

Display Technology Comparison

	TN (Passive LCD)	VA (Passive LCD)	STN (Passive LCD)	TFT	AMOLED	PMOLED	E-Paper
Operating temperature	-40°..+85°C	-30°..+85°C	-30°..+80°C	-40°..+85°C	-40°C..+85°C	-40°C..+85°C	+0°C..+50°C
Storage temperature	-40..+90°C	-40..+90°C	-40..+90°C	-40..+90°C	-40°C..+85°C	-40°C..+85°C	-25°C..+70°C
Backlight	Optional	Yes	Optional	Yes	No	No	No
Sunlight readable	●●●●	●	●●●●	●●	●	●	●●●●
Full graphic possible	Nein	No	Yes	Yes	Yes	Yes	Yes
Response time	●●	●●	●●	●●●	●●●●	●●●●	●
Viewing angle	●●	●●●	●●	TN: ●●● IPS/VA: ●●●●	●●●●	●●●●	●●●●
Power consumption	●●●●	●●	●●●	●	●	●	●●●● !
Full colour	No	No	No	Yes	Yes	No	No
Contrast	●	●●●	●	TN: ●●● IPS/VA: ●●●●	●●●●	●●●●	●●
Thickness	● (with BL) ●●●● (without BL)	●●●●	● (with BL) ●●●● (without BL)	●●	●●●●	●●●●	●●●●
Lifetime	50K – 100K hours	10K-20K hours	10K-50K hours (Depending on the colour)	30K-50K hours			
Fields of application	Enormous scope of application: - Industrial devices - Household appliances - Smart Home - Consumer products - Medical devices - Automotive	Enormous scope of application: - Industrial devices - Smart Home - Household appliances - Consumer products - Medical devices - Automotive	Enormous scope of application: - Industrial devices - Smart Home - Household appliances - Consumer products - Medical devices - Automotive	Enormous scope of application: - Industrial devices - Smart Home - Household appliances - Consumer products - Medical devices - Automotive	- Wearables - Smartphones - Tablets - Monitors	- Industrial devices - Smart Home - Household appliances - Consumer products - Medical devices - Automotive	- E-Reader - Price labels - Shelf labels - Nameplates - Smart Home
Advantages	+ Low power consumption + Fully customized designs from 2K per year onwards, with moderate tooling costs + Low cost + Easy to control + Robust	+ Fully customized designs from 2K per year onwards, with moderate tooling costs + Low cost + Easy to control + Robust	+ Low power consumption + Fully customized designs from 2K per year onwards, with moderate tooling costs + Low cost + Easy to control + Robust	+ Look and design + Adjustment possibilities with standard displays + Response time + Viewing angles (IPS/VA) + High contrast	+ Low module thickness + No backlight needed + Look and design + Response time + Viewing angles + High contrast + Rich colours	+ Low module thickness + No backlight needed + Response time + Viewing angles + High contrast + Easy to control	+ Low power consumption + Paper-like look + Good readability under direct sunlight
Disadvantages	- Old fashioned look - Limited layout possibilities - Limited optical performance - No full graphic layout	- Limited layout possibilities - No full graphic layout - Sunlight readable	- Old fashioned look - Limited layout possibilities - Limited optical performance	- High tooling fees for full customized designs - Power consumption - Readability under sunlight	- Price - Lifetime - High MOQ's - High tooling fees for full customized designs - Long-term availability - Readability under sunlight - Burn-in	- Price - Lifetime - Readability under sunlight - Burn-in	- Only for Indoor-applications (due to limited temperature range) - Weak response time - Price - High tooling fees for full customized full graphic designs

● Weak
●● OK
●●● Good
●●●● Very good
●●●● ! Extremely good