

EMS-TM-PC50

Phase change pad, 5.0 W/m·K, 0.20–1.0 mm

Die-cut pad for the TIM2 plane; softens in place to resist pump-out under thermal cycling.

Die-cut phase change pad at 5.0 W/m·K, supplied 0.20 mm to 1.0 mm thick and softening across a 45 °C to 55 °C transition window. Thermal resistance is 0.010 °C·cm²/W (max) by ASTM D5470, and the pressure behind that figure is not published, so the delivered batch condition is printed with it. The failure it is selected against is pump-out: a paste is displaced from the bond line by CTE mismatch over thousands of thermal cycles, and a phase change material softens in place instead of flowing away.

ORDERING INFORMATION

Part number	EMS-TM-PC50
Thermal conductivity (through-plane)	5.0 W/m·K
Thermal resistance	0.010 °C·cm ² /W (max)
Thickness range	0.20 mm to 1.0 mm
Phase change temperature	45 °C to 55 °C, ASTM D3418
Operating temperature range	-40 °C to +125 °C, IEC 60068-2-14
Breakdown voltage	3.0 kV/mm minimum, ASTM D149
Packaging	Die-cut pads on release liner, bagged to the drawing; custom outline to supplied drawing

THERMAL PERFORMANCE AND CONDITIONS

Parameter	Value	Notes
Model code	EMS-TM-PC50	Family ladder.
Thermal conductivity, through-plane	5.0 W/m·K	ASTM D5470. Through-plane figure; comparable with grease and pad figures, and never published without its pressure and thickness. ASTM D5470 measures apparent thermal impedance at a controlled pressure and thickness; intrinsic conductivity comes from repeating the measurement at several thicknesses and regressing the results, where the intercept is contact resistance and the slope gives the conductivity. A conductivity figure without its pressure and thickness is not a specification.
Thermal resistance	0.010 °C·cm ² /W (max)	Ladder target rather than a published figure: the datasheet renders the delivered batch resistance. The test pressure and the thickness are not published.
Test pressure and thickness of the resistance figure	Not published	The condition is not published for this figure, so the delivered batch condition (pressure and thickness) is printed with it instead. The row is stated rather than omitted so the reader knows the condition is missing, not that the figure is unqualified.
Comparison with a published grease figure	0.020 °C·in ² /W at 30 psi = 0.0031 °C·cm ² /W	One square inch is 6.4516 cm ² . The grease figure carries a stated pressure and this figure does not, so the two are compared as bands rather than as a ranking.

Parameter	Value	Notes
Interface resistance floor across classes	Below 0.05 °C·cm²/W	Commercial grease and phase change materials both reach this floor, which is the useful working statement.
Thickness range and tolerance	0.20 mm to 1.0 mm	ASTM D374, plus the drawing tolerance agreed on the first article. A phase change sheet is supplied four times the bond line a paste is designed for.
Phase change temperature	45 °C to 55 °C	ASTM D3418 by DSC, established on the 8.5 W/m·K grade. The window is fixed by the formulation, not by the assembly. A loop below the window keeps the material solid and pad-like; a loop above it keeps it conformal, and the datasheet states which one the grade is set for.
Operating temperature range	-40 °C to +125 °C	IEC 60068-2-14. Ceiling comparison: grease publishes -50 °C to +150 °C.
Density	Not published for this grade	The 8.5 W/m·K grade publishes 2.4 g/cc by ASTM D792; no density is published for this grade.

ELECTRICAL, CYCLING AND COMPLIANCE

Parameter	Value	Notes
Breakdown voltage	3.0 kV/mm minimum	ASTM D149. Specified where the interface also has to isolate.
Flame rating	UL 94 V-0	The rating these grades are built to; the rating name is published and no reference to a certification document is published, because none is in hand.
Thermal cycling reference	JESD22-A104D · JESD-A105C	Qualification references for TIM temperature cycling and humidity. No published cycle count exists per grade, so the datasheet states the test condition and the result of the delivered batch instead of a life figure.
Operating range bracketing	IEC 60068-2-14	Brackets the published -40 °C to +125 °C range.
Re-assembly and rework	Die-cut pad lifted and replaced	A stencil-printed paste has to be cleaned off the same faces, which is the practical advantage of this class. The published selection warning asks the buyer to confirm pump-out risk, thermal cycling, storage and re-assembly.
Packaging and storage	Die-cut to the drawing; storage per the safety data sheet	Custom die-cutting runs to the supplied outline. Storage temperature per the safety data sheet.
Shelf life	Issued with the datasheet for the delivered grade	No shelf life is published for this ladder; the figure is issued with the datasheet for the grade supplied.
Sample lead time	5–10 working days	Published lead time in this category.
Standards applied	ASTM D5470 · ASTM D374 · ASTM D3418 · ASTM D792 · ASTM D149 · IEC 60068-2-14 · JESD22-A104D	Standard designations are named. Certification and standard designations are named only. No certificate, registration, patent or file number is published, and no third-party approval document is in hand for a model in this family.

APPLICATIONS

- Interfaces that cycle thermally and cannot hold a paste bond line

- Assembly lines where a die-cut pad is faster to place than a stencil print
- Rework, where the pad is lifted and replaced rather than cleaned off
- Gaps of 0.20 mm to 1.0 mm on the TIM2 plane

COMPATIBLE WITH

- EMS-TM-G series thermal grease on flat interfaces with hard stops
- EMS-TM-P series gap filler pads where the gap exceeds 1.0 mm
- EMS-TM-GR series graphene pads where through-plane conductivity above 8.5 W/m·K is required
- Cold plates and heat-sink bases flat enough to hold the transition window

ORDERED AS

- A die-cut outline and a thickness from the drawing
- A grade whose transition window matches the loop's operating band
- A first-article inspection record against the supplied drawing

MODEL LADDER — PHASE CHANGE

Parameter	Value	Notes
EMS-TM-PC20	2.0 W/m·K · 0.020 °C·cm²/W (max)	Ladder target
EMS-TM-PC30	3.0 W/m·K · 0.015 °C·cm²/W (max)	Ladder target
EMS-TM-PC40	4.0 W/m·K · 0.012 °C·cm²/W (max)	Ladder target
EMS-TM-PC50	5.0 W/m·K · 0.010 °C·cm²/W (max)	Ladder target
EMS-TM-PC60	6.0 W/m·K · 0.009 °C·cm²/W (max)	Ladder target
EMS-TM-PC85	8.5 W/m·K · 0.0078 °C·cm²/W (max)	Published datasheet grade

CLASS COMPARISON

Parameter	Value	Notes
Transition window	45 °C to 55 °C	ASTM D3418 by DSC, this family
Ceiling	-40 °C to +125 °C	This family, IEC 60068-2-14
Grease ceiling	-50 °C to +150 °C	EMS-TM-G series
Thickness	0.20 mm to 1.0 mm	Four times the bond line a paste is designed for
Isolation where required	3.0 kV/mm minimum	ASTM D149

NOTES

- Thermal resistance carries its test pressure and its thickness. The test pressure behind the published 0.0078 °C·cm²/W figure is not published, and the note column says so rather than omitting the row.
- Thermal conductivity is never published alone: the pressure and the thickness behind the figure travel with it, and through-plane is the only axis this family publishes.
- Where the blueprint marks a figure as a ladder target rather than a published figure, the note column says so; the datasheet renders the delivered batch figure at the stated pressure.
- No published cycle count exists per grade, so no life figure is published. The datasheet states the test condition and the result of the delivered batch.
- Scope: the TIM2 plane, lid or heat-sink base to cold plate and cold plate to manifold or rail. No coolant distribution units and no cold plates are supplied.
- Supplied by EMS-Trade Cooling, a Shenzhen trading house that integrates, inspects, stocks and ships. Die-cutting runs to the supplied drawing with a first-article inspection record per order. No manufacturing of this item is claimed.

Full specification sheet and current pricing EMS-Trade Cooling · ems-cool.com Typical lead time confirmed on order acknowledgement.	EMS-TM-PC50 Rev. A 2026-09-19
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