



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



Advanced solutions for protection, light control and display enhancement.



go anywhere. do more.





Protection, Light Control and Display Enhancement

3M™ Display Protection Films

Extend the life of your displays with 3M's durable, precision designed protection films that protect and enhance displays while maintaining their own look longer.

3M™ Glossy Protection Film (GLS200)

- Helps prevent damage, scratches and scuffs
- Instant upgrade in mechanical robustness
- High clarity, glossy finish
- Scotchgard™ easy-to-clean surface
- Chemical and disinfectant resistant

3M™ Glossy Low Reflection Protection Film (GLR320)

- Helps prevents damage, scratches and scuffs
- Reduces annoying reflections
- Enhances display clarity while maintaining glossy finish
- Scotchgard™ easy-to-clean surface
- Chemical and disinfectant resistant

3M™ Anti-Reflection Matte Protection Film (ARMR220)

- Helps prevents damage, scratches and scuffs
- Color-neutral anti-reflection technology
- Anti-glare matte to reduce mirror-like reflections
- Scotchgard™ easy-to-clean surface
- Chemical and disinfectant resistant

3M™ Anti-Glare Protection Film (AGF6200)

- Helps prevents damage, scratches and scuffs
- Anti-glare matte to reduce mirror-like reflections
- Masks fingerprints
- Minimal impact on display image
- Chemical and disinfectant resistant

Light Control Films

Manage the distribution of light with 3M's microlouver films that create privacy, manage reflections or improve display contrast.

3M™ Advanced Light Control Film Polycarbonate (ALCF-P)

- Create visual security on the outside of LCDs
- ± 30 degree viewing angle perpendicular to the louvers
- Available with or without matte hardcoat
- Compatible with most touch systems

3M™ Advanced Light Control Film A2 and A2+ (ALCF-A2/ALCF-A2+)

- Prevent nighttime reflections from glass surfaces of automobiles
- Low birefringent polycarbonate film
- ± 30 degree viewing angle perpendicular to the louvers
- ALCF-A2+ features a reflective polarizer (DBEF)

3M™ Light Control Film (LCF)

- Create visual security or contrast improvement on the outside of LCDs
- ± 24 degree viewing angle perpendicular to the louvers
- Polyester-based film

Brightness Enhancement Films

Recycling, light management films increase the brightness of LCD backlights. Use them to increase brightness in the display, or translate them into power savings or thermal management.

3M™ Brightness Enhancement Film (BEF)

- Prismatic film that manages the angular output of light to increase brightness
- Refraction technology compresses backlight output to on-axis viewer
- Can cross two sheets at 90 degrees
- Variety of configurations for specific needs

3M™ Dual Brightness Enhancement Film (DBEF)

- Multilayer, reflective polarizer
- Increases brightness and amount of available light over entire LCD
- Polarizes a backlight's output to allow more light to pass through the LCD
- Light normally absorbed and lost by the backlight is "re-polarized"
- Variety of configurations for specific needs

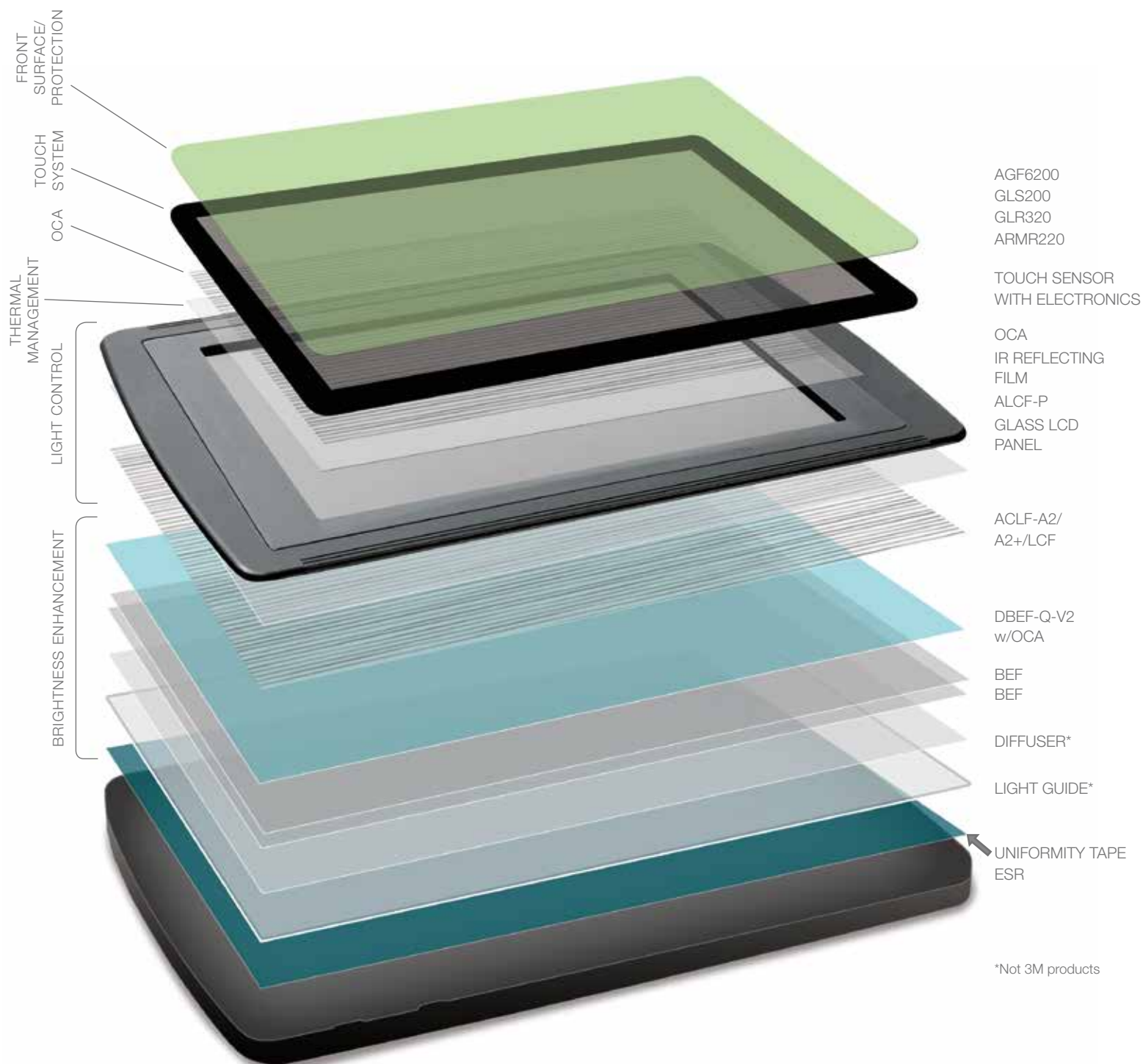
3M™ Enhanced Specular Reflection (ESR)

- Thin, 100% polymer reflector film
- Backlight reflector for LCDs
- Provides more than 98% reflectance across the entire spectrum
- Maximizes the recycling efficiency of LCD backlights

3M™ Uniformity Tape (UT)

- Microreplicated lens film with adhesive on one side
- Efficiently spreads light from an LED light source within a linear plane
- Allows for the use of fewer LEDs
- Maintains uniformity
- Used on the edge of an LCD light guide

3M™ Display Films offer advanced solutions for display enhancement above and below the display surface



Environmental Performance and Specifications

	TRANSMISSION	HAZE	CLARITY	PENCIL HARDNESS	REFLECTION	APPLIED THICKNESS	COLD	DRY HEAT	HEAT & HUMIDITY	THERMAL SHOCK
PRODUCTS										
PROTECTION FILMS										
GLR* (Glossy Low Reflection)	96%	0.6%	99%	3H(200g)	1.95%	.130mm	-40°C /500 hours	85°C /500 hours	60°C/90% R.H./500 hours **	85°C for 1 hour to -40°C for 1 hour, 100 cycles
GLS200* (Glossy Protection)	92%	2%	99%	4H(500g)	N/A	.155mm				
ARMR220 Protection*	96%	2.5%	80%	3H(500g)	1.6%	.155mm				
AGF6200* (Anti-Glare Protection)	94%	20%	40%	3H(500g)	N/A, anti-glare matte	.146mm				
	COLD	DRY HEAT		HEAT & HUMIDITY		THERMAL SHOCK		NON HALOGENATED	APPLIED THICKNESS	
PRODUCTS	-40°C/ 1,000 hours	95°C/ 1,000 hours	85°C/ 1,000 hours	65°C/95% R.H./1,000 hours **	65°C/90% R.H./1,000 hours **	One hour at -40°C followed by one hour at +95°C	One hour at -40°C followed by one hour at +85°C			
LOUVER FILMS										
ALCF-P ABR0/ABR2	X		X	X			X		533 um	
ALCF-A2	X	X			X		X		380 um	
ALCF-A2+	X	X			X		X		490 um	
LCFHI-T48	500 HRS	500 HRS			500 HRS		500 HRS		680 um	
LCF PlusII	X		X	X			X		730 um	
LCF PC100K	X	X		X		X			450 um	
LCF PC200K	X	X		X		X			650 um	
PRISM FILMS										
BEF II 90/24	X	X		X		X			140 um	
BEF II 90/50	X	X		X		X		X	150 um	
BEF3-T-155	X	X		X		X			155 um	
REFLECTIVE POLARIZERS										
DBEF-D2-400	X	X		X		X			395 um	
DBEF-D2-280	X	X		X		X			280 um	
DBEF-Q-V2 with OCA	X				X		X		138 um	
DBEF II	X		X	X			X		150 um	
DEBEF-Q-V2	X		X	X			X		113 um	
REFLECTOR										
ESR	X	X		X		X			66 um	
UNIFORMITY TAPE	X	X		X			X		115 um	
ESR with adhesive	X	X		X			X		104 um	
D50A	X	X		X			X		114 um	

*Typical Value

**Noncondensing



Mobile Enterprise

- Field Services
- Inventory
- Warehouse
- Delivery

Government

- Public Safety
- Military
- Law Enforcement
- Rugged Lcds
- Aviation

Financial

- Mobile Banking
- Atms

Healthcare

- Medical Records
- All-In-One Monitors
- Tablets
- Patient Check-In
- Nursing Stations
- Ehrs

Entertainment

- In-Flight
- Gaming Stations
- Slot Machines

Transportation

- Off-Road/Heavy Equipment Vehicles
- Locomotives
- Information Displays
- Aviation

Retail

- Hospitality
- Retail Pos
- Information Kiosks
- Digital Signage

Automotive

- Center Console
- Instrument Cluster
- Rear-View Mirrors
- Entertainment Displays



3M™ Automotive Grade Films

Offering benefits critical to the automotive industry

3M offers a full line of enhancement films that can be used to increase the design freedom for automotive interiors. They are used to manage reflections, manipulate light distribution and increase display brightness. Benefits can include improved driver/passenger viewability, increased thermal management and more open interior designs.

- Center console displays
- Instrument cluster displays
- Rear-seat displays
- Rear-view mirror displays
- Lighting elements



Design freedom through reflection control

ALCF-A2 and A2+ manage reflections created by stray light exiting automotive displays and instrumentation. These reflections, on the windscreen or side glass, can be a cause of driver distraction. Managing this light allows automotive interior designs to be more open. ALCF-A2+ has the added advantage of brightness enhancement with the inclusion of DBEF in its construction.

3M has been supplying enhancement films to the LCD monitor industry since its emergence, reliably offering solutions customized to meet the demands of new technologies. 3M is committed to providing industry-leading service and support for the complete line of film products and the designers, engineers and brands that implement them.

For more information visit our website at www.3m.com/displayenhancement or call 1.800.553.9215



Display Materials and Systems Division
3M Center, Bldg. 235-2S-62
St. Paul, MN 55144-1000

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