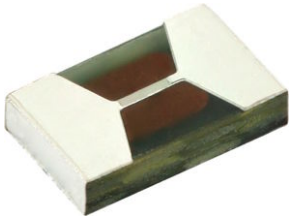
Massive Electro-Pyrotechnic Initiator AEC-Q200 Qualified Resistor Chip



DESIGN SUPPORT TOOLS

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3D Models Available

MEPIA is the AEC-Q200 qualified declination of Vishay MEPIC product.
The principle of MEPIA is to convert electrical energy into heat in a precise electro-thermal profile. Automotive applications cover airbags and security belts activation.
Additional information about general purpose MEPIC product can be found here:
www.vishay.com/doc?53058

FEATURES

- **AEC-Q200 qualified**
- Surface mount design for standard assembly process
- SMD version only, with tin terminations
- Case size 0805
- Firing energy down to 0.5 mJ [(1)]
- Firing time down to 250 µs
- Ohmic value: 2 Ω
- Joule effect ignition
- Easy set up by design of firing levels
- Very predictable, reproducible and reliable behavior
- Compatibility with pyrotechnic element has to be tested in real environment
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

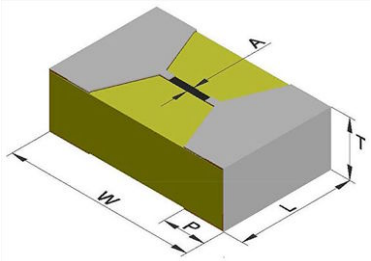
Pb-free

RoHS COMPLIANT

Note

(1) Ignitor performances are dependent on both pyrotechnic primer chemistry and active areas geometry

DIMENSIONS AND TOLERANCES in millimeters (inches)



MODEL	SIZE / CASE DESIGNATION	WIDTH W	LENGTH L	THICKNESS T	BACK SIDE PADS P	ACTIVE AREA WIDTH TOLERANCE A
MEPIA (SMD)	0805	2.00 ± 0.15 (0.080 ± 0.006)	1.25 ± 0.10 (0.050 ± 0.004)	0.6 ± 0.1 (0.024 ± 0.004)	0.45 ± 0.2 (0.018 ± 0.006)	± 0.01 (± 0.0004)

Notes

- For the assembly on board, we recommend the lead (Pb)-free thermal profile as per J-STD-020C
- Do not use iron soldering method to mount a MEPIA because it may damage the component (deformation that may cause active area cracks)

STANDARD ELECTRICAL SPECIFICATIONS

MODEL	SIZE / CASE DESIGNATION	RESISTANCE RANGE Ω	RESISTANCE TOLERANCE %
MEPIA (SMD)	0805	2	7.5 to 30

MECHANICAL SPECIFICATIONS

Mechanical protection	None
Resistive element	NiCr foil
Substrate	Epoxy based FRx
Terminations	Tin

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PERFORMANCES				
TESTS	**SPEC.**	**CONDITIONS**	**SPEC. REQUIREMENTS**	**TYPICAL PERFORMANCES**
High temperature exposure	MIL-STD-202 Method 108	*T* = 125 °C / 1000 h	± 2 % ± 0.05 Ω	± 1.5 %
Temperature cycling	JESD22 Method JA-104	-55 °C / 125 °C 1000 cycles	± 5 % ± 0.05 Ω	± 1.5 %
Biased humidity	MIL-STD-202 Method 103	85 °C / 85 % RH 1000 h	± 2 % ± 0.05 Ω	± 1.2 %
Operational life	MIL-STD-202 Method 108	*T* = 125°C / 1000 h *P* = 51 mW (P based on no fire conditions)	± 2 % ± 0.05 Ω	± 1.6 %
Mechanical shock	MIL-STD-202 Method 213	100 *G*	± 2 % ± 0.05 Ω	± 0.2 %
Vibration	MIL-STD-202 Method 204	2000 Hz / 5G 10 cycles	± 2 % ± 0.05 Ω	± 0.2 %
Solderability	MIL-STD-202 Method 210 Cond. D	T = 245 °C / 3 s	No degradation of termination side	Visual inspection: conform to spec.
ESD	AEC-Q200-002	Air discharge *U* = 25 kV / 1 time	± 5 % ± 0.05 Ω	± 1.5 %
Reflow	According to IPC-610 / vers. E § 8.3.2.6 / Fig. 8.35	Sn96.6Ag3Cu0.5 soldering	25 % of the height of the termination	Visual inspection: conform to spec.
Electrical characterization	User spec.	-55°C / 125°C alumina board	± 200 ppm/°C	± 160 ppm/°C
Electrical characterization	User spec.	-55°C / 125°C FR4 board	± 200 ppm/°C	± 170 ppm/°C
Board flex	AEC-Q200-005	60 s / 2 mm	± 2 % ± 0.05 Ω	± 0.2 %
Shear test	AEC-Q200-006	0.5 N / 60 s	± 2 % ± 0.05 Ω	± 0.8 %

RANGE OF IGNITION PERFORMANCES					
MODEL	**"NO FIRE" CURRENT A**	**"NO FIRE" DURATION s**	**"ALL FIRE" CURRENT A**	**IGNITION TIME ms**	**"ALL FIRE" ENERGY µJ**
MEPIA (SMD)	0.5 to 1.2	2 to 10	Down to 1	Down to 0.25	Down to 500

TECHNOLOGY

The MEPIA active area (heating zone) will be impregnated by the user with a primary pyrotechnic material (usually wet primer followed by drying) in such way to ensure an intimate contact for an optimum heat transfer of thermal energy. Note that the active area of MEPIA shall not be put in direct contact with explosive powder as grain size will not ensure intimate contact and will induce non reproducible and non reliable performances.

The two main characteristics of a MEPIA resistor are their "All Fire" (AF) and "No Fire" (NF) performances:

- "All Fire" (AF) represents the command pulse (generally with capacitance discharge) where the major amount of the dissipated energy will be transferred to the primer to generate the ignition
- "No Fire" (NF) represents the immunity of the resistor with primer to the environmental electro-magnetic pollution and electric continuity test, where the major amount of the dissipated energy will be transferred to the substrate to ensure no ignition

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ASSEMBLY PRECAUTIONS

In order to obtain reproducible ignition performances it is important that the assembly process fulfills the following criteria:

- Take specific precautions, such as no air bubble during preparation and application of primer, in order to ensure the intimate contact of pyrotechnic primer and MEPIA active area (potential misfire)
- Take specific handling precaution in order not to damage MEPIA active area (ex: pickup head design for pick and place or specific fixing tools in the entire assembly process)
- All along the assembly process, take specific care to extreme thermo-mechanic stress that could be applied to the MEPIA (such as stress induced during over molding) because the active area of MEPIA is subjected to crack (and generate unstable resistance value)
- The MEPIA reliability is only guaranteed for one single reflow profile
- In case of necessity to dismantle a MEPIA, another MEPIA must be used (no rework is allowed)
- Pay specific attention to the cleaning process after reflow soldering in order not to damage the active area and to keep it clean from various pollution

ORDERING PROCEDURE

Global Part Numbering: MEPIA0805-2R0ILT09

M	E	P	I	A	0	8	0	5	-	2	R	0	I	L	T	0	9

MODEL	SIZE	VALUE	TOLERANCE	ENERGY CLASS	PACKAGING	OPTION
MEPIA	**0805**	**2R0**	**I** = 7.5 % **K** = 10 % **L** = 20 % **M** = 30 %	**L** = low (typical all fire = 500 µJ) **H** = high (typical all fire = 1 mJ)	For more information see “Codification of packaging” table	Leave blank if no option

CODIFICATION OF PACKAGING

CODE 18	PACKAGING	REMARK (USUAL ASSEMBLY PROCESS)
T	Tape and reel (plastic tape)	Automatic pick-and-place
W	Waffle pack	Manual placing on PCB
B	Bag	Bowl feeding

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