

FMCRU100-20 Thru FMCRU100-60

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FMCRU100-20 Thru FMCRU100-60

0.8A Sensitive Gate Silicon Controlled Rectifiers Blocking Voltage : 200 ~ 600V

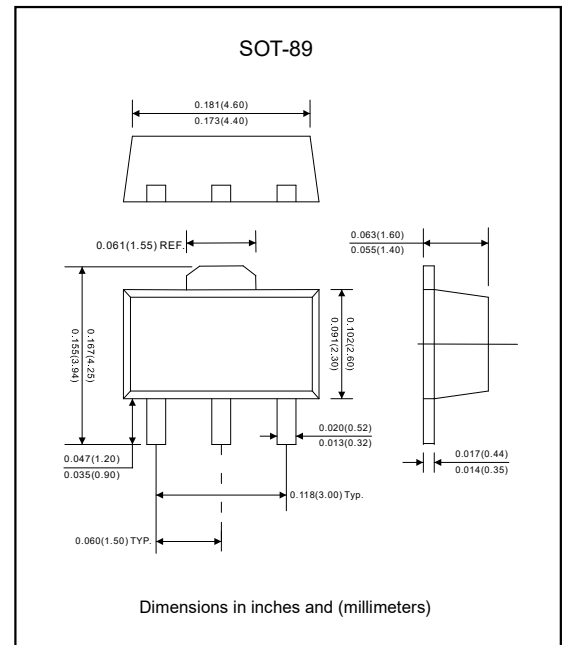
Features

- Sensitive gate allows triggering by micro controllers and other logic circuits.
- Blocking voltage 200V to 600V.
- On-state current rating of 0.8A RMS at 80°C.
- High surge current capability -10A.
- Minimum and maximum values of I_{GT} , V_{GT} and I_H specified for ease of design.
- Immunity to dv/dt -20V/ μ sec minimum at 110°C.
- Glass-passivated surface for reliability and uniformity.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen free parts, ex. FMCRU100-20-H.

Mechanical data

- Epoxy : UL94-V0 reted Flame retardent.
- Case : Molded plastic, SOT-89.
- Terminals : Solder plated, solder able per MIL-STD-750, Method 2026.
- Polarity : Indicated by cathode band.
- Mounting Position : Any.

Package outline



Absolute maximum ratings ($T_A=25^\circ\text{C}$, Unless otherwise noted)

Parameter	Symbol	Ratings			Unit
		FMCRU100-20	FMCRU100-40	FMCRU100-60	
Peak repetitive off-state voltage (Note 1) ($T_J=-40 \sim 110^\circ\text{C}$, Sine wave, 50 ~ 60Hz; Gate open)	V_{DRM} V_{RRM}	200	400	600	V
On-state RMS current ($T_c=80^\circ\text{C}$) 180°C condition angles	$I_{T(RMS)}$	0.8			A
Peak non-repetitive surge current (1/2 cycle, Sine Wave, 60Hz, $T_J=25^\circ\text{C}$)	I_{TSM}	10			A
Circuit fusing considerations ($t=8.3$ ms)	I^2t	0.415			A ² s
Forward peak gate power ($T_A=25^\circ\text{C}$, Pulse width $\leq 1.0\mu\text{s}$)	P_{GM}	0.1			W
Forward average gate power ($T_A=25^\circ\text{C}$, $t=8.3\text{ms}$)	$P_{G(AV)}$	0.01			W
Peak gate current – forward ($T_A=25^\circ\text{C}$, Pulse width $\leq 1.0\mu\text{s}$)	I_{GM}	1			A
Peak gate voltage – reverse ($T_A=25^\circ\text{C}$, Pulse width $\leq 1.0\mu\text{s}$)	V_{GRM}	5			V
Operating Junction temperature range (Rated V_{RRM} and V_{DRM})	T_J	-40 to +110			°C
Storage temperature range	T_{STG}	-40 to +150			°C
Thermal resistance junction to ambient	$R_{\theta JA}$	400			°C/W

Note :

Absolute maximum ratings are those values beyond which the device could be permanently damaged.
Absolute maximum ratings are stress ratings only and functional device operation is not implied.

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Electrical characteristics (At $T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off characteristics						
Peak forward or reverse blocking current	I_{DRM}	$V_{\text{D}}=\text{Rated } V_{\text{DRM}} \text{ and } V_{\text{RRM}}; R_{\text{GK}}=1\text{k}\Omega \text{ (} T_{\text{c}}=25^{\circ}\text{C} \text{)}$			10	μA
	I_{RRM}	$V_{\text{D}}=\text{Rated } V_{\text{DRM}} \text{ and } V_{\text{RRM}}; R_{\text{GK}}=1\text{k}\Omega \text{ (} T_{\text{c}}=110^{\circ}\text{C} \text{)}$			100	
On characteristics						
Peak forward on-state voltage (Note 2)	V_{TM}	$I_{\text{TM}}=1\text{A Peak (} T_{\text{A}}=25^{\circ}\text{C} \text{)}$			1.7	V
Gate Trigger Current (Continuous DC) (Note 3)	I_{GT}	$V_{\text{AK}}=7\text{Vdc, } R_{\text{L}}=100\Omega \text{ (} T_{\text{c}}=25^{\circ}\text{C} \text{)}$	30		100	μA
Holding Current	I_{H}	$V_{\text{AK}}=7\text{Vdc, initiating current}=20\text{mA (} T_{\text{c}}=25^{\circ}\text{C} \text{)}$		0.5	5	mA
		$V_{\text{AK}}=7\text{Vdc, initiating current}=20\text{mA (} T_{\text{c}}=-40^{\circ}\text{C} \text{)}$			10	
Latch Current	I_{L}	$V_{\text{AK}}=7\text{V, } I_{\text{g}}=200\mu\text{A (} T_{\text{c}}=25^{\circ}\text{C} \text{)}$		0.6	10	mA
		$V_{\text{AK}}=7\text{V, } I_{\text{g}}=200\mu\text{A (} T_{\text{c}}=-40^{\circ}\text{C} \text{)}$			15	
Gate trigger voltage (Continuous DC)	V_{GT}	$V_{\text{AK}}=7V_{\text{DC}}, R_{\text{L}}=100\Omega \text{ (} T_{\text{c}}=25^{\circ}\text{C} \text{)}$		0.62	0.8	V
		$V_{\text{AK}}=7V_{\text{DC}}, R_{\text{L}}=100\Omega \text{ (} T_{\text{c}}=-40^{\circ}\text{C} \text{)}$			1.2	
Dynamic parameters						
Critical rate of rise of off-state voltage	dv/dt	$V_{\text{D}}=\text{Rated } V_{\text{DRM}}, \text{ Exponential waveform, } R_{\text{GK}}=1\text{K}\Omega, T_{\text{J}}=110^{\circ}\text{C}$	20	35		V/ μs
Critical rate of rise of on-state current	di/dt	$P_{\text{K}}=20\text{A; } P_{\text{W}}=10\mu\text{s; diG/dt}=1\text{A}/\mu\text{s, } I_{\text{gt}}=20\text{mA}$			50	A/ μs

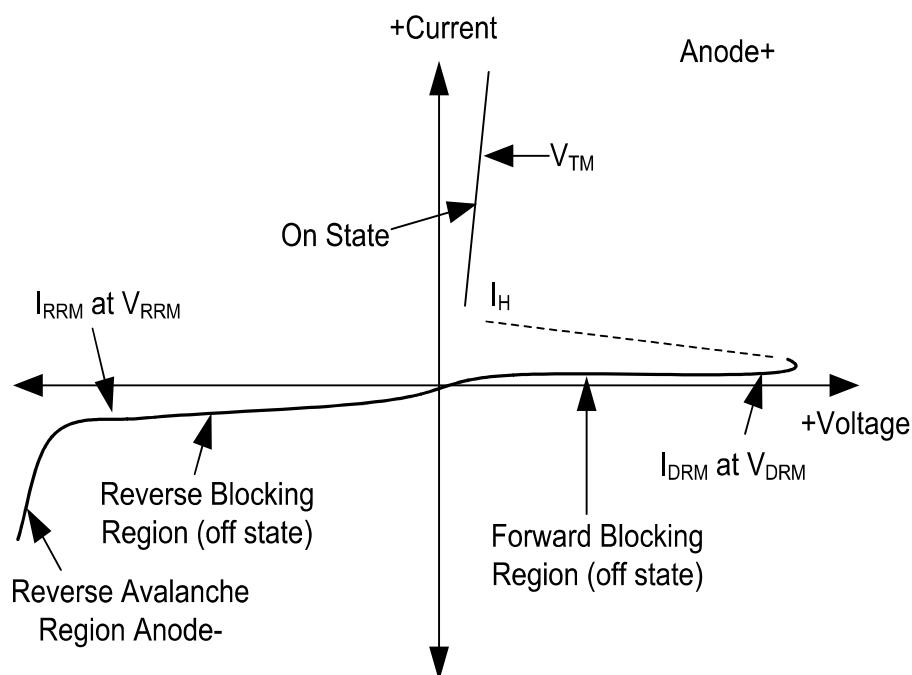
Note:

- V_{DRM} and V_{RRM} for all types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage; however, positive gate voltage shall not be applied concurrent with negative potential on the anode. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.
- Indicates Pulse Test Width $\leq 1.0\text{ms}$, duty cycle $\leq 1\%$.
- Does not include R_{GK} in measurement.

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Voltage current characteristic of SCR

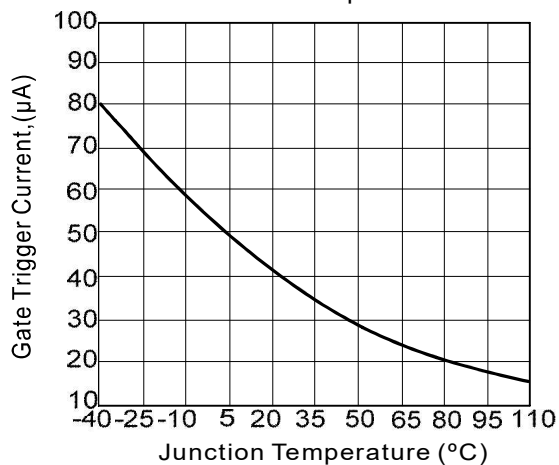
Parameter	Symbol
Peak repetitive off state forward voltage	V_{DRM}
Peak forward blocking current	I_{DRM}
Peak repetitive off state reverse voltage	V_{RRM}
Peak reverse blocking current	I_{RRM}
Peak on state voltage	V_{TM}
Holding current	I_H



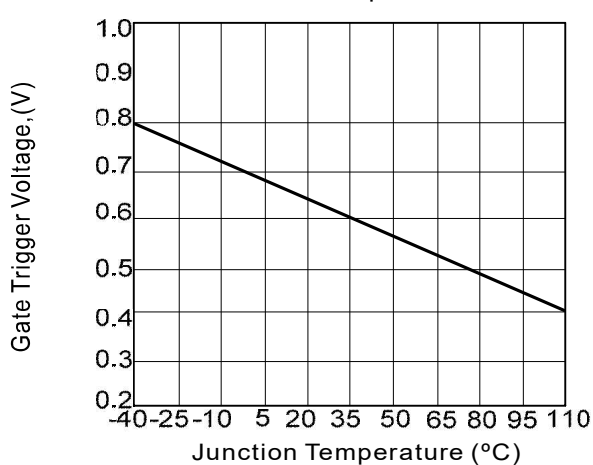
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Typical characteristics Curves

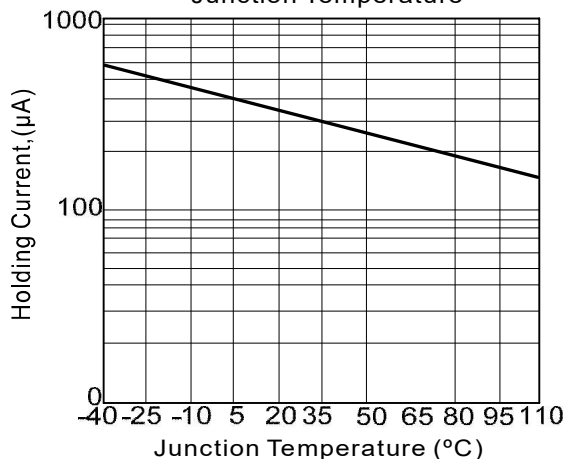
Typical Gate Trigger Current vs. Junction Temperature



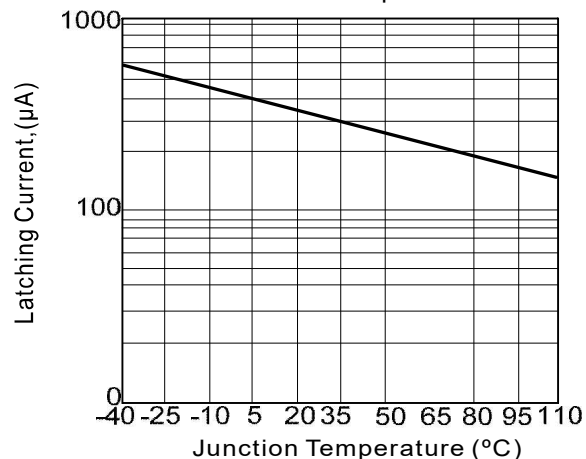
Typical Gate Trigger Voltage vs. Junction Temperature



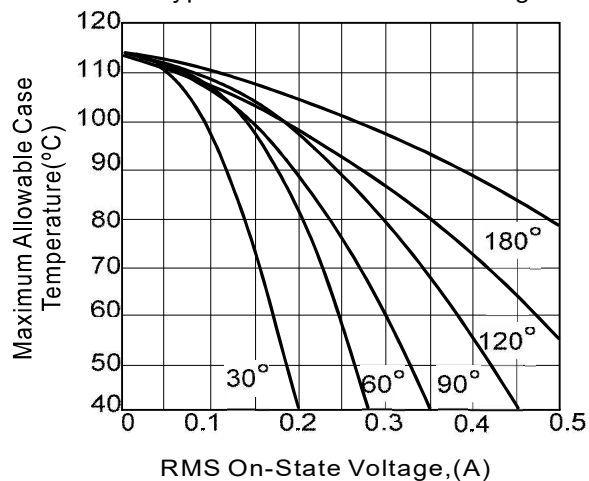
Typical Holding Current vs. Junction Temperature



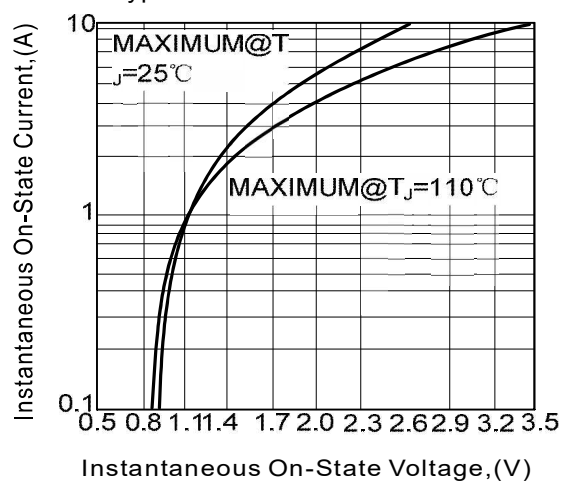
Typical Latching Current vs. Junction Temperature



Typical RMS Current Derating

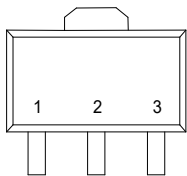
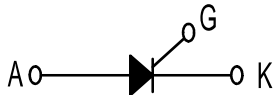


Typical On-State Characteristics

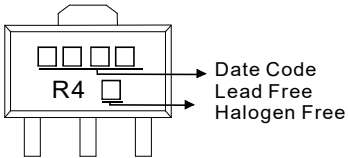
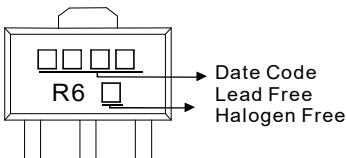
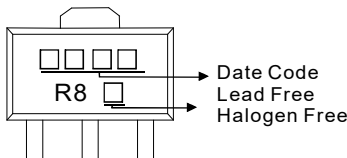


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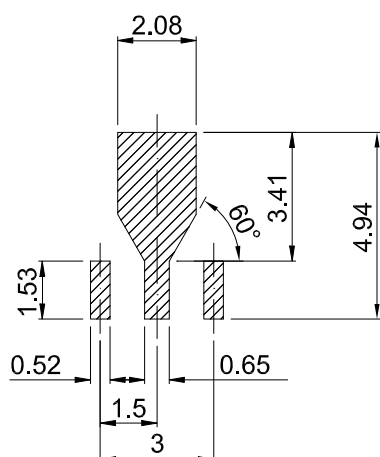
Pinning information

Pin	Simplified outline	Symbol
Pin1 G: Gate Pin2 A: Anode Pin3 K: Cathode		

Marking

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Suggested solder pad layout

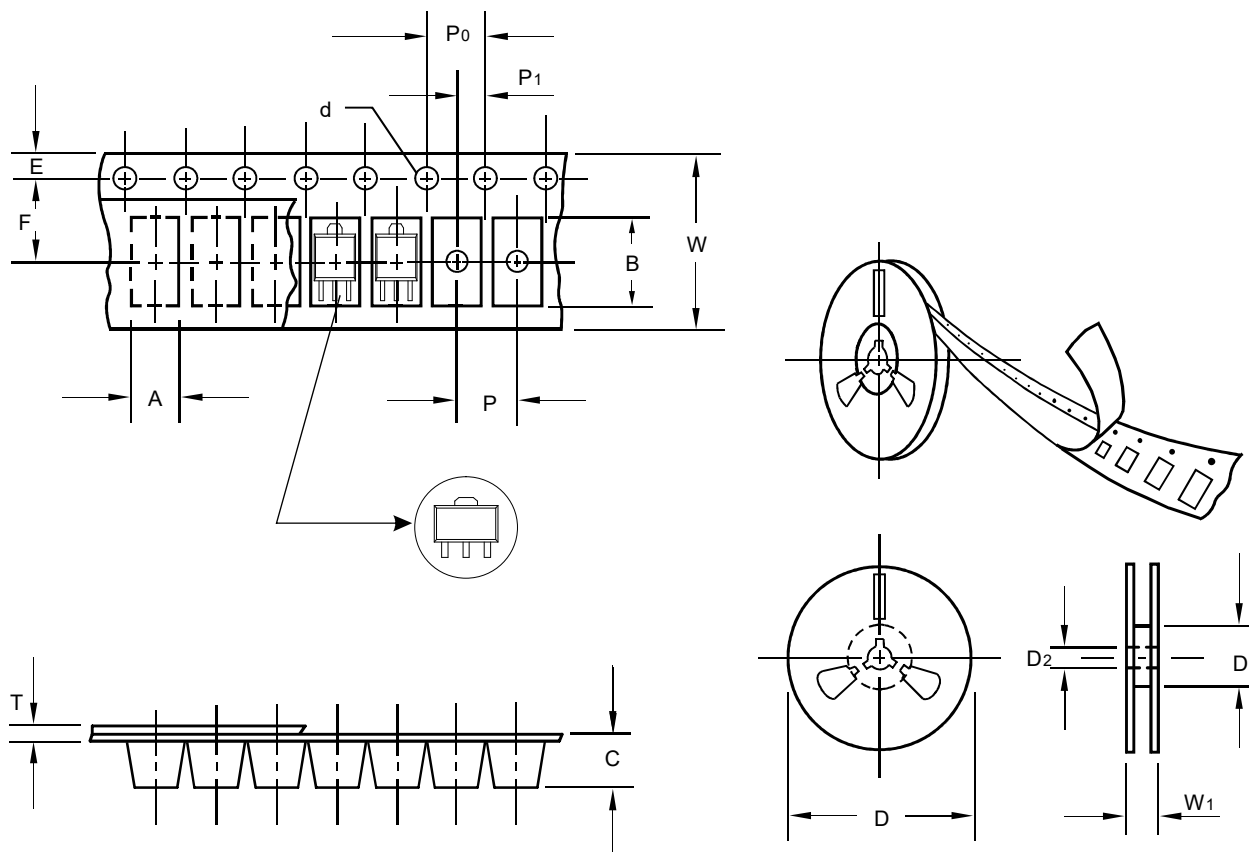


Note:

1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.

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Packing information



unit:mm

Item	Symbol	Tolerance	SOT-89
Carrier width	A	0.1	4.85
Carrier length	B	0.1	4.45
Carrier depth	C	0.1	1.85
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	-
13" Reel inner diameter	D1	min	-
7" Reel outside diameter	D	1.0	180.00
7" Reel inner diameter	D1	1.5	60.00
Feed hole diameter	D2	0.2	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	5.50
Punch hole pitch	P	0.1	8.00
Sprocket hole pitch	P0	0.1	4.00
Embossment center	P1	0.1	2.00
Overall tape thickness	T	0.01	0.292
Tape width	W	0.1	12.00
Reel width	W1	0.2	16.50

Note: Devices are packed in accordance with EIA standard RS-481-A and specifications listed above.

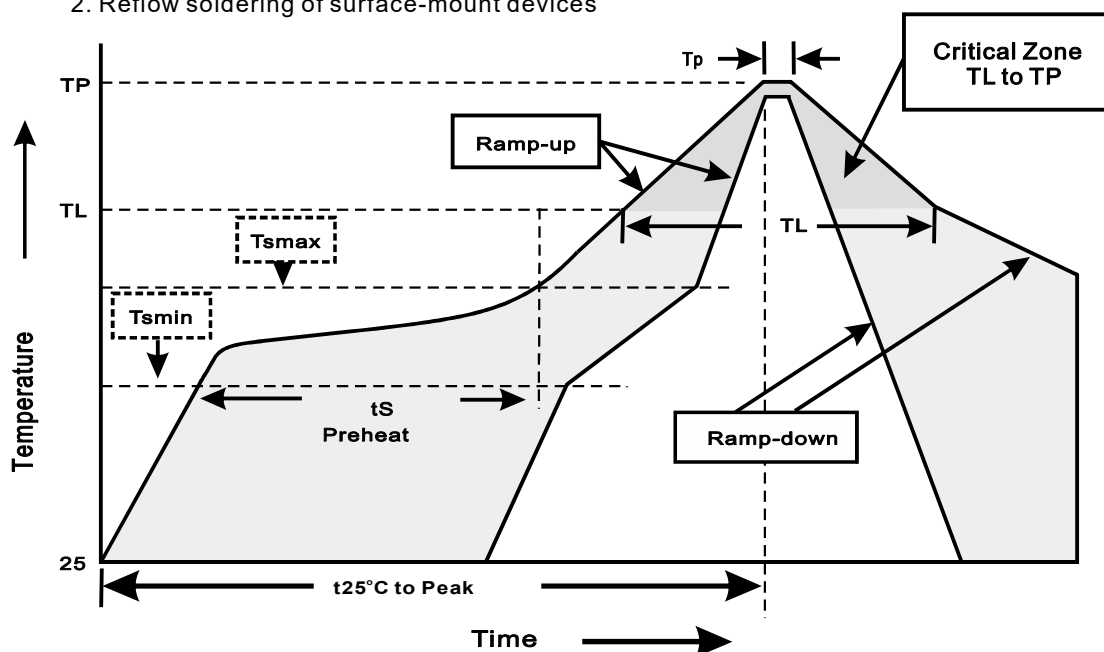
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Reel packing

PACKAGE	REEL SIZE	REEL (pcs)	COMPONENT SPACING (m/m)	BOX (pcs)	INNER BOX (m/m)	REEL DIA, (m/m)	CARTON SIZE (m/m)	CARTON (pcs)	APPROX. GROSS WEIGHT (kg)
SOT-89	7"	1,000	8.0	10,000	183*123*183	178	382*257*387	80,000	18.5

Suggested thermal profiles for soldering processes

1. Storage environment: Temperature=5°C~40°C Humidity=55%±25%
2. Reflow soldering of surface-mount devices



3. Reflow soldering

Profile Feature	Soldering Condition
Average ramp-up rate(T _L to T _P)	<3°C/sec
Preheat -Temperature Min(T _{smín}) -Temperature Max(T _{smáx}) -Time(min to max)(t _s)	150°C 200°C 60~120sec
T _{smáx} to T _L -Ramp-upRate	<3°C/sec
Time maintained above: -Temperature(T _L) -Time(t _{TL})	217°C 60~260sec
Peak Temperature(T _P)	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(t _P)	10~30sec
Ramp-down Rate	<6°C/sec
Time 25°C to Peak Temperature	<6minutes