AEC-Q200 Qualification

The Best Choice for Automotive - MELF Resistors

Advantages of MELF Resistor:

- Stronger mechanical structure, resistant to seismic vibration and thermal shock.
- Excellent in heat dissipation. (Especially suitable for air cooling).
- Superior surge protection than chip resistors (Surge Proof).
- Highly stable, suitable for long period usage. (Excellent Stability).
- Low temperature drift, high precision.
- Low noise interference at low ohm value.

When the system is switched on at supplied voltage, the temperature of the cylindrical chip resistor (on the right) is significantly lower than the traditional chip resistor (on the left)

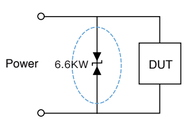
Battery Management System

Due to the difference of charging and discharging time of the battery, a balancing system is crucial to extend battery life and performance. Since Firstohm MELF resistor has better heat dissipation and stability to operate longer hours than chip resister, it is widely used in BMS passive equalization applications.

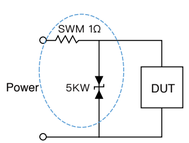
Automotive electronics ISO7637-2 low-cost surge test solution

In automotive systems, electronics must pass the ISO7637 EMC transient test to verify that the automotive electronics will not suffer from spikes and fail. In response to the surge immunity required by ISO7637 # 5a, a TVS function higher than # 5b must be selected to pass the test. The Firstohm is the best solution for passing the # 5a test. It is recommended to use an anti-surge resistor to reduce the impact of the surge on the circuit. Therefore, the # 5b TVS can be used to pass the # 5a test, as follows:

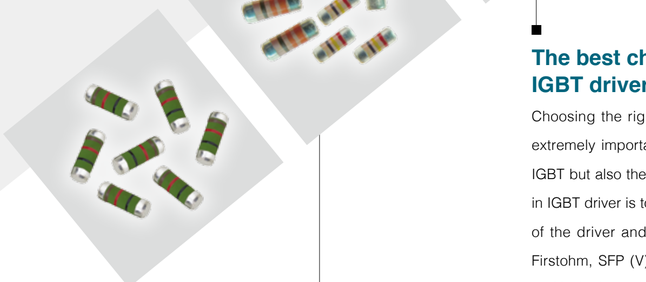
ISO7637	Specification	Safety	Total circuit cost
Commonly used #5a circuit	6.6KW TVS (Ex. : ASTV66SM824A)	Ordinary	High
# 5a circuit using Firstohm	**SWM100,1Ω/2Ω + 5KW TVS (Ex. :TV50C110-441)**	Excellent	Low

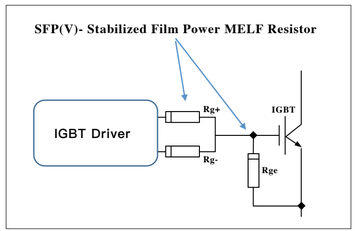


General #5a Circuit



Recommended #5a Circuit





The best choice of the gate resistor in the IGBT driver circuit

Choosing the right gate resistor (Rg) for different IGBT characteristics is extremely important as it affects not only the dynamic performance of the IGBT but also the cost and reliability. The primary role of gate resistors (Rg) in IGBT driver is to eliminate gate-level oscillations, transfer the power losses of the driver and regulate the switching speed of the power switch. The Firstohm, SFP (V) and MM (V), complies with the AEC-Q200 specification and is the best choice for gate resistor in IGBT driver circuits.

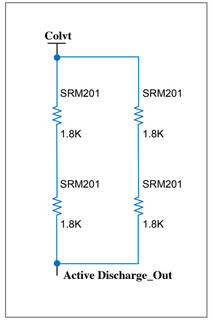
VDE

Electric Motor Controller Solutions (Active Discharge Resistors)

It is an integral part to use capacitive components in electric motor controller circuits. The use of passive discharging large capacitors will be limited by the internal space of the controller and the limitation of the discharging resistor. There is a risk of high pressure leak by discharging over a long period of time. To avoid such risk, it is necessary to set up a rapid active capacitor discharging circuit, and discharge the capacitor quickly in an emergency.

Firstohm solution: SRM (Surge Resistor) (2 in series 2 and Parallel)

* SRM resistor products, has passed the German VDE0860 certification.



Company Proile

Quality • Reliability
Cost-Down via Innovation

Established in 1969, First Resistor & Condenser Co., Ltd. (Firstohm) is specialized in thin-film resistors. Backed by strong in-house research and development capability and manufacturing technology acquired from major partners in Japan and the US, Firstohm has pioneered the development in various types of resistors in response to the changing environment of global technologies.

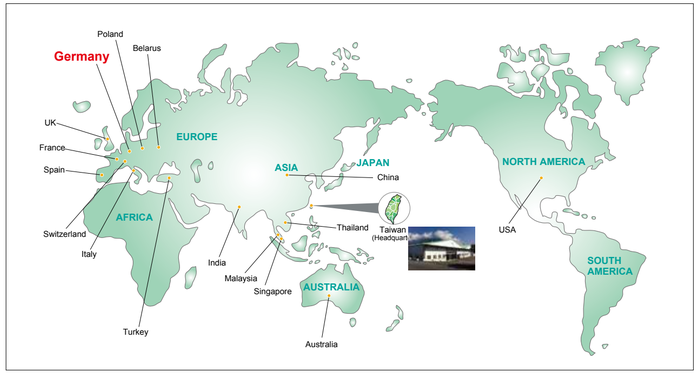
Philosophy and Mission

Given the fast-developing technology landscape, the ability of component manufacturers to evolve and provide quality parts in time has become increasingly crucial to introduction of new electronic products. Our goal at Firstohm is to constantly pursue innovation and to provide customers with quality products and reliable services in a cost efficient and timely manner.

Competitive Advantages

- **Extensive range of specialty resistors** – These products include MELF resistors, surge resistors, high voltage resistors, precision resistors, and current sense resistors.
- **Customer-oriented** – Firstohm is able to customize products and services according to customer's special requirement.
- **In-house research and development capability** – This enables Firstohm's swift responses to the market trend.
- **Solution provider** – To ensure optimal outcome, Firstohm closely collaborates with the customers from the initial technical consulting to the final resistor product selection.

Global Reach (The biggest market : Germany)



Metal Film MELF Resistors (Vehicle grade)

	Type	Power Rating at 70℃	Maximum Working Voltage	Maximum Overload Voltage	Minimum Resistance	Maximum Resistance	Resistance Tolerance	Temperature Coefficient
	MM204V	1/4W	200V	400V	0.47Ω	10MΩ	±1% ~ ±5%	±25PPM ~ ±100PPM
	MM52V	1/2W	300V	500V	0.47Ω	10MΩ	±1% ~ ±5%	
	MMP204V	1/4W	200V	400V	10Ω	1MΩ	±0.5%	±5PPM ~ ±50PPM
					22Ω	1MΩ	±0.25%	
					43Ω	1MΩ	±0.1%	
	MMP52V	1/2W	300V	500V	10Ω	1MΩ	±0.5%	
					15Ω	1MΩ	±0.25%	
					33Ω	1MΩ	±0.1%	
	SFP204V	1/2W	200V	400V	0.5Ω	332KΩ	±1% ~ ±5%	±25PPM, ±50PPM
	SFP101V	1W	350V	700V	0.5Ω	332KΩ	±1% ~ ±5%	
	SFP201V	2W	400V	800V	0.5Ω	332KΩ	±1% ~ ±5%	
	SFP301V	3W	400V	800V	0.5Ω	332KΩ	±1% ~ ±5%	

Anti-Surge MELF Resistors (Vehicle Grade)

	Type	Power Rating at 70℃	Maximum Working Voltage	Maximum Permissible Surge Voltage	Minimum Resistance	Maximum Resistance	Resistance Tolerance	Temperature Coefficient
	SRM204	1/4W	400V	2,000V	1Ω	1MΩ	±1% ~ ±5%	±200PPM, ±400PPM
	SRM204T	1/2W	450V	4,000V	1Ω	10MΩ	±1% ~ ±5%	
	SRM207P	1/2W	600V	8,000V	0.1Ω	2M2Ω	±1% ~ ±5%	
	SRM101T	1W	600V	10,000V	0.1Ω	2M2Ω	±1% ~ ±5%	
	SRM201	2W	700V	9,000V	0.1Ω	2M2Ω	±1% ~ ±5%	
	SRM301	3W	800V	10,000V	0.1Ω	2M2Ω	±1% ~ ±5%	
	SWM100	1W	350V	7,500V	0.1Ω	1.5KΩ	±5%	±100PPM, ±300PPM
	SWM200	2W	400V	8,500V	0.1Ω	1.5KΩ	±5%	
	SWM300	3W	400V	9,000V	0.1Ω	1.5KΩ	±5%	
	SWM400	4W	450V	11,000V	0.1Ω	1.5KΩ	±5%	

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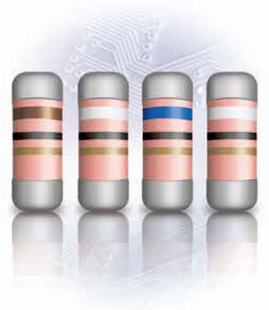
Firstohm® Since 1969

Resistors (Automotive)



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