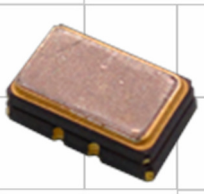
Model 580

Stratum 3 Clipped Sine Wave TCXO/VC-TCXO



Part Dimensions:
5.0 × 3.2 × 1.65mm • 83mg

Features

- Ceramic Surface Mount Package
- Fundamental Crystal Design
- Frequency Range 10 – 52MHz *
- Operating Voltage +2.5V, +3.0V and +3.3V
- Frequency Stability, Overall ±4.6ppm
- Operating Temperature Range to -40°C to +85°C
- Voltage Control Option for Frequency Tuning [VC-TCXO]
- Enable Function Option
- Tape and Reel Packaging, EIA-481

Standard Frequencies – see Page 8 for common frequencies.

* Check with factory for availability of frequencies not listed.

Applications

- Sub 6GHz 5G Small Cell
- IEEE 1588 Timing
- Synchronous Ethernet
- Base Stations, Femtocells
- Mobile Communication
- Wireless Connectivity
- IoT and IIoT
- GPS
- Test and Measurement

Description

CTS Model 580 is a high performance Temperature Compensated Crystal Oscillator [TCXO] suitable for applications requiring Stratum 3 performance. Employing analog IC technology with clipped sine output and high order temperature compensation engine; coupled with a fundamental quartz crystal M580 has excellent stability and low jitter/phase noise performance.

Ordering Information

Model	Supply Voltage	Frequency Code [MHz]	Frequency Stability [2]	Temperature Range	Frequency Tuning	Packaging
580	E	L	XXX	X2	C	T	T

Code	Function
Blank	No Enable
E	Enable

Code	Frequency
	Product Frequency Code [1]

Code	Temp. Range	Code	Temp. Range
W	0°C to +50°C	D	-30°C to +85°C
H	-10°C to +60°C	I	-40°C to +85°C
C	-20°C to +70°C		

Code	Packing
T	1k pcs./reel

Code	Voltage
N	+2.5Vdc
R	+3.0Vdc
L	+3.3Vdc

Code	Stability
X5	±0.05ppm [3]
01	±0.10ppm [4]
02	±0.20ppm
X2	±0.28ppm
05	±0.50ppm

Code	Frequency Deviation
T	TCXO [No Voltage Control]
A	±5ppm - ±15ppm [VCTCXO]

Notes:

1] Refer to document 016-1454-0, Frequency Code Tables. 3-digits for frequencies <100MHz.
2] Frequency vs. Temperature only.
3] Available with operating temperature range code "W".
4] Available with operating temperature range code "W" and "H".

Not all performance combinations and frequencies may be available.
Contact your local CTS Representative or CTS Customer Service for availability.

Electrical Specifications

Operating Conditions

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Maximum Supply Voltage	V_{CC}	-	-0.6	-	4.6	V
Maximum Control Voltage	V_C	-	-0.5	-	V_{CC}	V
Supply Voltage	V_{CC}	±5%	2.36 2.85 3.14	2.5 3.0 3.3	2.63 3.15 3.47	V
Supply Current	I_{CC}	Typical Measured @ 26MHz	-	3.0	6.0	mA
Output Load	$R_L//C_L$	-		10k Ohm//10pF		-
Operating Temperature	T_A	-	0 -10 -20 -30 -40	+25	+50 +60 +70 +85 +85	°C
Storage Temperature	T_{STG}	-	-40	-	+85	°C

Frequency Stability

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Frequency Range	f_O	-		10 - 52		MHz
Frequency Stability						
Overall Frequency Stability	$\Delta f/f_O$	Reference to f_O, Including 20 Years Aging	-4.6	-	4.6	ppm
Initial Calibration		Calibration @ +25°C, At Time of Shipment	-0.8	-	0.8	ppm
Temperature Only [1]	$\Delta f/f_{25}$	[Fmax - Fmin]/2, Over -40°C to +85°C	-0.28	-	0.28	ppm
Voltage Coefficient	$\Delta f/f_{25}$	Supply Voltage, ±5%	-0.16	-	0.16	ppm
Load Coefficient		Load, ±10%	-0.30	-	0.30	ppm
Aging	$\Delta f/f_{25}$	20 Years @ +40°C, Nominal V_{CC} and V_C	-3.0	-	3.0	ppm
Holdover	$\Delta f/f_O$	[Fmax - Fmin]/2, Over 24 Hours	-0.4	-	0.4	ppm

1.] See Ordering Information for additional stability options.

Output Parameters

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Output Type	-	DC Coupled		Clipped Sine		-
Output Voltage Levels	V_O	-	0.8	-	-	V_{P-P}
Output Duty Cycle	SYM	@ 50% Level	45	-	55	%
Start Up Time	T_S	-	-	5	10	ms
Enable Function		Standby				
Enable Input Voltage	V_{IH}	Pin 6 Logic '1', Output Enabled	0.7V_{CC}	-	-	V
Disable Input Voltage	V_{IL}	Pin 6 Logic '0', Output Disabled	-	-	0.3V_{CC}	V
Enable Current	I_{STB}	Pin 6 Logic '0', Output Disabled	-	-	10	µA
Enable Time	T_{PLZ}	Pin 6 Logic '1'	-	-	10	ms
Phase Noise	-	See Typical Plots	-	-	-	-

Electrical Specifications

Control Voltage

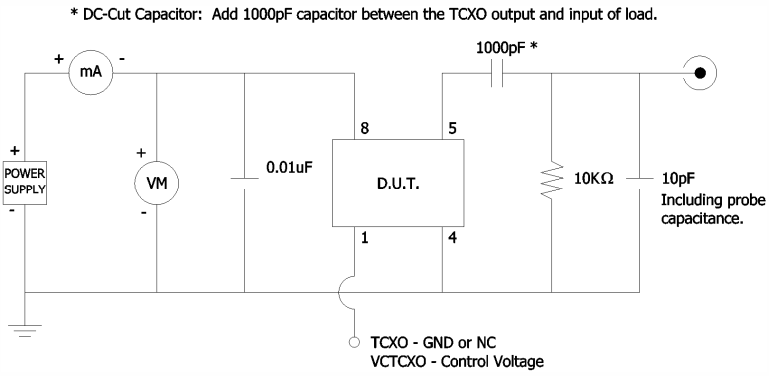
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Control Voltage	V_C	Nominal V_{CC}	0.5	1.5	2.5	V
Frequency Tuning [VCTCXO Only]	$\Delta f/f_O$	Specified V_C Range	±5	-	±15	ppm
Linearity	L	Best Straight Line Fit	-	-	±10	%
Input Impedance	Z_{Vc}	-	100	-	-	kOhms
Transfer Function	-	-		Positive		-

Enable Truth Table

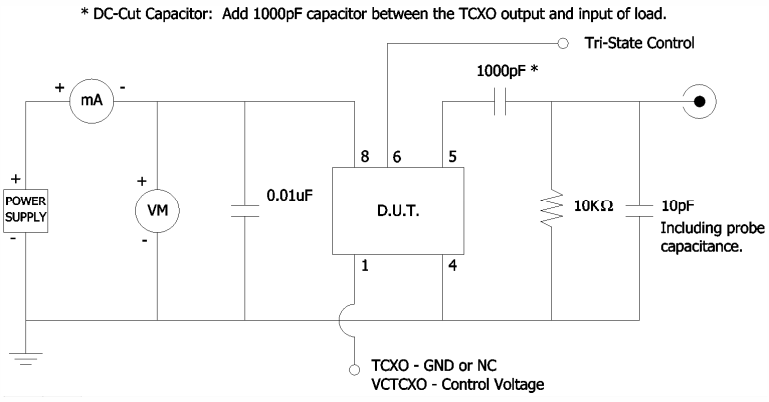
Pin 6	Pin 5
Logic '1'	Output Enabled
Open	Output Enabled
Logic '0'	Output Disabled, High Impedance

Test Circuit

Clipped Sine – w/o Enable Function



Clipped Sine – w/ Enable Function

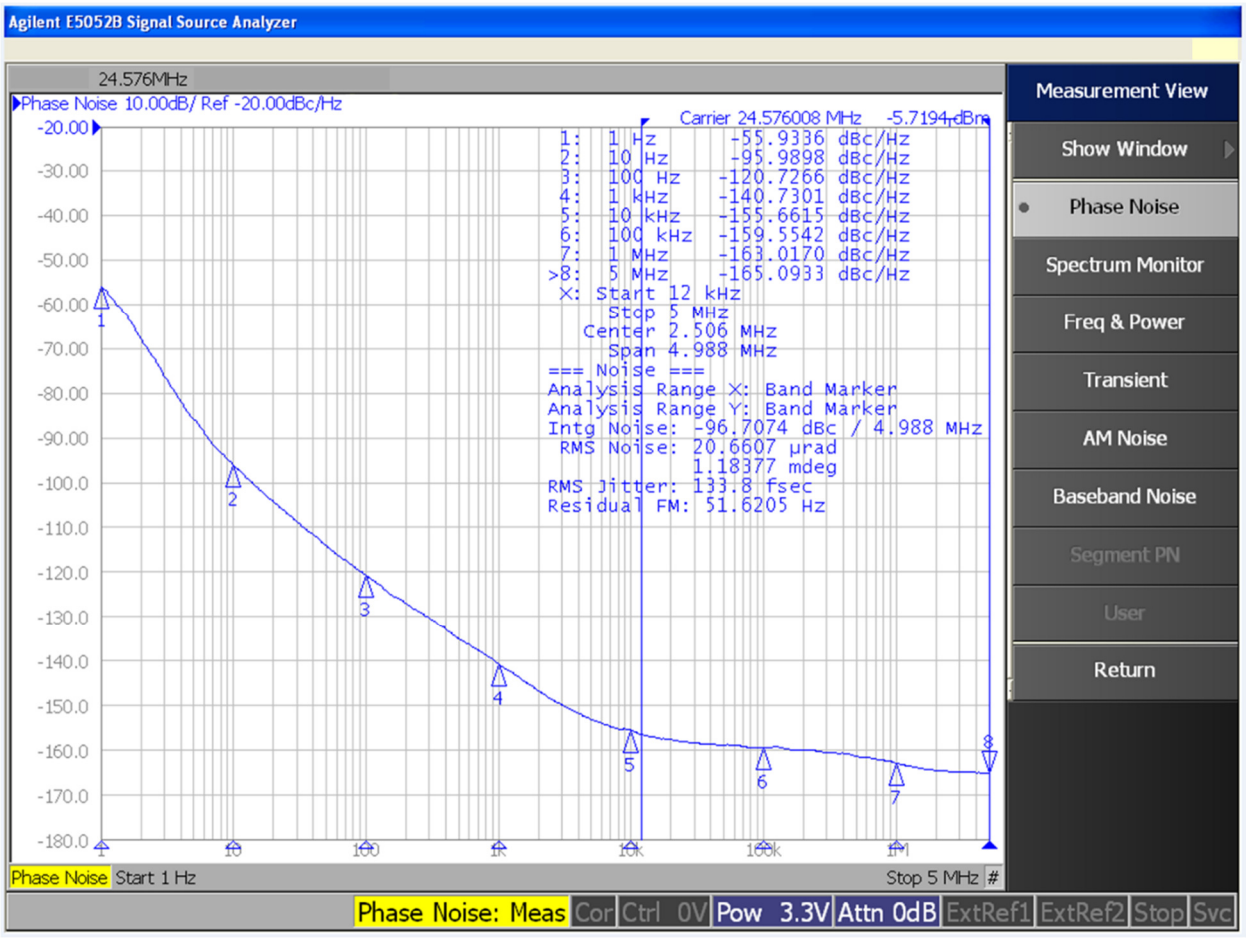


Electrical Specifications

Performance Data

Phase Noise [typical]

24.5760MHz, V_{CC} = +3.3V, T_A = +25°C

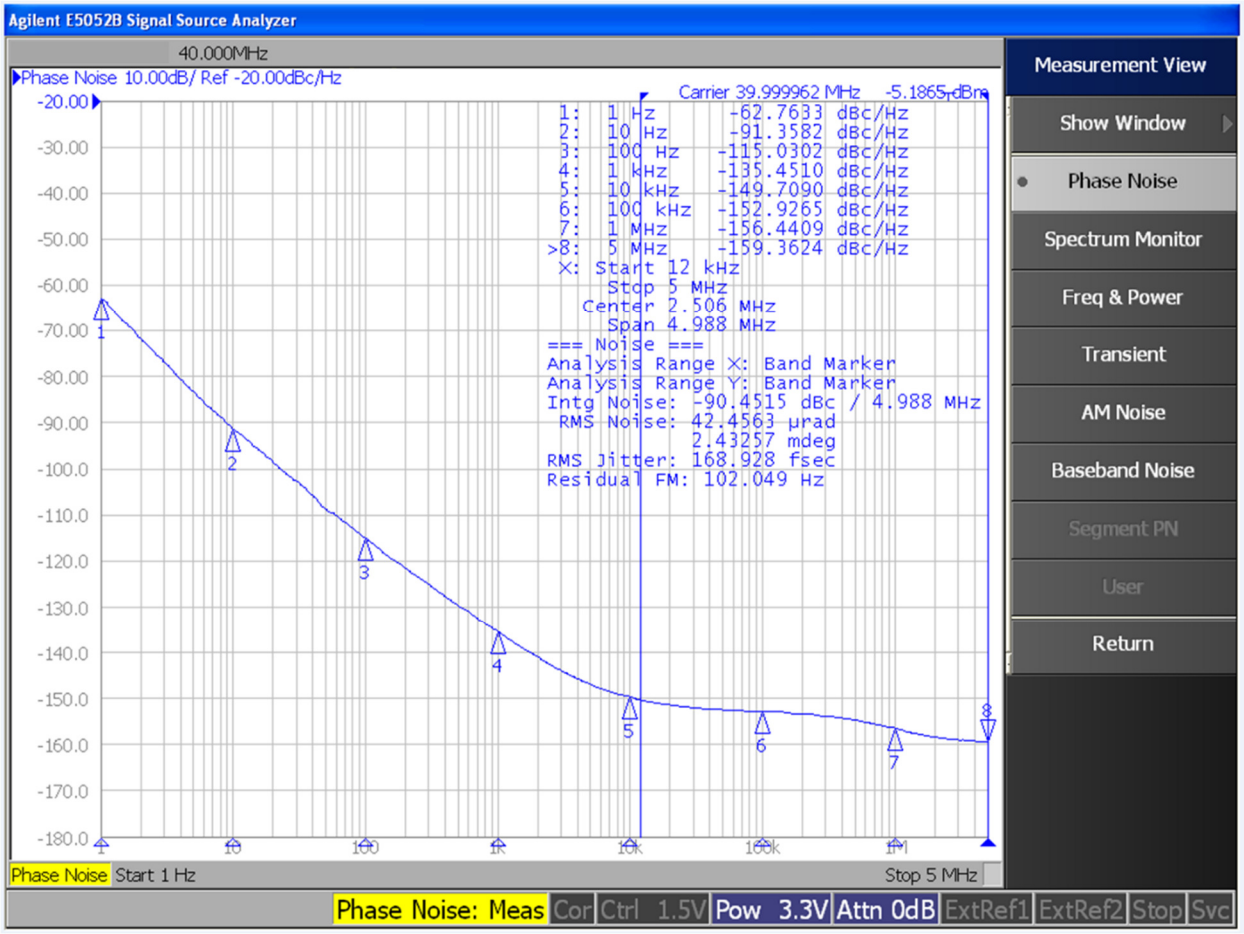


Electrical Specifications

Performance Data

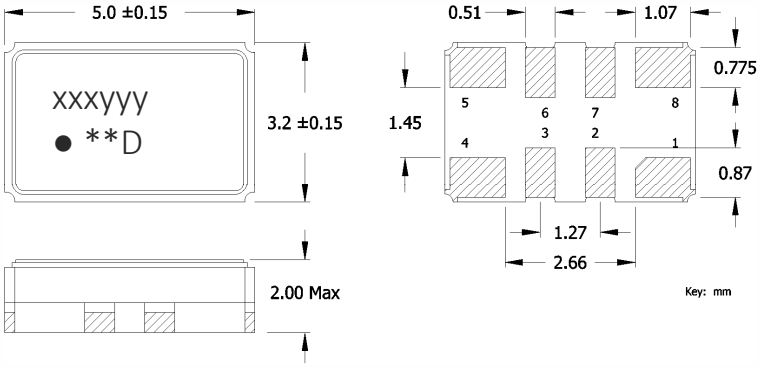
Phase Noise [typical]

40MHz, V_{CC} = +3.3V, V_C = +1.5V, T_A = +25°C



Mechanical Specifications

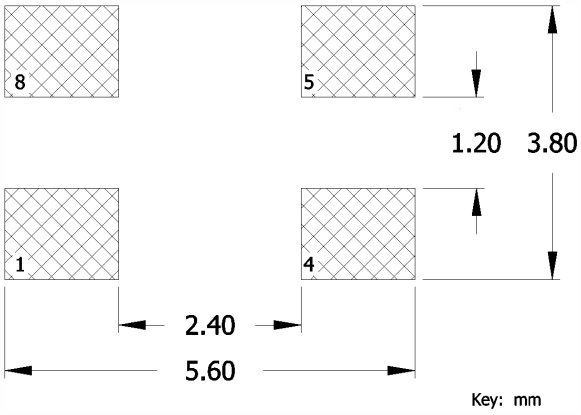
Package Drawing – 8-Pad



Marking Information

1. xxx – Frequency Code, 3-digits.
   3-digits for frequencies <100MHz
   [See document 016-1454-0, Frequency Code Tables.]
2. yyy – Crystal Lot Code or Date Code [optional].
3. ● – Pin 1 Identifier.
4. ** – Manufacturing site code.
5. D – Date Code. See Table I for codes.

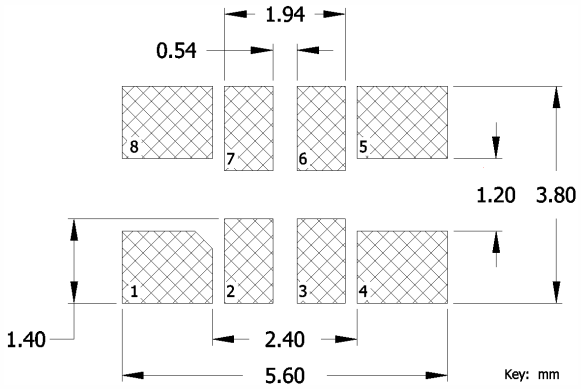
Recommended Pad Layout – w/o Enable Function



Notes

1. DO NOT make connections to non-labeled pins or castellations as they may have internal connections used in the manufacturing process.
2. JEDEC termination code (e4). Barrier-plating is nickel [Ni] with gold [Au] flash plate.
3. Reflow conditions per JEDEC J-STD-020; +260°C maximum, 20 seconds.
4. MSL = 1.

Recommended Pad Layout – w/ Enable Function



Mechanical Specifications

Pin Assignments – 8-Pad Solder Attach

Pin	Symbol	Function
1	V_C	GND or NC – TCXO [Note 1] Control Voltage – VCTCXO
2	NC	No Connect
3	NC	No Connect
4	GND	Circuit & Package Ground
5	Output	Clipped Sine Output
6	NC or EOH	No Connect or Optional Enable
7	NC	No Connect
8	V_{CC}	Supply Voltage

Pin Assignments – 4-Pad Solder Attach

Pin	Symbol	Function
1	V_C	GND or NC – TCXO [Note 1] Control Voltage – VCTCXO
2	GND	Circuit & Package Ground
3	Output	Clipped Sine Output
4	V_{CC}	Supply Voltage

Notes

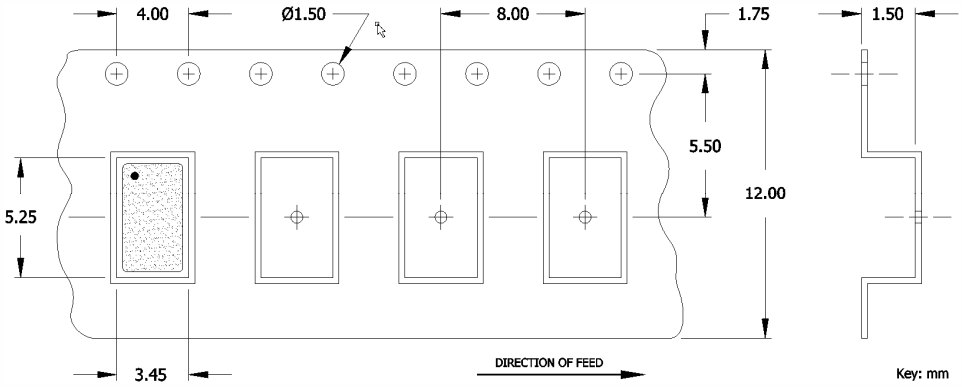
1. Connect to ground for TCXO, no frequency tuning. Pin can be left floating.
2. DC-Cut capacitor required. Add 1000pF capacitor between TCXO output and input of load.

Table I - Date Code, Beginning year 2021

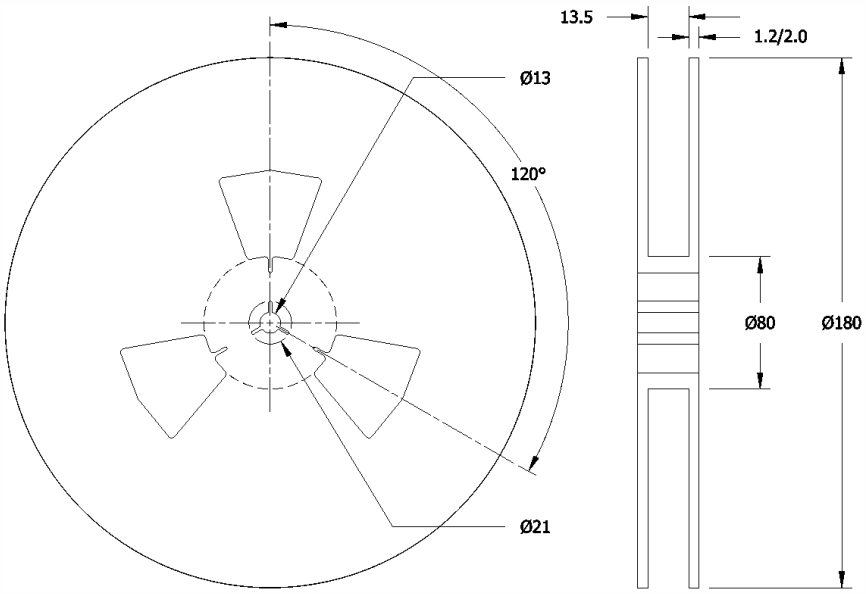
YEAR \ MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2021 2025 2029 2033 2037	A	B	C	D	E	F	G	H	J	K	L	M
2022 2026 2030 2034 2038	N	P	Q	R	S	T	U	V	W	X	Y	Z
2023 2027 2031 2035 2039	a	b	c	d	e	f	g	h	j	k	l	m
2024 2028 2032 2036 2040	n	p	q	r	s	t	u	v	w	x	y	z

Packaging - Tape and Reel

Tape Drawing



Reel Drawing



Notes

1. Device quantity is 1k pieces per 180mm reel.
2. Complete CTS part number, frequency value and date code information must appear on reel and carton labels.

Addendum

Common Frequencies and Frequency Codes – MHz

FREQUENCY	ORDERING CODE	FREQUENCY	ORDERING CODE	FREQUENCY	ORDERING CODE
10.000000	100	25.000000	250	**50.000000**	500
12.800000	128	26.000000	260	52.000000	520
13.000000	130	27.000000	270		
16.000000	160	30.000000	300		
16.384000	163	**30.720000**	307		
16.800000	168	32.000000	320		
19.200000	192	36.000000	360		
19.440000	194	38.400000	384		
20.000000	200	38.880000	388		
20.480000	204	**40.000000**	400		
24.000000	240	48.000000	480		
24.576000	24C	49.152000	491		

Frequencies in **bold** are standard.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

CTS:

580EL10002CAT 580EL10002CTT 580EL10002DAT 580EL10002DTT 580EL10002IAT 580EL10002ITT
580EL10005CAT 580EL10005CTT 580EL10005DAT 580EL10005DTT 580EL10005IAT 580EL10005ITT
580EL100X2CAT 580EL100X2CTT 580EL100X2DAT 580EL100X2DTT 580EL100X2IAT 580EL100X2ITT
580EL12802CAT 580EL12802CTT 580EL12802DAT 580EL12802DTT 580EL12802IAT 580EL12802ITT
580EL12805CAT 580EL12805CTT 580EL12805DAT 580EL12805DTT 580EL12805IAT 580EL12805ITT
580EL128X2CAT 580EL128X2CTT 580EL128X2DAT 580EL128X2DTT 580EL128X2IAT 580EL128X2ITT
580EL13002CAT 580EL13002CTT 580EL13002DAT 580EL13002DTT 580EL13002IAT 580EL13002ITT
580EL13005CAT 580EL13005CTT 580EL13005DAT 580EL13005DTT 580EL13005IAT 580EL13005ITT
580EL130X2CAT 580EL130X2CTT 580EL130X2DAT 580EL130X2DTT 580EL130X2IAT 580EL130X2ITT
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580EL16302CAT 580EL16302CTT 580EL16302DAT 580EL16302DTT 580EL16302IAT 580EL16302ITT
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580EL16805CAT 580EL16805CTT 580EL16805DAT 580EL16805DTT