Santa Ana, CA
Microsemi
Progress Powered by Technology

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MM158-XX-X

PRELIMINARY

DISCHARGE: up to 150Ah
CHARGE: up to 3V
SHORT: 150Adc

BATTERY CELL BYPASS/SHORTING MODULE

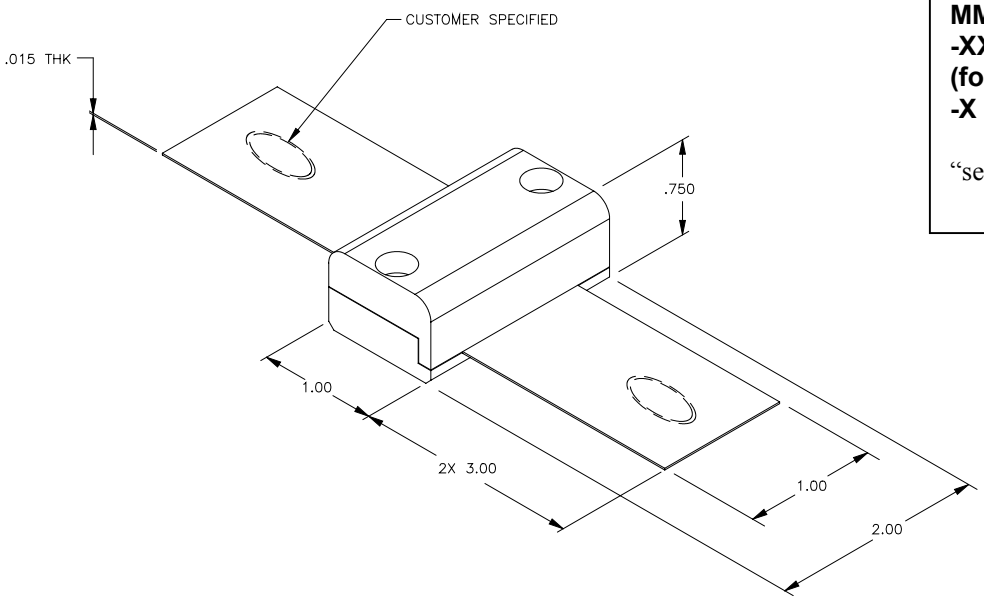
Features

- Designed for use with spacecraft NiH_2 and Li-Ion battery cells
- Thermally activated non-dissipative permanent cell bypass
- Compact, rugged construction offers weight and cost savings
- Copper terminations available in user specified length, bend, and hole diameter and location
- Radiation tolerant to 300 Krad total dose
- Discrete charge and discharge diodes are packaged in Slugger™2 and screened and qualified per Microsemi PS11.50
- Available in Bi-directional (charge/discharge) or Uni-directional (discharge) configuration.

Maximum Ratings Prior to Activation @ 25°C (unless otherwise specified)

PART NUMBER	SYMBOL	TYP	MAX.	UNIT
Discharge Current, option 1	ID		150	Amps
Charge Current, option 1	IC		50	Amps
Non-Repetitive Peak Surge Current (discharge)	IDSM		300	Amps
Non-Repetitive Peak Surge Current (charge)	ICSM		300	Amps
Geo-stationary Operating Temperature Range	Top	-20 to +55		°C
Storage Temperature Range	Tstg		-55 to +150	°C
Thermal resistance, junction to lead, discharge, measured at lead adjacent to cover	RΘjLD		tbd	°C/W
Thermal resistance, junction to lead, charge, measured at lead adjacent to cover	RΘjLC		tbd	°C/W
Weight (lead length = 3")	Weight		<50	Grams

Mechanical Outline



Ordering Information
MM158 = basic design
-XX = discharge, charge option number (for uni-direction, use "0" for charge)
-X = specific terminations (see note 6)

"see note 4 for ordering examples"

PRELIMINARY

Electrical Parameters, DISCHARGE @ TC = 25°C (see notes 2 and 5)

DESCRIPTION	SYMBOL	CONDITIONS	MIN	TYP.	MAX	UNIT
Option 1 (recommended for 100Ah to 150Ah cell)						
Forward Voltage	VD1-1	IF= 5 A		0.82	0.84	V
Forward Voltage	VD2-1	IF= 20 A		0.89	0.92	V
Forward Voltage	VD3-1	IF= 50 A		0.96	0.98	V
Forward Voltage	VD4-1	IF= 100 A		1.04	1.10	V
Forward Voltage	VD5-1	IF= 150 A		1.11		
Option 2 (recommended for 50Ah to 100Ah cell)						
Forward Voltage	VD1-2	IF= 5 A		1.63	1.67	V
Forward Voltage	VD2-2	IF= 20 A		1.78	1.84	V
Forward Voltage	VD3-2	IF= 50 A		1.92	1.97	V
Forward Voltage	VD4-2	IF= 100 A		2.08		V
Option 3 (recommended for <50Ah cell)						
Forward Voltage	VD1-3	IF= 5 A		2.44	2.50	V
Forward Voltage	VD2-3	IF= 20 A		2.67	2.77	V
Forward Voltage	VD3-3	IF= 50 A		2.87		V

Electrical Parameters, CHARGE @ TC = 25°C (see notes 2 and 5)

DESCRIPTION	SYMBOL	CONDITIONS	MIN	TYP.	MAX	UNIT
Option 1 (recommended for 1.5V cell)						
Forward Voltage	VC1-3	IF= 10 mA	1.5	1.72		V
Forward Voltage	VC2-3	IF= 5 A	2.2	2.44	2.50	
Forward Voltage	VC3-3	IF= 25 A	2.4	2.68	2.78	V
Forward Voltage	VC4-3	IF= 50 A	2.5	2.87	2.95	V
Option 2 (recommended for 2.5V cell)						
Forward Voltage	VC1-4	IF= 10 mA	2.25	2.58		V
Forward Voltage	VC2-4	IF= 5 A	3.3	3.65	3.75	V
Forward Voltage	VC3-4	IF= 25 A	3.6	3.93	4.15	V
Forward Voltage	VC4-4	IF= 50 A		4.2		V
Option 3 (recommended for 3.0V cell)						
Forward Voltage	VC1-5	IF= 10 mA	2.81	3.22		V
Forward Voltage	VC2-5	IF= 5 A	4.12	4.56	4.69	V
Forward Voltage	VC3-5	IF= 25 A		4.91		V

MM158-XX-X

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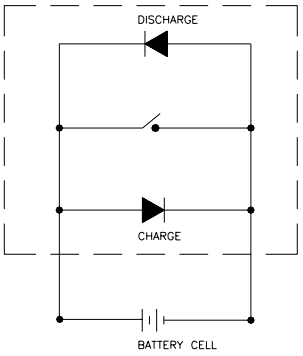
Charge/discharge bypass activation @ TA = 25°C (see notes 3 and 5)

DESCRIPTION	SYMBOL	CONDITIONS	MIN	TYP.	MAX	UNIT
Discharge, option 1	Dts1-60	ID = 60A		80		secs
Discharge, option 2	Dts2-30	ID = 30A		170		secs
Discharge, option 2	Dts2-50	ID = 50 A		55	80	secs
Discharge, option 2	Dts2-70	ID = 70 A		38	55	secs
Charge, option 1	Cts1-20	IC = 20A		170		secs

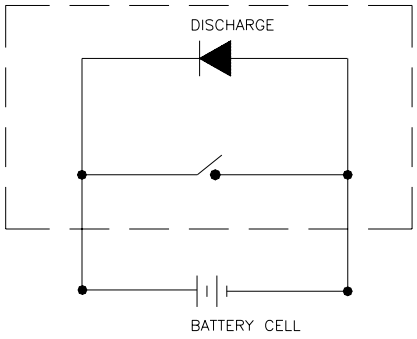
Electrical Parameters, after bypass shorts @ TA = -20°C to +40°C (see note 5)

DESCRIPTION	SYMBOL	CONDITIONS	MIN	TYP.	MAX	UNIT
Shorted Current	Ishort	t= dc	150			A
Shorted Current (pulse)	IPshort	t= 500ms	TBD			A
Resistance	Rshort	Lead length ≤ 0.5”			300	uΩ
Shorted Cycling	Cshort	Ishort=150 A Duty cycle = tbd	TBD			cycles

Schematic for Bi-directional



Schematic for Uni-directional



Notes

1. All tests are pulse test, t ≤ 500 µs, duty cycle δ ≤ 2%, unless otherwise indicated
2. Lead length ≤ 0.5”
3. With Leads un-heatsinked
4. Ordering examples:
   a) MM158-12-1, Discharge option1 (100Ah to 150Ah), Charge option2 (2.5V), customer specified termination
   b) MM158-23-0, Discharge option2 (50Ah to 100Ah), Charge option3 (3.0V) , 3" straps with no holes
   c) MM158-10-2, Discharge option1 (100Ah to 150Ah), unidirectional, customer specified termination
5. Consult factory for different or additional electrical requirements not shown above.
6. Consult factory for specific mounting requirements.