LM556/LM556C Dual Timer

General Description

The LM556 Dual timing circuit is a highly stable controller capable of producing accurate time delays or oscillation. The 556 is a dual 555. Timing is provided by an external resistor and capacitor for each timing function. The two timers operate independently of each other sharing only $V_{\rm CC}$ and ground. The circuits may be triggered and reset on falling waveforms. The output structures may sink or source 200 mA.

Features

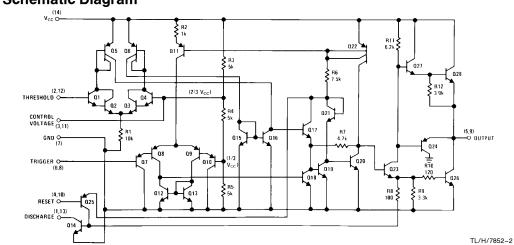
- Direct replacement for SE556/NE556
- Timing from microseconds through hours
- Operates in both astable and monostable modes
- Replaces two 555 timers

- Adjustable duty cycle
- Output can source or sink 200 mA
- Output and supply TTL compatible
- Temperature stability better than 0.005% per °C
- Normally on and normally off output

Applications

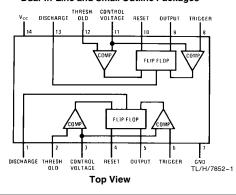
- Precision timing
- Pulse generation
- Sequential timing
- Time delay generation
- Pulse width modulation
- Pulse position modulation
- Linear ramp generator

Schematic Diagram



Connection Diagram

Dual-In-Line and Small Outline Packages



Order Number LM556J or LM556CJ See NS Package Number J14A

Order Number LM556CM See NS Package Number M14A

Order Number LM556CN See NS Package Number N14A

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Absolute Maximum Ratings

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Supply Voltage

Power Dissipation (Note 1) LM556J, LM556CJ LM556CN

Operating Temperature Ranges

LM556C 0°C to +70°C LM556 -55°C to +125°C Storage Temperature Range

Soldering Information
Dual-In-Line Package

Soldering (10 seconds)
Small Outline Package

260°C

 -65°C to $+150^{\circ}\text{C}$

mall Outline Package Vapor phase (60 seconds) Infrared (15 seconds)

215°C 220°C

See AN-450 "Surface Mounting Methods and Their Effect on Product Reliability" for other methods of soldering surface mount devices.

Electrical Characteristics ($T_A = 25^{\circ}C$, $V_{CC} = +5V$ to +15V, unless otherwise specified)

+18V

1785 mW

1620 mW

Parameter	Conditions	LM556			LM556C			Units
		Min	Тур	Max	Min	Тур	Max	Oilles
Supply Voltage		4.5		18	4.5		16	٧
Supply Current (Each Timer Section)	$V_{CC} = 5V, R_L = \infty$ $V_{CC} = 15V, R_L = \infty$ (Low State) (Note 2)		3 10	5 11		3 10	6 14	mA mA
Timing Error, Monostable Initial Accuracy Drift with Temperature Accuracy over Temperature Drift with Supply	$\mbox{R}_{\mbox{\scriptsize A}}=1\mbox{k}$ to 100 k $\Omega,$ C $=$ 0.1 $\mu\mbox{F},$ (Note 3)		0.5 30 1.5 0.05			0.75 50 1.5 0.1		% ppm/°C % %/V
Timing Error, Astable Initial Accuracy Drift with Temperature Accuracy over Temperature Drift with Supply	R_A , $R_B=1$ k to 100 k Ω , $C=0.1~\mu$ F, (Note 3)		1.5 90 2.5 0.15			2.25 150 3.0 0.30		% ppm/°C % %/V
Trigger Voltage	$V_{CC} = 15V$ $V_{CC} = 5V$	4.8 1.45	5 1.67	5.2 1.9	4.5 1.25	5 1.67	5.5 2.0	V V
Trigger Current			0.1	0.5		0.2	1.0	μΑ
Reset Voltage	(Note 4)	0.4	0.5	1	0.4	0.5	1	٧
Reset Current			0.1	0.4		0.1	0.6	mA
Threshold Current	V _{TH} = V-Control (Note 5) V _{TH} = 11.2V		0.03	0.1 250		0.03	0.1 250	μA nA
Control Voltage Level and Threshold Voltage	V _{CC} = 15V V _{CC} = 5V	9.6 2.9	10 3.33	10.4 3.8	9 2.6	10 3.33	11 4	V V
Pin 1, 13 Leakage Output High			1	100		1	100	nA
Pin 1, 13 Sat Output Low Output Low	(Note 6) V _{CC} = 15V, I = 15 mA V _{CC} = 4.5V, I = 4.5 mA		150 70	240 100		180 80	300 200	mV mV

$\textbf{Electrical Characteristics} \; (T_A = 25^{\circ}\text{C}, V_{CC} = ~+5\text{V to}~+15\text{V}, \text{unless otherwise specified)} \; (\text{Continued}) \; (\text{Continu$

Parameter	Conditions	LM556			LM556C			Units
		Min	Тур	Max	Min	Тур	Max	Oille
Output Voltage Drop (Low)	V _{CC} = 15V							
	I _{SINK} = 10 mA		0.1	0.15		0.1	0.25	V
	I _{SINK} = 50 mA		0.4	0.5		0.4	0.75	V
	I _{SINK} = 100 mA		2	2.25		2	2.75	V
	I _{SINK} = 200 mA		2.5			2.5		V
	$V_{CC} = 5V$							
	I _{SINK} = 8 mA		0.1	0.25				V
	I _{SINK} = 5 mA					0.25	0.35	V
Output Voltage Drop (High)	I _{SOURCE} = 200 mA, V _{CC} = 15V		12.5			12.5		V
	$I_{\text{SOURCE}} = 100 \text{ mA}, V_{\text{CC}} = 15 \text{V}$	13	13.3		12.75	13.3		V
	$V_{CC} = 5V$	3	3.3		2.75	3.3		V
Rise Time of Output			100			100		ns
Fall Time of Output			100			100		ns
Matching Characteristics	(Note 7)							
Initial Timing Accuracy			0.05	0.2		0.1	2.0	%
Timing Drift with Temperature			±10			±10		ppm/°C
Drift with Supply Voltage			0.1	0.2		0.2	0.5	%/V

Note 1: For operating at elevated temperatures the device must be derated based on a +150°C maximum junction temperature and a thermal resistance of 70°C/W (Ceramic), 77°C/W (Plastic DIP) and 110°C/W (SO-14 Narrow).

Note 2: Supply current when output high typically 1 mA less at $V_{CC} = 5V$.

Note 3: Tested at $V_{CC}\,=\,5V$ and $V_{CC}\,=\,15V.$

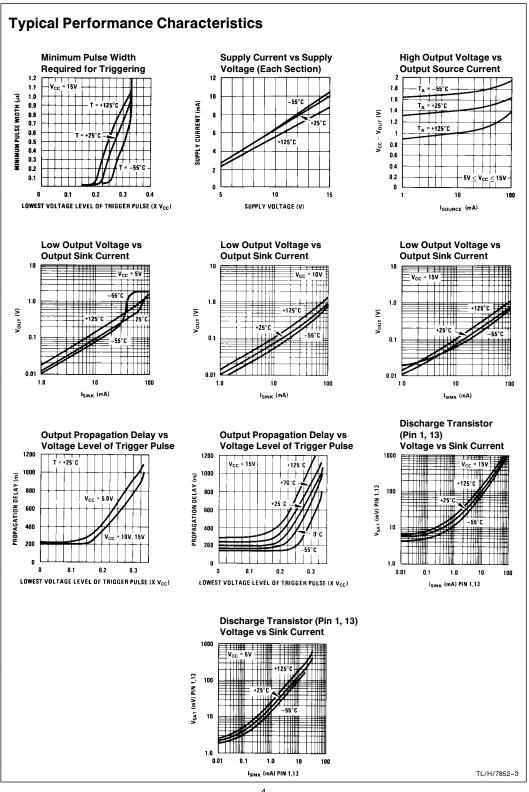
Note 4: As reset voltage lowers, timing is inhibited and then the output goes low.

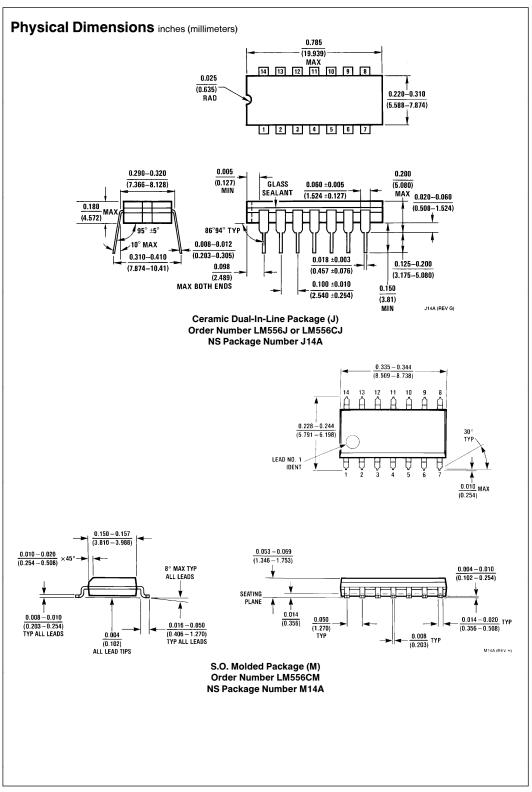
Note 5: This will determine the maximum value of $R_A + R_B$ for 15V operation. The maximum total ($R_A + R_B$) is 20 $M\Omega$.

Note 6: No protection against excessive pin 1, 13 current is necessary providing the package dissipation rating will not be exceeded.

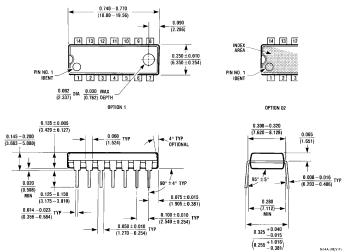
Note 7: Matching characteristics refer to the difference between performance characteristics of each timer section.

Note 8: Refer to RETS556X drawing for specifications of military LM556J version.





Physical Dimensions inches (millimeters) (Continued)



Molded Dual-In-Line Package (N) Order Number LM556CN NS Package Number N14A

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