CSC™ CHERRY SEMICONDUCTOR

# CS-365

# 3A POWER OPERATIONAL AMPLIFIER

## DESCRIPTION

The CS-365 is a monolithic integrated circuit available in a TO-220 package. It is intended for use as a power operational amplifier in a wide range of applications, including servo amplifiers and power supplies. The high gain and high output power capabilities provide superior performance wherever an operational amplifier/power booster combination is required.

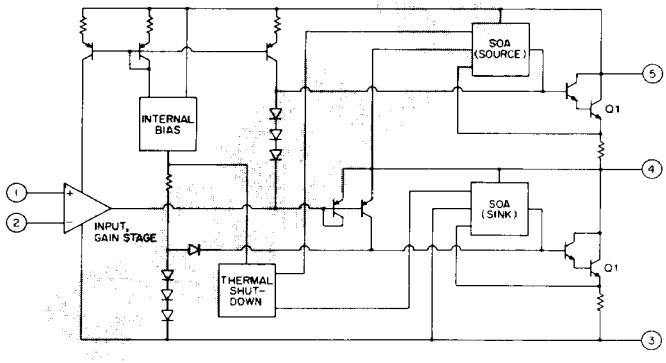
## ABSOLUTE MAXIMUM RATINGS

| | | |
|---|---|---|
| Supply Voltage | ±18 | V |
| Upper power transistor $V_{CE}$ | 36 | V |
| Lower power transistor $V_{CE}$ | 36 | V |
| Input voltage | $V_s$ | |
| Differential input voltage | ±15 | V |
| Peak output current | 3.5 | A |
| Power dissipation at $T_{case}$ = 90°C | 20 | W |
| Storage and junction temperature | -40 to 150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{th\ j\text{-}case}$ Thermal resistance junction-case | max | 3 | °C/W |

## BLOCK DIAGRAM

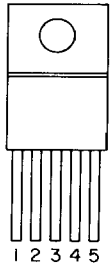



## FEATURES:

- Output current up to 3A
- Large common-mode and differential mode ranges
- SOA protection
- Thermal protection
- ±18V supply

## PIN CONNECTIONS

Tab (Pin 3)




1. NON INVERTING INPUT
2. INVERTING INPUT
3. $-V_S$
4. OUTPUT
5. $+V_S$

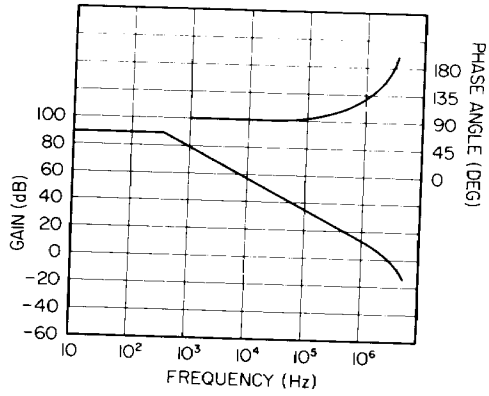
5

Cherry Semiconductor Corporation, 2000 South County Trail, East Greenwich, Rhode Island 02818
Tel: (401)885-3600 Telefax (401)885-5786 Telex WUI 6817157

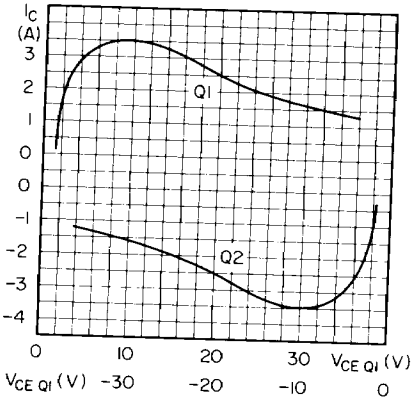
**ELECTRICAL CHARACTERISTICS** ($V_s$ = ± 15V, $T_j$ = ± 25°C unless otherwise specified)

| PARAMETER | CONDITIONS | | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|---|
| Supply voltage | | | ±6 | | ±18 | V |
| Quiescent drain current | $V_s$ = ± 18V | | | 40 | 60 | mA |
| Input bias current | | | | 0.2 | 1 | μA |
| Input offset voltage | | | | ±2 | ±10 | mV |
| Input offset current | | | | ±20 | ±200 | nA |
| Slew-Rate | $G_v$ = 10 | | | 8 | | V/μs |
| | $G_v$ = 1 | | | 6 | | |
| Output voltage swing | f = 1kHz | $I_p$ = 0.3A | | 27 | | $V_{pp}$ |
| | | $I_p$ = 3A | | 24 | | |
| | f = 10kHz | $I_p$ = 0.3A | | 27 | | $V_{pp}$ |
| | | $I_p$ = 3A | | 23 | | |
| Input resistance (pin 1) | f = 1kHz | | 100 | 500 | | KΩ |
| Voltage gain (open loop) | | | | 80 | | dB |
| Input noise voltage | B = 10 to 10,000 Hz | | | 2 | | μV |
| Input noise current | | | | 100 | | pA |
| Common mode rejection | $R_g \leq$ 10 KΩ $G_v$ = 30 dB | | | 70 | | dB |
| Supply voltage rejection | $R_g$ = 22 kΩ<br>$V_{ripple}$ = 0.5 $V_{rms}$<br>$f_{ripple}$ = 100 Hz | $G_v$ = 10 | | 60 | | dB |
| | | $G_v$ = 100 | | 40 | | dB |
| Efficiency | f = 1 kHz<br>$R_L$ = 4Ω | $I_p$ = 1.6A; $P_o$ = 5W | | 70 | | % |
| | | $I_p$ = 3A; $P_o$ = 18W | | 60 | | % |
| Thermal shut-down case temperature | $P_{tot}$ = 12W | | | 110 | | °C |
| | $P_{tot}$ = 6W | | | 130 | | |

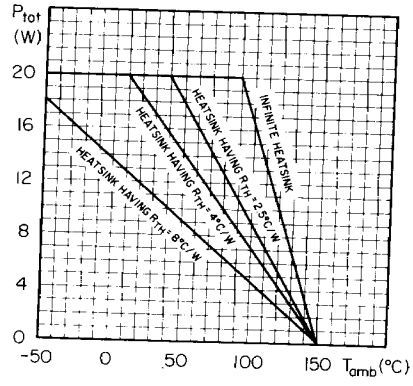
**Open loop frequency response**



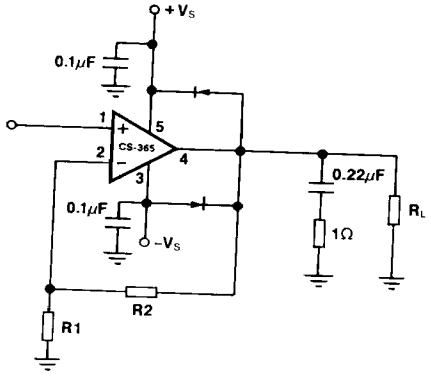

**Maximum output current vs. voltage ($V_{CE}$) across each output transistor**



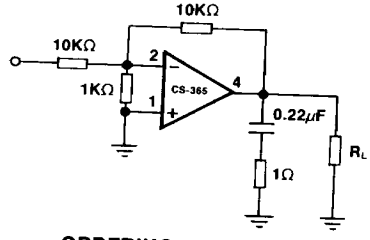

**Maximum allowable power dissipation vs. ambient temperature**




**Application circuit ($G_V$>10)**




**Unity gain configuration**




**ORDERING INFORMATION**

| PART NUMBER | DESCRIPTION |
|---|---|
| CS-365 | TO-220 |