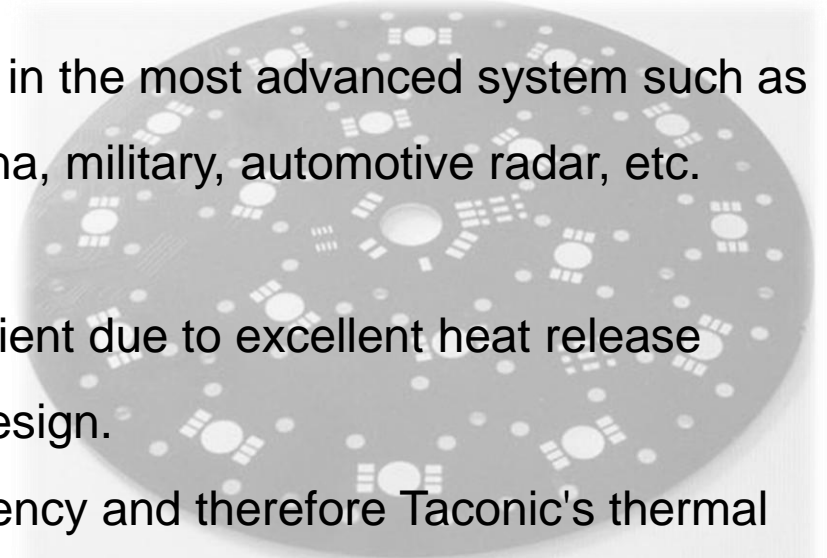
TacLED

TacLED

Taconic's state-of-the-art technology is used in the most advanced system such as mobile communication, RFID, satellite antenna, military, automotive radar, etc.

TacLED is designed to make LED more efficient due to excellent heat release performance and flexibility for LED lighting design.

Thermally stressed LED lighting loses efficiency and therefore Taconic's thermal solutions are essential to LED thermal management.



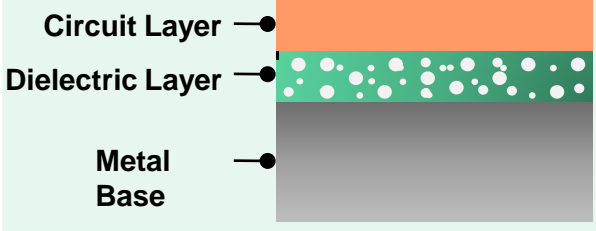
PCB: Ø180mm (18 LEDs RGB or MONOCOLOR)



PCB: Thickness 2mm Ø40mm (6 LEDs REBEL)

Product Line Up

✓ Constructions

Product	TacLED-10, -20
Construction	 <p>Circuit Layer</p> <p>Dielectric Layer</p> <p>Metal Base</p>
Circuit Layer	<p>Cu</p> <p>(0.5, 1, 2, 3 oz)</p>
Dielectric Layer	<p>Epoxy + Filler</p> <p>(50~300μm)</p>
Metal Base	<p>Aluminium</p> <p>(1.0, 1.5, 2.0, 3.0 mm)</p> <p>Copper</p>

Benefits & Applications

Benefits

Applications

TacLED-10, -20

- ✓ Excellent heat dissipation
- ✓ High dielectric breakdown voltage
- ✓ Reduced thermal resistance
- ✓ Good dielectric adhesion strength
- ✓ High reliability

- ✓ LED BLU and lighting
- ✓ Automotive ECU module etc.

Typical Properties(1)

✓ TacLED-10, 20

Properties		Unit	Test Method	TacLED-10	TacLED-20
Thermal Conductivity(k)		W/m·K	ASTM E1461	1	2
Dielectric Thickness(t)		μm (in)	-	85 (0.0033)	85 (0.0033)
Thermal Impedance		°C in ² /W		0.13	0.06
Peel Strength(1oz ED Cu)		kg/cm	IPC-TM-650 2.4.8 (Test Condition A)	1.7	1.5
		lbs/in		9.5	8.4
Dielectric Breakdown		kV (kV/mm)	ASTM D149 (Test Condition A)	>6 (70.5)	>6 (70.5)
Dielectric Constant	@1MHz	-	IPC-TM-650 2.5.5.3	4.6	5.2
	@10GHz	-	IPC-TM-650 2.5.5.5.1	4.6	5.2
Loss Factor	@1MHz	-	IPC-TM-650 2.5.5.5.1	0.02	0.02
Solder Resistance (@300°C)		min	-	> 10	> 10

Typical Properties(2)

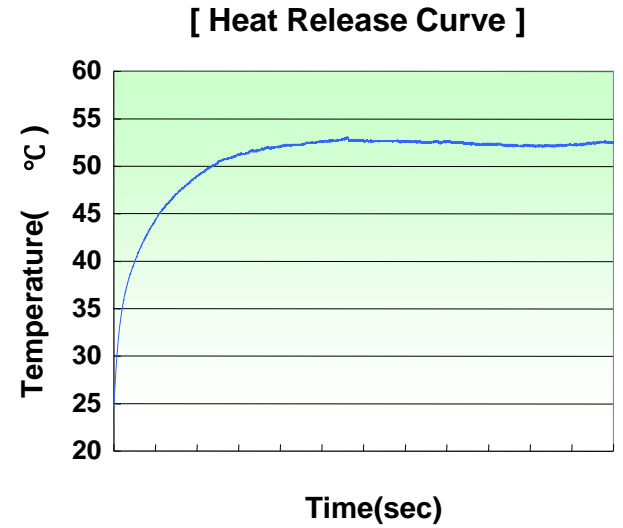
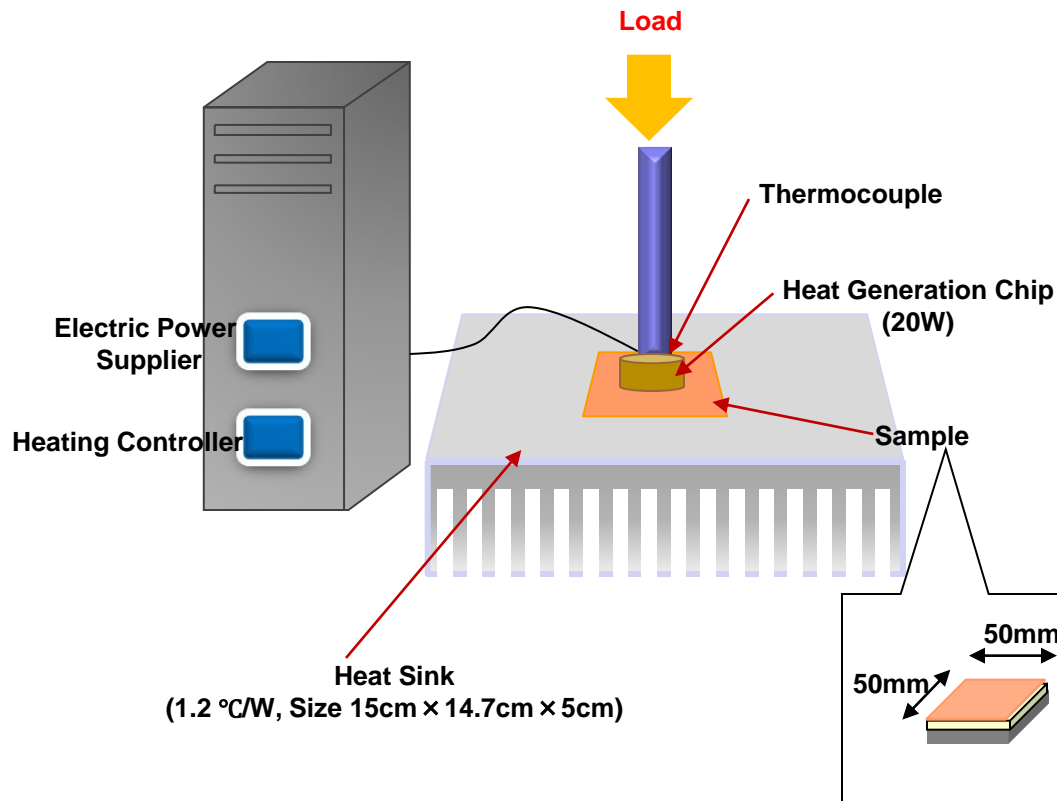
✓ TacLED-10, 20

Properties	Unit	Test Method	TacLED-10	TacLED-20
Moisture Absorption	%	IPC-TM-650 2.6.2.1	< 0.5	< 0.5
Surface Resistivity	Mohm	IPC-TM-650 2.5.17.1	2.6E+11	3.9E+11
Volume Resistivity	Mohm·cm	IPC-TM-650 2.5.17.1	4.8E+11	6.5E+11
Tg	°C	-	136	125
CTE(Z axis)	ppm/°C	ASTM D3386(TMA)	41 (< Tg)	34 (< Tg)
Flammability Rating	-	UL-94	V-0	V-0

TacLED

Heat Release Performance

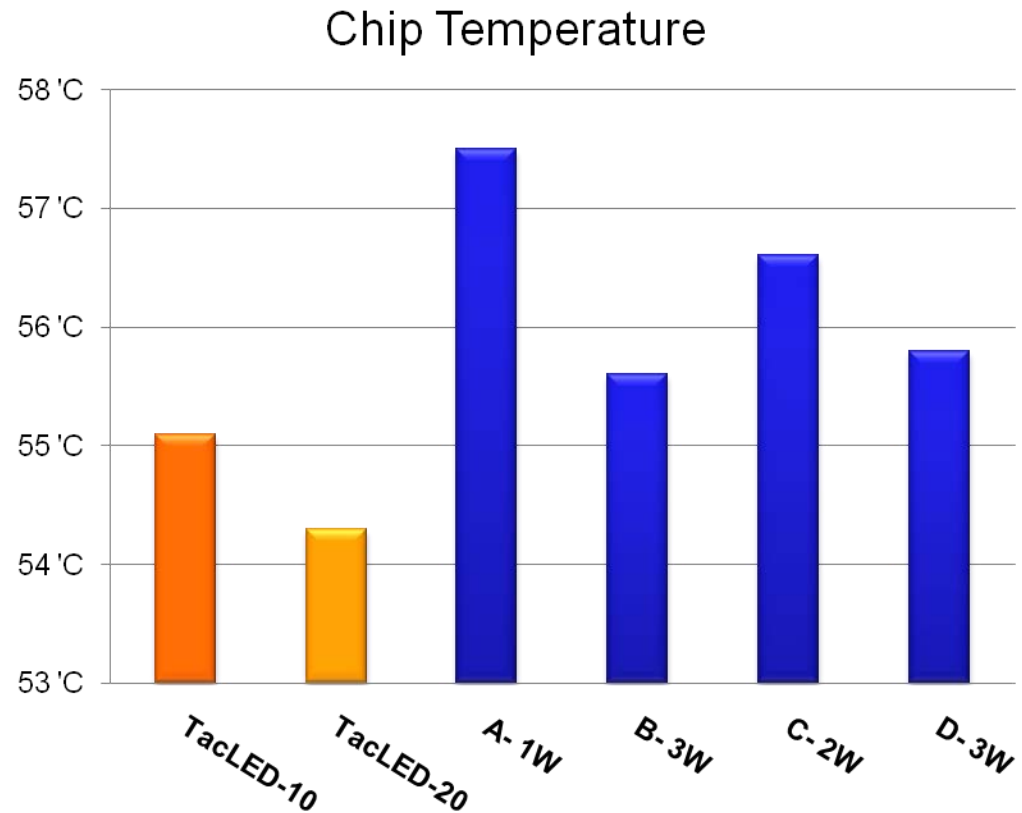
Test Method



Heat Release Performance (1)

✓ Comparative efficiency of heat release

Sample	Cu	Dielectric	Al
TacLED-10	1 oz	85 μ m	1.5 t
TacLED -20	2 oz	85 μ m	1.5 t
A- 1W	2 oz	120 μ m	1.5 t
B- 3W	1 oz	120 μ m	1.5 t
C- 2W	2 oz	80 μ m	1.0 t
D- 3W	1 oz	80 μ m	1.5 t



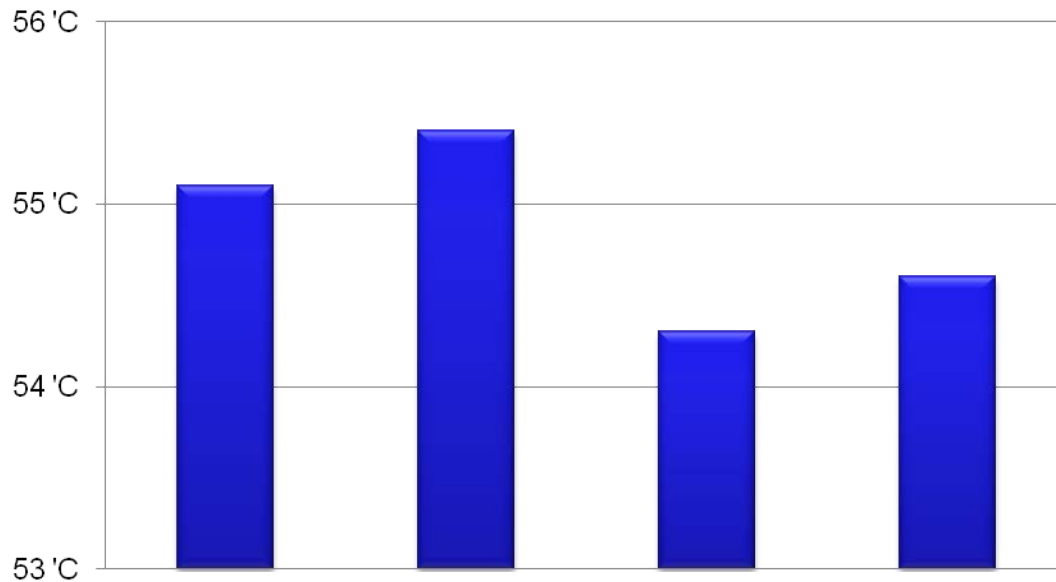
Test Conditions

- Heat generation chip : 20W
- Heat sink : 1.2 °C/W, Size 15cm × 14.7cm × 5cm
- Sample size : 50mm x 50mm
- TacLED : Al 5052

Heat Release Performance (2)

✓ Heat release depending on Cu & Al thickness

Chip Temperature



Test Conditions

- Heat generation chip : 20W

- Heat sink : 1.2 °C/W,

Size

15cm × 14.7cm × 5cm

- Dielectric Layer : 85µm

- Al 5052

- Sample : TacLED-10, 20

- Sample size : 50mm x 50mm

Dielectric	1W	1W	2W	2W
Cu	1 oz	1 oz	2 oz	2 oz
Al	1.5 t	1.0 t	1.5 t	1.0 t

Comparison Data

<i>Properties</i>	<i>TacLED-10</i>	<i>TacLED-20</i>	<i>A- 1W</i>	<i>B- 3W</i>	<i>C- 2W</i>	<i>Remarks</i>
Dielectric Thickness	85 μm	85 μm	100~120 μm	120 μm	80 μm	IPC 4101
Thermal Conductivity	1.0 W/m·K	2.0 W/m·K	1.0 W/m·K	3.0 W/m·K	1.6 W/m·K	Nano flash @ CCL
Peel Strength	1.7 kg/cm 9.5lbs/in (1oz) 2.7 kg/cm 15.1lbs/in (2oz)	1.5 kg/cm 8.4lbs/in (1oz) 2.2 kg/cm 12.3lbs/in (2oz)	— — (1oz) 2.7 kg/cm 15.1lbs/in (2oz)	0.7 kg/cm 3.9lbs/in (1oz) — — (2oz)	— — (1oz) 2.2 kg/cm 12.3lbs/in (2oz)	JIS C6481 (Test condition A)
Dielectric Break Down Voltage (AC)	> 6 kV	> 6 kV	> 6 kV	3~ 4 kV	> 6 kV	ASTM D149 (Test condition A)
Solder Float (288°C)	> 20min	> 20min	5~10min	3~5 min	> 20min	High power program hot plate

These are typical values, not guaranteed values.