

Small size and low On-resistance P-channel MOSFET for automotive equipment

The ten products, including “SSM3J374R”, are small, low On-resistance P-channel MOSFETs for automotive devices.

Three types of small and surface mounting packages have been prepared: SOT-23F and SOT-323F (Toshiba’s package name: UFM), and SOT-346 (S-Mini). Many of the new products have low On-resistance characteristics and support 1.5 V drive, so that lower voltage of BMS^[1] control ICs can be supported. In addition, all the products are qualified for AEC-Q101.

In order to increase the cruising range of electric vehicles such as EVs and HEVs^[2], cell capacity is becoming larger, and current to balance cells is also increasing. In conventional ICs with embedded cell balance circuit, the chip temperature can easily increase while operating. We propose circuit design that suppresses the increase in chip temperature by external our low voltage drive MOSFET for the cell balancing purpose.



Features

- Three kinds of small and surface mounting packages
- 1.5 V low voltage drive (Not for SSM3J374R and SSM3J372R)
- AEC-Q101 qualified

Applications

- Automotive equipment
- Battery cell balance circuit
- Load switch circuit



Product Specifications

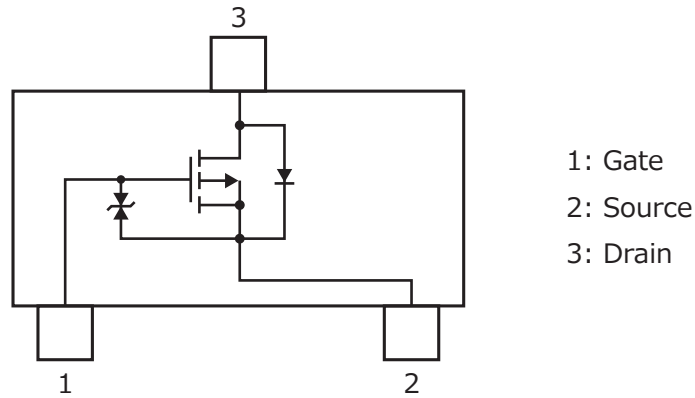
(@T_a=25°C)

Part number	Package	Absolute maximum ratings			Drain-source On-resistance R _{DS(ON)} max (mΩ)					Input capacitance C _{iss} typ. (pF)
		Drain-source voltage V _{DSS} (V)	Gate-source voltage V _{GSS} (V)	Drain current (DC) I _D (A)	@V _{GS} = -1.5 V	@V _{GS} = -1.8 V	@V _{GS} = -2.5 V	@V _{GS} = -4.5 V	@V _{GS} = -10 V	
SSM3J145TU	SOT-323F (UFM)	-20	-8/+6	-3.0	260	180	132	103	-	270
SSM3J144TU		-20	-8/+6	-3.2	240	168	123	93	-	290
SSM3J140TU		-20	-8/+6	-4.4	63.2	41.1	31	25.8	-	1800
SSM3J143TU		-20	-8/+6	-5.5	88.4	56	39.7	29.8	-	840
SSM3J377R	SOT-23F	-20	-8/+6	-3.9	240	168	123	93	-	290
SSM3J371R		-20	-8/+6	-4.0	150	100	75	55	-	630
SSM3J378R		-20	-8/+6	-6.0	88.4	56	39.7	29.8	-	840
SSM3J374R		-30	-20/+10	-4.0	-	-	-	105	71	280
SSM3J372R		-30	-12/+6	-6.0	-	144	72	50	42	560
SSM3J375F	SOT-346 (S-Mini)	-20	-8/+6	-2.0	311	231	179	150	-	270

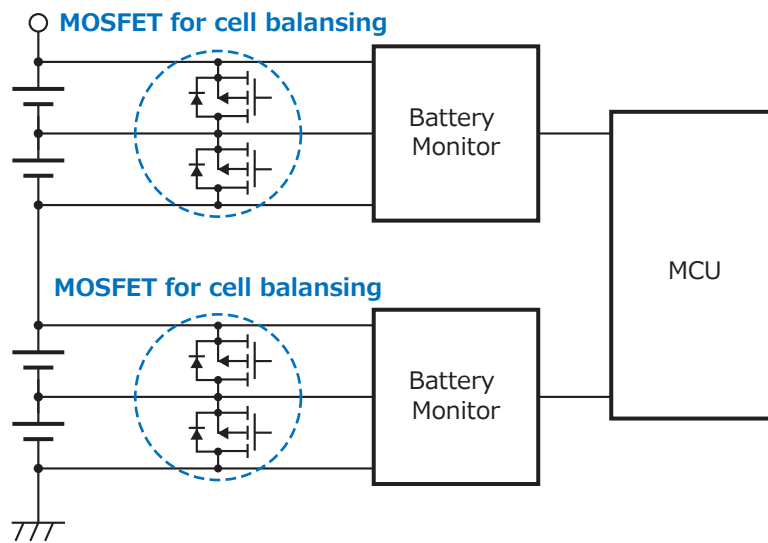
Notes: [1] Battery Management System: BMS

[2] Electric Vehicle: EV, Hybrid Electric Vehicle: HEV

Pin Connection



Application Circuit Example



Battery cell balancing circuit of automotive equipment

The application circuits shown in this document are provided for reference purposes only. Thorough evaluation is required, especially at the mass-production design stage. Toshiba Electronic Devices & Storage Corporation does not grant any license to any industrial property rights by providing these examples of application circuits.

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