

Customer Code: \_\_\_\_\_

# DATASHEET

DAPU P/N: CM55F-K122-10.00MHzCustomer P/N: CM-0007

Plot			The Label
Drew	Audited	Approved	Stamp, please! Thanks!
Date: 2016.10.08			

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**Table of amendment**

Version	Revision contents	Prepared by	Revised date
1.0	The first issued	<i>Amway</i>	2009.11.16
1.1	“Functional Block Diagram”, “Workflow Diagram”, “The Product Test Output Message”, “Aplication Information” added “RF Output - VOH / VOL- Test Condition”, “Holdover Capability- Test Condition”, “Pulse Width”, “Environmental Conditions”, “Mechanical Structure”, “Reflow Soldering Curve”, “Coding Rules” changed	<i>Amway</i>	2014.05.04
1.2	Modified the 1st page “Pin Definition” ,“1 PPS Output Waveform Characteristics” changed	<i>Amway</i>	2015.04.07
1.3	“Mechanical Structure” changed	<i>Amway</i>	2016.10.08



## 1. Electrical Parameters

	Parameters	Min.	Typ.	Max.	Unit.	Test Condition	
1 PPS Reference Input	Waveform	HCMOS					
	High-Level Output Voltage ( $V_{IH}$ )	2.7			V	50 $\Omega$	
	Low-Level Output Voltage ( $V_{IL}$ )			0.4	V		
	Pulse Width	10			$\mu$ s		
	Connector	Pin 10					
State Input	Parameters	Min.	Typ.	Max.	Unit.	Test Condition	
	Lock	2.7			V	<5mA Load	
	Holdover			0.4	V	<5mA Load	
	Connector	Pin 8					
RF Output	Parameters	Min.	Typ.	Max.	Unit.	Test Condition	
	Nominal Frequency	10.00			MHz		
	Waveform	HCMOS					
	High-level Output Voltage ( $V_{OH}$ )	2.7			V	< 5mA Load	
	Low-level Output Voltage ( $V_{OL}$ )			0.4	V	< 5mA Load	
	Rise/Fall Time			8	ns	Load 15pF	
	Duty Cycle	45	50	55	%	Load 15pF	
	Accuracy	-1		+1	$\times 10^{-12}$	24 hours average when locked to 1 PPS	
	Short-term Stability			0.02	$\times 10^{-9}$	Temperature stability, no EMI/EMC or other interference, test after power for 1 hour ref. to 25 $^{\circ}$ C; 1s, using PN9000 equipment.	
	Aging Tolerance Per Day	-0.2		+0.2	$\times 10^{-9}$	$V_{cc}, T_A$ constant measurement referenced to frequency observed with $T_A=25^{\circ}$ C, $V_{cc}=5.0$ V, in FREE RUN condition and after 30 days of operation.	
	Aging Tolerance 1 Year	-0.01		+0.01	$\times 10^{-6}$		
	Phase Noise (All conditions)			-118	-113	dBc/Hz	10Hz
				-138	-133		100Hz
				-148	-143		1KHz
			-150	-145	10KHz		
			-150	-145	100KHz		
			-150	-150	1MHz		
Connector	Pin 14						



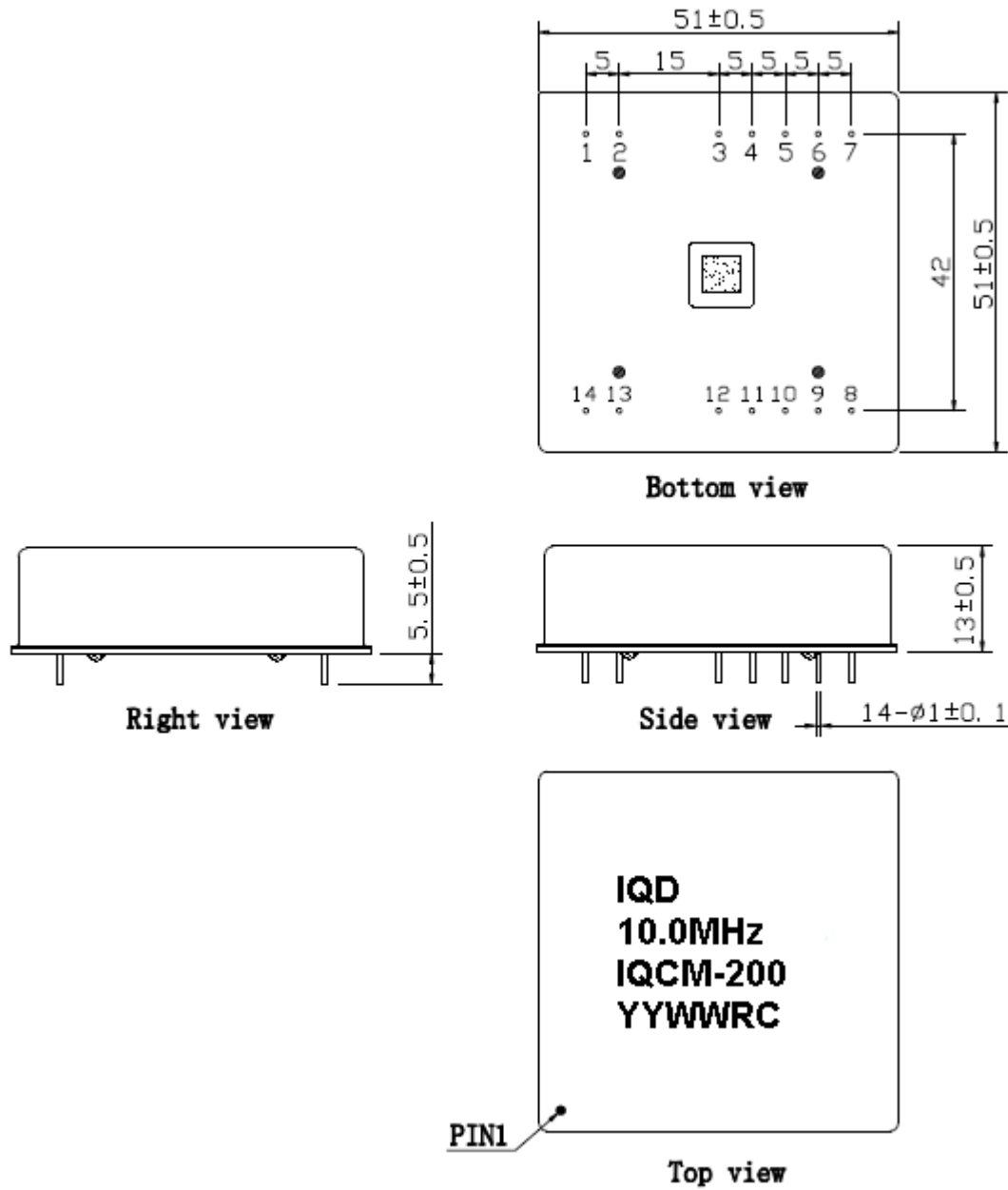
Holdover Capability	Holdover Time	Min.	Typ.	Max.	Unit.	Test Condition	
	24 Hours	-1.5		+1.5	μs	ΔT=±2℃, 24 hours holdover after turn on 7days and lock 3days. Temperature variable speed less than 1℃per minute	
Supply Voltage	Parameters	Min.	Typ.	Max.	Unit.	Test Condition	
	Supply Voltage	4.75	5.0	5.25	V		
	Current Consumption			1400	mA	During Warm-up	
				600	mA	During steady state operation @25℃	
	AC Ripple			50	mVpk-pk	10Hz to 1MHz	
Connector	Pin 3						
1 PPS Output Waveform Characteristics	Parameters	Min.	Typ.	Max.	Unit.	Test Condition	
	Waveform	HCMOS					
	High-Level Output Voltage(V <sub>OH</sub> )	2.7			V	50Ω	
	Low-level Output voltage (V <sub>OL</sub> )			0.4	V		
	Pulse Width	10			μs		
	Phase accuracy		-50		50	ns	Power on, the 1 PPS output is the reference 1PPS in;.
			-300		300	ns	When the CM is locked and stable, the 1PPS output is the divided OCXO frequency output.
Connector	Pin 12						
State Output	Parameters	Min.	Typ.	Max.	Unit.	Test Condition	
	Lock	2.7			V	<5mA Load	
	Holdover			0.4	V	<5mA Load	
	Connector	Pin 5					
Serial Interfaces	Parameters	Min.	Typ.	Max.	Unit.	Test Condition	
	Rx high-level Input Voltage (V <sub>H</sub> )	2.7			V		
	Rx low-level Input Voltage (V <sub>L</sub> )			0.4	V		



	Tx high-level Output Voltage (VH)	2.7			V	
	Tx low-level Output Voltage (VL)			0.4	V	
	Serial Protocol	9600-N-8-1				
	Connector	Pin6 and Pin7				
Environmental Conditions	Parameter	Conditions				
	Operating Temperature	-10°C to 70°C				
	Storage Temperature	-55°C to 105°C				
	Storage Humidity	30%~80%				
	ESD Level	Human Body Model,class2: 2000V to 4000V; ANSI/ESDA/JEDEC JS-001-2010.				
		Machine Model, class B: 200V to 400V; ANSI/ESDA/JEDEC JS-001-2010.				
	Moisture Sensitivity Level	Not humidity sensitive.				
	Vibration	Test Condition: 0.75mm ;acceleration:10g;10Hz~500Hz, one cycle per 30 min, test 2 hours. (3 times for each 3 directions X ,Y , Z), IEC 68-2-06 Test Fc.				
Shock	50g; 11ms; half sine wave (3 times for each 3 directions X ,Y , Z ),IEC 68-2-27 Test Ea/Severity 50A.					
Full Package Storage	Relative humidity (%)	20%~70%				
	Temperature (°C)	-10~35°C				



## 2. Mechanical Structure(mm)



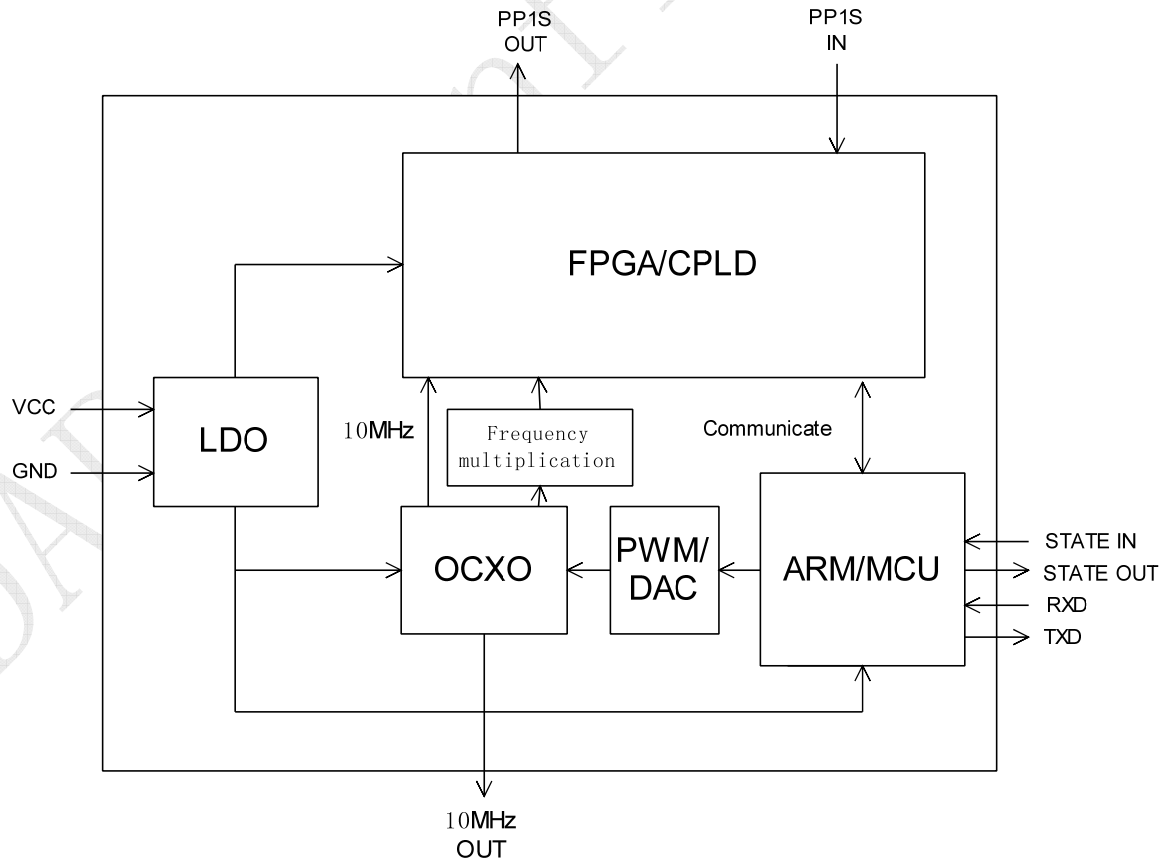
**Note1:** Tolerance  $\pm 0.2$ mm without mark

**Note2:** Referential Weight  $52 \pm 5$ g



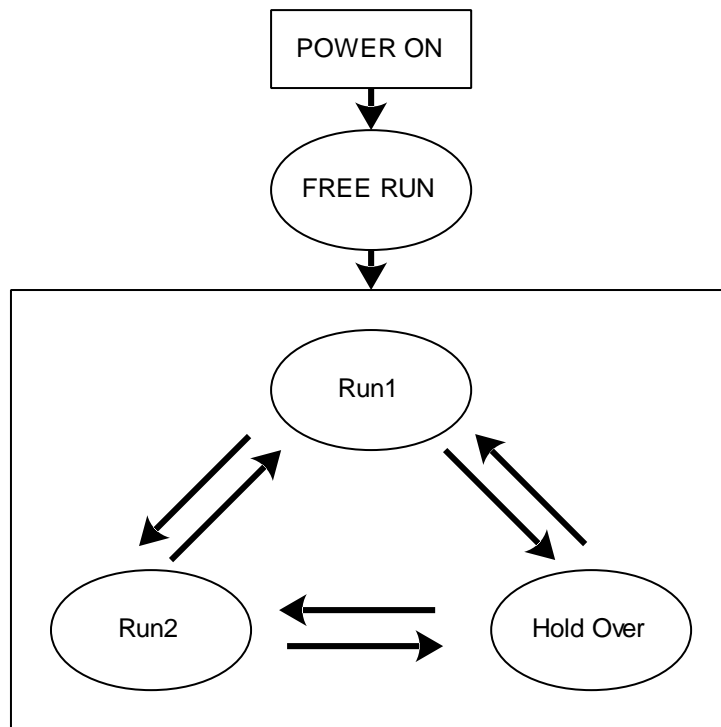
PIN DEFINITION			
PIN	NAME	DESCRIPTION	
3	VCC	Power supply input, 4.75V to 5.25V.	
5	State OUTPUT	State output. Output high level when the CM is locked and stable, others low level.	
6	RX INPUT	Asynchronous serial data input. 9600-N-8-1.	
7	TX OUTPUT	Asynchronous serial data output.9600-N-8-1.	
8	State INPUT	H: Lock	The work state is set to normal operation when the state input is high.
		L: Holdover	The work state is set to hold over when the state input is low.
10	1PPS INPUT	1PPS reference input.	
12	1PPS OUTPUT	The clock module 1PPS output .Power on, the 1 PPS output is the reference 1PPS in; When the CM is locked and stable, the 1PPS output is the divided OCXO frequency output.	
14	10MHz OUTPUT	10MHz OCXO frequency output .	
1、2、9	NC	Not connected.	
4、11、13	GND	GND	

### 3. Functional Block Diagram





#### 4. Workflow Diagram



Run1: Fast track. Adjust the OCXO 10MHz output frequency quickly to track the 1PPS of 10MHz with 1PPS reference.  
Run2: Slow track. Adjust the OCXO 10MHz output frequency slowly when the phase error is in the define range.  
Hold Over: GPS 1PPS reference miss, an algorithm has been developed which enables adaptive modeling of the frequency stability of an OCXO with reference to a GPS timing signal.  
Free Run: Clock module power on without 1PPS reference anyway.





## 5. The Product Test Output Message

Example:

\$PDP,00,0,F,Q,-3095,32768.0000,32768.0000,000,000,00000.0000,00000.0000,00000.0000,00000.0000,3-23,+000.0000,-0000,www.dptel.com,1.1,2011-05-16\*55

Notes:

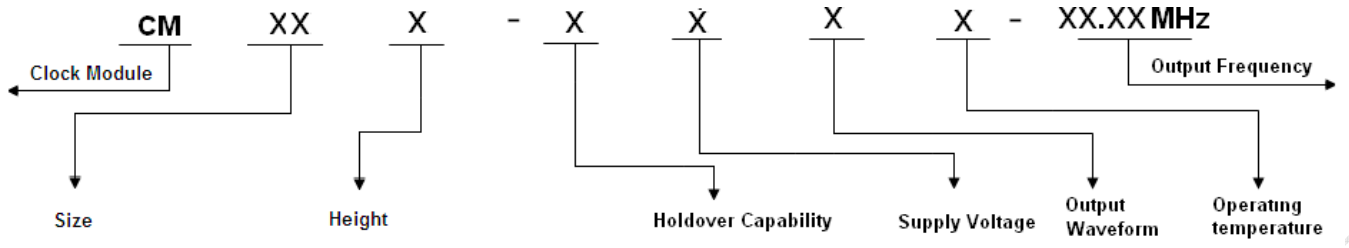
In the Format column, c stand for char ,d stand for digit, s stand for sign.

Field No.	Name	Format	Description	Length (byte)
0	\$PDP	\$ccc	Message ID, DAPU Telecom Technology protocol header	4
1	No	dd	Message No.	2
2	TxRxFlag	d	The transmit and receive flag.(0: upper computer transmit; 1: upper computer receive)	1
3	CStatus	c	Current status.(F: warm-up; L: Lock; H: Hold over)	1
4	TrackStatus	d	Track status (Q: fast track;S: slow track)	1
5	cPHDiff	sdddd	Current phase difference	5
6	cPWM1	dddd.dddd	Current PWM1 (Voltage-controlled value1)	10
7	cPWM2	dddd.dddd	Current PWM2 (Voltage-controlled value2)	10
8	SYNCNT	ddd	The synchronous times	3
9	HCNT	ddd	Hours after enter slow track	3
10	HPAVG	dddd.dddd	The average of the PWM in the last 1 hour	10
11	VCH1	dddd.dddd	Voltage-controlled compensation value every 1 hour	10
12	HPMOD	dddd.dddd	The Module PWM Value	
13	VCM10	dddd.dddd	Voltage-controlled compensation value every 10 minutes	10
14	POS	d-dd	The position of the product.(Layer-No), just for the inner test.	4
15	inT	sddd.dddd	NA	9
16	TcPHDiff	sdddd	The product current phase difference	5
17	Website		www.dptel.com	13
18	Version	d.d	version	3
19	Date	dddd-dd-dd	Date	10
20		dd	55	2
21	END		<CR><LF>	2



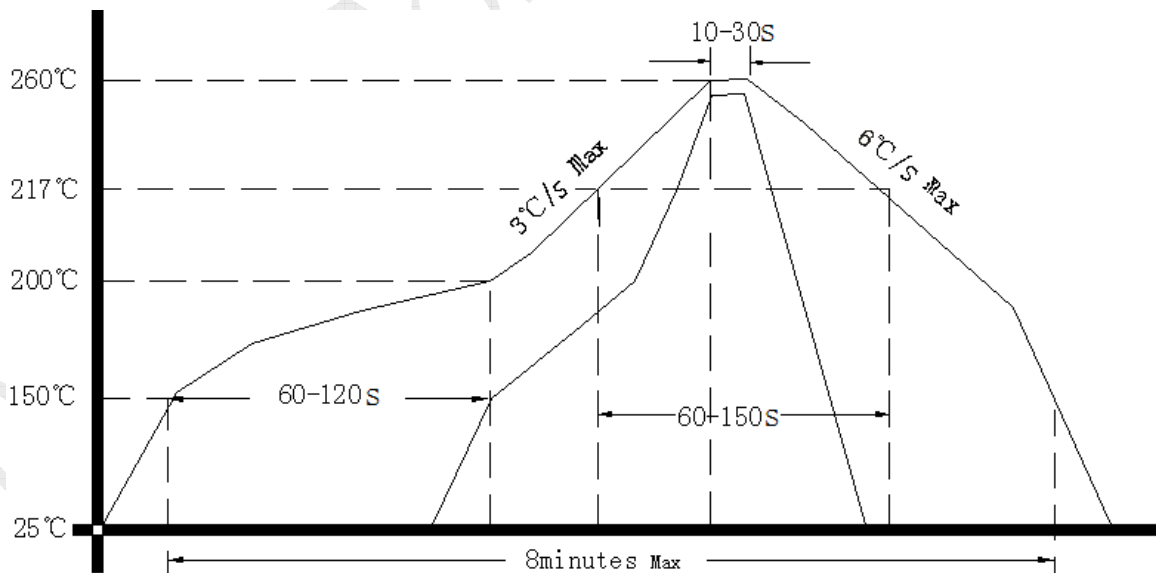


### 7. Coding Rules



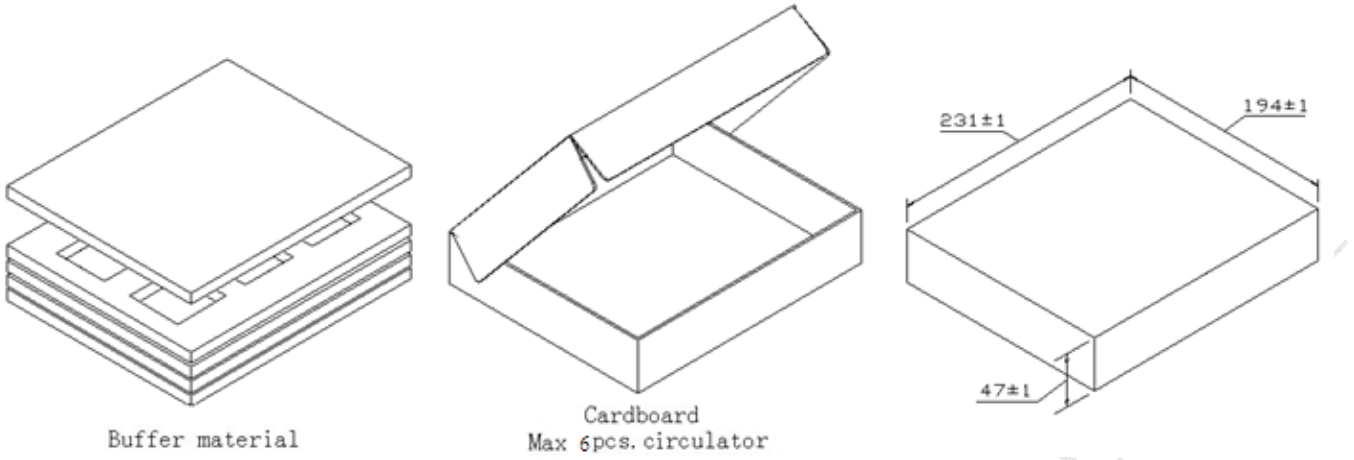
Size		Height		Holdover Capability			Supply Voltage		Output Waveform		Operating temperature		
55	50×50 (mm)	A	19mm, single Freq, external GPS receiver	A	±1.5µs	0°C~60°C	24hours	1	5.0V	1	Sine Wave	1	0°C~80°C
66	60×60 (mm)	B	19mm, single Freq, internal GPS receiver	B	±3.0µs	0°C~60°C	24hours			2	HCMOS	2	-10°C~70°C
65	65×65 (mm)	C	19mm, single Freq, internal dual-mode receiver	C	±8.0µs	0°C~60°C	24hours					9	-20°C~75°C
		F	13mm, single Freq, external GPS receiver	D	±1.5µs	ΔT=±5°C	24hours						
		G	13mm, single Freq, internal GPS receiver	E	±3.0µs	ΔT=±5°C	24hours						
		H	13mm, dual-Freqs, internal GPS receiver	F	±8.0µs	ΔT=±5°C	24hours						
		K	13mm, single Freq, internal dual-mode receiver	G	±1.5µs	ΔT=±5°C	8hours						
		L	13mm, dual-Freqs, internal dual-mode receiver	H	±3.0µs	ΔT=±5°C	8hours						
				I	±8.0µs	ΔT=±5°C	8hours						
				K	±1.5µs	ΔT=±2°C	24hours						
				M	±3.0µs	ΔT=±2°C	24hours						
				N	±8.0µs	ΔT=±2°C	24hours						
				O	±1.5µs	ΔT=±2°C	8hours						
				P	±3.0µs	ΔT=±2°C	8hours						
				Q	±8.0µs	ΔT=±2°C	8hours						

### 8. Reflow Soldering Curve (RoHS)





## 9. Package (mm)



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