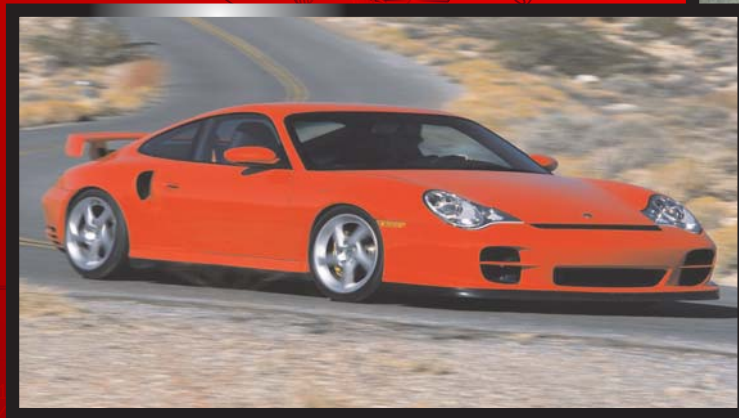
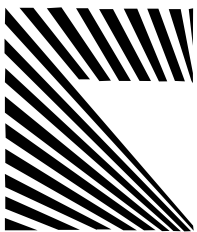


HI REL OSCILLATORS



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<http://www.cardinalxtal.com>
E-Mail: sales@cardinalxtal.com

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CRYSTAL OSCILLATORS

SURFACE MOUNT OSCILLATORS

TCXO

VCXO

TCVCXO

NAME	DESCRIPTION	PAGE
CFE4	(XO, LVPECL, 4 PIN, FREQ. RANGE 38.0MHz-640.0MHz)	1
CFL4	(XO, LVDS, 4 PIN, FREQ. RANGE 38.0MHz-640.0MHz)	2
CFED	(XO, LVPECL, 6 PIN, FREQ. RANGE 38.0MHz-640.0MHz)	3
CFL	(XO, LVDS, 6 PIN, FREQ. RANGE 38.0MHz-640.0MHz)	4
CFVE	(VCXO, LVPECL, 6 PIN, FREQ. RANGE 38.0MHz-640MHz)	5
CFVED	(VCXO, LVPECL, 6 PIN, FREQ. RANGE 38.0MHz-640MHz)	6
CFVL	(VCXO, LVDS, 6 PIN, FREQ. RANGE 38.0MHz-640MHz)	7
CTED	(TCXO, LVPECL, 6 PIN, FREQ. RANGE 38.0MHz-640MHz)	8
CTL	(TCXO, LVDS, 6 PIN, FREQ. RANGE 38.0MHz-640MHz)	9
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CTVL	(TCVCXO, LVDS, 6 PIN, FREQ. RANGE 38.0MHz-640MHz)	11

- * LVPECL Output
- * Industry Standard Outline

Applications

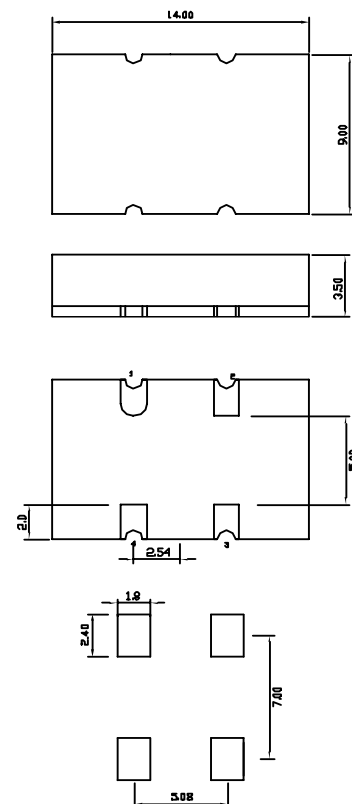
- * Serial Communications
- * Routers
- * Switches
- * WAN Interfaces
- * Test Equipment



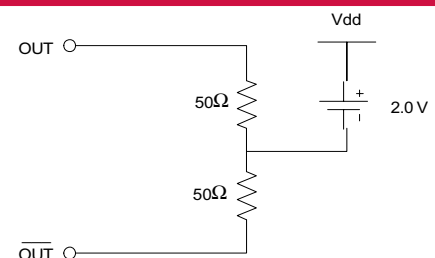
Part Numbering Example: CFE4 Z - A5 BP - 222.5792

CFE4	Z	A5	BP	222.5792
SERIES	PACKAGING OPTIONS	OPERATING TEMP.	STABILITY	FREQUENCY
CFE4	Blank = Bulk Z = Tape and Reel	Blank = 0°C ~ +70°C A5 = -20°C ~ +70°C A7 = -40°C ~ +85°C	Blank = ±100 ppm BP = ±50 ppm	

Specifications:	Min	Typ	Max	Unit
Frequency Range:	38		640	MHz
Stability:	-50		+ 50	ppm
Supply Voltage:	3.135	3.3	3.465	V
Operating Temperature:	-40		+ 85	°C
Storage Temperature:	-55		+ 125	°C
Duty Cycle:	45		55	%
Start-Up Time:		3	10	mS
Aging: (ppm/1st Year) Ta=25°C, Vdd=3.3V			5	ppm
Supply Current:			100	mA
Short Circuit Current:		± 50		mA
RMS Period Jitter:		5		pS
RMS Integrated Jitter: 12kHz to 20MHz		0.7		pS
Phase Noise @ 10kHz:			-120	dBc/Hz
Output Voltage: Voh Vol	Vdd - 1.025		Vdd - 1.62	V V
Rise/Fall Time:		0.4	0.8	nS
Output Level:	LVPECL			
Packaging:	Tape and Reel 1000 pcs per Reel			

CFE4

- PIN Function
- 1 LVPECL-
 - 2 Ground
 - 3 LVPECL+
 - 4 VDD

LVPECL Levels Test Circuit

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- * LVDS Output
- * Industry Standard Outline

Applications

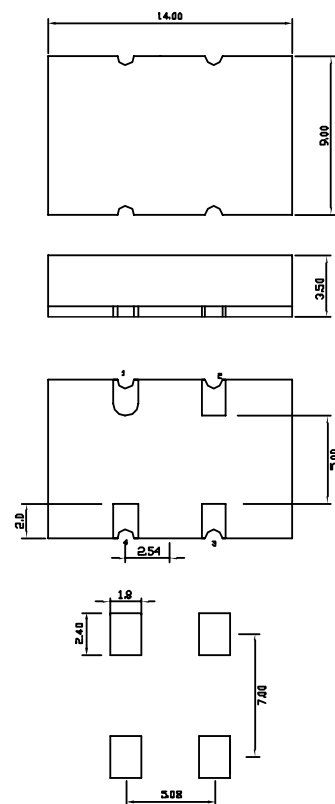
- * Serial Communications
- * Routers
- * Switches
- * WAN Interfaces
- * Test Equipment



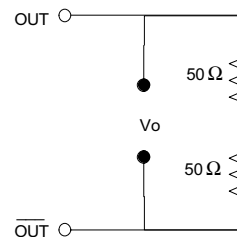
Part Numbering Example: CFL4 Z - A5 BP - 222.5792

CFL4	Z	A5	BP	222.5792
SERIES	PACKAGING OPTIONS	OPERATING TEMP.	STABILITY	FREQUENCY
CFL4	Blank = Bulk Z = Tape and Reel	Blank = 0°C ~ +70°C A5 = -20°C ~ +70°C A7 = -40°C ~ +85°C	Blank = ±100 ppm BP = ±50 ppm	

Specifications:	Min	Typ	Max	Unit
Frequency Range:	38		640	MHz
Stability:	-50		+ 50	ppm
Supply Voltage:	3.135	3.3	3.465	V
Operating Temperature:	-40		+ 85	°C
Storage Temperature:	-55		+ 125	°C
Duty Cycle:	45		55	%
Start-Up Time:		3	10	mS
Aging: (ppm/1st Year) Ta=25C, Vdd=3.3V			5	ppm
Supply Current:			100	mA
Short Circuit Current:		± 50		mA
RMS Period Jitter:		5		pS
RMS Integrated Jitter: 12kHz to 20MHz		0.7		pS
Phase Noise @ 10kHz:			-120	dBc/Hz
Output Voltage: Voh Vol	Vdd - 0.9		Vdd - 1.6	V V
Output Differential Voltage:	247	355	454	mV
Rise/Fall Time:		0.4	0.8	nS
Output Level:	LVDS			
Packaging:	Tape and Reel 1000 pcs per Reel			

CFL4

PIN Function
1 LVDSL-
2 Ground
3 LVDS+
4 VDD

LVDS Levels Test Circuit

- * LVPECL Output
- * Industry Standard Outline

Applications

- * Serial Communications
- * Routers
- * Switches
- * WAN Interfaces
- * Test Equipment



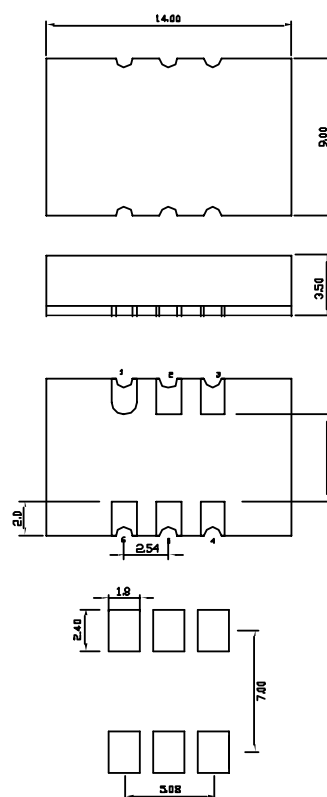
Part Numbering Example: CFED Z - A5 BP - 222.5792 TS

CFED	Z	A5	BP	222.5792	TS
SERIES	PACKAGING OPTIONS	OPERATING TEMP.	STABILITY	FREQUENCY	TRI-STATE
CFED	Blank = Bulk Z = Tape and Reel	Blank = 0°C ~ +70°C A5 = -20°C ~ +70°C A7 = -40°C ~ +85°C	Blank = ±100 ppm BP = ±50 ppm		TS = Tri-State

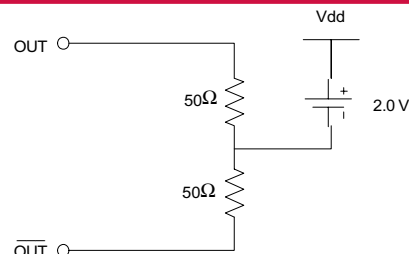
Specifications:	Min	Typ	Max	Unit
Frequency Range:	38		640	MHz
Stability:	-50		+ 50	ppm
Supply Voltage:	3.135	3.3	3.465	V
Operating Temperature:	-40		+ 85	°C
Storage Temperature:	-55		+ 125	°C
Duty Cycle:	45		55	%
Start-Up Time:		3	10	mS
Aging: (ppm/1st Year) Ta=25°C, Vdd=3.3V			5	ppm
Supply Current:			100	mA
Short Circuit Current:		± 50		mA
RMS Period Jitter:		5		pS
RMS Integrated Jitter: 12kHz to 20MHz		0.7		pS
Phase Noise @ 10kHz:			-120	dBc/Hz
Output Voltage:				
Voh	Vdd - 1.025			V
Vol			Vdd - 1.62	V
Rise/Fall Time:		0.4	0.8	nS
Output Level:	LVPECL			
Packaging:	Tape and Reel 1000 pcs per Reel			

CFED

Dimensions are in mm



- PIN Function
- 1 DISABLE
 - 2 NO CONNECT
 - 3 Ground
 - 4 LVPECL +
 - 5 LVPECL -
 - 6 Vdd

LVPECL Levels Test Circuit

- * LVDS Output
- * Industry Standard Outline

Applications

- * Serial Communications
- * Routers
- * Switches
- * WAN Interfaces
- * Test Equipment



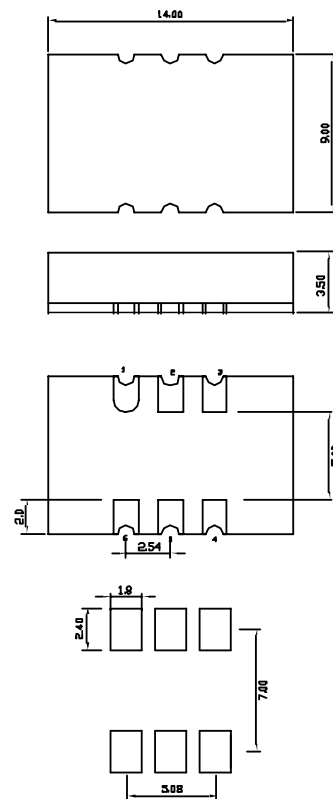
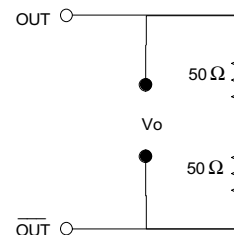
Part Numbering Example: CFL Z - A5 BP - 222.5792 TS

CFL	Z	A5	BP	222.5792	TS
SERIES	PACKAGING OPTIONS	OPERATING TEMP.	STABILITY	FREQUENCY	TRI-STATE
CFL	Blank = Bulk Z = Tape and Reel	Blank = 0°C ~ +70°C A5 = -20°C ~ +70°C A7 = -40°C ~ +85°C	Blank = ±100 ppm BP = ±50 ppm		TS = Tri-State

Specifications:	Min	Typ	Max	Unit
Frequency Range:	38		640	MHz
Stability:	-50		+ 50	ppm
Supply Voltage:	3.135	3.3	3.465	V
Operating Temperature:	-40		+ 85	°C
Storage Temperature:	-55		+ 125	°C
Duty Cycle:	45		55	%
Start-Up Time:		3	10	mS
Aging: (ppm/1st Year) Ta=25°C, Vdd=3.3V			5	ppm
Supply Current:			100	mA
Short Circuit Current:		± 50		mA
RMS Period Jitter:		5		pS
RMS Integrated Jitter: 12kHz to 20MHz		0.7		pS
Phase Noise @ 10kHz:			-120	dBc/Hz
Output Voltage: Voh Vol	Vdd - 0.9		Vdd - 1.6	V V
Output Differential Voltage:	247	355	454	mV
Rise/Fall Time:		0.4	0.8	nS
Output Level:	LVDS			
Packaging:	Tape and Reel 1000 pcs per Reel			

CFL

Dimensions are in mm

**LVDS Levels Test Circuit**

- * LVPECL Output
- * Industry Standard Outline

Applications

- * Serial Communications
- * Routers
- * Switches
- * WAN Interfaces
- * Test Equipment

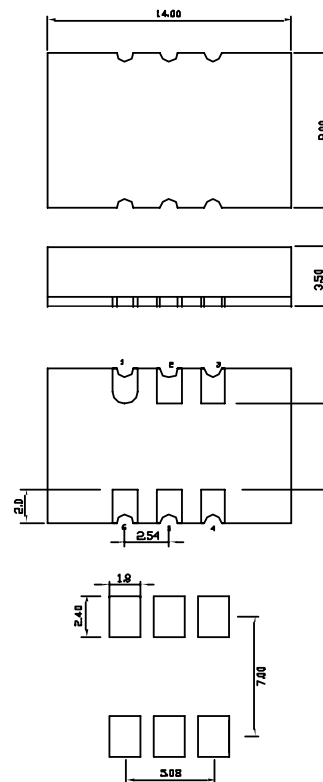
**Part Numbering Example: CFVE Z - A5 BP - 222.5792 TS**

CFVE	Z	A5	BP	222.5792	TS
SERIES	PACKAGING OPTIONS	OPERATING TEMP.	STABILITY	FREQUENCY	TRI-STATE
CFVE	Blank = Bulk Z = Tape and Reel	Blank = 0°C ~ +70°C A5 = -20°C ~ +70°C A7 = -40°C ~ +85°C	Blank = ±100 ppm BP = ±50 ppm		TS = Tri-State

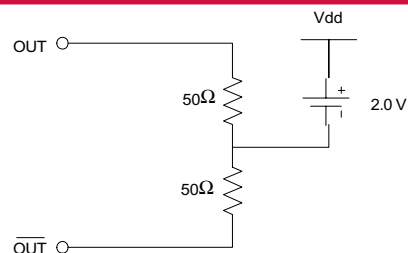
Specifications:	Min	Typ	Max	Unit
Frequency Range:	38		640	MHz
Stability:	-50		+ 50	ppm
Supply Voltage:	3.135	3.3	3.465	V
Frequency Tuning Range:		±100		ppm
External Control Voltage:	0.35		3.0	V
Operating Temperature:	-40		+ 85	°C
Storage Temperature:	-55		+ 125	°C
Duty Cycle:	45		55	%
Start-Up Time:		3	10	mS
Aging: (ppm/1st Year) Ta=25°C, Vdd=3.3V			5	ppm
Supply Current:			100	mA
Short Circuit Current:		± 50		mA
RMS Period Jitter:		5		pS
RMS Integrated Jitter: 12kHz to 20MHz		0.7		pS
Phase Noise @ 10kHz:			-120	dBc/Hz
Output Voltage:				
Voh	Vdd - 1.025			V
Vol			Vdd - 1.62	V
Rise/Fall Time:		0.4	0.8	nS
Output Level:	LVPECL			
Packaging:	Tape and Reel 1000 pcs per Reel			

CFVE

Dimensions are in mm



PIN Function
 1 VCONTROL
 2 ENABLE
 3 Ground
 4 LVPECL +
 5 LVPECL -
 6 Vdd

LVPECL Levels Test Circuit

- * LVPECL Output
- * Industry Standard Outline

Applications

- * Serial Communications
- * Routers
- * Switches
- * WAN Interfaces
- * Test Equipment



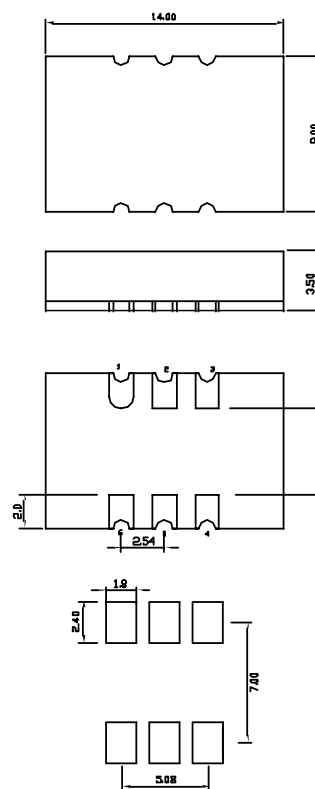
Part Numbering Example: CFVED Z - A5 BP - 222.5792 TS

CFVED	Z	A5	BP	222.5792	TS
SERIES	PACKAGING OPTIONS	OPERATING TEMP.	STABILITY	FREQUENCY	TRI-STATE
CFVED	Blank = Bulk Z = Tape and Reel	Blank = 0°C ~ +70°C A5 = -20°C ~ +70°C A7 = -40°C ~ +85°C	Blank = ±100 ppm BP = ±50 ppm		TS = Tri-State

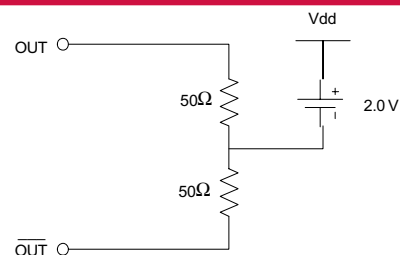
Specifications:	Min	Typ	Max	Unit
Frequency Range:	38		640	MHz
Stability:	-50		+ 50	ppm
Supply Voltage:	3.135	3.3	3.465	V
Frequency Tuning Range:		±100		ppm
External Control Voltage:	0.35		3.0	V
Operating Temperature:	-40		+ 85	°C
Storage Temperature:	-55		+ 125	°C
Duty Cycle:	45		55	%
Start-Up Time:		3	10	mS
Aging: (ppm/1st Year) Ta=25°C, Vdd=3.3V			5	ppm
Supply Current:			100	mA
Short Circuit Current:		± 50		mA
RMS Period Jitter:		5		pS
RMS Integrated Jitter: 12kHz to 20MHz		0.7		pS
Phase Noise @ 10kHz:			-120	dBc/Hz
Output Voltage:				
Voh	Vdd - 1.025			V
Vol			Vdd - 1.62	V
Rise/Fall Time:		0.4	0.8	nS
Output Level:	LVPECL			
Packaging:	Tape and Reel 1000 pcs per Reel			

CFVED

Dimensions are in mm



- PIN Function
- 1 VCONTROL
 - 2 DISABLE
 - 3 Ground
 - 4 LVPECL +
 - 5 LVPECL -
 - 6 Vdd

LVPECL Levels Test Circuit

- * LVDS Output
- * Industry Standard Outline

Applications

- * Serial Communications
- * Routers
- * Switches
- * WAN Interfaces
- * Test Equipment



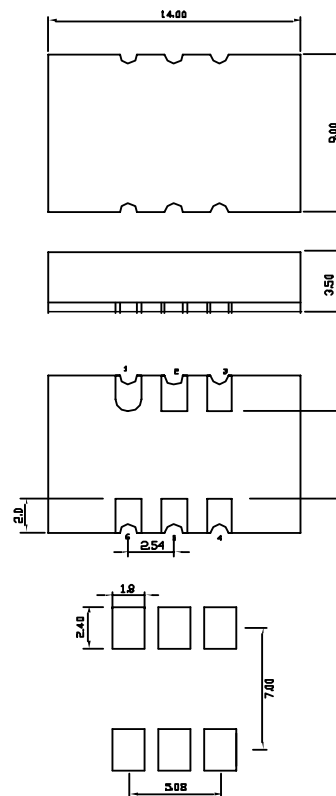
Part Numbering Example: CFVL Z - A5 BP - 222.5792 TS

CFVL	Z	A5	BP	222.5792	TS
SERIES	PACKAGING OPTIONS	OPERATING TEMP.	STABILITY	FREQUENCY	TRI-STATE
CFVL	Blank = Bulk Z = Tape and Reel	Blank = 0°C ~ +70°C A5 = -20°C ~ +70°C A7 = -40°C ~ +85°C	Blank = ±100 ppm BP = ±50 ppm		TS = Tri-State

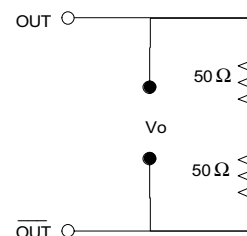
Specifications:	Min	Typ	Max	Unit
Frequency Range:	38		640	MHz
Stability:	-50		+ 50	ppm
Supply Voltage:	3.135	3.3	3.465	V
Frequency Tuning Range:		± 100		ppm
External Control Voltage:	0.35		3.0	V
Operating Temperature:	-40		+ 85	°C
Storage Temperature:	-55		+ 125	°C
Duty Cycle:	45		55	%
Start-Up Time:		3	10	mS
Aging: (ppm/1st Year) Ta=25C, Vdd=3.3V			5	ppm
Supply Current:			100	mA
Short Circuit Current:		± 50		mA
RMS Period Jitter:		5		pS
RMS Integrated Jitter: 12kHz to 20MHz		0.7		pS
Phase Noise @ 10kHz:			-120	dBc/Hz
Output Voltage: Voh Vol	Vdd - 0.9		Vdd - 1.6	V V
Output Differential Voltage:	247	355	454	mV
Rise/Fall Time:		0.4	0.8	nS
Output Level:	LVDS			
Packaging:	Tape and Reel 1000 pcs per Reel			

CFVL

Dimensions are in mm



PIN Function
1 VCONTROL
2 ENABLE
3 Ground
4 LVDS +
5 LVDS -
6 Vdd

LVDS Levels Test Circuit

- * LVPECL Output
- * Industry Standard Outline

Applications

- * Serial Communications
- * Routers
- * Switches
- * WAN Interfaces
- * Test Equipment



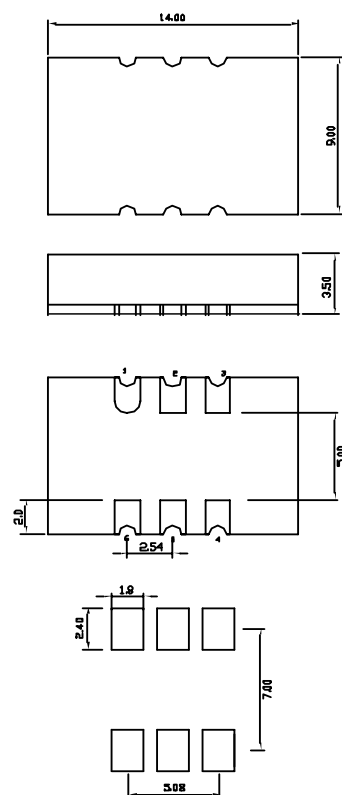
Part Numbering Example: CTED Z - A5 B3 - 222.5792 TS

CTED	Z	A5	B3	222.5792	TS
SERIES	PACKAGING OPTIONS	OPERATING TEMP.	STABILITY	FREQUENCY	TRI-STATE
CTED	Blank = Bulk Z = Tape and Reel	Blank = 0°C ~ +70°C A5 = -20°C ~ +70°C	B3 = ±2.5 ppm		TS = Tri-State

Specifications:	Min	Typ	Max	Unit
Frequency Range:	38		640	MHz
Stability:	- 2.5		+ 2.5	ppm
Supply Voltage:	3.135	3.3	3.465	V
Operating Temperature:	-30		+ 70	°C
Storage Temperature:	-40		+ 85	°C
Duty Cycle:	45		55	%
Start-Up Time:		3	10	mS
Aging: (ppm/1st Year) Ta=25C, Vdd=3.3V			1	ppm
Supply Current:			100	mA
Short Circuit Current:		± 50		mA
RMS Period Jitter:		5		pS
RMS Integrated Jitter: 12kHz to 20MHz		0.7		pS
Phase Noise @ 10kHz:			-120	dBc/Hz
Output Voltage: Voh Vol	Vdd - 1.025		Vdd - 1.62	V V
Rise/Fall Time:		0.4	0.8	nS
Output Level:	LVPECL			
Packaging:	Tape and Reel 1000 pcs per Reel			

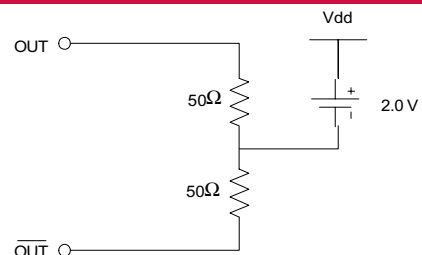
CTED

Dimensions are in mm



PIN Function
 1 DISABLE
 2 NO CONNECT
 3 Ground
 4 LVPECL +
 5 LVPECL -
 6 Vdd

LVPECL Levels Test Circuit



- * LVDS Output
- * Industry Standard Outline

Applications

- * Serial Communications
- * Routers
- * Switches
- * WAN Interfaces
- * Test Equipment



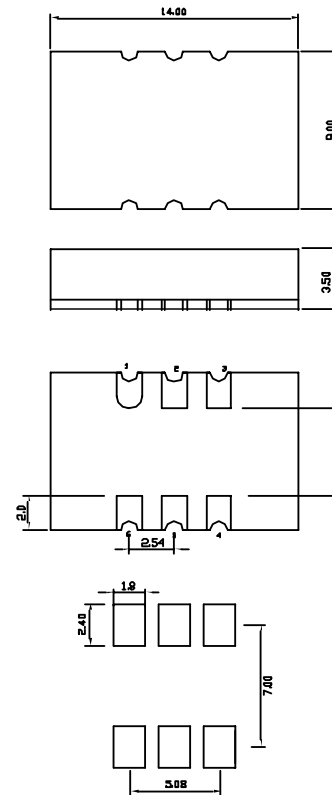
Part Numbering Example: CTL Z - A5 B3 - 222.5792 TS

CTL	Z	A5	B3	222.5792	TS
SERIES	PACKAGING OPTIONS	OPERATING TEMP.	STABILITY	FREQUENCY	TRI-STATE
CTL	Blank = Bulk Z = Tape and Reel	Blank = 0°C ~ +70°C A5 = -20°C ~ +70°C	B3 = ± 2.5 ppm		TS = Tri-State

Specifications:	Min	Typ	Max	Unit
Frequency Range:	38		640	MHz
Stability:	- 2.5		+ 2.5	ppm
Supply Voltage:	3.135	3.3	3.465	V
Operating Temperature:	-30		+ 70	°C
Storage Temperature:	-40		+ 85	°C
Duty Cycle:	45		55	%
Start-Up Time:		3	10	mS
Aging: (ppm/1st Year) Ta=25°C, Vdd=3.3V			1	ppm
Supply Current:			100	mA
Short Circuit Current:		± 50		mA
RMS Period Jitter:		5		pS
RMS Integrated Jitter: 12kHz to 20MHz		0.7		pS
Phase Noise @ 10kHz:			-120	dBc/Hz
Output Voltage: Voh Vol	Vdd - 0.9		Vdd - 1.6	V
Output Differential Voltage:	247	355	454	mV
Rise/Fall Time:		0.4	0.8	nS
Output Level:	LVDS			
Packaging:	Tape and Reel 1000 pcs per Reel			

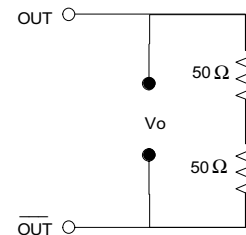
CTL

Dimensions are in mm



- PIN Function**
- 1 ENABLE
 - 2 NO CONNECT
 - 3 Ground
 - 4 LVDS +
 - 5 LVDS -
 - 6 Vdd

LVDS Levels Test Circuit



- * LVPECL Output
- * Industry Standard Outline

Applications

- * Serial Communications
- * Routers
- * Switches
- * WAN Interfaces
- * Test Equipment



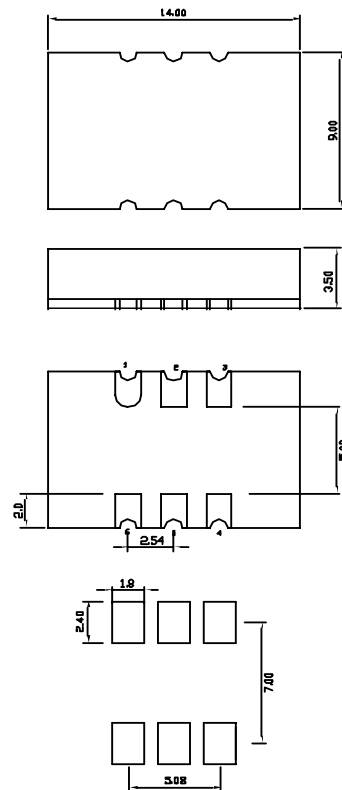
Part Numbering Example: CTVED Z - A5 B3 - 222.5792 TS

CTVED	Z	A5	B3	222.5792	TS
SERIES	PACKAGING OPTIONS	OPERATING TEMP.	STABILITY	FREQUENCY	TRI-STATE
CTVED	Blank = Bulk Z = Tape and Reel	Blank = 0°C ~ +70°C A5 = -20°C ~ +70°C	B3 = ±2.5 ppm		TS = Tri-State

Specifications:	Min	Typ	Max	Unit
Frequency Range:	38		640	MHz
Stability:	- 2.5		+ 2.5	ppm
Supply Voltage:	3.135	3.3	3.465	V
Frequency Tuning Range:		+/- 8		ppm
External Control Voltage:	0.35		3.0	V
Operating Temperature:	-30		+ 70	°C
Storage Temperature:	-40		+ 85	°C
Duty Cycle:	45		55	%
Start-Up Time:		3	10	mS
Aging: (ppm/1st Year) Ta=25C, Vdd=3.3V			1	ppm
Supply Current:			100	mA
Short Circuit Current:		± 50		mA
RMS Period Jitter:		5		pS
RMS Integrated Jitter: 12kHz to 20MHz		0.7		pS
Phase Noise @ 10kHz:			-120	dBc/Hz
Output Voltage:				
Voh	Vdd - 1.025			V
Vol			Vdd - 1.62	V
Rise/Fall Time:		0.4	0.8	nS
Output Level:	LVPECL			
Packaging:	Tape and Reel 1000 pcs per Reel			

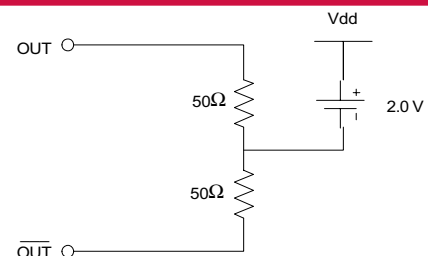
CTVED

Dimensions are in mm



- PIN Function
- 1 VCONTROL
 - 2 DISABLE
 - 3 Ground
 - 4 LVPECL +
 - 5 LVPECL -
 - 6 Vdd

LVPECL Levels Test Circuit



- * LVDS Output
- * Industry Standard Outline

Applications

- * Serial Communications
- * Routers
- * Switches
- * WAN Interfaces
- * Test Equipment



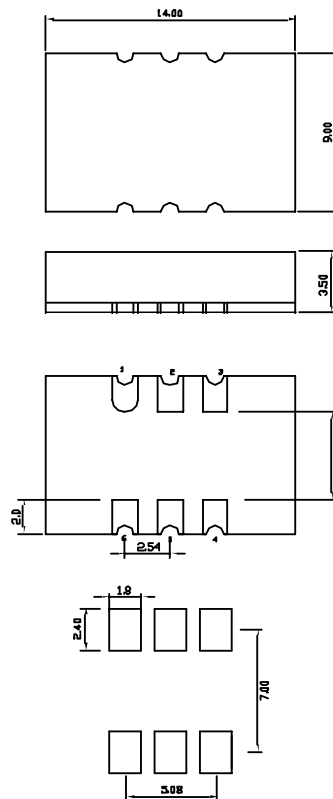
Part Numbering Example: CTVL Z - A5 B3 - 222.5792 TS

CTVL	Z	A5	B3	222.5792	TS
SERIES	PACKAGING OPTIONS	OPERATING TEMP.	STABILITY	FREQUENCY	TRI-STATE
CTVL	Blank = Bulk Z = Tape and Reel	Blank = 0°C ~ +70°C A5 = -20°C ~ +70°C	B3 = ±2.5 ppm		TS = Tri-State

Specifications:	Min	Typ	Max	Unit
Frequency Range:	38		640	MHz
Stability:	- 2.5		+ 2.5	ppm
Supply Voltage:	3.135	3.3	3.465	V
Frequency Tuning Range:		+/- 8		ppm
External Control Voltage:	0.35		3.0	V
Operating Temperature:	-30		+ 70	°C
Storage Temperature:	-40		+ 85	°C
Duty Cycle:	45		55	%
Start-Up Time:		3	10	mS
Aging: (ppm/1st Year) Ta=25°C, Vdd=3.3V			1	ppm
Supply Current:			100	mA
Short Circuit Current:		± 50		mA
RMS Period Jitter:		5		pS
RMS Integrated Jitter: 12kHz to 20MHz		0.7		pS
Phase Noise @ 10kHz:			-120	dBc/Hz
Output Voltage: Voh Vol	Vdd - 0.9		Vdd - 1.6	V V
Output Differential Voltage:	247	355	454	mV
Rise/Fall Time:		0.4	0.8	nS
Output Level:	LVDS			
Packaging:	Tape and Reel 1000 pcs per Reel			

CTVL

Dimensions are in mm



- PIN Function
- 1 VCONTROL
 - 2 ENABLE
 - 3 Ground
 - 4 LVDS +
 - 5 LVDS -
 - 6 Vdd

LVDS Levels Test Circuit