



M.S.KENNEDY CORP.

10 AMP, 500V, 3 PHASE IGBT BRUSHLESS MOTOR CONTROLLER

4370

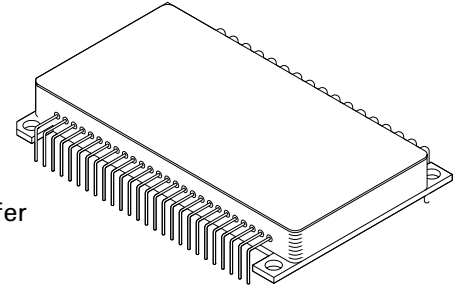
4707 Dey Road Liverpool, N.Y. 13088

(315) 701-6751

FEATURES:

- 500 Volt Motor Supply Voltage
- 10 Amp Output Switch Capability
- 100% Duty Cycle High Side Conduction Capable
- Shoot-Through/Cross Conduction Protection
- Hall Sensing and Commutation Circuitry on Board
- "Real" Four Quadrant Torque Control Capability
- Good Accuracy Around the Null Torque Point
- Isolated Package Design for High Voltage Isolation Plus Good Thermal Transfer
- 60°/ 120° Phasing Selectable

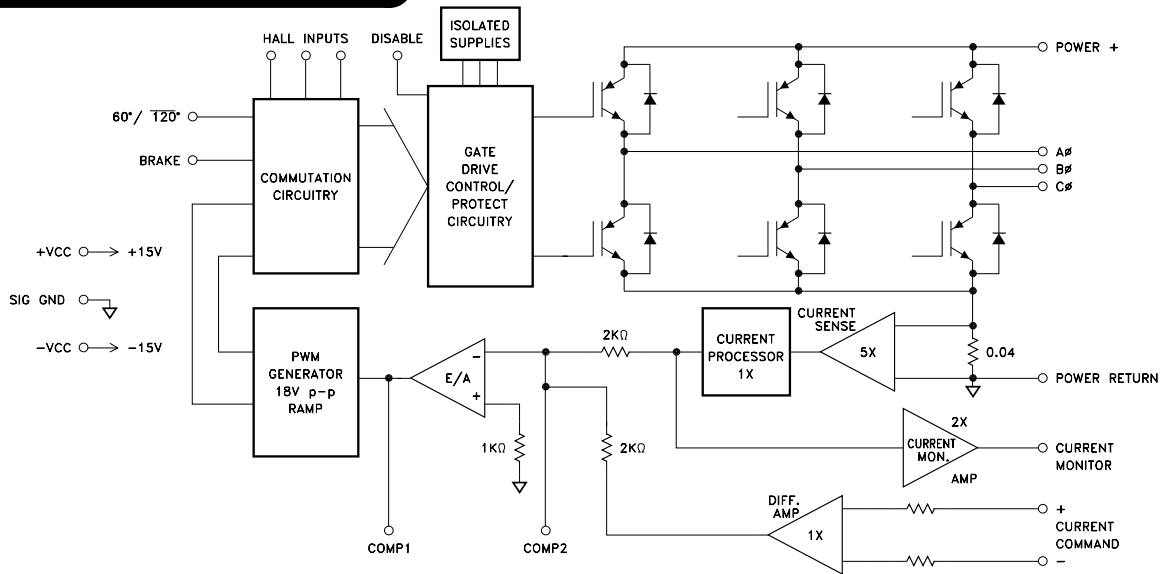
MIL-PRF-38534 QUALIFIED



DESCRIPTION:

The MSK 4370 is a complete 3 Phase IGBT Bridge Brushless Motor Control System in an electrically isolated hermetic package. The hybrid is capable of 10 amps of output current and 500 volts of DC bus voltage. It has the normal features for protecting the bridge. Included is all the bridge drive circuitry, hall sensing circuitry, commutation circuitry and all the current sensing and analog circuitry necessary for closed loop current mode (torque) control. When PWM'ing, the transistors are modulated in locked anti-phase mode for the tightest control and the most bandwidth. Provisions for applying different compensation schemes are included. The MSK 4370 has good thermal conductivity of the IGBT's due to isolated substrate/package design that allows direct heat sinking of the hybrid without insulators. The anti-parallel commutation diodes are ultrafast recovery types for high efficiency/low switching losses.

EQUIVALENT SCHEMATIC



TYPICAL APPLICATIONS

- 3 Phase Brushless DC Motor Control
- Servo Control
- Fin Actuator Control
- Gimbal Control
- AZ-EL Control

PIN-OUT INFORMATION

| | |
|----------------|--------------------|
| + Vcc | Power + |
| -Vcc | CØ |
| Hall Input A | BØ |
| Hall Input B | AØ |
| Hall Input C | Power Return (GND) |
| Compensation 1 | Current Command + |
| SIG GND | Current Command - |
| Brake | Current Monitor |
| Disable | Compensation 2 |
| | 60°/120° |

ABSOLUTE MAXIMUM RATINGS

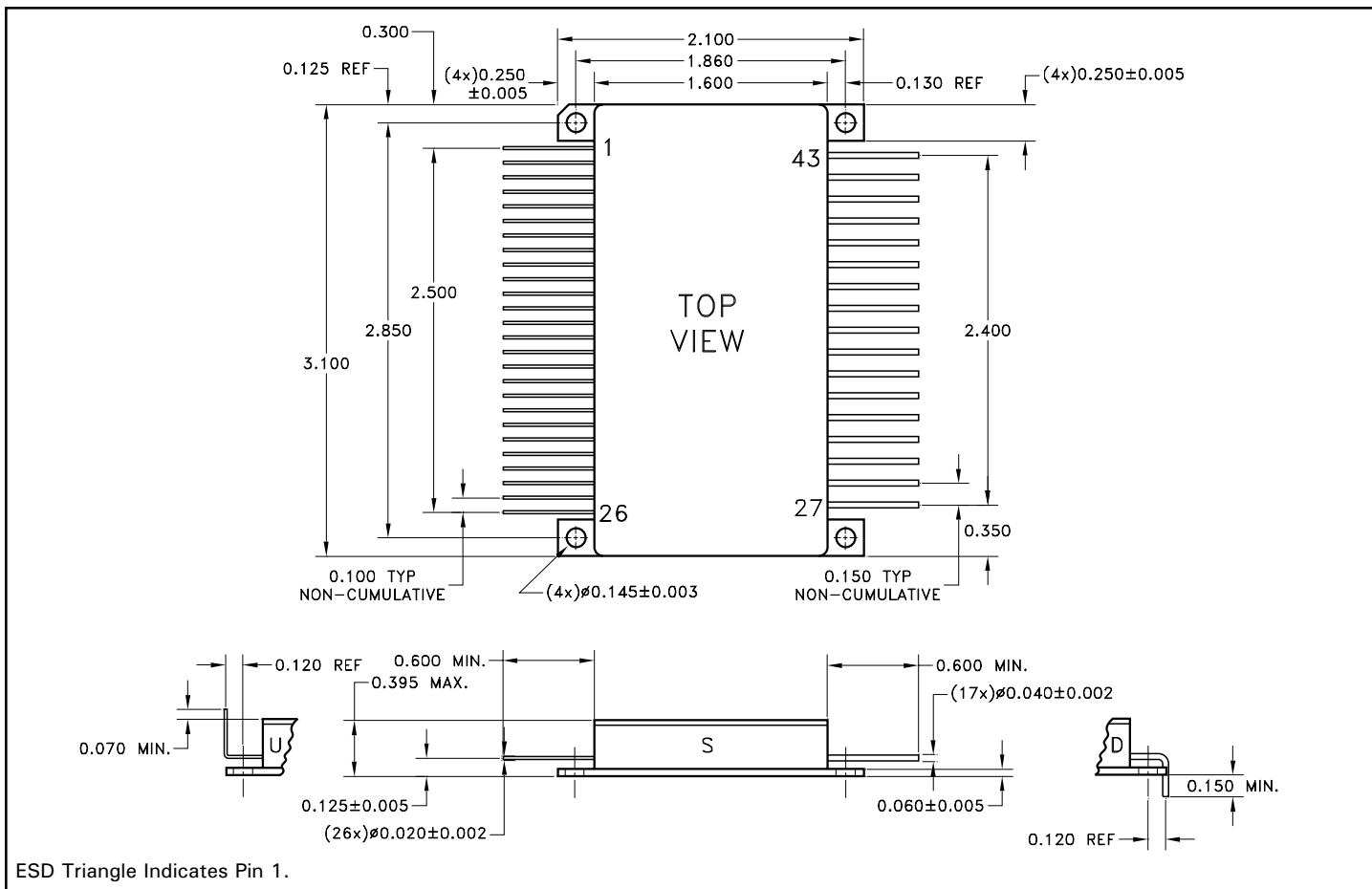
| | | | | | |
|------------------|---------------------------|--------|-----------------|--|-----------------|
| V+ | High Voltage Supply | 500V | θ_{JC} | Thermal Resistance | 1.5°C/W |
| V _{IN} | Current Command Input | ±13.5V | T _{ST} | Storage Temperature Range | -65°C to +150°C |
| +V _{CC} | | +18V | T _{LD} | Lead Temperature Range (10 Seconds) | +300°C |
| -V _{CC} | | -18V | T _C | Case Operating Temperature | -55°C to +125°C |
| I _{OUT} | Continuous Output Current | 10A | T _J | Junction Temperature | +150°C |
| I _{PK} | Peak Output Current | 20A | | | |

ELECTRICAL SPECIFICATIONS

All Ratings: T_c = +25°C Unless Otherwise Specified

| Parameter | Test Conditions | MSK 4370 | | | Units |
|-----------------------------|---|----------|------|------|--------|
| | | Min. | Typ. | Max. | |
| POWER SUPPLY CURRENT | | | | | |
| +V _{CC} | +V _{CC} = +15V | TBD | TBD | TBD | mA |
| -V _{CC} | -V _{CC} = -15V | TBD | TBD | TBD | mA |
| PWM | | | | | |
| Free Running Frequency | No Clock Sync | 20 | 22 | 24 | KHz |
| CONTROL | | | | | |
| Transconductance | ±8 Amps Output | 1.9 | 2 | 2.1 | V/amp |
| Current Monitor | ±8 Amps Output | 0.9 | 1 | 1.1 | V/amp |
| Output Offset | @ 0 Volts Command | - | ±5.0 | - | mAmp |
| HALL INPUTS | | | | | |
| Low Level Input Voltage | | - | - | 0.8 | Volts |
| High Level Input Voltage | | 3.0 | - | - | Volts |
| ERROR AMP | | | | | |
| Input Voltage Range | | ±11 | ±12 | - | Volts |
| Slew Rate | | 6.5 | 8 | - | V/μSec |
| Output Voltage Swing | | ±12 | ±13 | - | Volts |
| Gain Bandwidth Product | | - | 6.5 | - | MHz |
| Large Signal Voltage Gain | | 175 | 275 | - | V/mV |
| OUTPUT | | | | | |
| Rise Time | | - | 2 | - | μSec |
| Fall Time | | - | 2 | - | μSec |
| Breakdown Voltage | @ 50μA | 500 | - | - | Volts |
| Leakage Current | @ 500V | - | - | 50 | μAmps |
| Voltage Drop Across Bridge | @ 10 Amps | - | - | 5 | Volts |
| Diode Forward Voltage | @ 10 Amps | - | - | 1.5 | Volts |
| t _{rr} | I _F = 10 Amps, di/dt = 100A/μS | - | - | 60 | nSec |
| Dead Time | | - | 2 | - | μSec |

MECHANICAL SPECIFICATIONS



ESD Triangle Indicates Pin 1.

NOTE: ALL DIMENSIONS ARE ±0.010 INCHES UNLESS OTHERWISE LABELED.

ORDERING INFORMATION

MSK4370 H U

LEAD CONFIGURATIONS

S = STRAIGHT; U = BENT UP; D = BENT DOWN

SCREENING

BLANK = INDUSTRIAL; H = MIL-PRF-38534

GENERAL PART NUMBER

The above example is a Military grade hybrid with leads bent up.

M.S. Kennedy Corp.

4707 Dey Road, Liverpool, New York 13088

Phone (315) 701-6751

FAX (315) 701-6752

www.mskennedy.com

The information contained herein is believed to be accurate at the time of printing. MSK reserves the right to make changes to its products or specifications without notice, however, and assumes no liability for the use of its products.