/ Revised record

C	2018-4				
D	2019-3-25	1			
E	2020-1-3		Rdson 50		
F	2020-4-13	2	3230		

/ Descriptions

BRCL3160MF / BRCL3160MF
MOSFET
BRCL3160MF SOT23-6
BRCL3160MF

The BRCL3160MF series product is a high integration solution for lithium-lion/polymer battery protection.BRCL3160MF contains advanced power MOSFET, high-accuracy voltage detection circuits and delay circuits.
BRCL3160MF is put into an ultra-small SOT23-6 package and only one external component makes it an ideal solution in limited space of battery pack. BRCL3160MF has all the protection functions required in the battery application including overcharging, overdischarging, overcurrent and load short circuiting protection etc. The accurate overcharging detection voltage ensures safe and full utilization charging.The low standby current drains little current from the cell while in storage. The device is not only targeted for digital cellular phones, but also for any other Li-Ion and Li-Poly battery-powered information appliances requiring long-term battery life.

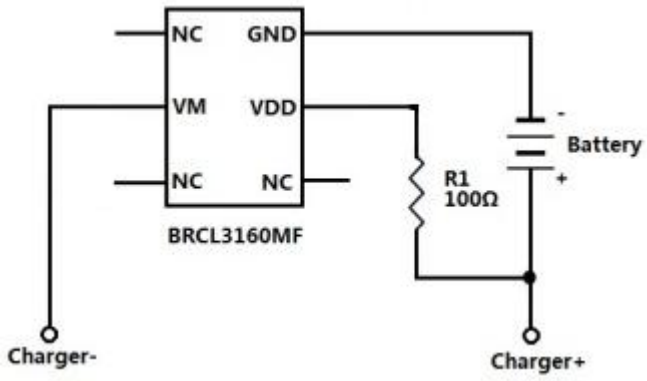
/ Features

- 50mΩ MOSFET
- SOT23-6
- 2
- 0V
- 2.8uA 1.5uA; ROHS
-
- Integrate advanced power MOSFET with Equivalent of 50mΩ $R_{DS(ON);}$
- Ultra-small SOT23-6 package;
- Over-temperature Protection; Overcharge Current Protection; Two-step Overcurrent Detection: Overdischarge Current; Load Short Circuiting.
- Charger detection function; 0V battery charging function; delay times are generated inside;High-accuracy voltage detection.
- Low Current Consumption; Operation Mode: 2.8uA typ; Power-down Mode: 1.5uA typ ; RoHS Compliant and Lead (Pb) Free.
- Halogen-free Product.

/ Applications

One-Cell lithium-ion battery pack; Lithium-Polymer battery pack.

/ Typical Application



(1)

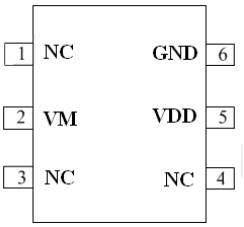
(2)

Notes：

(1) The chip power consumption shall not exceed the maximum power consumed by the package.

(2) This product has anti-static protection function, but do not exceed the maximum capacity of the product to withstand static electricity.

/ Pinning



Pin Number	Pin Name	Pin Description
1	NC	No electrical connection.
2	VM	The negative terminal of the charger. The internal FET switch connects this terminal to GND.
3	NC	No electrical connection.
4	VT	No electrical connection.
5	VDD	Power Supply.
6	GND	Ground, connect the negative terminal of the battery to this pin.

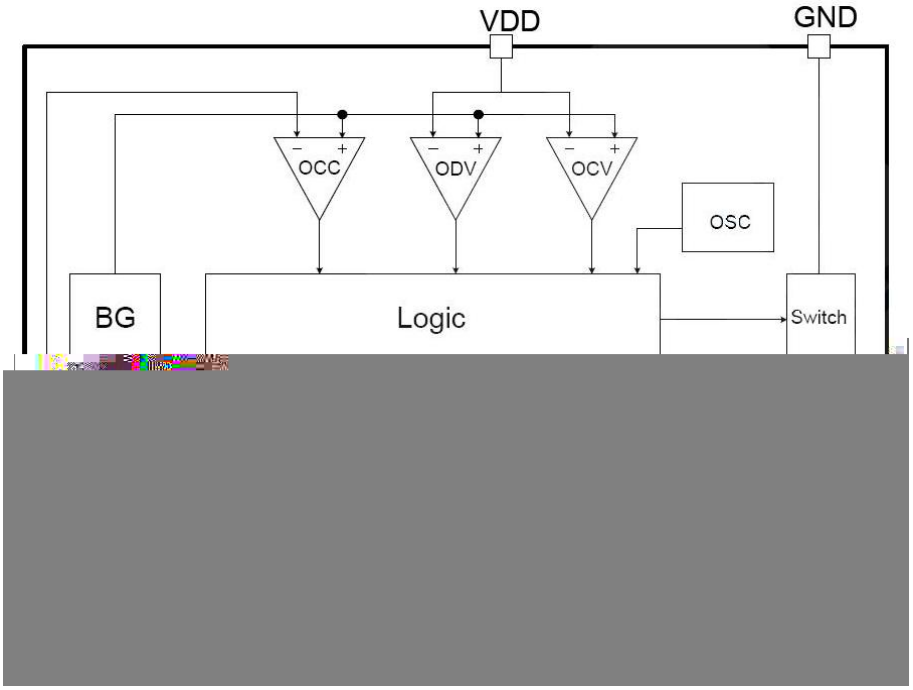
/ Marking

See Marking Instructions.

/Parameter	/Symbol	/Value	/Unit
V_{DD} input pin voltage	V_{IN}	-0.3 to +6.0	V
V_M input pin voltage	V_{VM}	-6.0 to +10	V
Power Dissipation	P_D	400	mW
Maximum Junction Temperature	T_J	125	℃
Lead Temperature	T_L	300	℃
Operating Junction Temperature	T_{opr}	-40 to +85	℃
Storage Temperature	T_{stg}	-55 to +150	℃
Package Thermal Resistance	$R_{\theta JA}$	250	℃/W
	$R_{\theta Jc}$	130	℃/W
ESD	ESD	2000	V

/Parameter	/Symbol	/Test Condition	/Min	/Typ	/Max	/Unit
Overcharge Detection Voltage	V_{CU}		4.25	4.30	4.35	V
Overcharge Release Voltage	V_{CL}		4.05	4.10	4.15	V
Overdischarge Detection Voltage	V_{DL}		2.30	2.40	2.50	V
Overdischarge Release Voltage	V_{DR}		2.90	3.00	3.10	V
Charger Detection Voltage	V_{CHA}			-0.12		V
Overdischarge Current1 Detection	I_{IOV1}	V_{dd}=3.5V		3.0		A
Load Short-Circuiting Detection	I_{SHORT}	V_{dd}=3.5V		12		A
Current Consumption in Normal Operation	I_{OPE}	V_{dd}=3.5V，V_M=0V		2.80		μA

/ Functionl Block Diagram



/ Functional Description

The BRCL3160MF monitors the voltage and current of a battery and protects it from being damaged due to overcharge voltage, overdischarge voltage, overdischarge current, and short circuit conditions by disconnecting the battery from the load or charger. The peripheral circuit is very simple. The MOSFET is integrated and its $R_{DS(ON)}$ is as low as 50mΩ typical.

/ Normal Operating mode

/ Overcharge Condition

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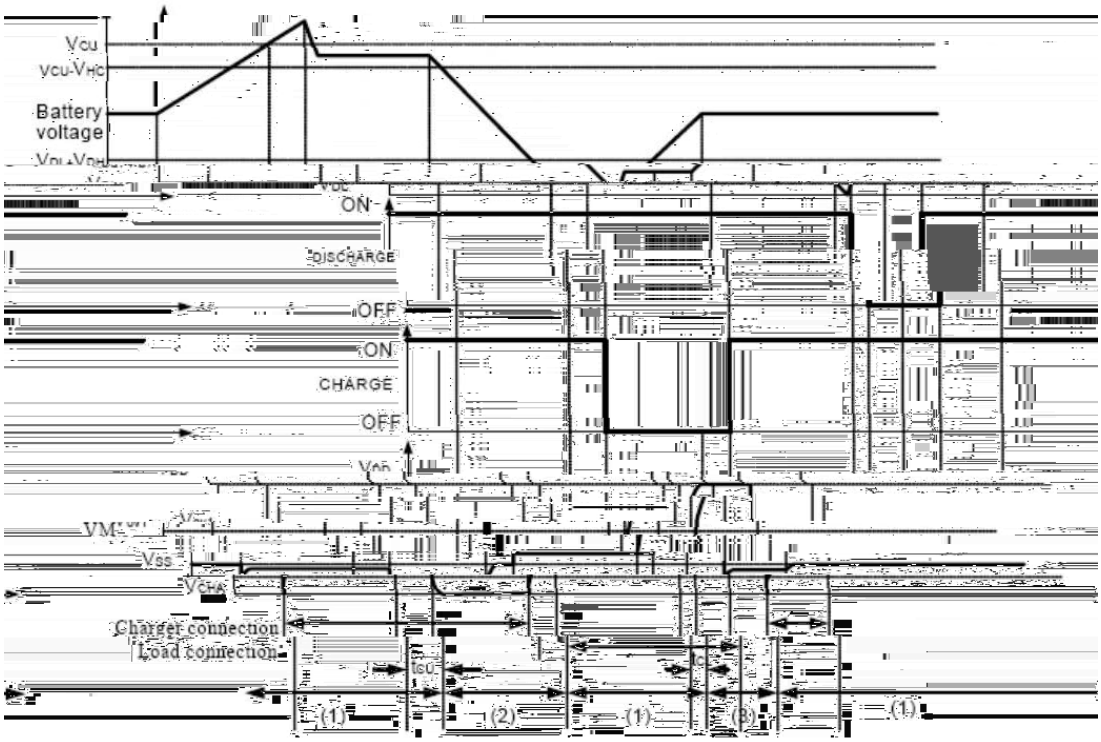
/ Overdischarge Condition

/ Abnormal Charge Current Detection

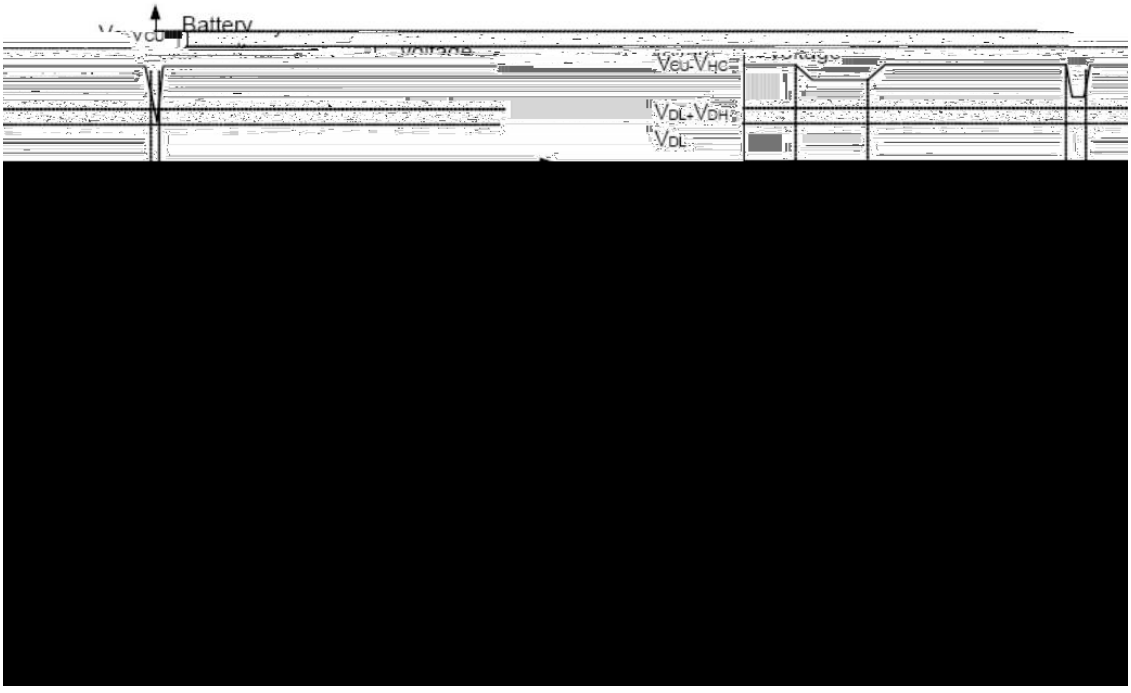
/ Load Short-circuiting Condition

/ Timing Chart

/Overcharge And Overdischarge Detection

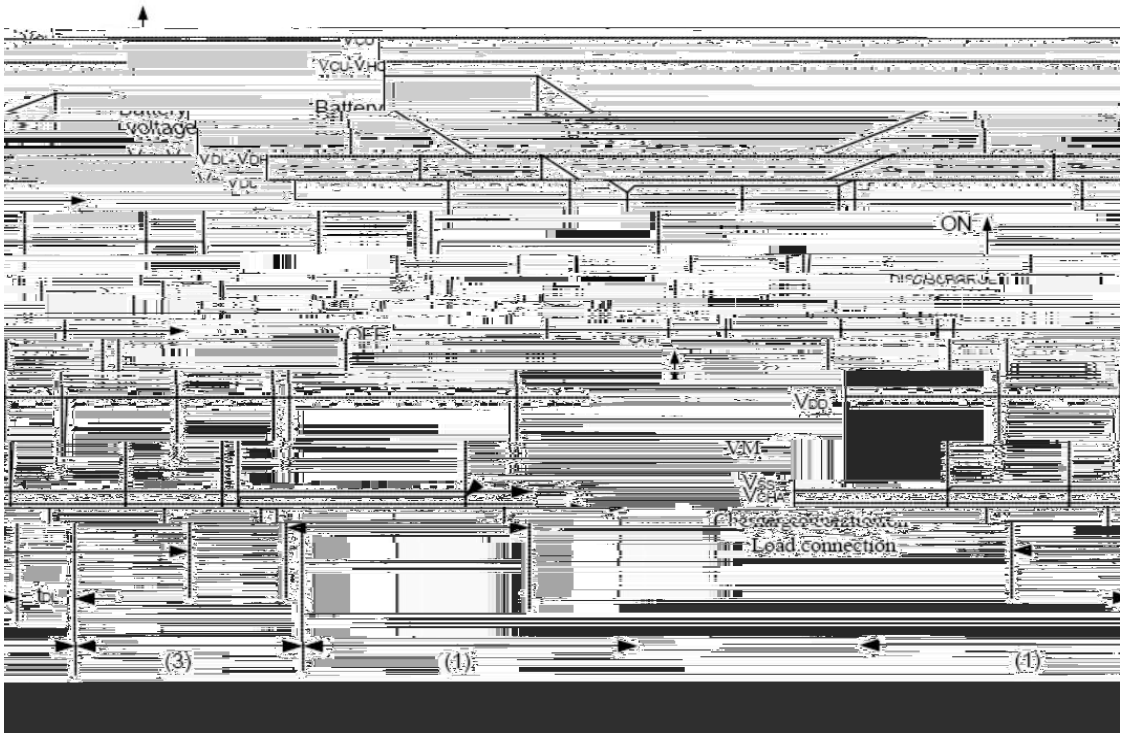


/Overdischarge Current Detection

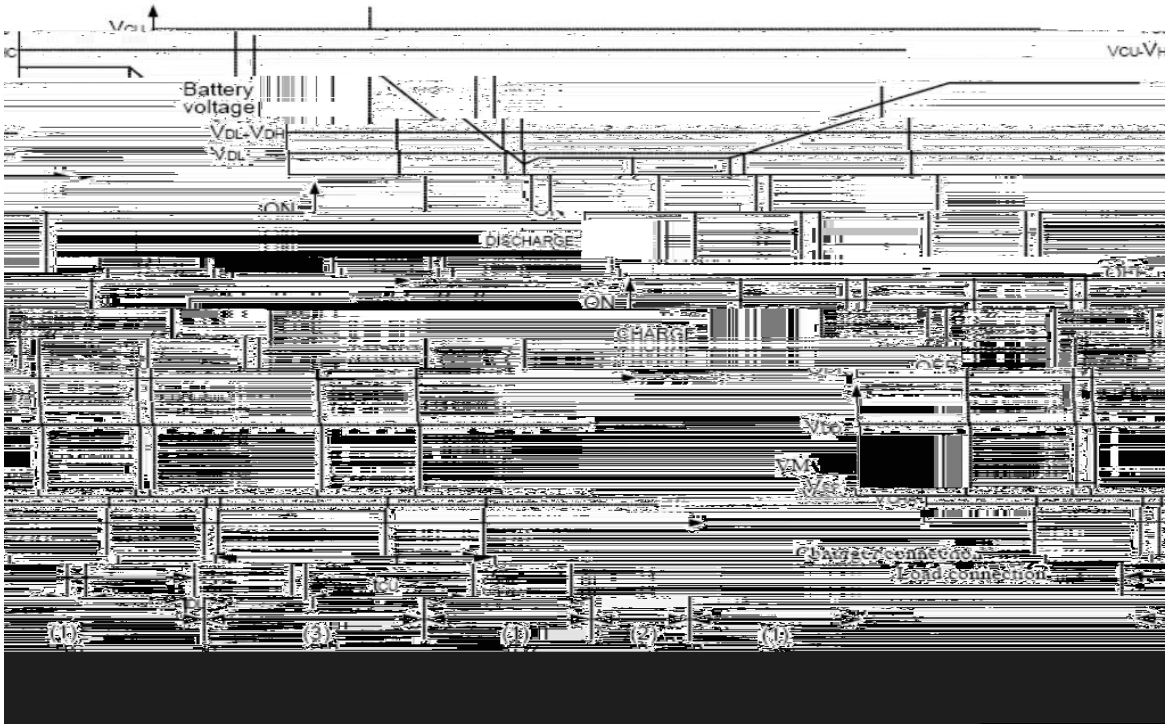


/ Timing Chart

/Charger Detection

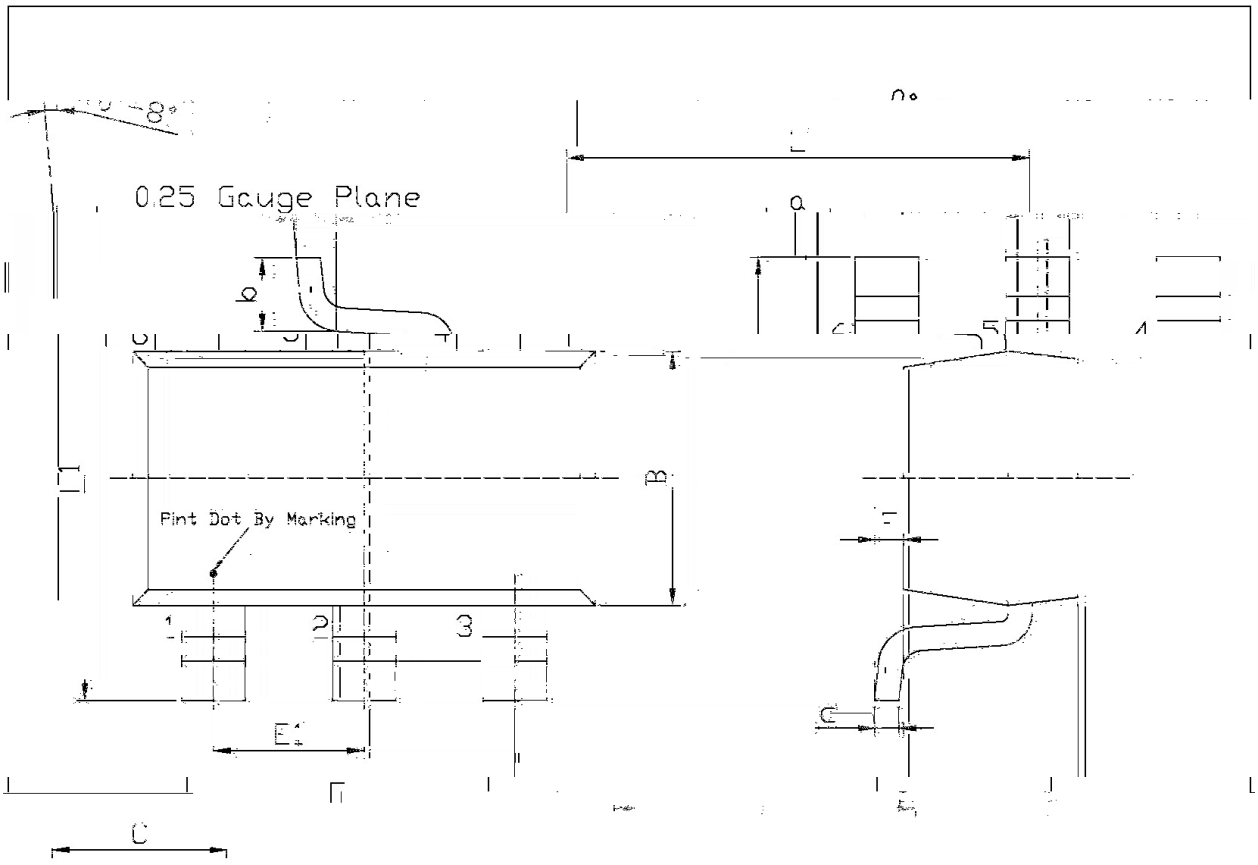


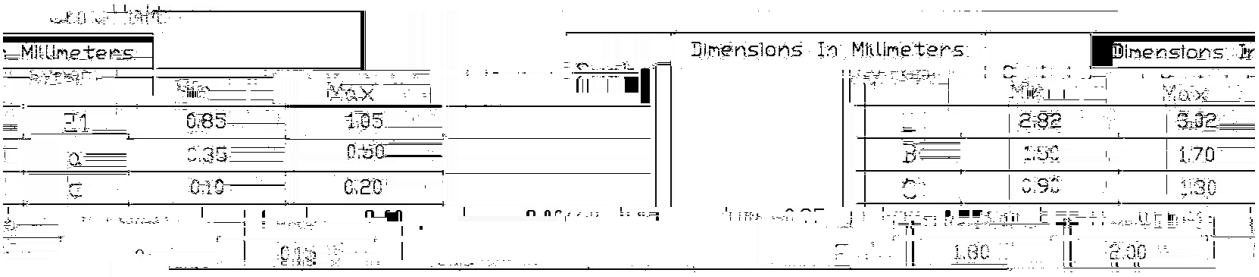
/Abnormal Charge Detection

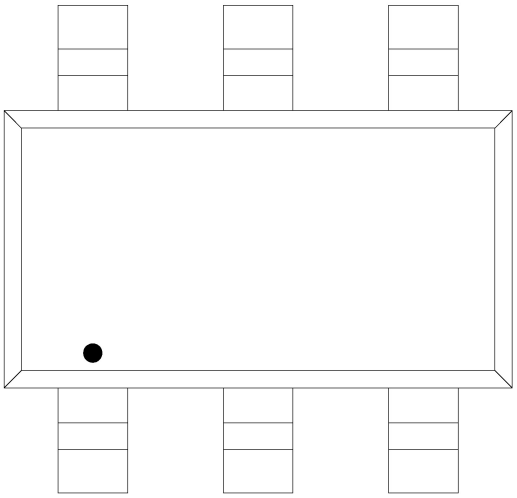


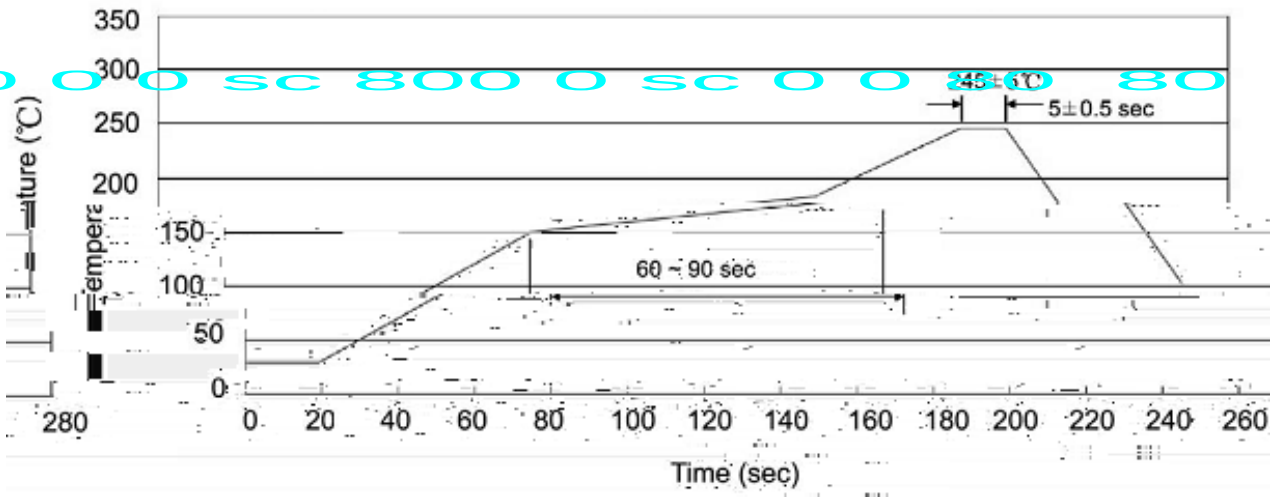
Notes: (1) Normal condition (2) Overcharge voltage condition (3) Overdischarge voltage condition (4) Overcurrent condition

/ Package Dimensions









Note:

1 150 180 60 90see