

FMOSAG2730

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FMOSAG2730

7.0A 20V Dual N-Channel Enhancement Mode Power MOSFET ESD Protection

Features

- $V_{DS}=20V$, $I_D=7A$.
- $R_{DS(ON)} \leq 17m\Omega$, @ $V_{GS}=4.5V$, $I_D=3A$.
- $R_{DS(ON)} \leq 18.5m\Omega$, @ $V_{GS}=4.0V$, $I_D=3A$.
- $R_{DS(ON)} \leq 24.5m\Omega$, @ $V_{GS}=3.1V$, $I_D=3A$.
- $R_{DS(ON)} \leq 27m\Omega$, @ $V_{GS}=2.5V$, $I_D=3A$.
- Low drain-source on-resistance.
- ESD protected embedded.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free part, ex.FMOSAG2730-H.

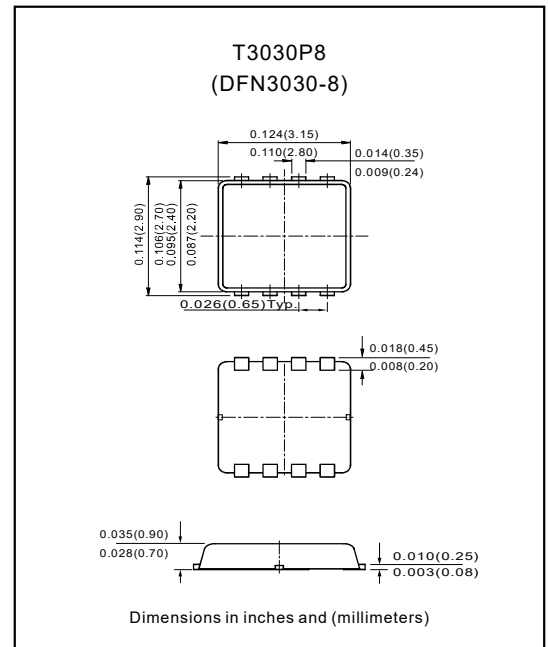
Application

- DC/DC Converter.
- Motor Drivers.
- Ideal for high-frequency switching and synchronous rectification.

Mechanical data

- Epoxy: UL94-V0 rated flame retardant.
- Case : Molded plastic, T3030P8 (DFN3030-8).
- Mounting Position : Any.

Package outline



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

Parameter	Symbol	Ratings	Unit
Drain-source voltage	V_{DS}	20	V
Gate-source voltage	V_{GS}	± 12	V
Continuous drain current (Note1)	I_D	7	A
		5.8	
Pulsed drain current (Note2)	I_{DM}	43	A
Power dissipation (Note3)	P_D	1.47	W
Thermal resistance, junction to ambient (note1)	$R_{\theta JA}$	85	$^\circ C/W$
Operating junction temperature	T_J	+150	$^\circ C$
Storage temperature range	T_{STG}	-55 to +150	$^\circ C$

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
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Off characteristics

Drain-source breakdown voltage	BV_{DSS}	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	20			V
BV_{DSS} temperature coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C , $I_D=1\text{mA}$		0.014		$\text{V}/^{\circ}\text{C}$
Drain-source leakage current	I_{DSS}	$V_{DS}=16\text{V}$, $V_{GS}=0\text{V}$			25	μA
Gate-source leakage current	I_{GSS}	$V_{GS}=\pm 12\text{V}$, $V_{DS}=0\text{V}$			± 10	μA

On characteristics

Gate threshold voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}$, $I_D=250\mu\text{A}$	0.5		1.2	V
$V_{GS(TH)}$ temperature coefficient	$\Delta V_{GS(TH)}$			-2.09		$\text{mV}/^{\circ}\text{C}$
Drain-Source on-state resistance	$R_{DS(ON)}$	$V_{GS}=4.5\text{V}$, $I_D=3\text{A}$		14.5	17	$\text{m}\Omega$
		$V_{GS}=4.0\text{V}$, $I_D=3\text{A}$		15	18.5	
		$V_{GS}=3.1\text{V}$, $I_D=3\text{A}$		18.5	24.5	
		$V_{GS}=2.5\text{V}$, $I_D=3\text{A}$		22	27	
Gate resistance	R_g	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1\text{MHz}$		1.83		Ω

Dynamic parameters

Input capacitance	C_{iss}	$V_{GS}=0\text{V}$, $V_{DS}=15\text{V}$, $f=1.0\text{MHz}$		735		pF
Out capacitance	C_{oss}			83		
Reverse transfer capacitance	C_{rss}			81		

Switching parameters

Total gate charge (4.5V)	Q_g	$V_{GS}=4.5\text{V}$, $V_{DS}=16\text{V}$, $I_D=3\text{A}$		9.86		nC
Gate to source charge	Q_{gs}			1.41		
Gate to drain charge	Q_{gd}			2.48		
Turn-on delay time	$t_{d(on)}$	$V_{DD}=10\text{V}$, $V_{GS}=4.5\text{V}$, $R_g=3.3\Omega$, $I_D=3\text{A}$		7		ns
Rise time	t_r			36		
Turn-off delay time	$t_{d(off)}$			46.5		
Fall time	t_f			15		

Source-drain diode ratings and characteristics

Drain-source diode forward voltage (Note2)	V_{SD}	$I_S=7\text{A}$, $V_{GS}=0\text{V}$, $T_J=25^{\circ}\text{C}$			1.2	V
Continuous source current (Note1,6)	I_S	$V_G=V_D=0\text{V}$, Force current			7	A

Note: 1. The data tested by surface mounted on a 1 inch² FR-4 board with 2oz copper.

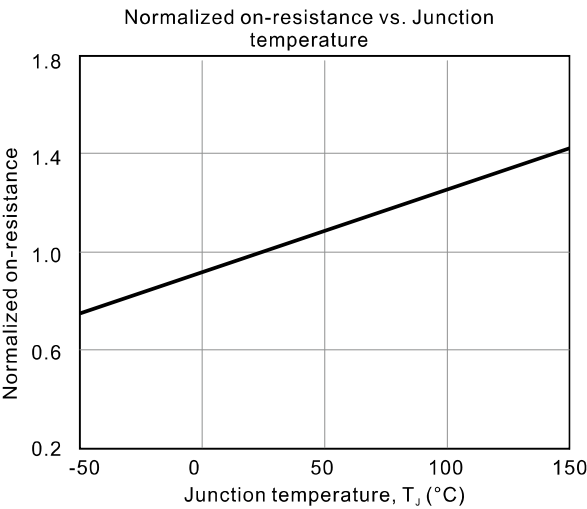
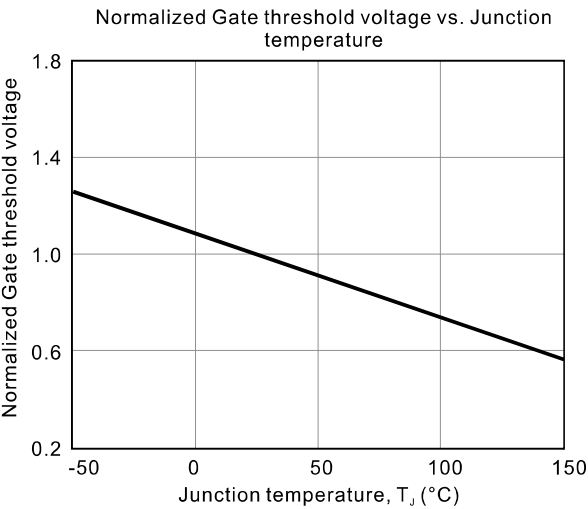
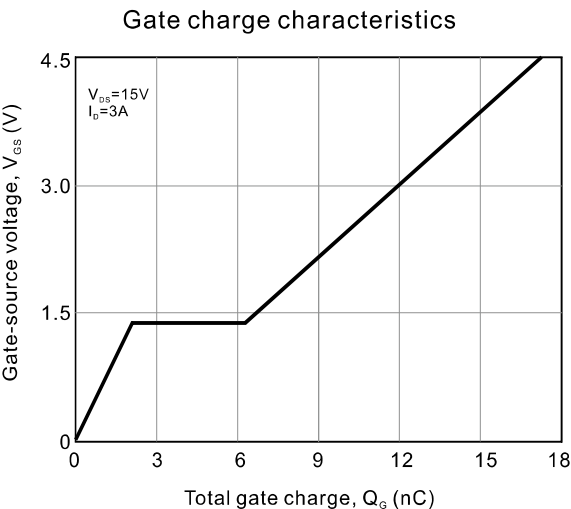
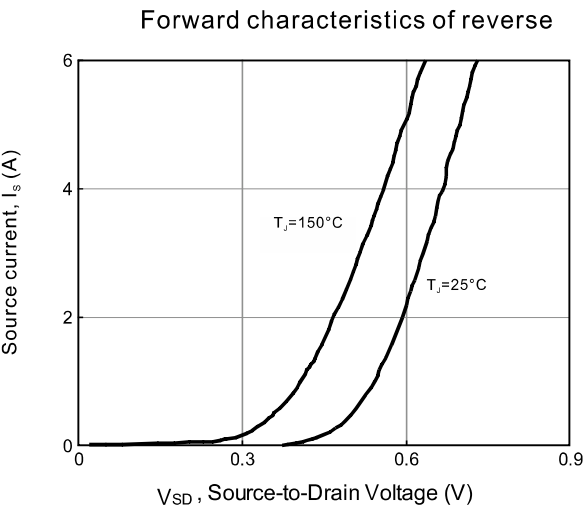
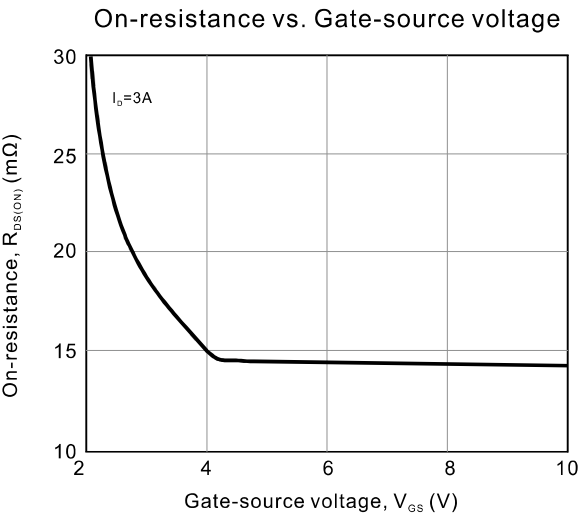
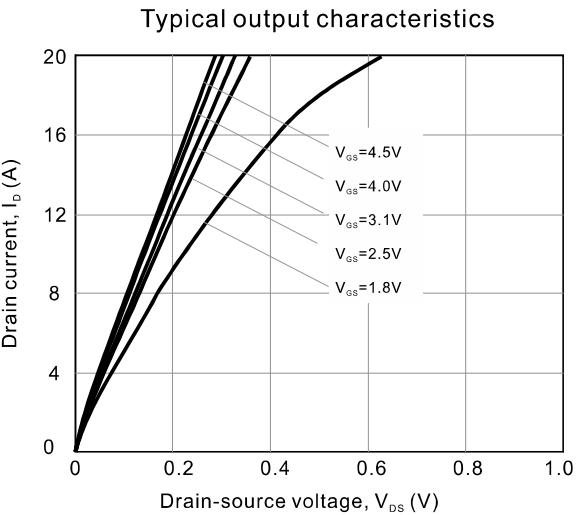
2. The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.

3. The power dissipation is limited by 150°C junction temperature.

4. The data is theoretically the same as I_D and I_{DM} , in real application, should be limited by total power dissipation.

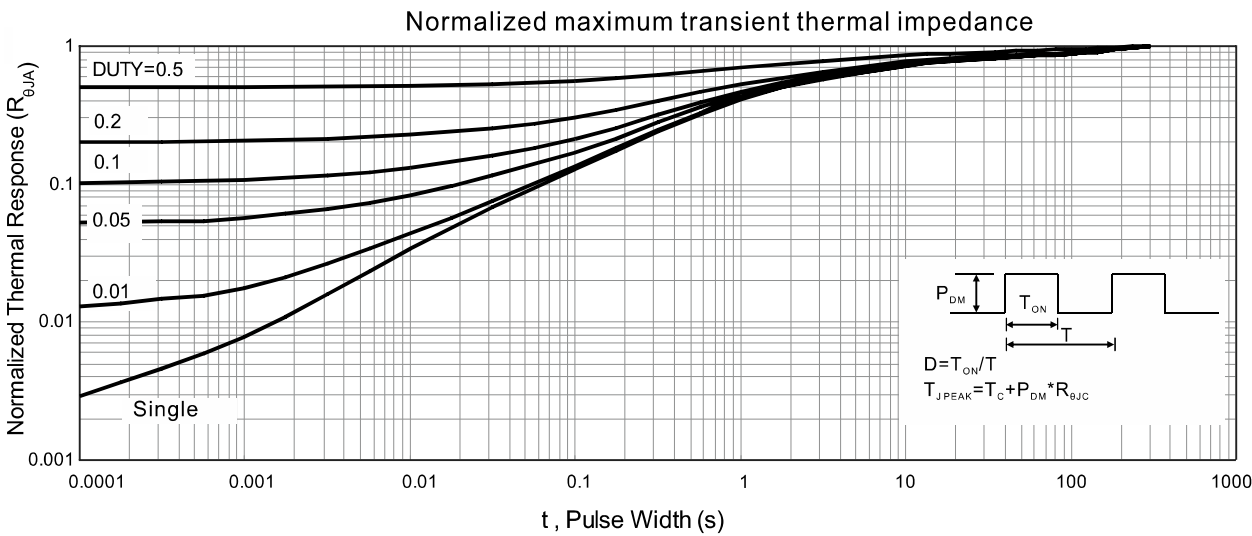
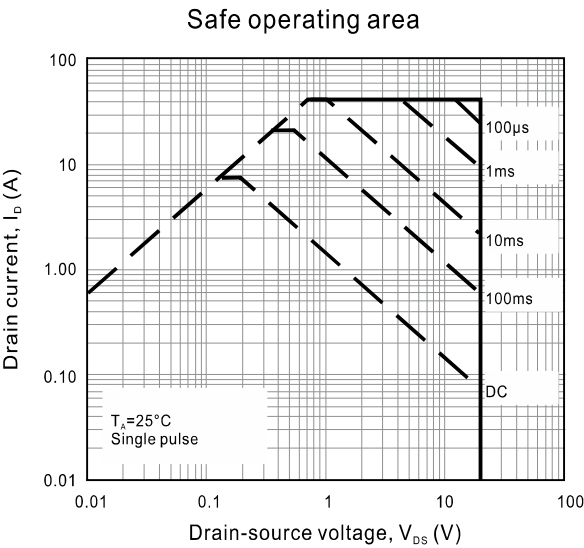
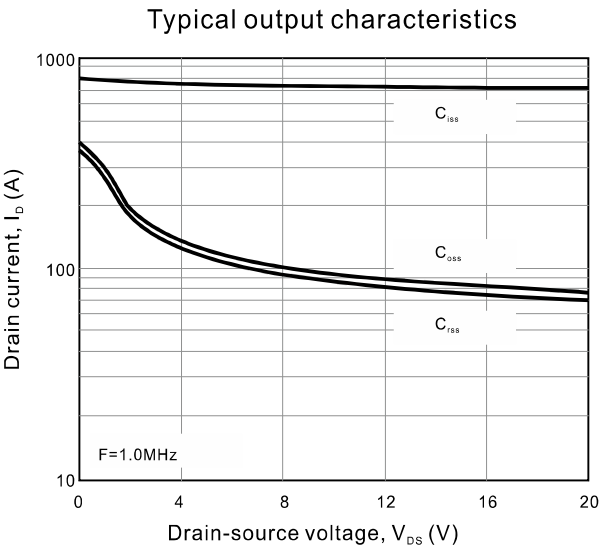
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Rating and characteristic curves



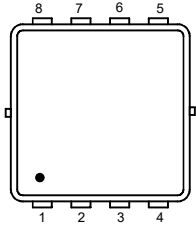
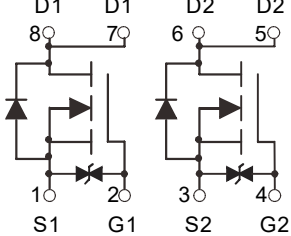
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Rating and characteristic curves



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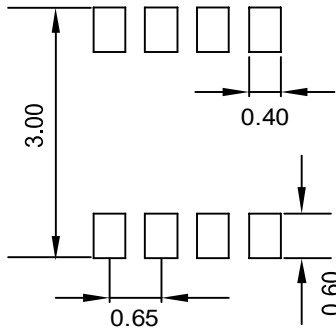
Pinning information

Pin	Simplified outline	Symbol
Pin 1 Source(S1) Pin 2 Gate(G1) Pin 3 Source(S2) Pin 4 Gate(G2) Pin 5,6 Drain(D2) Pin 7,8 Drain(D1)		

Marking

Type number	Marking code
FMOSAG2730	AG2730

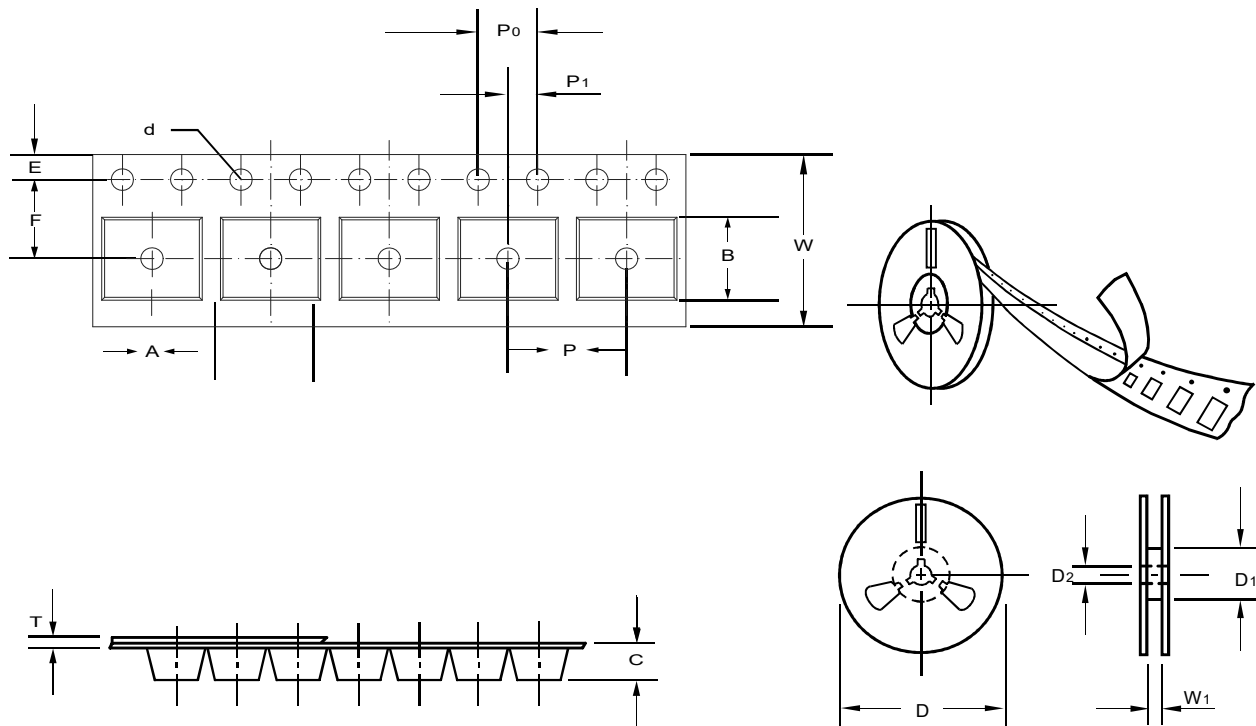
Suggested solder pad layout



Note:
1.Controlling dimension:in millimeters.
2.General tolerance:±0.05mm.
3.The pad layout is for reference purposes only.

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Packing information



unit:mm

Item	Symbol	Tolerance	T3030P8 (DFN3030-8)
Carrier width	A	0.1	3.35
Carrier length	B	0.1	3.20
Carrier depth	C	0.1	1.10
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	178.0
7" Reel inner diameter	D1	min	59.5
Feed hole diameter	D2	0.5	13.0
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	3.50
Punch hole pitch	P	0.1	4.0
Sprocket hole pitch	P0	0.1	4.0
Embossment center	P1	0.1	2.0
Overall tape thickness	T	0.05	0.23
Tape width	W	0.3	8.0
Reel width	W1	2.0	8.4

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

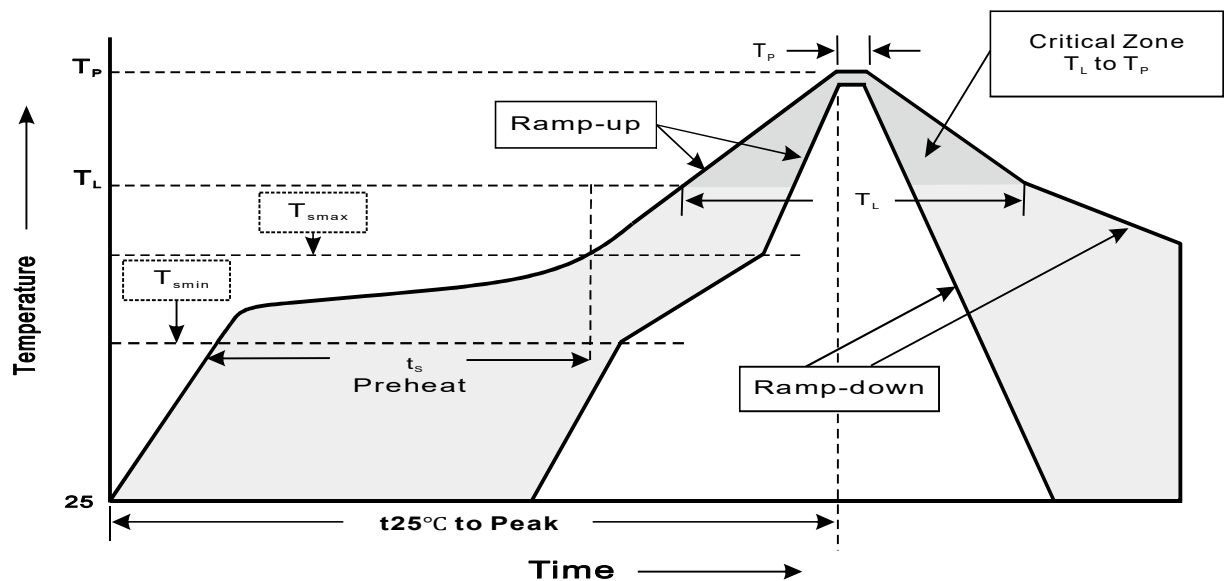
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Reel packing

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)
T3030P8	7"	3,000	8.0	30,000	183*123*183	178	382*257*387	240,000

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