ANYNET+ SIM CARD ES6XXX

Eseye's EX6xxx SIM cards enable IoT devices to connect through mobile networks globally and switch networks to maintain optimum connectivity. A single SKU permits a device to deploy in all territories supported by the modem in use. Eseye supply different IMSI configurations, represented by each x.

Features

- GSMA, ETSI and ISO compliant
- eUICC and multi-IMSI
- Space for up to 10 profiles, remote profile management
- Industrial grade
- Storage for application security parameters

Applications

- 2G, 3G, 4G/LTE and Cat M1 LTE IoT devices
- Global deployments
- Security
- Vending, Point of Sale terminals
- EV charge point
- Critical infrastructure monitoring
- Cloud-connected
- Edge processing devices
- Connected consumer applications

Standards

- REACH, RoHS, halogen-free
- ISO 7816, ETSI TS 102.221
- GSMA Remote Provisioning Architecture for Embedded UICC v3.1

Device Information

AnyNet+ SIM card	Package
ES6x5x	3FF
ES6x2x	MFF2
ES6x3x	2FF/3FF/4FF

Pin Definitions

Pin name	Description	ES6x5x	ES6x2x*	ES6x3x
VDD	Card Power	1	8	1
Reset	Card Reset (Optional)	2	7	2
CLOCK	Card Clock	3	6	3
GND	Ground	4	1	4
VPP	Programming	5		5
I/O	In/Out [Data]	6	3	6

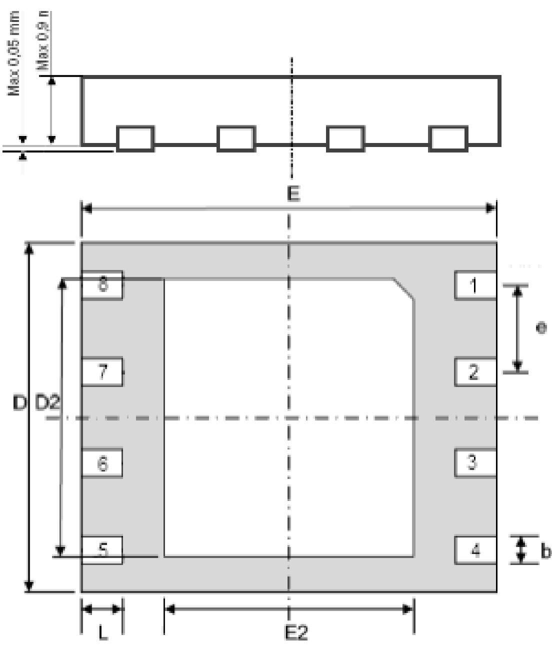
*According to MFF2 specifications, pins 2, 4 & 5 are RFU. They should be floating (soldered onto the PCB but not connected to any signal).

Operating parameters

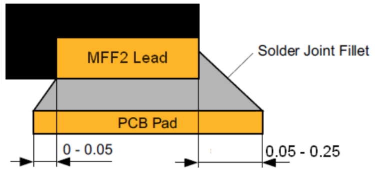
	ES6x5x	ES6x2x	ES6x3x
Minimum operational and storage temperature (°C)	-40	-40	-25
Maximum operational and storage temperature (°C)	+105	+105	+85
Operating Voltage: Class A (5V) Minimum, Maximum (V)	4.5, 5.5	4.5, 5.5	4.5, 5.5
Operating Voltage: Class B (3V) Minimum, Maximum (V)	2.7, 3.3	2.7, 3.3	2.7, 3.3
Operating Voltage: Class C (1.8V) Minimum, Maximum (V)	1.62, 1.98	1.62, 1.98	1.62, 1.98
Plastic type	Polycarbonate	n/a	ABS
Moisture/reflow conditions (260°C)	n/a	MSL 1	n/a
High humidity (85°C, 85% humidity) (hours with bias)	1000	1000	n/a
Corrosion (salt atmosphere at 35°C) (hours)	240	96	n/a
Vibration (AEC-Q100 frequency 20~2000Hz, acceleration 20G peak)	✓	✓	n/a
Shock (AEC-Q100 1500G)	✓	✓	n/a
Non-volatile memory (kb)	320	320	320
RAM (applets & NAA) (kb)	7	7	7
Data retention time at 85°C (years)	10	10	10
Minimum updates	10M	10M	10M

Copyright 2021 Eseye Ltd

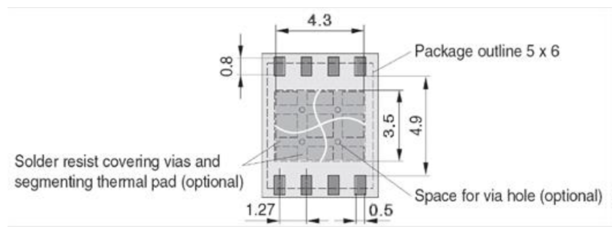
ES6x2x package outline and footprint



Parameter	Dimensions (mm)	
	Typical	Maximum
E	6.00	6.15
D	5.00	5.15
L	0.60	0.7
b	0.40	0.50
E2	3.40	3.50
D2	4.20	4.30
e	1.27	

Pin #1 is identified by a cut or round corner in the central pad: 

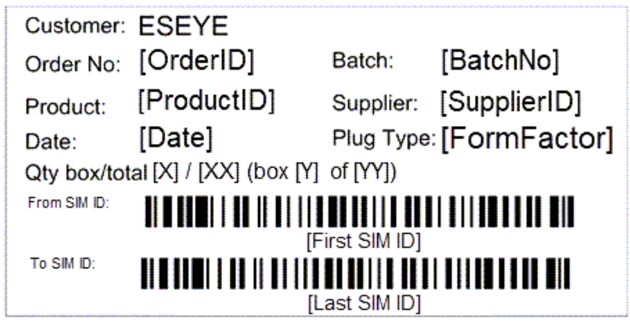
Extending the outer pad by 0.05-0.25mm from the package land helps improve the external solder joints.



ES6xxx labels and quantity

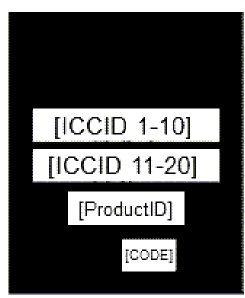
A reel label is placed on each reel, inner packaging and inner box.

Format: 80 x 40 mm



Embedded SIMs (MFF2) only

The following information is lasered onto the back of the embedded SIM. Most customers will read the ICCID from the chip after installation.



[CODE] may be required for activation. Check product documentation for more information.

Items per reel: 1000 or 3000

Guidance on using ES6x2x

Solderability

- Ni/Pd/Au/Ag PPF plating.
- Maximum reflow temperature: 260°C.
- Lead-free packaging compliant to the European Directive for Restriction of Hazardous Substances (RoHS).

Package handling

- Take standard preventative measures to prevent electrostatic discharge damage.
- Use appropriate handling processes to ensure the packages are free from moisture for soldering.

The ES6x2x is not designed for re-mounting after it is soldered to a PCB.

Copyright 2021 Eseye Ltd

PCB design recommendations

Solder and connect the central pad to the copper plane in order to improve attachment to the PCB and help heat dissipation.

For good solder joints and no bridging:

- PCB design complies with IPC-D-275.
- Flatness within 0.1mm per linear centimetre.
- Solderability complies with ANSI/J-STD-003.

If vias holes are required for maximised heat dissipation:

- Use typical dimensions for thermal vias: diameter 0.25-0.35mm, pitch 1.0-1.2mm.
- Plug vias to prevent solder wicking using tenting, Liquid Photo-Imageable (LPI) solder mask, or encroaching.

To prevent spikes on the supply voltage pins:

- Choose an appropriate decoupling capacitor (100nF is commonly used).
- Place capacitor between GND (VSS) and VCC (VDD), as close as possible to the VCC pin.

Mounting recommendations

Component placement and alignment

- To prevent shorting from solder bridging, ensure that no component is misaligned by more than 50% from pad centre.

Solder paste

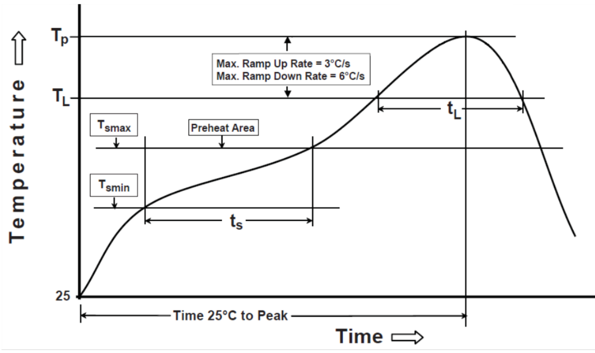
- Use a no-clean solder paste if possible, although a lead-free solder paste metal alloy composition can be used. We recommend Type 3 paste, J-STD-005.
- Ensure solder paste is suitable for printing the solder stencil aperture dimensions.

Reflow

- All standard reflow soldering processes and typical temperature profiles are suitable for ES6x2x board assembly, including:
  - Forced convection (recommended)
  - Vapor phase
  - Infrared

Wave soldering is not possible.

- When using infrared ovens without convection, carefully ensure a sufficiently homogeneous temperature profile for all solder joints on the PCB, especially on large, complex boards with different thermal masses of the components. This includes the boards under the ES6x2x.
- Pb-Free Assembly.



Parameter		Amount
Preheat/Soak:		
	T_{smin} – Minimum temperature	150°C
	T_{smax} – Maximum temperature	200°C
	t_S – Time in seconds	60-120s
T_p – Peak temperature		250°C
T_L – Liquidous temperature		217°C
t_L – Time		60-120s
Time 25°C to peak temperature		8 minutes max

PCB cleaning

- If a no-clean solder paste and flux are used, PCB cleaning is usually not required. However, some types of no-clean solder paste may contain some contamination on the final board. Check and remove any residue on the board.

Solder joint inspection

- Use 2D or 3D techniques to measure the volume of solder plated on the PCB.
- Use Automated Optical Inspection (AOI) or an x-ray inspection system to check for defects after re-flowing the mounted package.
- Use cross-sectioning to verify fillet shape, size, and joint standoff height.

Ordering Information

AnyNet+ SIM card	Package	Description
ES6x5x	3FF	AnyNet+ SIM 3FF only
ES6x2x	MFF2	Embedded AnyNet+ SIM
ES6x3x	2FF/3FF/4FF	AnyNet+ SIM Triple Cut

Technical Support:	Sales:
UK: +44 1483 802503	UK: +44 1483 802501
France: +33 9 87 67 53 37	France: +33 9 87 67 53 36
Australia: +61 8 9551 5200	Norway: +47 454 62 017
USA: +1 484-935-3130	USA: +1 512-813-0599
Brazil: +55 11 4950-7015	Brazil: +55 11 5059-1574
	Africa: +27 87 551 8200
Email: support@eseye.com	**Email: sales@eseye.com**

Copyright 2021 Eseye Ltd