

## Cooling Solutions for ETE-A945GSE, ETE-PV510, ETE-GLX and ETE-GLX3 Modules



### Description

ET(e) modules provide the functionality of an Embedded PC on a standard ETX-sized module. ET(e) modules are fully compliant with the latest ETX specification.

Depending on the computing performance, the processor and chipset technology and the system environment ET(e) modules require different cooling measures.

MSC has developed various solutions that help the system designer to quickly solve the heat dissipation problems and ensure optimal environmental conditions for the module.

### Heat spreaders

Standardized thermal interfaces for easy integration in customers cooling concept and full interchangeability.



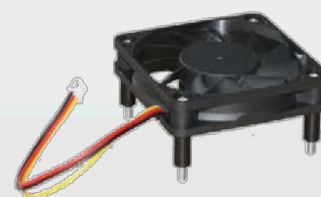
### Passive cooling

Optimized heat sinks for best cooling performance even in industrial environment.



### Active cooling

Heat sinks combined with a dedicated speed controlled fan. An off-the-shelf solution for demanding ambient conditions.



## Heat spreaders

The ETX cooling concept is based on a heat spreader that offers a clearly defined interface for system specific cooling measures. It consists of a metal plate with direct thermal connection to the most power dissipating components.

System designers can implement different cooling concepts through thermal connection to this heat spreader.

In some cases a connection to the system housing might already provide sufficient heat dissipation, other applications might be better served with passive cooling elements that are exposed to the airflow inside the system.



### Highlights

- Thermal interface compliant to ETX Specification
- Heat conducting stacks on bottom side
- Threaded (M2.5) or through-hole version available
- Mounting holes for heat conducting components

Dimensions	Material
<b>Height:</b> 8 mm Maximum height measured from top of PCB to top of heat spreader. <b>Outline:</b> 114 x 96 mm	<b>Plate:</b> Black anodized aluminum

Order Number	Description	Reference
1073444	Heat spreader for ETE-A945GSE with threaded standoffs M2.5	MSC ETE-A945GSE-01 HSP-001
1073643	Heat spreader for ETE-A945GSE with through-hole standoffs	MSC ETE-A945GSE-02 HSP-001
36629	Heat spreader for ETE-PV510 with threaded standoffs M2.5	MSC ETE-PV510-01 HSP-001
38518	Heat spreader for ETE-PV510 with through-hole standoffs	MSC ETE-PV510-02 HSP-001
24899	Heat spreader for ETE-GLX/GLX3 with threaded standoffs M2.5	MSC ETE-GLX-01 HSP-001
25916	Heat spreader for ETE-GLX/GLX3 with through-hole standoffs	MSC ETE-GLX-02 HSP-001

## Passive cooling

For systems with sufficient air flow around the module, either passive through convection or forced by a system internal fan, MSC's passive cooling solution may be used.

Passive cooling solutions consist of an extruded aluminum heat sink with heat conducting stacks on the bottom side.



### Highlights

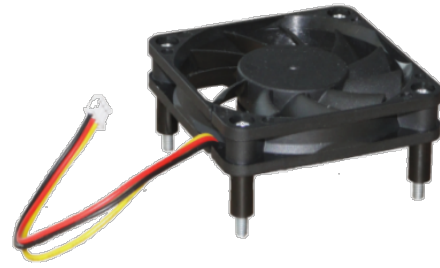
- Heat conducting stacks on bottom side
- Threaded (M2.5) or through-hole versions available
- Prepared for optional fan
- Screws for mounting included

Dimensions	Material
<b>Height:</b> 20 mm Maximum height measured from top of PCB to top of heat sink. <b>Outline:</b> 114 x 96 mm	<b>Plate:</b> Black anodized aluminum

Order Number	Description	Reference
1073416	Heat sink for ETE-A945GSE with threaded standoffs M2.5 ** (optional fan kit is not included)	MSC ETE-A945GSE-02 HSI-001
38469	Heat sink for ETE-A945GSE with through-hole standoffs ** (optional fan kit is not included)	MSC ETE-A945GSE-03 HSI-001
36627	Heat sink for ETE-PV510 with threaded standoffs M2.5 ** (optional fan kit is not included)	MSC ETE-PV510-01 HSI-001
on request	Heat sink for ETE-PV510 with through-hole standoffs ** (optional fan kit is not included)	MSC ETE-PV510-02 HSI-001

## Active cooling

In cases where an active cooling is required MSC offers a fan kit for mounting on top of the heat sink.



### Highlights

- 60 mm x 60 mm fan with tacho signal and special connector for MSC ETE modules
- Spacers and screws included

Dimensions	Excerpt of fan data sheet
<p><b>Height:</b> 32 mm (heat sink with fan) Maximum height of heat sink with fan mounted. Measured from top of PCB to top of heat sink.</p>	<p><b>Operating Temperature:</b> -10° C~70° C (normal humidity) <b>Storage Temperature:</b> -20° C~75° C (normal humidity) <b>Rated Speed:</b> 4 200rpm ± 10% In free air at rated voltage; testing speed after continuous 3 minute operation at ambient temperature of 25° C <b>Airflow:</b> 16.98CFM; 0.48m<sup>3</sup>/min At rated voltage; at zero static pressure <b>Life expectance (L10):</b> More than 90% shall keep running after continuous operation of 50.000 hours at rated voltage in 40° C ambient temperature and 65% relative humidity condition. Fan life should be redefined when above conditions are changed.</p>
Note	
<p>a) Free air circulation above the fan is necessary to assure proper air flow! b) Locking the rotor when it's running may damage the fan as well as the control circuit on the COM Express module!</p>	

Order Number	Description	Reference
36068	Fan kit for ETE-PV510 and ETE-A945GSE	MSC ETE-PV510-01 FKT-001

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