

Absolute Maximum Ratings (Note 1)

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

Supply Voltage	10.5V
Input Voltage on Pin 6, 7 (Note 2)	-0.3V to ($V^+ + 0.3V$) for $V^+ < 5.5V$ ($V^+ - 5.5V$) to ($V^+ + 0.3V$) for $V^+ > 5.5V$
Current into Pin 6 (Note 2)	20 μA
Output Short Circuit Duration ($V^+ \leq 5.5V$)	Continuous

Power Dissipation (Note 3)

Dual-In-Line Package	1.4W
Surface-Mount Package	0.6W
T_J Max (Note 3)	150°C
θ_{JA} (Note 3)	
Dual-In-Line Package	90°C/W
Surface-Mount Package	160°C/W
Storage Temp. Range	-65°C $\leq T \leq$ 150°C
Lead Temperature (Soldering, 5 sec.)	260°C
ESD Tolerance (Note 7)	$\pm 2000V$

Electrical Characteristics (Note 4)

Symbol	Parameter	Conditions	Typ	LMC7660IN/ LMC7660IM	Units Limits
				Limit (Note 5)	
I_S	Supply Current	$R_L = \infty$	120	200 400	μA max
V^+H	Supply Voltage Range High (Note 6)	$R_L = 10\text{ k}\Omega$, Pin 6 Open Voltage Efficiency $\geq 90\%$	3 to 10	3 to 10 3 to 10	V
V^+L	Supply Voltage Range Low	$R_L = 10\text{ k}\Omega$, Pin 6 to Gnd. Voltage Efficiency $\geq 90\%$	1.5 to 3.5	1.5 to 3.5 1.5 to 3.5	V
R_{out}	Output Source Resistance	$I_L = 20\text{ mA}$	55	100 120	Ω max
		$V = 2V$, $I_L = 3\text{ mA}$ Pin 6 Short to Gnd.	110	200 300	Ω max
F_{osc}	Oscillator Frequency		10		kHz
P_{eff}	Power Efficiency	$R_L = 5\text{ k}\Omega$	97	95 90	% min
$V_{o\text{ eff}}$	Voltage Conversion Efficiency	$R_L = \infty$	99.9	97 95	% min
I_{osc}	Oscillator Sink or Source Current	Pin 7 = Gnd. or V^+	3		μA

Note 1: Absolute Maximum ratings indicate limits beyond which damage to the device may occur. DC and AC electrical specifications do not apply when operating the device beyond its rated operating conditions. See Note 4 for conditions.

Note 2: Connecting any input terminal to voltages greater than V^+ or less than ground may cause destructive latchup. It is recommended that no inputs from sources operating from external supplies be applied prior to "power-up" of the LMC7660.

Note 3: For operation at elevated temperature, these devices must be derated based on a thermal resistance of θ_{JA} and T_J max, $T_J = T_A + \theta_{JA} P_D$.

Note 4: Boldface numbers apply at temperature extremes. All other numbers apply at $T_A = 25^\circ C$, $V^+ = 5V$, $C_{OSC} = 0$, and apply for the LMC7660 unless otherwise specified. Test circuit is shown in Figure 1.

Note 5: Limits at room temperature are guaranteed and 100% production tested. Limits in boldface are guaranteed over the operating temperature range (but not 100% tested), and are not used to calculate outgoing quality levels.

Note 6: The LMC7660 can operate without an external diode over the full temperature and voltage range. The LMC7660 can also be used with the external diode Dx, when replacing previous 7660 designs.

Note 7: The test circuit consists of the human body model of 100 pF in series with 1500 Ω .