

FMOS1012T

List

List.....	1
Package outline.....	2
Features.....	2
Mechanical data.....	2
Maximum ratings	2
Electrical characteristics.....	3
Rating and characteristic curves.....	4~5
Pinning information.....	6
Marking.....	6
Suggested solder pad layout.....	6
Packing information.....	7
Reel packing.....	8
Suggested thermal profiles for soldering processes.....	8

FMOS1012T

20V, 0.63A N-Channel MOSFET

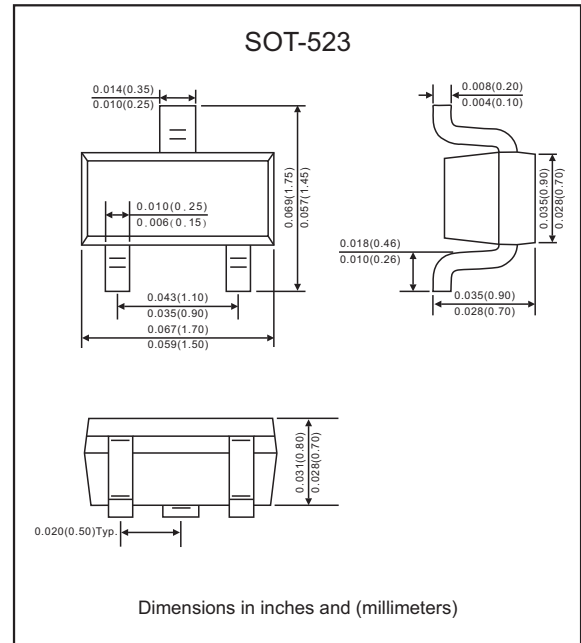
Features

- Low On-Resistance.
- Low gate threshold voltage.
- Low input capacitance.
- Fast switching speed.
- Low input / output leakage.
- ESD protected up to 2KV.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free part, ex.FMOS1012T-H.

Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-523
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Mounting Position : Any
- Weight : Approximated 0.003 gram

Package outline



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

Parameter	Symbol	Ratings	Unit
Drain-source voltage	V_{DS}	20	V
Gate-source voltage	V_{GS}	± 6	V
Continuous drain Current	I_D	0.63	A
Pulsed drain current	I_{DM}	6	A
Power dissipation	P_D	0.28	W
Operating Junction temperature range	T_j	+150	$^{\circ}\text{C}$
Storage temperature range	T_{STG}	-55 to +150	$^{\circ}\text{C}$
Thermal resistance Junction to ambient	$R_{\theta JA}$	452	$^{\circ}\text{C/W}$

Notes : 1. Device mounted on FR-4 PCB.
2. No purposefully added lead.

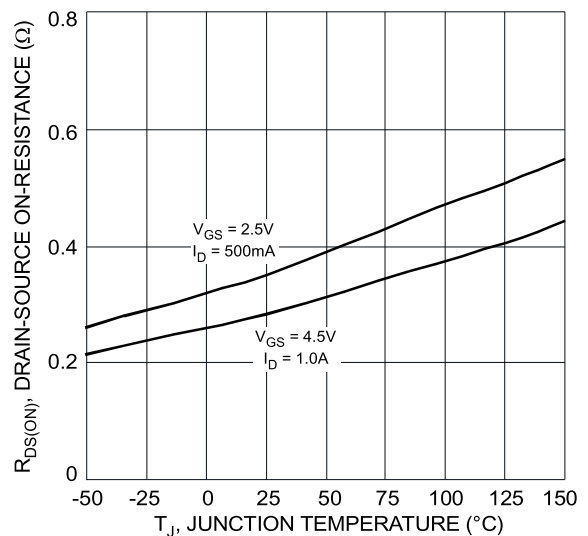
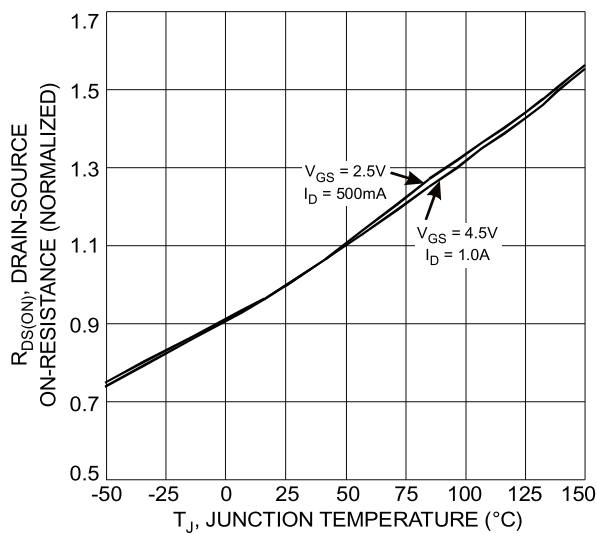
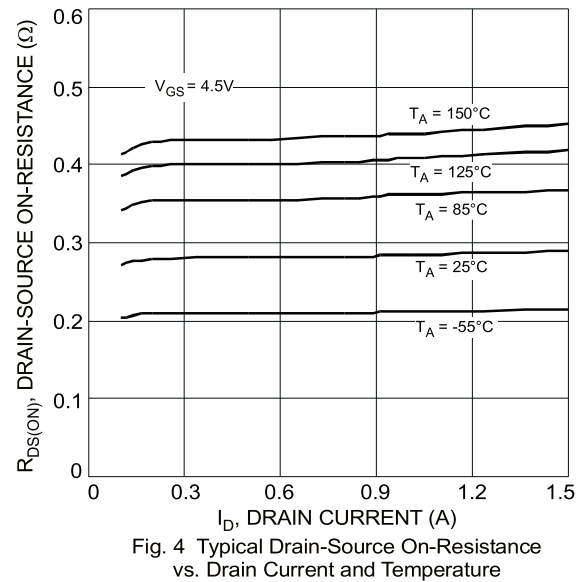
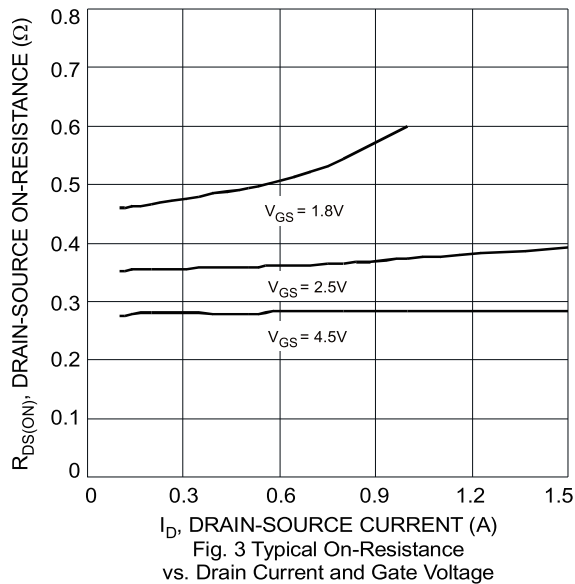
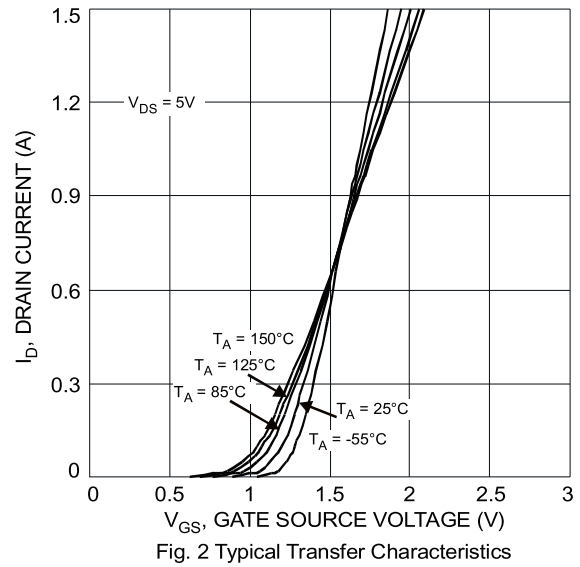
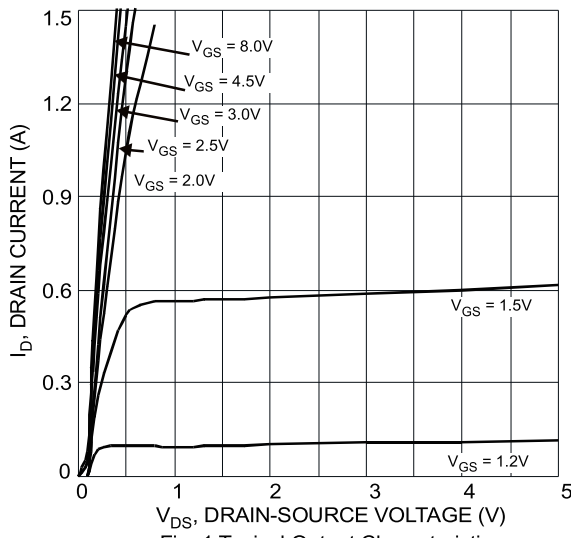
FMOS1012T

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

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Off characteristics						
Drain-source breakdown voltage	$V_{GS}=0V, I_D=250\mu A$	BV_{DSS}	20			V
Drain-source leakage current	$V_{DS}=20V, V_{GS}=0V$	I_{DSS}			100	nA
Gate-source leakage current	$V_{DS}=0V, V_{GS}=\pm 4.5V$	I_{GSS}			± 1.0	μA
Gate threshold voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	$V_{GS(TH)}$	0.5		1.0	V
Static drain-source on-resistance	$V_{GS}=4.5V, I_D=600mA$	$R_{DS(ON)}$		0.3	0.4	Ω
	$V_{GS}=2.5V, I_D=500mA$			0.4	0.5	
	$V_{GS}=1.8V, I_D=350mA$			0.5	0.7	
Forward transfer admittance	$V_{DS}=10V, I_D=400mA$	$ Y_{fs} $	1.4			S
Diode forward voltage	$I_S=150mA, V_{GS}=0V$	V_{SD}		0.7	1.2	V
Dynamic characteristics						
Input capacitance	$V_{DS}=16V, V_{GS}=0V, f=1MHz$	C_{iss}		60.67		pF
Output capacitance		C_{oss}		9.68		
Reverse transfer capacitance		C_{rss}		5.37		
Total gate charge	$V_{GS}=4.5V, V_{DS}=10V, I_D=250mA$	Q_g		736.6		pC
Gate-source charge		Q_{gs}		93.6		
Gate-drain charge		Q_{gd}		116.6		
Switching characteristics						
Turn-on delay time	$V_{GEN}=4.5V, V_{DD}=10V$ $I_D=200mA, R_G=10\Omega, R_L=47\Omega$	$t_{d(on)}$		5.1		ns
Turn-on rise time		t_r		7.4		
Turn-off delay time		$t_{d(off)}$		26.7		
Turn-off fall time		t_f		12.3		

Notes : 4. Short duration pulse test used to minimize self-heating effect.

Rating and characteristic curves (FMOS1012T)



Rating and characteristic curves (FMOS1012T)

Fig. 5 On-Resistance Variation with Temperature

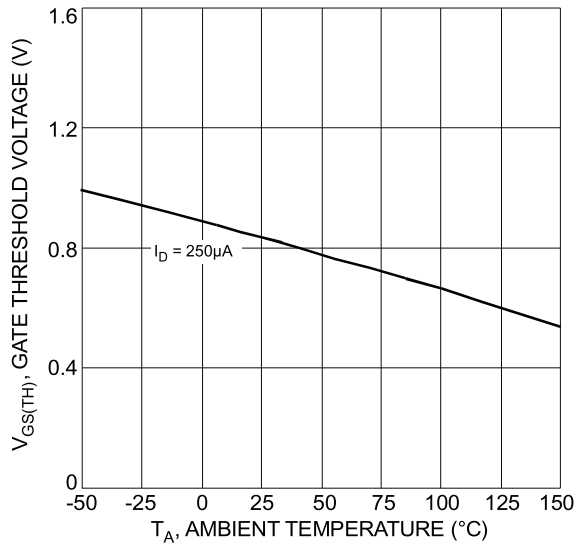


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

Fig. 6 On-Resistance Variation with Temperature

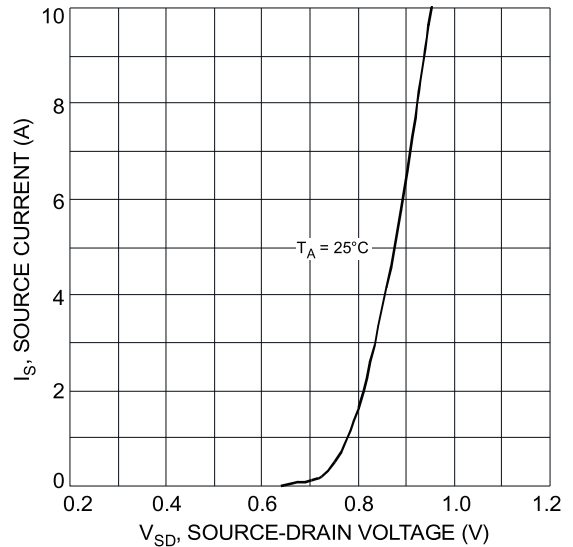


Fig. 8 Diode Forward Voltage vs. Current

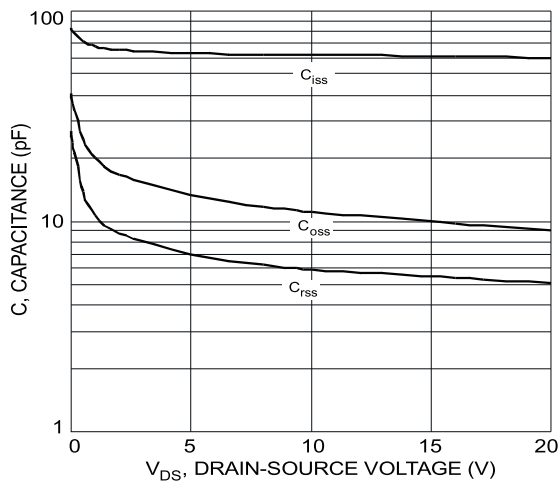


Fig. 9 Typical Capacitance

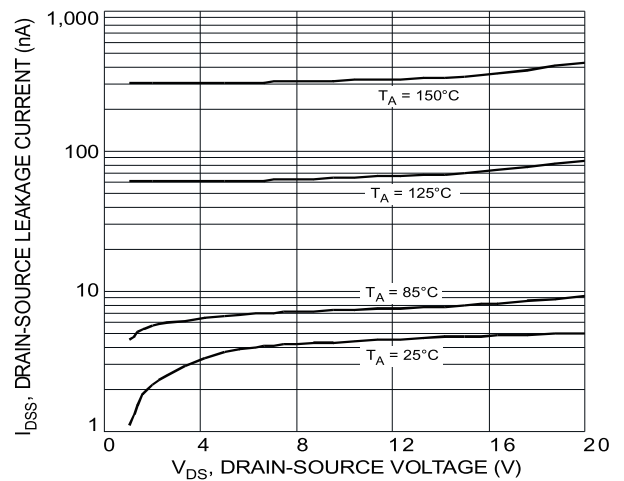


Fig. 10 Typical Drain-Source Leakage Current vs. Drain-Source Voltage

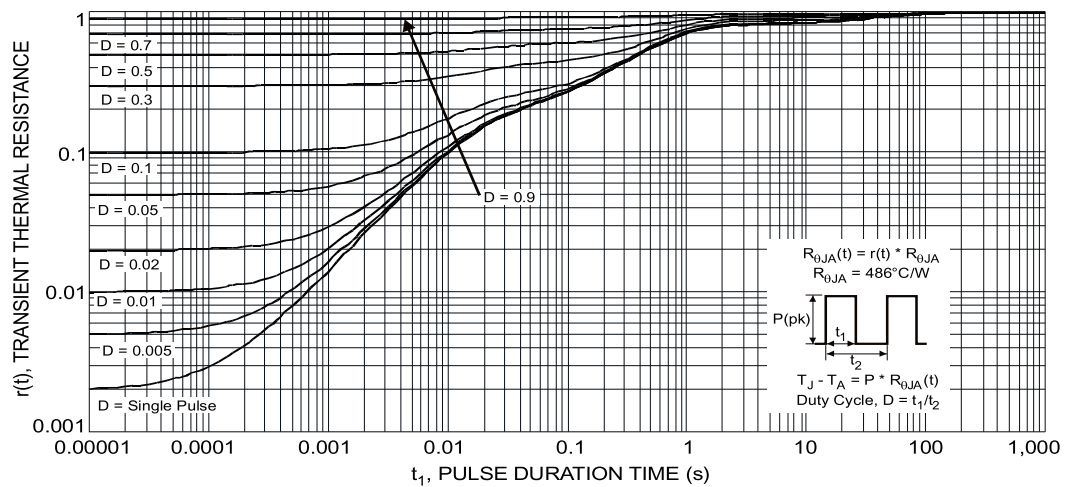
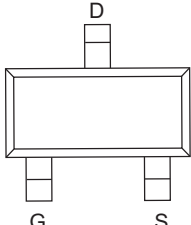
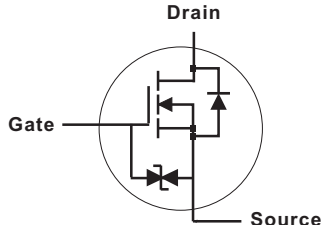


Fig. 11 Transient Thermal Response

FMOS1012T

Pinning information

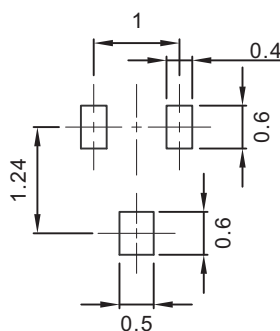
Pin	Simplified outline	Symbol
PinD Drain PinG Gate PinS Source		

Marking

Type number	Marking code
FMOS1012T	NA1,C

Suggested solder pad layout

SOT-523

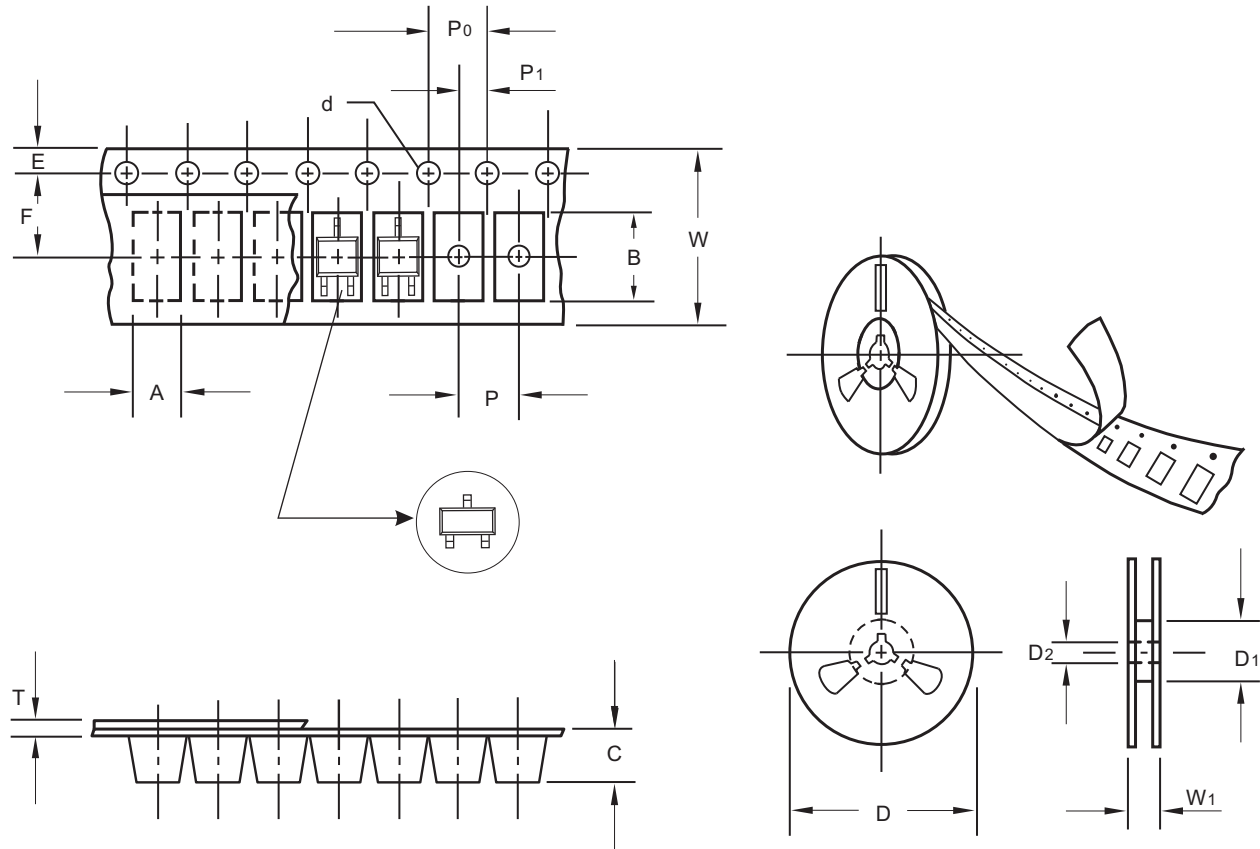


Note:

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

FMOS1012T

Packing information



unit:mm

Item	Symbol	Tolerance	SOT-523
Carrier width	A	0.1	1.85
Carrier length	B	0.1	1.85
Carrier depth	C	0.1	0.875
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	-
13" Reel inner diameter	D ₁	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D ₁	min	54.40
Feed hole diameter	D ₂	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	P ₀	0.1	4.00
Embossment center	P ₁	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W ₁	1.0	12.30

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

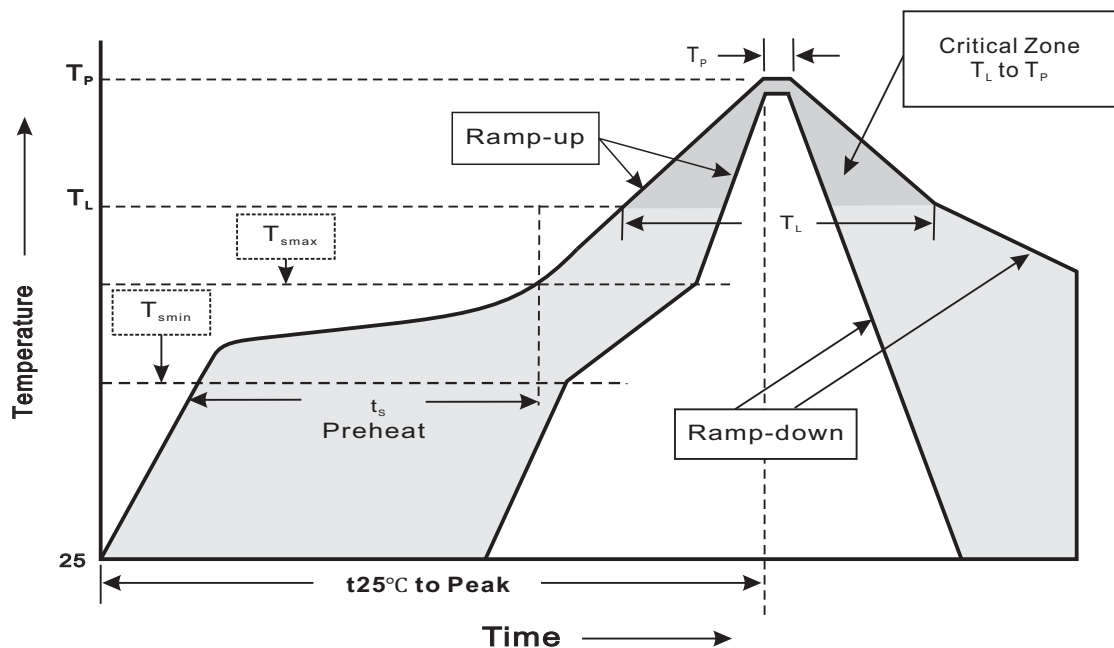
FMOS1012T

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-523	7"	3,000	4.0	30,000	183*123*183	178	382*257*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_{smin}) -Temperature Max (T_{smax}) -Time (min to max) (t_s)	150°C 200°C 60 ~ 120sec
T_{smax} to T_L -Ramp-up rate	< 3°C/sec
Time maintained above: -Temperature (T_L) -Time(T_L)	217°C 60 ~ 260 sec
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	< 6 minutes