

3M Electrically Conductive Tapes & Films

From simple to complex designs, 3M™ Electrically Conductive Tapes and 3M™ Electrically Conductive Films are designed for electromagnetic interference (EMI) shielding and grounding applications, enabling devices to meet electromagnetic compatibility requirements. These electrically conductive pressure sensitive adhesive (CPSA) tapes and electrically conductive films provide excellent adhesion to a variety of substrates including metals and plastics.

These tapes and films are easy to apply and can be hand or machine applied and die-cut, thus enhancing productivity. We have multiple thicknesses available to help you meet some of your most space-constrained and complex design requirements. These tapes provide robust protection against EMI in a range of market segments, such as consumer electronics, automotive, communication infrastructure, and aerospace & defense electronics. For easy access to additional product information on 3M's website, please click the product code.

3M Electrically Conductive Tapes & Films Selection Guide

Product	Typical Contact Resistance (R ohms)	EMI Shielding in Bond Line Gap/Slit	Flex to PCB Contact Resistance (R ohms)	Peel Strength (24 hr/RT)	Workability	Thermal Conductivity/Resistance (W/mK or C/W)
3M™ Electrically Conductive Tapes						
3M tape 9701	Best	Best	Best	Better	Better	Good
★ 3M tape 9703	Good	N/A	Better	Good	Good	Good
★ 3M tape 9707	Better	Better	Best	Better	Good	Best
3M tape 9709SL	Better	Better	Best	Good	Better	Best
3M tape 9712	Good	Good	Good	Better	Good	Good
★ 3M tape 9711S	Best	Better	Best	Best	Best	Better
3M tape 9713	Better	Good	Good	Better	Good	Good
★ 3M tape 9719	Good	Good	Good	Good = Std. Best = LSE	Good	Good
3M tape 9720S	Better	Good	Good	Good	Better	Good
3M tape 9732	Good	Good	Better	Best	Good	Good
3M tape 9750	Better	Better	Better	Best	Better	Good
3M™ Electrically Conductive Thermosetting Film						
3M film 2201P	Best	Best	Best	Best	Good	Better
3M™ Electrically Conductive Single-Sided Tape						
★ 3M tape 3304BC-S	Best	Best	Best	Better	Better	Good

3M Electrically Conductive Tapes & Films Selection Criteria

Selecting a 3M Electrically Conductive Tape or Film for grounding, shielding, and attachment includes identifying several application requirements. For instance, the selection process could take the following items into consideration, among others:

1. Contact R target
2. Contact surface type
3. Adhesion level desired
4. Bond line thickness
5. Z or XYZ conductivity path
6. Operating temperature range and environmental conditions
7. EMI shielding in bond line "Gap/Slit" for higher frequencies
8. Surface contact area for adhesion
9. Assembly pressure, temperature and time

★ = Some thicknesses included in Go-To Materials List

- Typical contact resistance - Gold flex bonded to stainless steel(SS). "Best" results relate to a lower contact R potential on SS Contact R can vary with SS type tested. See note 1 on page 3. Lower contact resistance can allow for improved EMI shielding of a design.
- EMI Shielding in Bond Line "Gap/Slit" - Best = High dB EMI Shielding. Inherent EMI shielding at the bond line provides significantly reduced crosstalk, stray EMI, noise in circuit, antennae effects, FPC susceptibility and spurious emissions
- Flex to PCB Contact Resistance - Potential to improve contact R grounding locations via improved surface conformability and XYZ conductive potential with a 3M electrically conductive tape or film vs. a generic Z-axis only conductive PSA
- Peel Strength- Adhesion to SS type substrate/3M Test Method/24 hour Room temp dwell
- Workability - Ease of Rework based on a standard set of high surface energy substrates
The tape design can affect rework based on adhesive type and conductive filler type
- Thermal Conductivity/Thermal Resistance - Effective Thermal resistance and Thermal Conductivity vs. a generic PSA without conductive fillers. Important for thermal connection performance between substrates

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Product	Available Tape Thicknesses in the US mil (mm)	Conduction Path (XYZ or Z)	Conductive Filler Type and Tape Format (C-DCT/C-SCT/C-PSA/C-NW Carrier)	Adhesive Type	Liner Type	Electrical resistance through Z-axis Ω (3M ETM-12)	Electrical Resistance through XY-axis Ω (3M ETM-7)	Features and Benefits
3M(TM) Electrically Conductive Adhesive Transfer Tapes								
3M tape 9701	2 (0.050) 4 (0.1)	XYZ	Ni/Cu Nonwoven C-NW Carrier	Acrylic	PET Release Liner	0.05 Ω 0.08 Ω	0.2 Ω	Low contact R, excellent conformability, quick bonding
★ 3M tape 9703	2 (0.050)	Z	Silver C-PSA	Acrylic	Silicone Treated Polycoated Kraft Paper (PCK)	0.01 Ω	NA	Z-axis, low outgassing
★ 3M tape 9707	2 (0.050)	XYZ	Silver C-PSA	Acrylic	Std PET/PET Liner	0.03 Ω	20-80 Ω	High adhesion, "Bond Line Gap/Slit" Low contact R, high frequency, thermal conductivity, excellent conformability Excellent resistance to shear stress Dual Liner
3M tape 9709SL	2 (0.050)	XYZ	Silver C-PSA	Acrylic	PCK Release liner PET Release liner	0.06 Ω	40 Ω	Standard adhesion, "Bond Line Gap/Slit" Low contact R, high frequency, thermal conductivity, excellent conformability Low liner release (SL)
3M tape 9712	5 (0.127)	XYZ	Carbon Nonwoven C-NW Carrier	Acrylic	Silicone Treated PCK	13 Ω	50-70 Ω	Standard adhesion No Nickel Non-magnetic material Nonwoven conductive scrim
★ 3M tape 9711S	2 (0.050) 4 (0.1) 6 (0.152) 8 (0.2)	XYZ	Ni/Cu woven C-DCT	Acrylic	PET Release Liner	0.02 ~ 0.08 Ω 0.04 - 0.9 Ω < 0.1 Ω	0.15-0.2 Ω 0.1 Ω 0.15 Ω 0.2 Ω	Low contact R, high adhesion, excellent conformability, quick bonding
3M tape 9713	3.5 (0.089)	XYZ	Ni/C Nonwoven C-NW Carrier	Acrylic	Silicone-Treated PCK	1.7 Ω	5 Ω	Standard adhesion
★ 3M tape 9719	4 (0.1)	XYZ	Ni/C Nonwoven C-NW Carrier	Silicone	Dual Polyester Liner	10 Ω	15-30 Ω	Good adhesion to LSE substrate Best peel strength for low surface energy(LSE) materials Good peel strength for standard products Higher temperature resistance 149°C-204°C
3M tape 9720S	1.2 (0.03)	XYZ	Ni/Cu Nonwoven C-NW Carrier	Acrylic	PET Release Liner	0-07 Ω	0.3 Ω	Medium adhesion Lower R non-woven conductive SC tape Thinner scrim design
3M tape 9732	4 (0.1)	XYZ	Ni/Cu Nonwoven C-NW Carrier	Acrylic	White PCK	0.05 Ω	0.12 Ω	Medium adhesion Thicker scrim design Excellent conformability and quick bonding
3M tape 9750	2.1 (0.055)	XYZ	Ni/Cu PET Nonwoven C-NW Carrier	Acrylic	PCK	0.07 Ω	0.1 Ω	High adhesion Lower R nonwoven conductive scrim
3M™ Electrically Conductive Thermosetting Film								
3M film 2201P	2.5 (0.065)	XYZ	Ni/Cu Nonwoven C-NW Carrier	Resin - Thermoset Epoxy / Acrylic	PET Release Liner	<200 m- Ω		High bond Strength, excellent conformability, high performance Requires high-temperature bonding process that is not reworkable after curing
3M™ Electrically Conductive Single-Sided Tape								
★ 3M tape 3304BC-S	1.8 (.045)	XYZ	Ni/Cu Nonwoven Foil Backing C-SCT	Acrylic	Silicone Coated PET film	-	0.05 Ω	Scratch resistant black copper foil Excellent edge conformability Single-sided, High shielding performances

- Tape thickness does not include liner. See Technical Data Sheet for details.
- The following technical information and data should be considered representative or typical only and should not be used for specification purposes.
- Electrical resistance tested in accordance with 3M Test Method. 3M ETM-12 test method uses 10 mm x 10 mm samples for testing. Contact your 3M Technical Representative for details.

Based on how a product structure is understood and naming preference, please note the following:

- Conductive Double Coated Tapes (C-DCT) have a uniform carrier (foil, fabric) with CPSA on both sides and is adhesive on both sides.
- Conductive Nonwoven (C-NW) carrier versions have a conductive nonwoven of varying densities within the conductive tape PSA layer and is adhesive on both sides.
- The Conductive Pressure Sensitive Adhesive (C-PSA) tape has a particle filler added to varying volume percent and is adhesive on both sides. A C-PSA may also be described as an (Electrically) Conductive Adhesive Transfer Tape (ECATT). The C-PSA term describes that the tape can be applied with pressure alone at typical application conditions. The ATT describes that the Adhesive "Transfer" Tape is provided on a release liner and is "transferred" to the end user surface when applied.
- A Conductive Single Coated Tape (C-SCT) has a foil or fabric top layer and has exposed adhesive on one side only.

Comparative Reference Table:

Based on the suggested selection criteria, the end user should identify a few tapes to test. Since each application is unique, application-specific testing is necessary to identify the optimum tape to use. The "Good-Better-Best" rankings are based on the 3M Test Method and tape performance in a nominal application. Each tape may employ different conductive particles, scrim or non-woven, thickness variations, acrylic adhesive type, etc., so each tape will perform differently based on end use application. Hence, end-users should conduct their own comparative testing. The following technical information and data should be considered representative or typical and should not be used for specification purposes.

Note 1. Test & performance results will vary based on factors such as, but are not limited to: Contact area; Assembly method; Testing conditions; Normal variations in product performance from one mfg. lot of material to the next; Variations found in a material within a mfg. lot (i.e., thickness, available conductive material in an actual sample tested, variations in conductive filler materials and uniformity of conductive materials dispersed within a lot of material, variations in adhesives, etc.); Test methods; Environmental aging; Exact test surface material type utilized, etc. The "Copper to Copper" & "Gold Flex to PCB" testing also should be noted for the differences related to the "Contact area" difference in the Test Methods (645 mm² vs. 6 mm²) as this does impact the test results. Testing of tapes and the noted test substrates does not imply that the tapes are suitable for an end use application of similar materials. End user is responsible to determine tape and substrate combination.

Are you still unsure which 3M EMI/EMC solution is right for your application? Our team of EMI specialists will help you select the right materials to help protect your devices from electromagnetic interference and electrostatic discharge (ESD). Visit 3M.com/3M/en_US/consumer-electronics-us/

Have questions? Need technical assistance? We're here to help!
Contact your 3M technical service representative for more information.

Safety Data Sheet: Consult Safety Data Sheet prior to use.

Regulatory: For regulatory information about this product, contact your 3M representative.

Technical Information: The technical information, recommendations and other statements contained in this document are based upon tests or experience that 3M believes are reliable, but the accuracy or completeness of such information is not guaranteed.

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Electronics Materials Solutions Division

3M Center, Building 224-3N-11
St. Paul, MN 55144-1000
Phone: 1-888-364-3577
www.3M.com/Electronics

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