

## ICs for use with Crystal Oscillators (PLL built - in)

### GENERAL DESCRIPTION

The XC2173 series are high frequency, low power consumption CMOS ICs with built-in crystal oscillator, divider and clock multiplier PLL circuits. Output is selectable from any one of the following values for f0: f0 x 5, f0 x 6, f0 x 7, f0 x 8, f0/2, f0/4, f0/8. With an oscillation capacitor & oscillation feedback resistor built-in, a stable oscillator circuit can be put together using only an external crystal oscillator.

By connecting an external standard clock, the above mentioned output frequencies can be achieved.

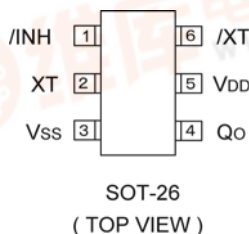
### APPLICATIONS

- Crystal oscillation modules
- Computer, DSP clocks
- Communication equipment
- Various system clocks

### FEATURES

- Oscillation Frequency** : 10MHz ~ 25MHz
- Divider Ratio** : f0/2, f0/4, f0/8
- Multiplier** : f0 x 5, f0 x 6, f0 x 7, f0 x 8
- Output** : 3-State
- Operating Voltage Range** : 3.3V ± 10% and 5.0V ± 10%
- Small Consumption Current**: Stand-by function included\*  
\* Oscillation continues in stand-by
- CMOS**
- Output Frequency** : 80MHz ~ 160MHz (5.0V)  
: 50MHz ~ 125MHz (3.3V)
- Divider Circuit & PLL Circuit Built-In**
- Oscillation Capacitor & Oscillation Feedback Resistor Built-In**
- Package** : SOT-26
- Environmentally Friendly** : EU RoHS Compliant, Pb Free

### PIN CONFIGURATION



### PIN ASSIGNMENT

PIN NUMBER	PIN NAME	FUNCTION
1	/INH	Stand-by control*
2	XT	Crystal Oscillator Connection (Input)
3	VSS	GND
4	Q0	Clock Output
5	VDD	Power Supply
6	/XT	Crystal Oscillator Connection (Output) /Standard Clock Input

\* Stand-by control pin has a pull-up resistor built-in.

### INH, Q0 PIN FUNCTION

/INH	"H" or OPEN	"L (Stand-by)
Q0	Divider / Multiplier Output	High Impedance

"H" = High level

"L" = Low level

# XC2173 Series

[查询XC2173供应商](#)

## PRODUCT CLASSIFICATION

Ordering Information

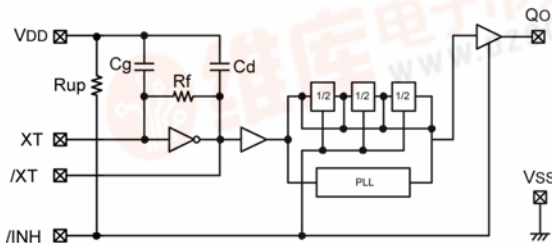
XC2173 - (\*)

DESIGNATOR	DESCRIPTION	SYMBOL	DESCRIPTION
	Duty Level	C	: CMOS (VDD/2)
	Output Capacity	M	: Multiplier output
		D	: Divider output
	Multiplier or Divider Ratio	2	: $f_0 / 2$
		4	: $f_0 / 4$
		5	: $f_0 \times 5$
		6	: $f_0 \times 6$
		7	: $f_0 \times 7$
		8	: $f_0 / 8$ & $f_0 \times 8$
	Input Oscillation Frequency	1	: 10MHz ~ 25MHz
-	Packages Taping Type (*)	MR-G	: SOT-26

(\*) The "-G" suffix indicates that the products are Halogen and Antimony free as well as being fully RoHS compliant.

(2) The device orientation is fixed in its embossed tape pocket. For reverse orientation, please contact your local Torex sales office or representative. (Standard orientation: R- , Reverse orientation: L- )

## BLOCK DIAGRAM



## ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	CONDITIONS	UNITS
Supply Voltage	VDD	VSS-0.3 ~ VSS+7.0	V
Input Voltage	VIN	VSS-0.3 ~ VDD+0.3	V
Power Dissipation	Pd	250 (*)	mW
Operating Temperature Range	Topr	-40 ~ +85	
Storage Temperature Range	Tstg	-55 ~ +125	

\* When measured on a glass epoxy PCB

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## ELECTRICAL CHARACTERISTICS

3.3V, f0 x 8 multiplier (\*1)

Ta=25

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Operating Voltage	V <sub>DD</sub>		2.97	3.30	3.63	V
'H' Level Input Voltage	V <sub>IH</sub>		2.4	-	-	V
'L' Level Input Voltage	V <sub>IL</sub>		-	-	0.4	V
'H' Level Output Voltage	V <sub>OH</sub>	CMOS: V <sub>DD</sub> =2.97V, I <sub>OH</sub> =-8mA	2.47	-	-	V
'L' Level Output Voltage	V <sub>OL</sub>	CMOS: V <sub>DD</sub> =2.97V, I <sub>OL</sub> =8mA	-	-	0.4	V
Supply Current 1	I <sub>DD1</sub>	/INH="OPEN", C <sub>L</sub> =15pF, f=80MHz	-	10	-	mA
Supply Current 2	I <sub>DD2</sub>	/INH="L", C <sub>L</sub> =15pF, f=80MHz	-	1	-	mA
Input Pull-Up Resistance 1	R <sub>up1</sub>	/INH="L"	1.0	2.0	4.0	M
Input Pull-Up Resistance 2	R <sub>up2</sub>	/INH=0.7V <sub>DD</sub>	35	70	140	k
Internal Oscillation Capacitance	C <sub>g</sub>	(*3)	-	13	-	pF
	C <sub>d</sub>	(*3)	-	13	-	pF
Internal Oscillation Feedback Resistance	R <sub>f</sub>		0.3	1.0	2.0	M
Output Off Leak Current	I <sub>oz</sub>	/INH="L"	-	-	10	μA

5.0V, f0 x 8 multiplier (\*2)

Ta=25

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Operating Voltage	V <sub>DD</sub>		4.5	5.0	5.5	V
'H' Level Input Voltage	V <sub>IH</sub>		2.4	-	-	V
'L' Level Input Voltage	V <sub>IL</sub>		-	-	0.4	V
'H' Level Output Voltage	V <sub>OH</sub>	CMOS: V <sub>DD</sub> =4.5V, I <sub>OH</sub> =-16mA	3.9	4.2	-	V
'L' Level Output Voltage	V <sub>OL</sub>	CMOS: V <sub>DD</sub> =4.5V, I <sub>OL</sub> =16mA	-	0.3	0.4	V
Supply Current 1	I <sub>DD1</sub>	/INH="OPEN", C <sub>L</sub> =15pF, f=160MHz	-	35	-	mA
Supply Current 2	I <sub>DD2</sub>	/INH="L", C <sub>L</sub> =15pF, f=160MHz	-	5	-	mA
Input Pull-Up Resistance 1	R <sub>up1</sub>	/INH="L"	0.5	1.0	2.0	M
Input Pull-Up Resistance 2	R <sub>up2</sub>	/INH=0.7V <sub>DD</sub>	25	50	100	k
Internal Oscillation Capacitance	C <sub>g</sub>	(*3)	-	13	-	pF
	C <sub>d</sub>	(*3)	-	13	-	pF
Internal Oscillation Feedback Resistance	R <sub>f</sub>		100	240	400	k
Output Off Leak Current	I <sub>oz</sub>	/INH="L"	-	-	10	μA

\*1: Output frequency range is 80 MHz to 125MHz with a multiplier of f0 x 8 at 3.3V

\*2: Output frequency range is 80 MHz to 160MHz with a multiplier of f0 x 8 at 5.0V

\*3: R&D value



## ELECTRICAL CHARACTERISTICS (Continued)

3.3V, f<sub>0</sub> x 7 multiplier (\*1)

T<sub>a</sub>=25

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Operating Voltage	V <sub>DD</sub>		2.97	3.30	3.63	V
'H' Level Input Voltage	V <sub>IH</sub>		2.4	-	-	V
'L' Level Input Voltage	V <sub>IL</sub>		-	-	0.4	V
'H' Level Output Voltage	V <sub>OH</sub>	CMOS: V <sub>DD</sub> =2.97V, I <sub>OH</sub> =-8mA	2.47	-	-	V
'L' Level Output Voltage	V <sub>OL</sub>	CMOS: V <sub>DD</sub> =2.97V, I <sub>OL</sub> =8mA	-	-	0.4	V
Supply Current 1	I <sub>DD1</sub>	/INH="OPEN", C <sub>L</sub> =15pF, f=70MHz	-	9	-	mA
Supply Current 2	I <sub>DD2</sub>	/INH="L", C <sub>L</sub> =15pF, f=70MHz	-	1	-	mA
Input Pull-Up Resistance 1	R <sub>up1</sub>	/INH="L"	1.0	2.0	4.0	M
Input Pull-Up Resistance 2	R <sub>up2</sub>	/INH=0.7V <sub>DD</sub>	35	70	140	k
Internal Oscillation Capacitance	C <sub>g</sub>	(*3)	-	13	-	pF
	C <sub>d</sub>	(*3)	-	13	-	pF
Internal Oscillation Feedback Resistance	R <sub>f</sub>		0.3	1.0	2.0	M
Output Off Leak Current	I <sub>oz</sub>	/INH="L"	-	-	10	μA

5.0V, f<sub>0</sub> x 7 multiplier (\*2)

T<sub>a</sub>=25

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Operating Voltage	V <sub>DD</sub>		4.5	5.0	5.5	V
'H' Level Input Voltage	V <sub>IH</sub>		2.4	-	-	V
'L' Level Input Voltage	V <sub>IL</sub>		-	-	0.4	V
'H' Level Output Voltage	V <sub>OH</sub>	CMOS: V <sub>DD</sub> =4.5V, I <sub>OH</sub> =-16mA	3.9	4.2	-	V
'L' Level Output Voltage	V <sub>OL</sub>	CMOS: V <sub>DD</sub> =4.5V, I <sub>OL</sub> =16mA	-	0.3	0.4	V
Supply Current 1	I <sub>DD1</sub>	/INH="OPEN", C <sub>L</sub> =15pF, f=140MHz	-	28	-	mA
Supply Current 2	I <sub>DD2</sub>	/INH="L", C <sub>L</sub> =15pF, f=140MHz	-	5	-	mA
Input Pull-Up Resistance 1	R <sub>up1</sub>	/INH="L"	0.5	1.0	2.0	M
Input Pull-Up Resistance 2	R <sub>up2</sub>	/INH=0.7V <sub>DD</sub>	25	50	100	k
Internal Oscillation Capacitance	C <sub>g</sub>	(*3)	-	13	-	pF
	C <sub>d</sub>	(*3)	-	13	-	pF
Internal Oscillation Feedback Resistance	R <sub>f</sub>		100	240	400	k
Output Off Leak Current	I <sub>oz</sub>	/INH="L"	-	-	10	μA

\*1 : Output frequency range is 70 MHz to 125MHz with a multiplier of f<sub>0</sub> x 7 at 3.3V

\*2 : Output frequency range is 80 MHz to 160MHz with a multiplier of f<sub>0</sub> x 7 at 5.0V

\*3 : R&D value

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## ELECTRICAL CHARACTERISTICS (Continued)

3.3V, f0 x 6 multiplier (\*1)

Ta=25

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Operating Voltage	V <sub>DD</sub>		2.97	3.30	3.63	V
'H' Level Input Voltage	V <sub>IH</sub>		2.4	-	-	V
'L' Level Input Voltage	V <sub>IL</sub>		-	-	0.4	V
'H' Level Output Voltage	V <sub>OH</sub>	CMOS: V <sub>DD</sub> =2.97V, I <sub>OH</sub> =-8mA	2.47	-	-	V
'L' Level Output Voltage	V <sub>OL</sub>	CMOS: V <sub>DD</sub> =2.97V, I <sub>OL</sub> =8mA	-	-	0.4	V
Supply Current 1	I <sub>DD1</sub>	/INH="OPEN", C <sub>L</sub> =15pF, f=60MHz	-	8	-	mA
Supply Current 2	I <sub>DD2</sub>	/INH="L", C <sub>L</sub> =15pF, f=60MHz	-	1	-	mA
Input Pull-Up Resistance 1	R <sub>up1</sub>	/INH="L"	1.0	2.0	4.0	M
Input Pull-Up Resistance 2	R <sub>up2</sub>	/INH=0.7V <sub>DD</sub>	35	70	140	k
Internal Oscillation Capacitance	C <sub>g</sub>	(*3)	-	13	-	pF
	C <sub>d</sub>	(*3)	-	13	-	pF
Internal Oscillation Feedback Resistance	R <sub>f</sub>		0.3	1.0	2.0	M
Output Off Leak Current	I <sub>oz</sub>	/INH="L"	-	-	10	μA

5.0V, f0 x 6 multiplier (\*2)

Ta=25

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Operating Voltage	V <sub>DD</sub>		4.5	5.0	5.5	V
'H' Level Input Voltage	V <sub>IH</sub>		2.4	-	-	V
'L' Level Input Voltage	V <sub>IL</sub>		-	-	0.4	V
'H' Level Output Voltage	V <sub>OH</sub>	CMOS: V <sub>DD</sub> =4.5V, I <sub>OH</sub> =-16mA	3.9	4.2	-	V
'L' Level Output Voltage	V <sub>OL</sub>	CMOS: V <sub>DD</sub> =4.5V, I <sub>OL</sub> =16mA	-	0.3	0.4	V
Supply Current 1	I <sub>DD1</sub>	/INH="OPEN", C <sub>L</sub> =15pF, f=120MHz	-	23	-	mA
Supply Current 2	I <sub>DD2</sub>	/INH="L", C <sub>L</sub> =15pF, f=120MHz	-	5	-	mA
Input Pull-Up Resistance 1	R <sub>up1</sub>	/INH="L"	0.5	1.0	2.0	M
Input Pull-Up Resistance 2	R <sub>up2</sub>	/INH=0.7V <sub>DD</sub>	25	50	100	k
Internal Oscillation Capacitance	C <sub>g</sub>	(*3)	-	13	-	pF
	C <sub>d</sub>	(*3)	-	13	-	pF
Internal Oscillation Feedback Resistance	R <sub>f</sub>		100	240	400	k
Output Off Leak Current	I <sub>oz</sub>	/INH="L"	-	-	10	μA

\*1: Output frequency range is 60 MHz to 125MHz with a multiplier of f0 x 6 at 3.3V

\*2: Output frequency range is 80 MHz to 150MHz with a multiplier of f0 x 6 at 5.0V

\*3:R&D value



## ELECTRICAL CHARACTERISTICS (Continued)

3.3V, f<sub>0</sub> x 5 multiplier (\*1)

T<sub>a</sub>=25

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Operating Voltage	V <sub>DD</sub>		2.97	3.30	3.63	V
'H' Level Input Voltage	V <sub>IH</sub>		2.4	-	-	V
'L' Level Input Voltage	V <sub>IL</sub>		-	-	0.4	V
'H' Level Output Voltage	V <sub>OH</sub>	CMOS: V <sub>DD</sub> =2.97V, I <sub>OH</sub> =-8mA	2.47	-	-	V
'L' Level Output Voltage	V <sub>OL</sub>	CMOS: V <sub>DD</sub> =2.97V, I <sub>OL</sub> =8mA	-	-	0.4	V
Supply Current 1	I <sub>DD1</sub>	/INH="OPEN", C <sub>L</sub> =15pF, f=50MHz	-	7	-	mA
Supply Current 2	I <sub>DD2</sub>	/INH="L", C <sub>L</sub> =15pF, f=50MHz	-	1	-	mA
Input Pull-Up Resistance 1	R <sub>up1</sub>	/INH="L"	1.0	2.0	4.0	M
Input Pull-Up Resistance 2	R <sub>up2</sub>	/INH=0.7V <sub>DD</sub>	35	70	140	k
Internal Oscillation Capacitance	C <sub>g</sub>	(*3)	-	13	-	pF
	C <sub>d</sub>	(*3)	-	13	-	pF
Internal Oscillation Feedback Resistance	R <sub>f</sub>		0.3	1.0	2.0	M
Output Off Leak Current	I <sub>oz</sub>	/INH="L"	-	-	10	μA

5.0V, f<sub>0</sub> x 5 multiplier (\*2)

T<sub>a</sub>=25

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Operating Voltage	V <sub>DD</sub>		4.5	5.0	5.5	V
'H' Level Input Voltage	V <sub>IH</sub>		2.4	-	-	V
'L' Level Input Voltage	V <sub>IL</sub>		-	-	0.4	V
'H' Level Output Voltage	V <sub>OH</sub>	CMOS: V <sub>DD</sub> =4.5V, I <sub>OH</sub> =-16mA	3.9	4.2	-	V
'L' Level Output Voltage	V <sub>OL</sub>	CMOS: V <sub>DD</sub> =4.5V, I <sub>OL</sub> =16mA	-	0.3	0.4	V
Supply Current 1	I <sub>DD1</sub>	/INH="OPEN", C <sub>L</sub> =15pF, f=100MHz	-	23	-	mA
Supply Current 2	I <sub>DD2</sub>	/INH="L", C <sub>L</sub> =15pF, f=100MHz	-	5	-	mA
Input Pull-Up Resistance 1	R <sub>up1</sub>	/INH="L"	0.5	1.0	2.0	M
Input Pull-Up Resistance 2	R <sub>up2</sub>	/INH=0.7V <sub>DD</sub>	25	50	100	k
Internal Oscillation Capacitance	C <sub>g</sub>	(*3)	-	13	-	pF
	C <sub>d</sub>	(*3)	-	13	-	pF
Internal Oscillation Feedback Resistance	R <sub>f</sub>		100	240	400	k
Output Off Leak Current	I <sub>oz</sub>	/INH="L"	-	-	10	μA

\*1: Output frequency range is 50 MHz to 125MHz with a multiplier of f<sub>0</sub> x 5 at 3.3V

\*2: Output frequency range is 80 MHz to 125MHz with a multiplier of f<sub>0</sub> x 5 at 5.0V

\*3: R&D value



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## SWITCHING CHARACTERISTICS

3.3V

Ta=25

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Output Rise Time	tr	CL=15pF, 0.1VDD ~ 0.9VDD (*1)	-	2.0	-	ns
Output Fall Time	tf	CL=15pF, 0.9VDD ~ 0.1VDD (*1)	-	2.0	-	ns
Output DUTY Cycle	DUTY	CMOS: 0.5VDD, CL=15pF	45	-	55	%
Output Disable Delay Time	tpLZ	CL=15pF (*1)	-	-	100	ns
Output Enable Delay Time	tpZL	CL=15pF (*1)	-	-	100	ns
Jitter	tj	1 (*1)	-	50	-	ps

5.0V

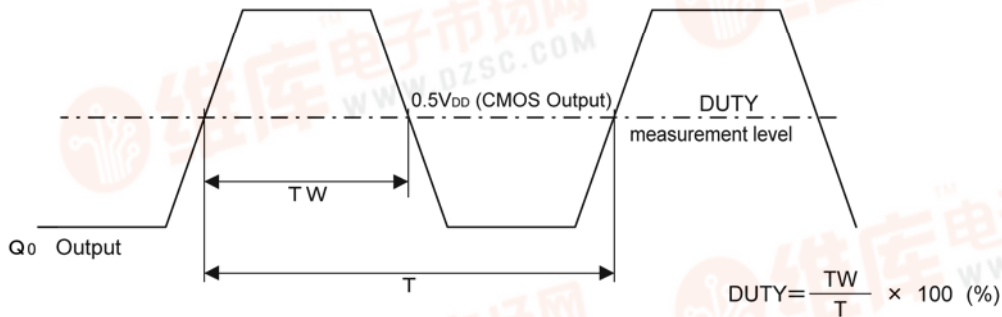
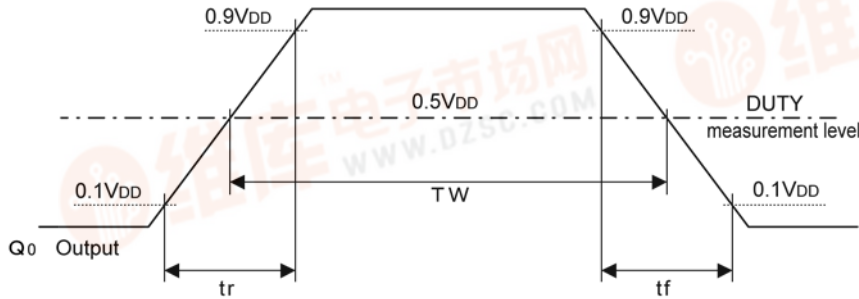
Ta=25

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Output Rise Time	tr	CL=15pF, 0.1VDD ~ 0.9VDD (*1)	-	1.5	-	ns
Output Fall Time	tf	CL=15pF, 0.9VDD ~ 0.1VDD (*1)	-	1.5	-	ns
Output DUTY Cycle	DUTY	CMOS: 0.5VDD, CL=15pF	45	-	55	%
Output Disable Delay Time	tpLZ	CL=15pF (*1)	-	-	100	ns
Output Enable Delay Time	tpZL	CL=15pF (*1)	-	-	100	ns
Jitter	tj	1 (*1)	-	50	-	ps

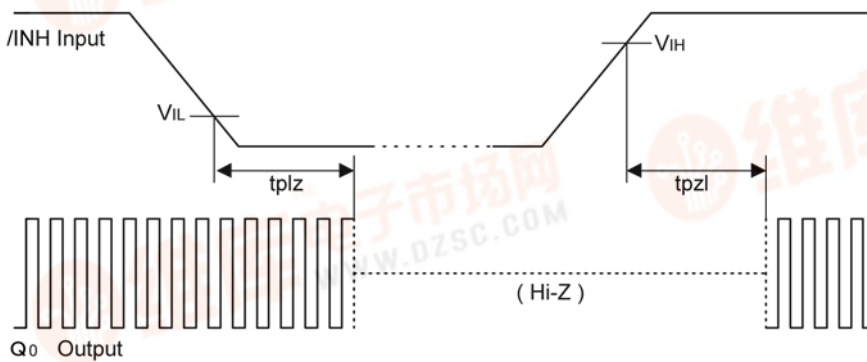
\*1 : R&D value

## SWITCHING CHARACTERISTICS

1) CMOS Level:  $t_r$ ,  $t_f$ , Duty



2) Output Disable/Enable Delay Time



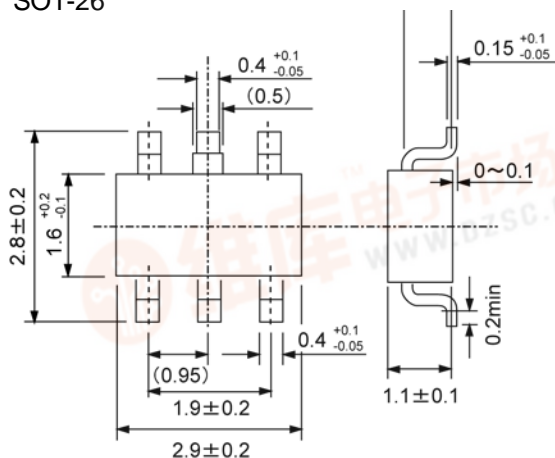
\*)  $/INH$  pin input waveform:  $t_r = t_f =$  less than 10 ns



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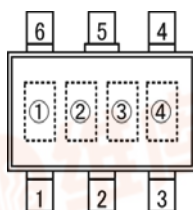
## PACKAGING INFORMATION

SOT-26



## MARKING RULE

SOT-26



SOT-26  
(TOP VIEW)

Represents product series

MARK
7

Represents output

MARK	OUTPUT
M	Multiplier
D	Divider

Represents multiplier and/or divider ratio

MARK	RATIO	MARK	RATIO
2	$f_0/2$	6	$f_0 \times 6$
4	$f_0/4$	7	$f_0 \times 7$
5	$f_0/5$	8	$f_0/8$ & $f_0 \times 8$

Represents assembly lot number.  
(Based on internal standards)

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