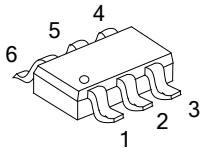
LOW-POWER, RAIL TO RAIL INPUT AND OUTPUT, HIGH OUTPUT CURRENT DRIVE OPERATIONAL AMPLIFIER WITH SHUTDOWN



SOT-26

■ DESCRIPTION

The UTC **LV715** is CMOS input stage, rail to rail input and output, high output current drive BiCMOS operational amplifier.

The UTC **LV715** offers high speed of 5V/μs slew rate.

The UTC **LV715** offers a shutdown pin can be used to disable the device, in the shutdown mode, the output is tri-stated, and the supply current in shutdown mode only 0.2μA.

The UTC **LV715** is designed to meet the demands of low power, low cost, and small size required by cellular phones and similar battery-powered portable electronics.

■ FEATURES

* Low Offset Voltage: 3mV (Maximum)
* Rail-to-Rail Input and Output
* Capable of Driving 600Ω Load
* Ensured 2.7V and 5V Performance
* Supply Current in Shutdown Mode: 0.2μA (Typical)
* Slew Rate: 5V/μs (Typical)

■ ORDERING INFORMATION

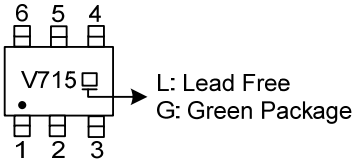
Ordering Number		Package	Packing
Lead Free	Halogen Free		
LV715L-AG6-R	LV715G-AG6-R	SOT-26	Tape Reel

LV715G-AG6-R

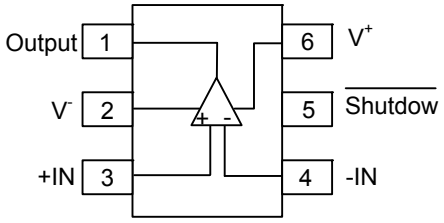
(1)Packing Type
(2)Package Type
(3)Green Package

(1) R: Tape Reel
(2) AG6: SOT-26
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



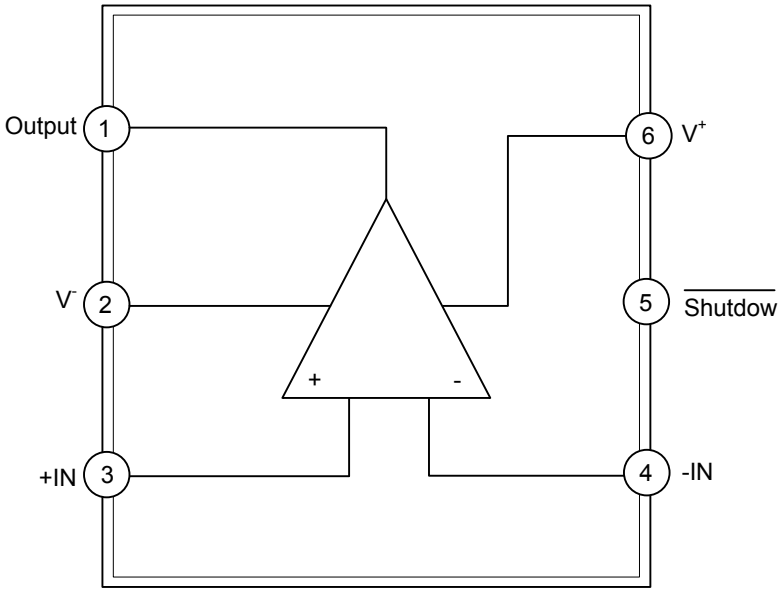
■ PIN CONFIGURATION



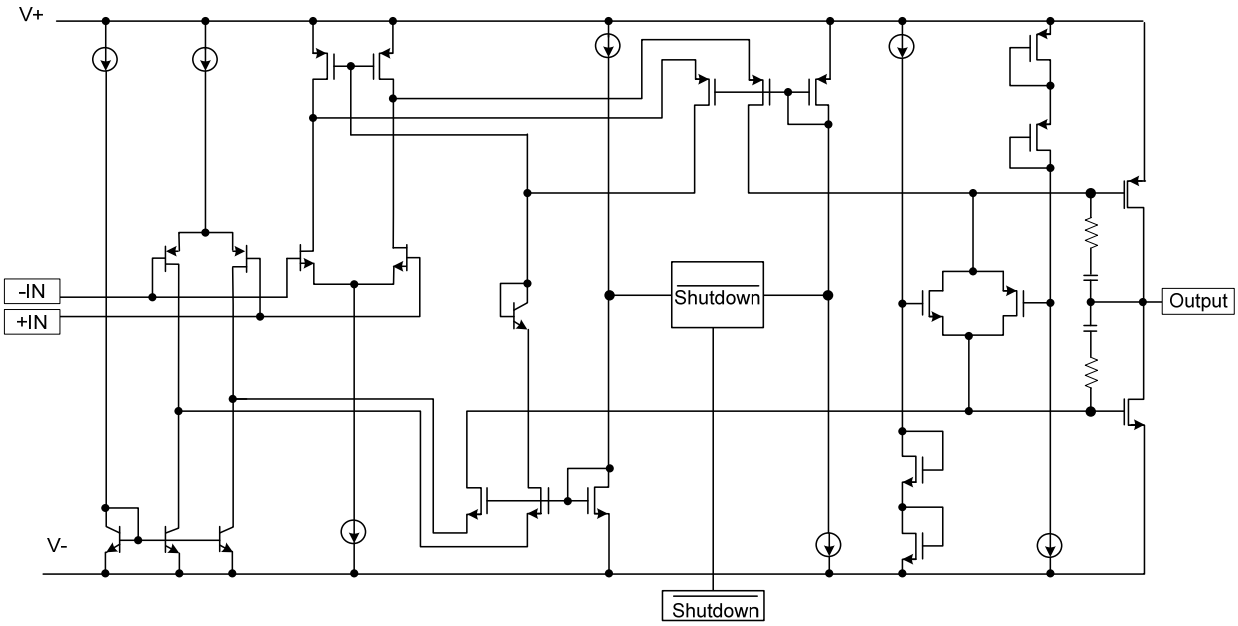
■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	Output	Output
2	V^-	Negative supply input
3	+IN	Non-inverting input
4	-IN	Inverting input
5	$\overline{\text{Shutdown}}$	Active low enable input
6	V^+	Positive supply power

■ BLOCK DIAGRAM



■ INTERNAL SIMPLE CIRCUIT



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage (V^+ -V^-)		5.5	V
Differential Input Voltage		±Supply voltage	
Voltage at Input or Output Pin		(V^-) − 0.4 ~ (V^+) + 0.4	V
Current at Input Pin		±10	mA
Junction Temperature	T_J	+150	°C
Storage Temperature	T_{STG}	-65 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V^+	2.7 ~ 5	V
Temperature	T_{OPR}	-40 ~ +85	°C

■ ELECTRICAL CHARACTERISTICS 2.7V

(T_A=25°C, V^+= 2.7V, V^-=0V, V_{CM}= V^+/2 and R_L>1MΩ, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Offset Voltage	V_{OS}	V_{CM}=0.85V and V_{CM}=1.85V		0.4	3	mV
Input Bias Current	I_B			4		pA
Common-Mode Rejection Ratio	CMRR	0≤V_{CM}≤2.7V	50	75		dB
Power Supply Rejection Ratio	PSRR	2.7V≤V^+≤ 5V, V_{CM} =0.85V	70	110		dB
		2.7V≤V^+≤ 5V, V_{CM} =1.85V	70	95		
Input Common-mode Voltage Range	V_{CM}	For CMRR ≥50dB, V-	-0.2	-0.3		V
		For CMRR ≥50dB, V+		3	2.9	
Output Short-circuit Current	I_{SC}	Sourcing, V_O=0V	15	28		mA
		Sourcing, V_O=2.7V	25	40		
Output Swing	V_O	R_L=10kΩ to 1.35V, V_{ID}=100mV	2.62	2.68		V
		T_A=25°C		0.01	0.12	
		R_L=600Ω to 1.35V, V_{ID}=100mV	2.52	2.55		
		T_A=25°C		0.05	0.23	
Output Leakage Current in Shutdown Mode	$I_{O(SD)}$			1		pA
Output Capacitance in Shutdown Mode	$C_{O(SD)}$			32		pF
Supply Current	I_Q	ON mode		1.2	1.7	mA
		Shutdown mode, V_{SD}=0V		0.002	10	uA
Large Signal Voltage	A_V	Sourcing, R_L=10kΩ, V_O=1.35~2.3V	80	115		dB
		Sinking, R_L=10kΩ, V_O=0.4~1.35V	80	113		
		Sourcing, R_L=600Ω, V_O=1.35~2.2V	80	110		
		Sinking, R_L=600Ω, V_O=0.5~1.35V	80	100		
Slew Rate	SR			5		V/us
Gain-Bandwidth Product	GBWP			5		MHz
Phase Margin	φ_M			60		°
Turnon Time	T_{ON}			<10		us
Shutdown Pin Voltage Range	V_{SD}	ON mode	2.4	1.5	2.7	V
		Shutdown mode	0	1	0.8	
Input-Referred Voltage Noise	e_n	f=1kHz		20		nV/$\sqrt{Hz}$

■ ELECTRICAL CHARACTERISTICS 3.2V

(T_A=25°C, V^+= 3.2V, V^-=0V, V_{CM}=V^+/2, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Swing	V_O	I_O=6.5mA	2.95	3		V
		T_A=25°C		0.01	0.18	

■ ELECTRICAL CHARACTERISTICS 5V

(T_A=25°C, V^+= 5V, V^-=0V, V_{CM}= V^+/2, and R_L>1MΩ, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Offset Voltage	V_{OS}	V_{CM}=0.85V, V_{CM}=4.15V		0.4	3	mV
Input Bias Current	I_B			4		pA
Common-Mode Rejection Ratio	CMRR	0≤V_{CM}≤5V	50	70		dB
Power Supply Rejection Ratio	PSRR	2.7V≤V^+≤ 5V, V_{CM} =4.15V	70	110		dB
			70	95		
Input Common-mode Voltage Range	V_{CM}	For CMRR ≥50dB, V-	-0.2	-0.3		V
		For CMRR ≥50dB, V+		5.3	5.2	
Output Short-circuit Current	I_{SC}	Sourcing, V_O=0V	25	35		mA
		Sinking, V_O=5V	25	40		
Output Swing	V_O	R_L=10kΩ to 2.5V, V_{ID}=100mV	4.92	4.98		V
		R_L=10kΩ to 2.5V, V_{ID}=-100mV		0.01	0.12	
		R_L=600Ω to 2.5V, V_{ID}=100mV	4.82	4.85		
		R_L=600Ω to 2.5V, V_{ID}=-100mV		0.05	0.23	
Output Leakage Current in Shutdown Mode	$I_{O(SD)}$			1		pA
Output Capacitance in Shutdown Mode	$C_{O(SD)}$			32		pF
Supply Current	I_Q	ON mode		1.17	1.7	mA
		Shutdown mode		0.2	10	uA
Large Signal Voltage	A_V	Sourcing, R_L=10kΩ, V_O=2.5~4.6V	80	123		dB
		Sinking, R_L=10kΩ, V_O=0.4~2.5 V	80	120		
		Sourcing, R_L=600Ω, V_O=2.5~4.5V	80	110		
		Sinking, R_L=600Ω, V_O=0.5~2.5V	80	118		
Slew Rate	SR			5		V/us
Gain-Bandwidth Product	GBWP			5		MHz
Phase Margin	φ_M			60		°
Turn on Time	T_{ON}			<10		us
Shutdown Pin Voltage Range	V_{SD}	ON mode	2.4	2.0	5.0	V
		Shutdown mode		1.5	0.8	
Input-Referred Voltage Noise	e_n	f=1kHz	0	20		nV/$\sqrt{Hz}$