

Data Sheet No: E04001

Version: V4

Date: 2024/03/21



DHDZ

Ignitor Chip Resistor

Resistance	2.0Ω~8.0Ω
Tolerance	±7%
All-Fire Voltage	16V
All Fire Duration	100μs

Applications

Automotive Airbag
Electronic Fireworks
Petroleum Perforating Bullet
Digital Electronic Detonator

**Better Solution for Sustainable
High End Manufacturing**



Comparison between Ignitor Chip Resistor and Traditional Bridge Wire:

Contrast Term	Ignitor Chip Resistor	Bridge Wire
Fusing time	Controllable	Uncontrollable
Reliability	Excellent	Bad
Consistency	Excellent	Bad
Predictability	Excellent	Bad
Accuracy	Excellent	Bad
Disadvantages	None	1. Bridge wires are thin and easily damaged 2. Tolerance is hard to control 3. The small contact area between bridge wire and explosives is hard to transfer heat
Advantages	1. Good consistency of tight tolerance. 2. Standard SMD resistor size for easy material picking and soldering. 3. High mechanical strength. 4. Compatible with any explosives. 5. Customize according to the application requirements of customers.	Cheap in price

Features of DHDZ Series Ignitor Chip Resistor:

1. Its substrate is made from Al₂O₃ ceramic, which provides far better mechanical strength than FR5 substrate. It protects the active area from mechanical shock and soldering heat.
2. The substrate is covered with a thermal insulation layer, preventing the energy from dissipating through the substrate at All-Fire state. When in the No-Fire state, the heat can dissipate through the ceramic substrate. Guarantee both igniting performance and safety.
3. Specialized processing technology guarantees the consistency of resistive element and resistance.
4. 100% automatic visual inspection before delivery, ensuring the quality of resistive elements.
5. High reliability, no misfire.

Comparison	RESI	Competitor
Substrate	Al ₂ O ₃ ceramic	FR5
Strength	High	Low
Reliability	Excellent	OK
Cost Performance	High	Low

All-Fire Voltage of 16V & Fusing Time of 100 μ s

High Reliability, No Misfire

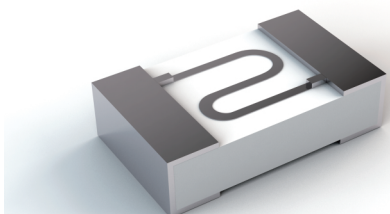
Introduction

Digital electronic detonator controls the ignition by electronic control module. The module inside detonator controls the ignition delay and ignition energy of detonator, and can conduct performance testing and ignition parts inspection. The detonator communicates with the ignition controller and other external control devices by the module.

There are a verification code and an ignition code in each detonator. The verification code is as an ID number, and ignition code is the keyword for detonator ignition. These two codes together ensure that electronic detonators are under strict regulation.

Ignition is triggered by the detonator's capacitor discharging while the capacitor is charged under instructions of digital control module. When the ignitor chip resistor receives the energy from the capacitor, electric energy converts into thermal energy and ignites the powder.

Therefore, the initiator chip resistor is one of the most critical factors to determine whether the digital electronic detonator can successfully operate.



Electrical Parameters

Part Number	Size	Resistance	Tolerance	Operating Temperature	TCR ppm/ $^{\circ}$ C(+25 $^{\circ}$ C Ref)
DHDZ0805L2R00G63C	0805	2 Ω	\pm 7%	-40 $^{\circ}$ C~+85 $^{\circ}$ C	\pm 200
DHDZ0805L4R00G63A	0805	4 Ω	\pm 7%	-40 $^{\circ}$ C~+85 $^{\circ}$ C	\pm 200
DHDZ0805L6R00G63A	0805	6 Ω	\pm 7%	-40 $^{\circ}$ C~+85 $^{\circ}$ C	\pm 150
DHDZ0805L8R00G63B	0805	8 Ω	\pm 7%	-40 $^{\circ}$ C~+85 $^{\circ}$ C	\pm 150

Ignition Performance

1. Min. "All Fire" Voltage, Max. "No Fire" voltage & "All Fire" Energy of Resistor:

Part Number	100uF (Aluminium Electrolytic Capacitor)			44uF (Tantalum Capacitor)		
	"All Fire" Voltage	"No Fire" Voltage	"All Fire" Energy	"All Fire" Voltage	"No Fire" Voltage	"All Fire" Energy
DHDZ0805L2R00G63C	7.9V (Min.)	5.4V (Max.)	3.12mJ	11.6V (Min.)	8.5V (Max.)	2.96mJ
DHDZ0805L4R00G63A	11.0V (Min.)	9.5V (Max.)	6.05mJ	14.1V (Min.)	12.1V (Max.)	4.37mJ
DHDZ0805L6R00G63A	13.6V (Min.)	12.1V (Max.)	9.25mJ	19.5V (Min.)	16.7V (Max.)	8.37mJ
DHDZ0805L8R00G63B	14.3V (Min.)	12.2V (Max.)	10.22mJ	18.8V (Min.)	16.8V (Max.)	7.78mJ

Note:
 1) The "all fire" voltage is at non-explosive condition, evaluated based on the completely fused bridge, by capacitor discharging method.
 The "all fire" voltage = the bridge fusing voltage.
 2) "All Fire" energy = $1/2 CV_f^2$.
 3) These parameters are only for reference for this operating condition. If having any question when operating in other different conditions or testing environments, please contact our sales.

2. "All Fire" Duration at 16V Loaded Voltage:

Part Number	"All Fire" Duration		Lot Standards (Typ.)
	100μF (Aluminium Electrolytic Capacitor)	44μF (Tantalum Capacitor)	
DHDZ0805L2R00G63C	Max. 100μs (Typ.)	Max. 100μs (Typ.)	Same Lot ≤ 10μs, among Different Lots ≤ 20μs
DHDZ0805L4R00G63A	Max. 200μs (Typ.)	Max. 200μs (Typ.)	Same Lot ≤ 15μs, among Different Lots ≤ 25μs
DHDZ0805L6R00G63A	Max. 500μs (Typ.)	Max. 500μs (Typ.)	Same Lot ≤ 25μs, among Different Lots ≤ 30μs
DHDZ0805L8R00G63B	Max. 500μs (Typ.)	Max. 500μs (Typ.)	Same Lot ≤ 30μs, among Different Lots ≤ 40μs

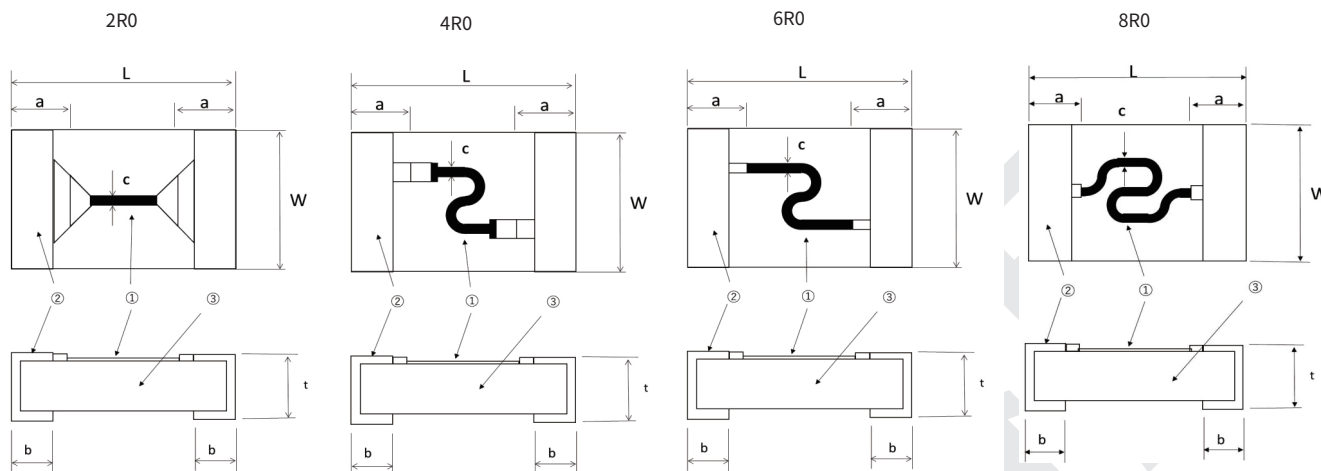
Note: Ignition test performs at non-explosive condition; if questions for different conditions are present, please contact us.

3. Peak Surface Temperature of Resistive Element:

Part Number	Loaded Current	Peak Temperature		Lot Standards (Typ.)
DHDZ0805L2R00G63C	370mA(0.27W)	Refer to peak temp	Min. 550°C (Typ.)	Same Lot ≤ 50°C, among Different Lots ≤ 60°C
DHDZ0805L4R00G63A	330mA(0.44W)	Refer to ave. of 4 points	Min. 550°C (Typ.)	Same Lot ≤ 50°C, among Different Lots ≤ 60°C
DHDZ0805L6R00G63A	330mA(0.65W)	Refer to ave. of 6 points	Min. 550°C (Typ.)	Same Lot ≤ 35°C, among Different Lots ≤ 40°C
DHDZ0805L8R00G63B	285mA(0.65W)	Refer to ave. of 6 points	Min. 550°C (Typ.)	Same Lot ≤ 35°C, among Different Lots ≤ 40°C

Dimensions Resistor

Unit:mm

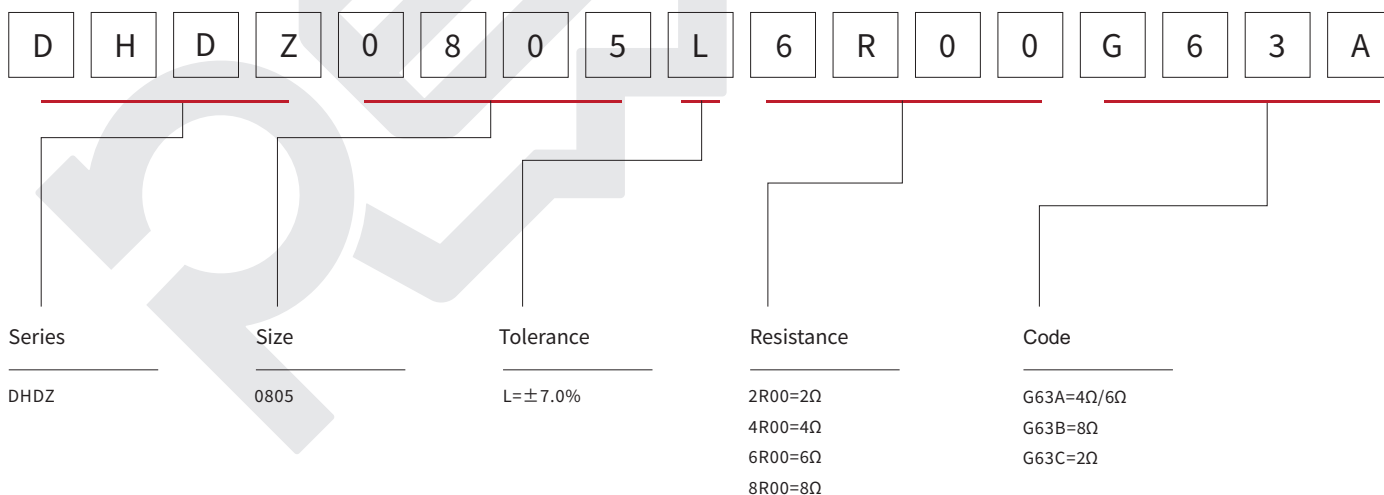


① Active Area: Ni-Cr ② Terminal: CuNiSn ③ Substrate: Al₂O₃

Resistance	L	W	t	a	b	c
2.0Ω	2.0±0.2	1.25±0.3	0.45±0.15	0.5±0.25	0.4±0.2	0.090±0.01
4.0Ω	2.0±0.2	1.25±0.3	0.45±0.15	0.5±0.25	0.4±0.2	0.084±0.01
6.0Ω	2.0±0.2	1.25±0.3	0.45±0.15	0.5±0.25	0.4±0.2	0.086±0.01
8.0Ω	2.0±0.2	1.25±0.3	0.45±0.15	0.5±0.25	0.4±0.2	0.072±0.01

Part Number Information

Example: DHDZ0805L6R00G63A (DHDZ 0805 ±7.0% 6Ω Code)



Performance

Test	Test Method	Standards	Test Limits
Resistance & Tolerance	-	IEC 60115-1 4.5 JIS C 5201-1	Not exceeding nominal tolerance CPK \geq 1.33
Resistance to Soldering Heat	Reflow soldering: Peak temp. \leq 260°C, duration \leq 10s. Temp. > 220°C, duration \leq 60s. 2 cycles max.	IEC 60115-1 4.18 JIS C 5201-1 4.18	$\Delta R/R \leq \pm(2.0\%+0.01\Omega)$ No mechanical damage
Solderability	Temperature of soldering: 235 \pm 5°C (Pb-Sn solder); 245 \pm 5°C (Sn-Ag-Cu solder); Duration of immersion 2 \pm 0.5 sec.	IEC 60115-1 4.17 JIS C 5201-1 4.17	95% minimum coverage
Resistance to Solvents	Commonly used acid/base solvents, stored for 2 years after wetted by the solvents	-	$\Delta R/R \leq \pm 1\%$ No deterioration such as changes in ignition performance.

Note:
Unless specified otherwise, all experiments are conducted under: Ambient temperature: 5 - 35°C, RH: 45 - 85%, Ap: 86 - 106kPa
If there are any doubts about the results, please test the parts according to the following conditions: Ambient temperature: 20 \pm 2°C, RH: 60 - 70%, Ap: 86 - 106kPa

Quality Assurance

1. Resistance and Dispersion: Measure by DMM, assuring the tolerance of resistance and dispersion to meet the nominal range;
2. Resistor Size: Inspect the size and dispersion of the ignition area through a microscope. Size and dispersion must meet the nominal range;
3. Visual Inspection: Through visual inspection, check the front, back, and terminals of the resistor for defects;
4. Defective Rate (after SMT): Ignition failure rate (after SMT) \leq 0.02% (failure including excessive resistance, bridge zone fracture, deformation, etc.);
5. Documents: Each reel is labeled with a qualified label, and each lot of products is delivered with a COC file.

Packaging

1. Resistors are packaged in tape & reel. 5000pcs/reel;
2. The outer packaging is nitrogen-filled, which is for the long-term storage.

Label Information

The label is on one side of the reel, with the following information:

1. Manufacturer and barcode;
2. Part number and barcode;
3. Quantity and barcode;
4. Date code and barcode (e.g. DC 2110 represents the 10th week of 2021);
5. Lot number and barcode;
6. Pb-free logo.

Storage

1. The recommended storage environment is an ambient temperature between 5 °C and 35 °C, and the humidity should be less than 50% RH;
2. The storage environment should avoid direct sunlight;
3. The storage environment should avoid moisture, dust, and harmful gases;
4. Please do not open the nitrogen-filled packaging before use.

Revision

Version	Revised Content	Date	Approver
V0	Initial Issue	2019.12.13	LFY
V1	Tolerance increased from $\pm 8\%$ to $\pm 7\%$ Add content of Ignition Performance	2021.04.11	LFY
V2	Add 2 Ω and 8 Ω resistance values	2021.06.02	LFY
V3	Add 4 Ω resistance value Supplement the content of Ignition Performance	2021.08.18	LFY
V4	Change datasheet to the new template	2024.03.21	LFY

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