SK10/100EL16V
Differential Receiver with Variable Output Swing

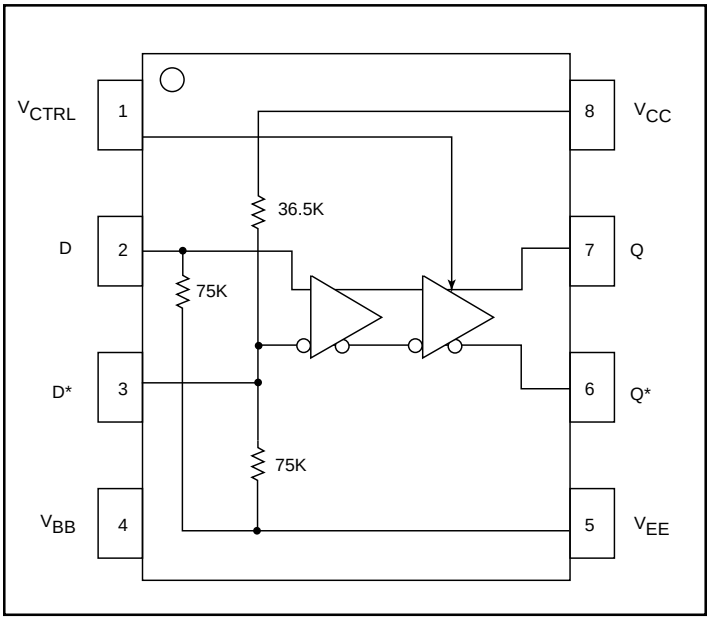
Description

The SK10/100EL16V is a differential receiver with variable output swing. Its VCTRL input controls the amplitude of the Q and Q* outputs. The operating range of the EL16V control input, VCTRL, is from VBB (large swing) to VCC (min swing), see Figure 2. Simple control of the output swing can be obtained by a variable resistor between the VBB and VCC pins, with wiper driving CTRL. Typical application circuits and results are described in Figures 1a, 1b, and 2.

The SK10/100EL16V provides a VBB output for either single-ended use or as a DC bias for AC coupling to the device. The VBB pin should be used only as a bias for the EL16V as its current sink/source capability is limited. Whenever used, the VBB pin should be bypassed to VCC via a 0.01 µF capacitor.

Under open input conditions, the pulldown resistor on D, pulldown and pullup resistors on D* will force the Q output LOW and Q* output HIGH. The VCTRL pin should be bypassed to VCC via a 0.01 µF capacitor when the pin is used.

Functional Block Diagram



Features

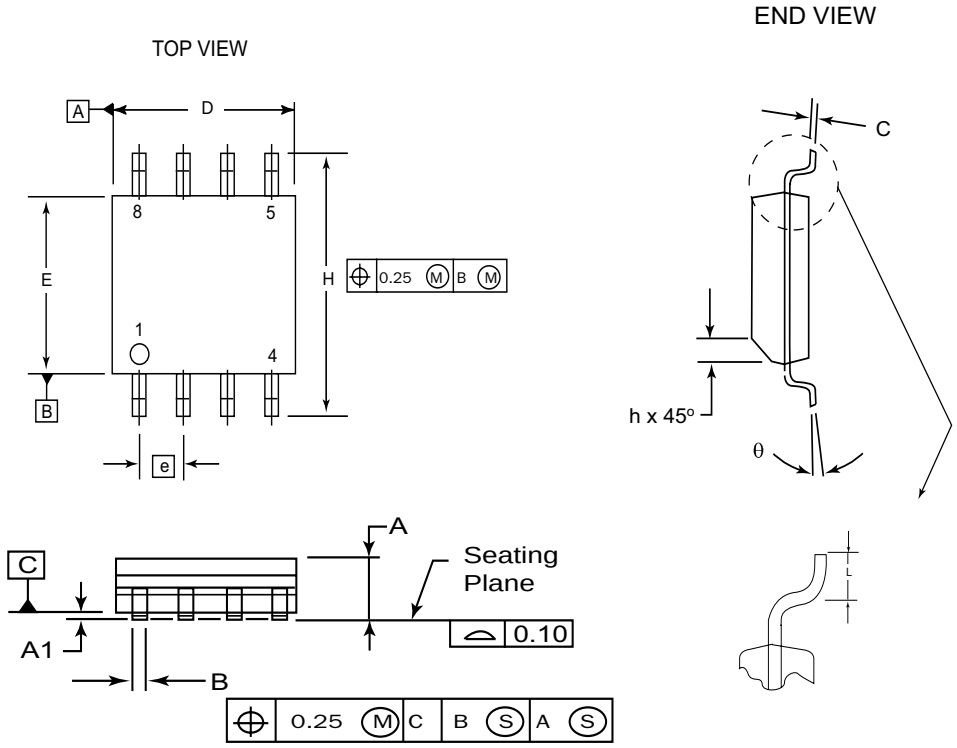
- Extended Supply Voltage Range: (VEE = –5.5V to –3.0V, VCC = 0V) or (VCC = +3.0V to +5.5V, VEE = 0V)
- High Bandwidth Output Transitions
- 300 ps Propagation Delay
- VBB Output
- Internal Input Resistors: Pulldown on D, Pulldown and Pullup on D*
- Q Output will Default Low with Inputs Open or at VEE
- New Differential Input Common Mode Range
- ESD Protection of >4000V
- Specified Over Industrial Temperature Range: –40°C to 85°C
- Available in Both 8 Pin SOIC (150 mil) and MSOP (3mm x 3mm) Packages

PIN Description

Pin	Function
D, D*	Differential Data Inputs
Q, Q*	Differential Data Outputs
VBB	Reference Output Voltage
VCTRL	Output Swing Control

Package Information

8 Pin SOIC Package

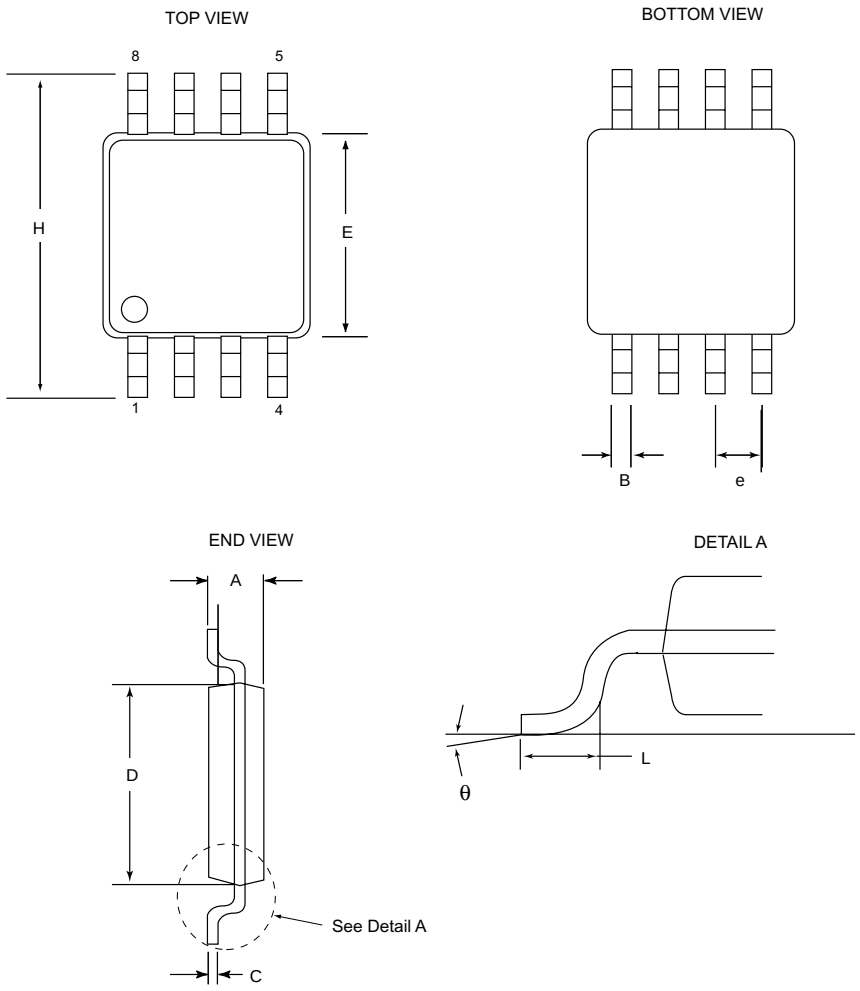


DIM	MILLIMETERS	
	MIN	MAX
A	1.35	1.75
A1	0.10	0.25
B	0.33	0.51
C	0.19	0.25
D	4.80	5.00
E	3.80	4.00
e	1.27 BSC	
H	5.80	6.20
h	0.25	0.50
L	0.40	1.27
θ	0°	8°

NOTES:
1. Dimensions are in millimeters.
2. Dimensions D and E do no include mold protrusion.
3. Maximum mold protrusion 0.15 per side.
4. Dimension B does not include Dambar protrusion. Allowable Dambar protrusion shall be 0.127 total in excess of the B dimension at maximum material condition.

Package Information *(continued)*

8 Pin MSOP Package



DIM	Millimeters	
	MIN	MAX
A	0.94	1.1
B	0.21	0.45
C	0.13	0.22
D	2.90	3.10
E	2.90	3.10
e	0.65 BSC	
H	4.7	5.1
L	0.4	0.7
θ	0°	6°

NOTES:
1. Dimensions are in mm.
2. Controlling dimension: mm
3. Dimension does not include mold flash or protrustions, either of which shall not exceed 0.20.

DC Characteristics

SK10/100EL16V DC Electrical Characteristics (Notes 1, 2)

(V_{CC} – V_{EE} = 3.0V to 5.5V; V_{OUT} loaded 50Ω to V_{CC}– 2.0V)

		TA = –40°C		TA = 0°C		TA = +25°C		TA = +85°C			
Symbol	**Characteristic**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Unit**	**Condition**
I_{EE}	Power Supply Current 10EL 100EL	 14 16	 27 32	 14 16	 27 32	 14 16	 27 32	 14 16	 27 32	 mA mA	
V_{BB}	Output Reference Voltage[9] 10EL 100EL	 -1.43 -1.38	 -1.30 -1.26	 -1.38 -1.38	 -1.27 -1.26	 -1.35 -1.38	 -1.25 -1.26	 -1.31 -1.38	 -1.19 -1.26	 V V	
V_{CC} – V_{EE}	Supply Voltage Range	3.0	5.5	3.0	5.5	3.0	5.5	3.0	5.5	V	
I_{IN}	Input Current: D, D*, (Diff) D, D*; V_{CTRL} (SE)	-150	150 150	-150	150 150	-150	150 150	-150	150 150	µA µA	
VO_{P-P}	Output Voltage[8]	570		600		650		650		mV	V_{CTRL} = Open
VO_{P-P}	Output Voltage[8]	100		100		100		100		mV	V_{CTRL} = V_{CC}
V_{PP}	Differential Input Swing[10]	150	1000	150	1000	150	1000	150	1000	mV	

AC Characteristics

SK10/100EL16V AC Electrical Characteristics

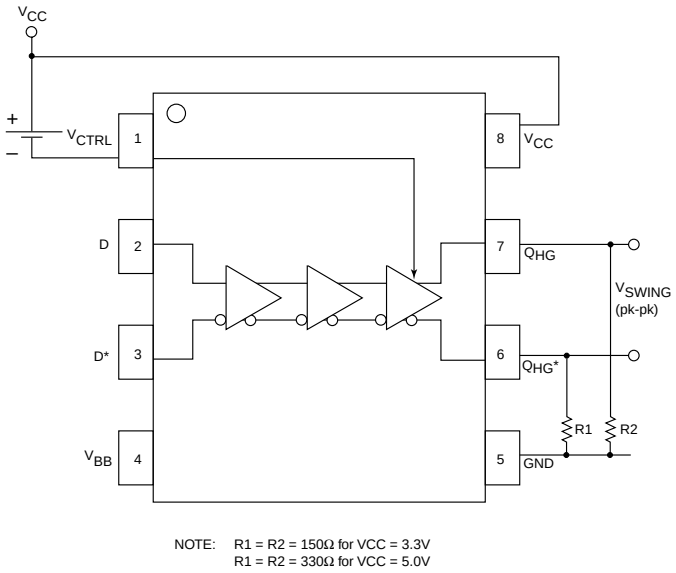
(V_{CC} – V_{EE} = 3.0V to 5.5V; V_{OUT} loaded 50Ω to V_{CC} – 2.0V)

Symbol	Characteristic	TA = –40°C			TA = 0°C			TA = +25°C			TA = +85°C			Unit	Condition
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max		
f_{max}	Maximum Toggle Frequency[4]	2.0			2.0			2.0			2.0			GHz	
t_{PLH} t_{PHL}	Input to Output Delay (DIFF) (SE)	275 250	290 300	310 340	280 250	300 310	320 350	290 250	305 315	325 360	295 250	320 330	340 370	ps ps	
A_V	Small Signal Gain[6]								32					dB	
t_{skew}	Duty Cycle Skew[3] (DIFF)		5	20		5	20		5	20		5	20	ps	
t_r , t_f	Output Rise/Fall Times Q (20% to 80%)	120	140	175	135	160	185	135	160	190	140	170	200	ps	
V_{CMR}	Common Mode Range[7]	V_{EE} + 1.7		VCC – 0.4	V_{EE} + 1.7		VCC – 0.4	V_{EE} + 1.7		VCC – 0.4	V_{EE} + 1.7		VCC – 0.4	V	
VO_{P-P}	Output Voltage[8]	570			600			650			650			mV	V_{CTRL} = Open
VO_{P-P}	Output Voltage[8]	100			100			100			100			mV	V_{CTRL} = V_{CC}

Notes:

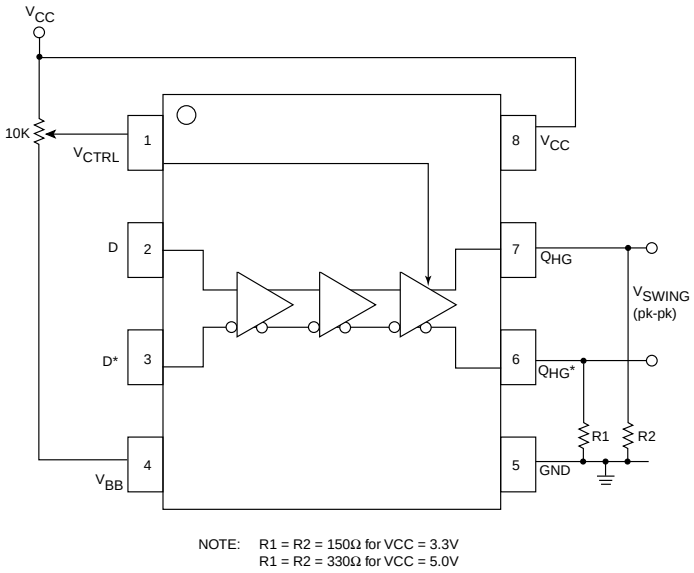
1. 10EL circuits are designed to meet the DC specifications shown in the table after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse airflow greater than 500 lfpm is maintained. Outputs are terminated through a 50Ω resistor to VCC–2.0V.
2. 100K circuits are designed to meet the DC specification shown in the table where transverse airflow greater than 500 lfpm is maintained.
3. Duty cycle skew is the difference between T_{PLH} and T_{PHL} propagation delay through a device.
4. F_{max} guaranteed for functionality only. See Figure 3 for typical output swing. VO_{P-P} levels are guaranteed at DC only.
5. V_{CTRL} voltage range should be between V_{BB} to V_{CC}.
6. The device has a DC gain of ~40.
7. CMR range is referenced to the most positive side of the differential input signal. Normal operation is obtained if the high level falls within the specified range and the peak-to-peak voltage lies between $VPP_{(min)}$ and 1V. The lower end of the CMR range varies 1:1 with VEE and is equal to VEE + 1.7V.
8. VO_{P-P} is obtained as follows: Voltages of Q and Q* outputs with respect to VCC are measured. The absolute difference between a high and a low state is equal to VO_{P-P}.
9. Voltages referenced to VCC = 0V.
10. Minimum input swing for which parameters are guaranteed.
11. For standard ECL DC specifications, refer to the ECL Logic Family Standard DC Specifications Data Sheet.
12. For part ordering description, see HPP Part Ordering Information Data Sheet.

AC Characteristics (*continued*)



NOTE: R1 = R2 = 150Ω for VCC = 3.3V
R1 = R2 = 330Ω for VCC = 5.0V

Figure 1A



NOTE: R1 = R2 = 150Ω for VCC = 3.3V
R1 = R2 = 330Ω for VCC = 5.0V

Figure 1B

Implementation of Voltage Source

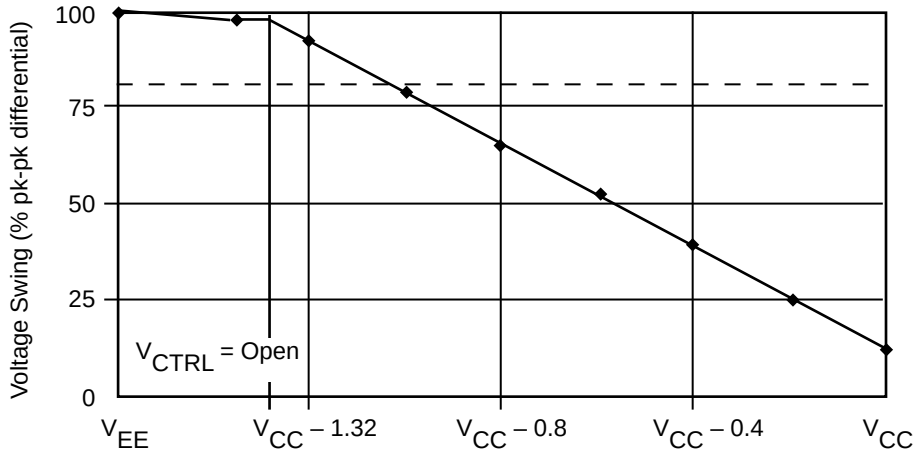
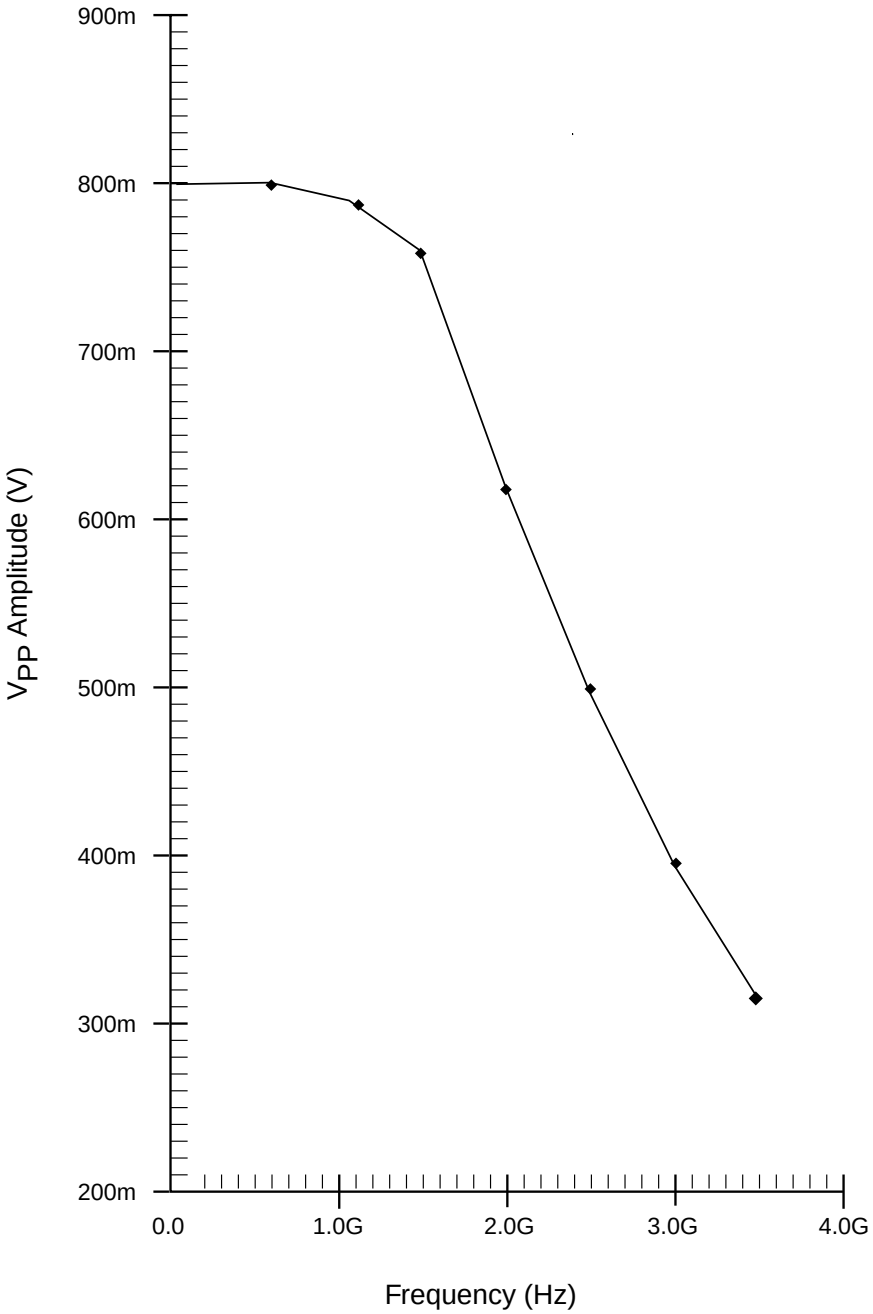


Figure 2. Typical Voltage Output Swing at 25°C

AC Characteristics (*continued*)



Input Conditions: 800 mV Peak-to-Peak

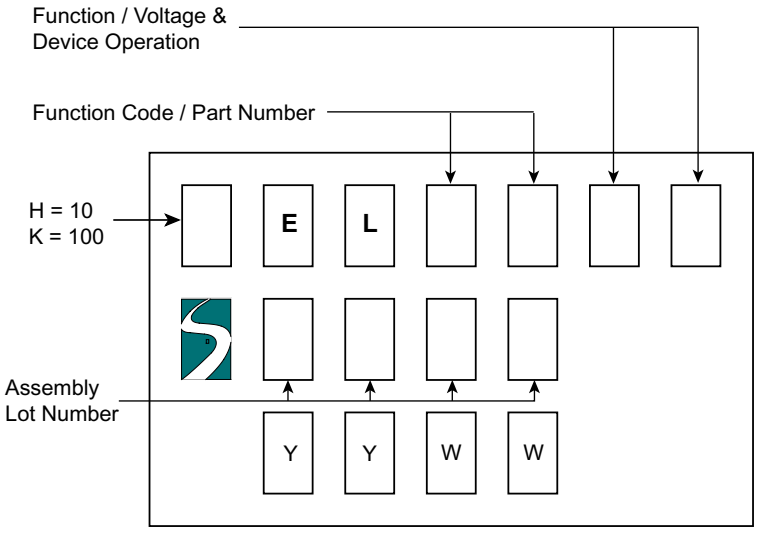
Figure 3. Typical Output V_{PP} vs. Frequency

Ordering Information

Ordering Code	Package ID	Temperature Range
SK10EL16VD	8-SOIC	Industrial
SK10EL16VDT	8-SOIC	Industrial
SK100EL16VD	8-SOIC	Industrial
SK100EL16VDT	8-SOIC	Industrial
SK10EL16VMS	8-MSOP	Industrial
SK10EL16VMST	8-MSOP	Industrial
SK100EL16VMS	8-MSOP	Industrial
SK100EL16VMST	8-MSOP	Industrial
SK10EL16VU	Die	
SK100EL16VU	Die	

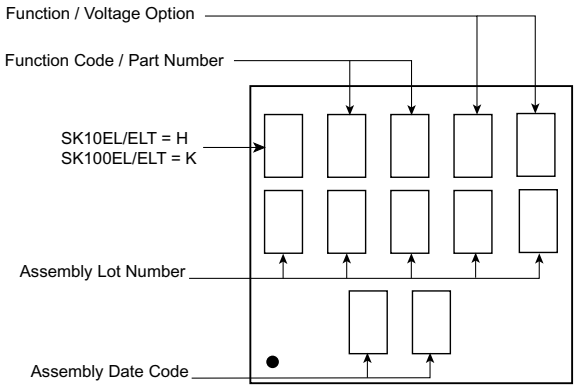
Marking Information

8 PIN SOIC PACKAGE



YY: Last two digits of the Year
WW: Working Week

8/10 PIN MSOP PACKAGES



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