

FMS2301A

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FMS2301A

20V P-Channel Enhancement Mode MOSFET

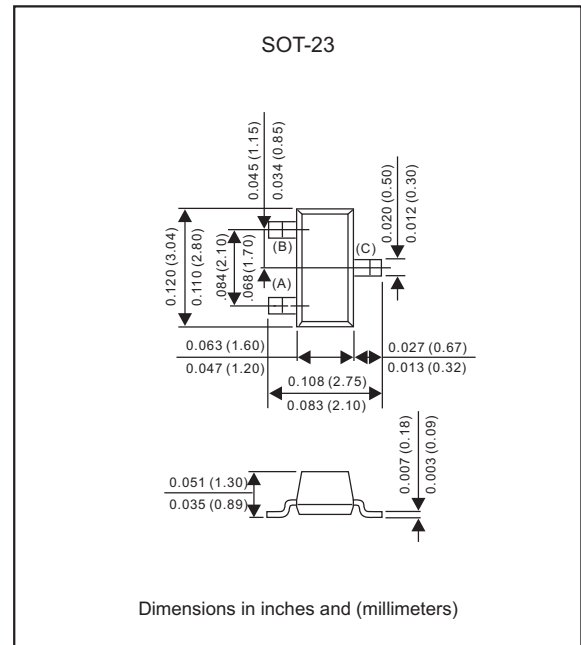
Features

- $R_{DS(ON)} \leq 75m\Omega @ V_{GS} = -4.5V$
- $R_{DS(ON)} \leq 95m\Omega @ V_{GS} = -2.5V$
- $R_{DS(ON)} \leq 130m\Omega @ V_{GS} = -1.8V$
- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability
- In compliance with EU RoHS 2002/95/EC directives.
- Suffix "-H" indicates Halogen-free part, ex. FMS2301A-H.

Mechanical data

- Epoxy: UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-23
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Mounting Position : Any
- Weight : Approximated 0.008 gram

Package outline



Maximum ratings (AT $T_A = 25^\circ C$ unless otherwise noted)

PARAMETER	CONDITIONS	Symbol	Limit	UNIT
Drain-source voltage		V_{DSS}	-20	V
Drain current-continue	$T_A = 25^\circ C$	I_D	-3.2	A
	$T_A = 70^\circ C$		-2.6	
	-pulsed	I_{DM}	-13	
Gate- source voltage-continue		V_{GS}	± 8.0	V
Maximum power dissipation	$T_A = 25^\circ C$	P_D	1.3	W
	$T_A = 70^\circ C$		0.8	
Thermal resistance-junction to ambient*		$R_{\theta JA}$	100	$^\circ C/W$
Operation junction temperature range		T_J	-55 to +150	$^\circ C$
Storage temperature range		T_{STG}	-65 to +150	$^\circ C$

* The device mounted on 1in² FR4 board with 2 oz copper

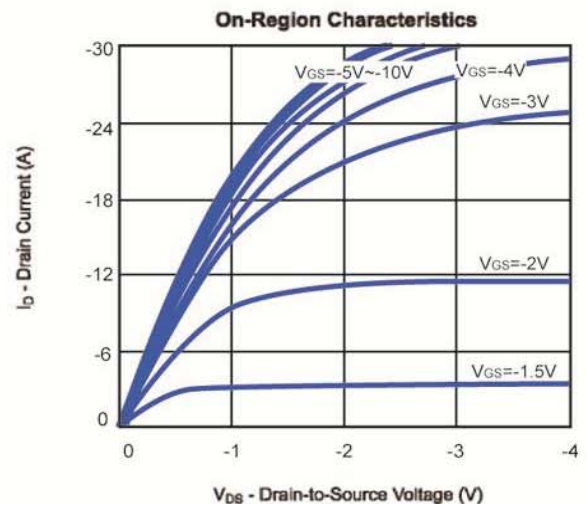
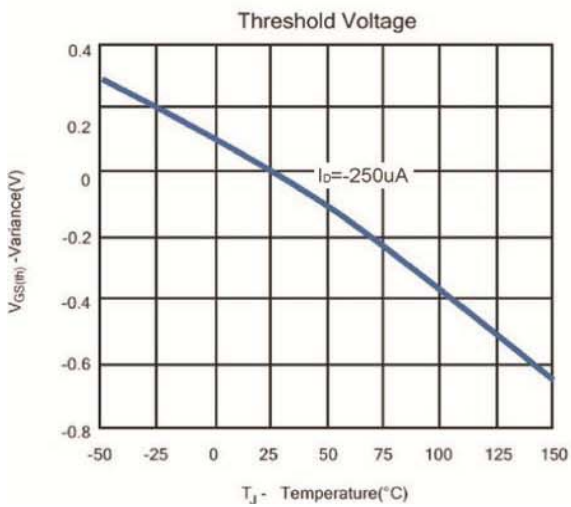
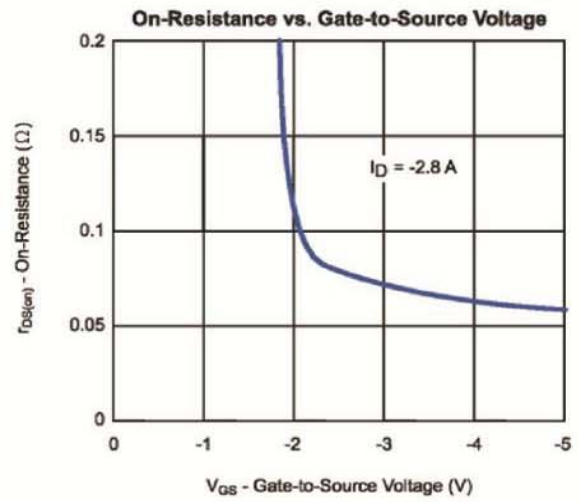
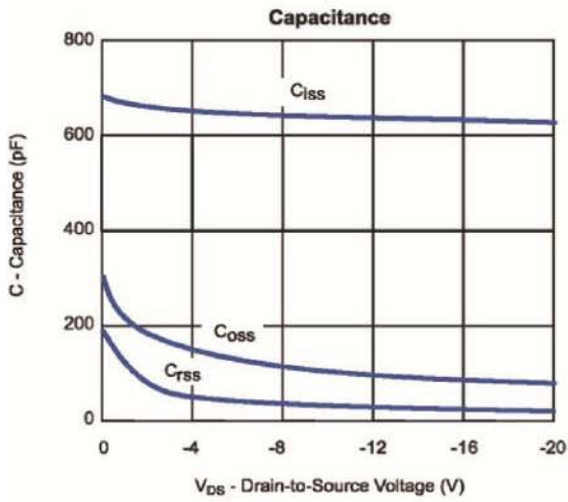
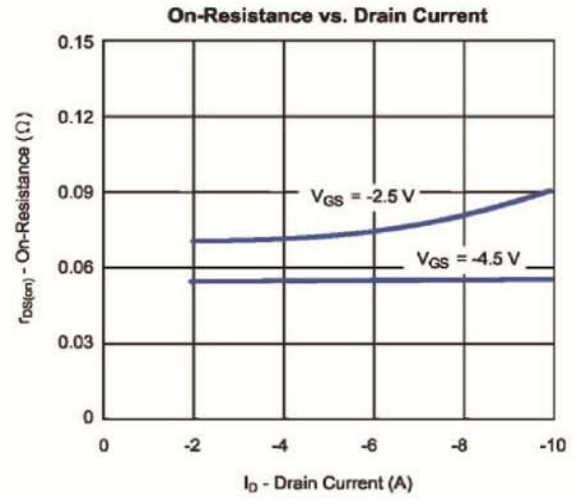
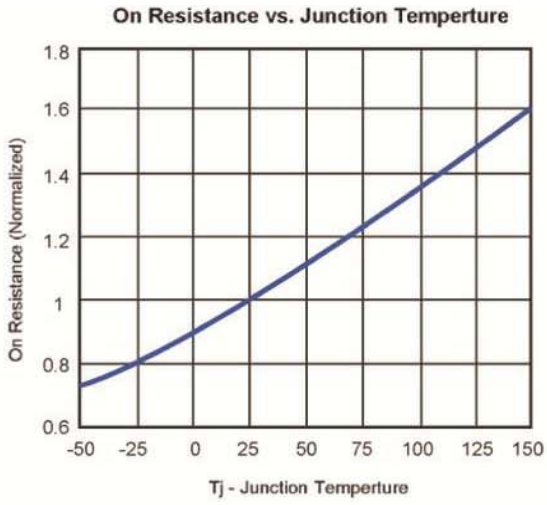
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Electrical characteristics (At $T_A=25^\circ\text{C}$ unless otherwise noted)

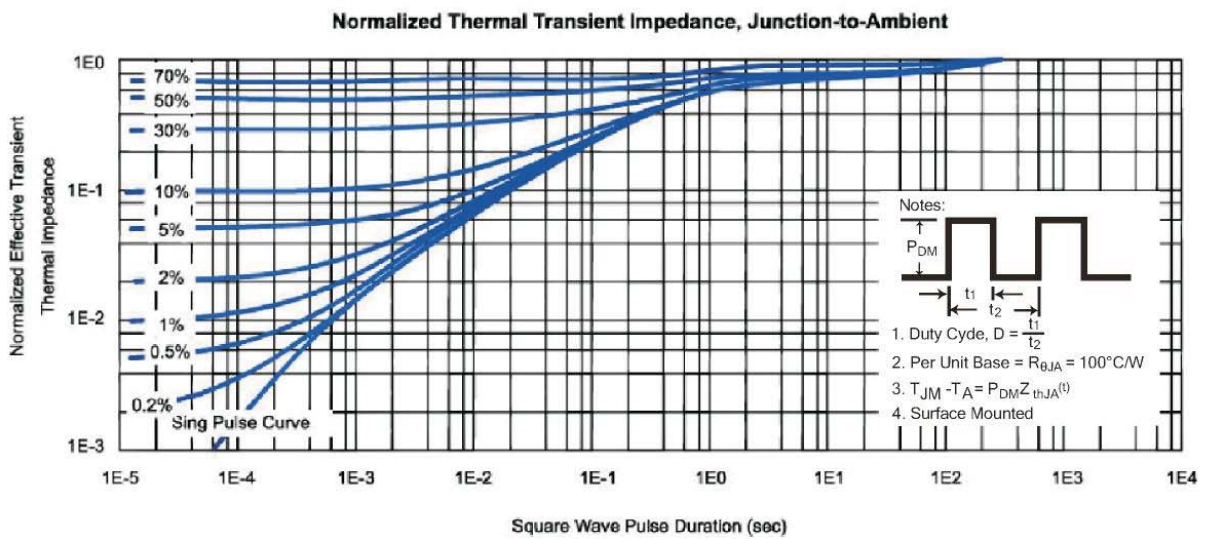
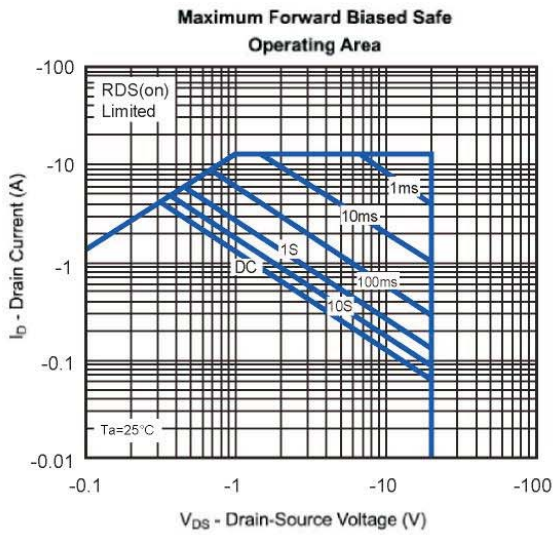
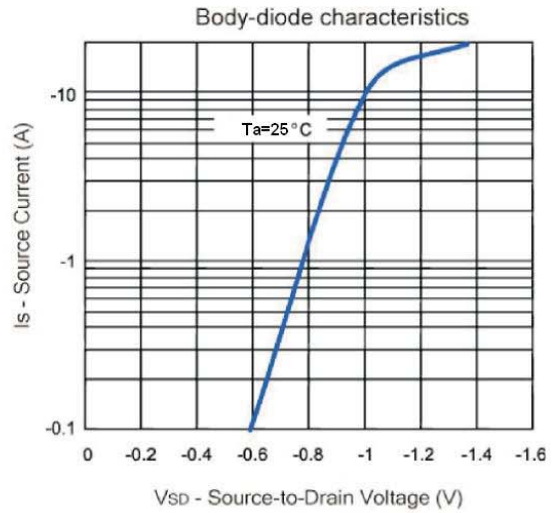
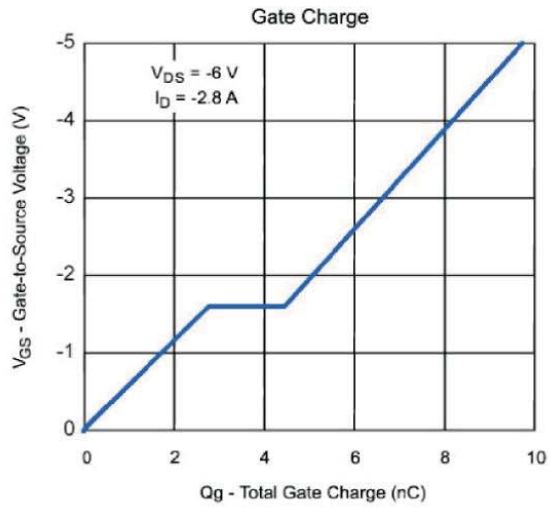
PARAMETER	CONDITIONS	Symbol	MIN.	TYP.	MAX.	UNIT
STATIC						
Drain-source breakdown voltage	$V_{GS} = 0V, I_D = -250\mu A$	BV_{DSS}	-20			V
Zero gate voltage drain current	$V_{DS} = -20V, V_{GS} = 0V, T_J = 25^\circ\text{C}$	I_{DSS}			-1.0	μA
Gate-body leakage current-forward	$V_{GS} = 8V, V_{DS} = 0$	I_{GSSF}			100	nA
Gate-body leakage current-reverse	$V_{GS} = -8V, V_{DS} = 0$	I_{GSSR}			-100	nA
Gate threshold voltage	$V_{DS} = V_{GS}, I_D = -250\mu A$	$V_{GS(th)}$	-0.4		-0.9	V
Static drain-source on-resistance ^a	$V_{GS} = -4.5V, I_D = -2.8A$ $V_{GS} = -2.5V, I_D = -2.4A$ $V_{GS} = -1.8V, I_D = -1.7A$	$R_{DS(on)}$		55 70 100	75 95 130	m Ω
Diode Forward Voltage	$V_{GS} = 0V, I_S = -1.0A, T_J = 25^\circ\text{C}$	V_{SD}		-0.7	-1.0	V
DYNAMIC						
Input capacitance	$V_{DS} = -15V, V_{GS} = 0V,$ $f = 1.0\text{MHz}$	C_{iss}		650		pF
Output capacitance		C_{oss}		65		
Reverse transfer capacitance		C_{rss}		16		
Total gate charge	$V_{DS} = -6.0V, I_D = -2.8A$ $V_{GS} = -4.5V$	Q_g		9.3		nC
Gate-source charge		Q_{gs}		3		
Gate-drain charge		Q_{gd}		1.5		
Turn-on delay time	$V_{DD} = -15V, R_L = 15\Omega$ $V_{GEN} = -10V, R_G = 6\Omega$	$t_{d(on)}$		32		ns
Turn-on rise time		t_r		18		
Turn-off delay time		$t_{d(off)}$		57		
Turn-off fall time		t_f		4.5		

Notes: a. Pulse test; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$

Rating and characteristic curves (FMS2301A)

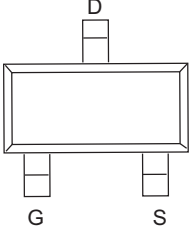
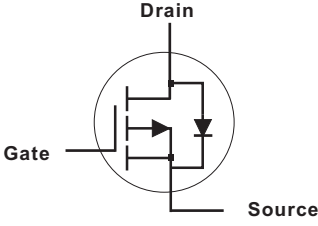


Rating and characteristic curves (FMS2301A)



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Pinning information

Pin	Simplified outline	Symbol
PinD Drain PinG Gate PinS Source		

Marking

Type number	Marking code
FMS2301A	WAAG0A (Note 1)

Note: 1.

P/N :

“WAAG is FMS2301A-H

“WAA” shown on the 1st~3rd position on --- FMS2301A

“G” shown on the 4th position on --- Green product-Halogen free

D/C :

0A is the sequence of “0-9” & “A~Z”

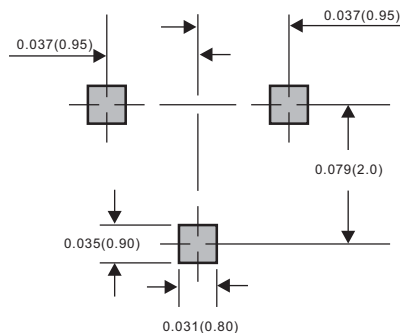
0~9 shown on the 5th position on ---2010~2019

A~Z shown on the 6th position on ---1week~26week

A~Z shown on the 6th position on ---27week~52week

Suggested solder pad layout

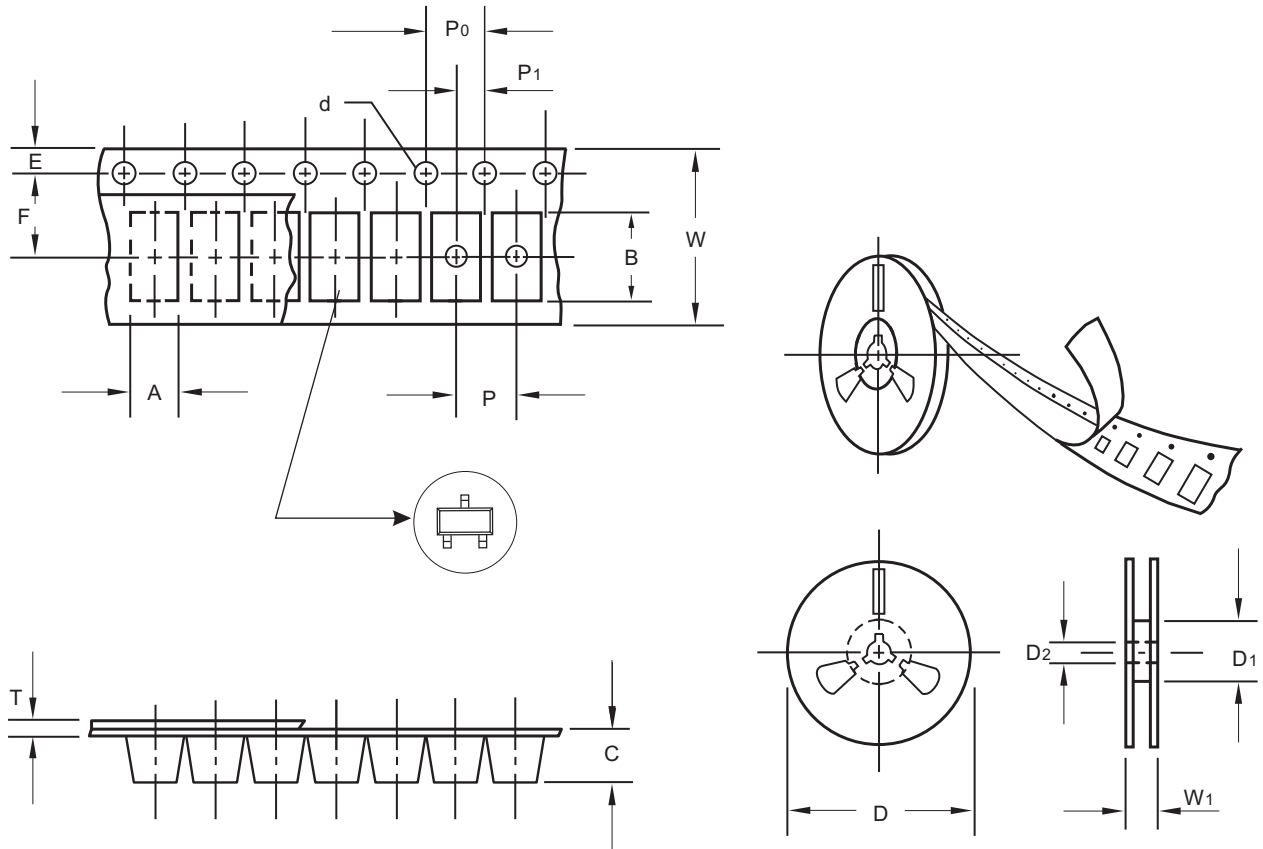
SOT-23



Dimensions in inches and (millimeters)

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Packing information



unit:mm

Item	Symbol	Tolerance	SOT-23
Carrier width	A	0.1	3.15
Carrier length	B	0.1	2.77
Carrier depth	C	0.1	1.22
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	2.0	178.00
7" Reel inner diameter	D1	min	55.00
Feed hole diameter	D2	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	3.50
Punch hole pitch	P	0.1	4.00
Sprocket hole pitch	P0	0.1	4.00
Embossment center	P1	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W1	1.0	12.0

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

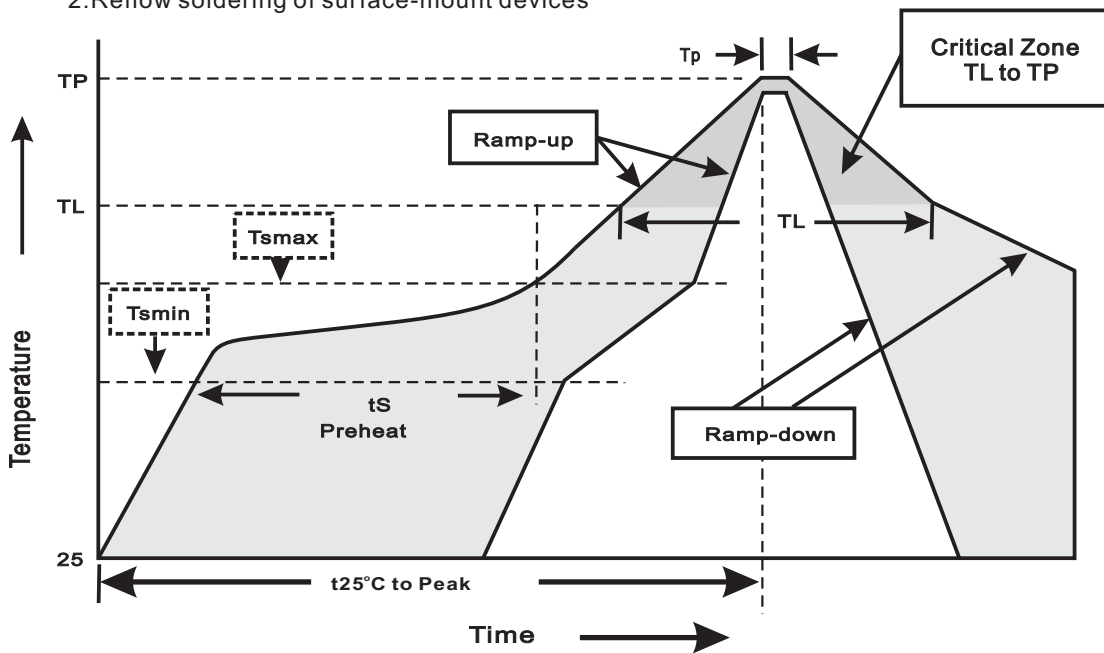
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Reel packing

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-23	7"	3,000	4.0	30,000	183*183*123	178	383*262*387	240,000	11.6

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 _{min}) -Temperature Max(T _{max}) -Time(min to max)(t _s)	150°C 200°C 60~120sec
T _{max} to T _L -Ramp-upRate	<3°C/sec
Time maintained above: -Temperature(T _L) -Time(t _L)	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