



M.S.KENNEDY CORP.

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

4370

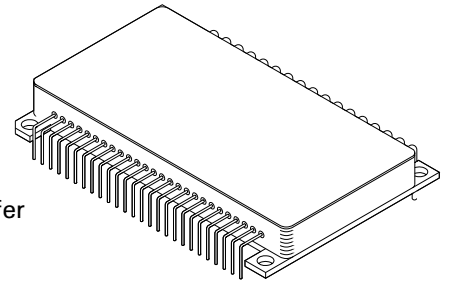
4707 Dey Road Liverpool, N.Y. 13088

(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

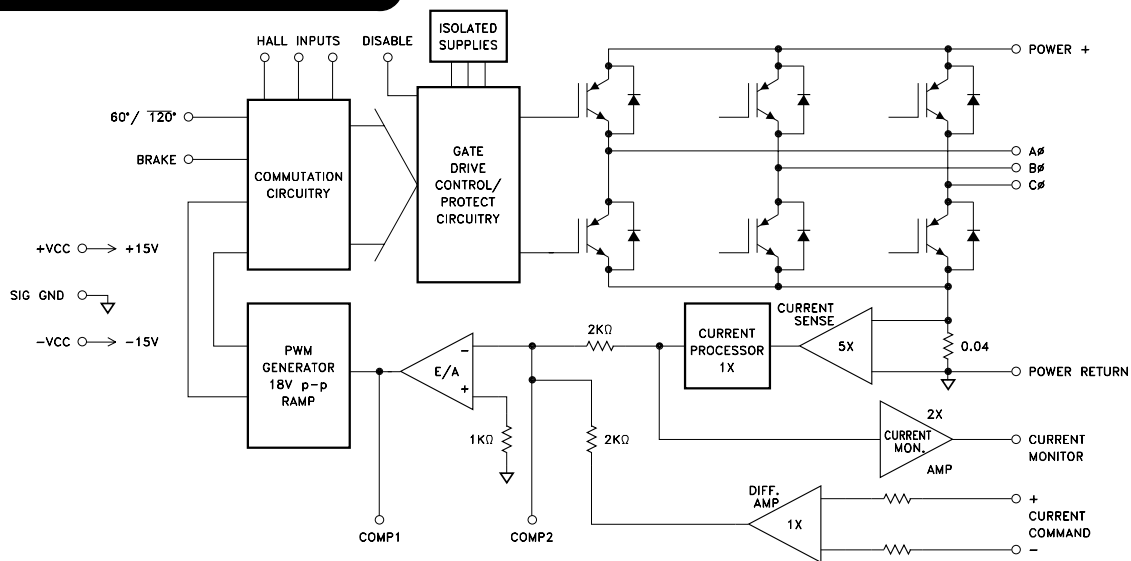
MIL-PRF-38534 QUALIFIED



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

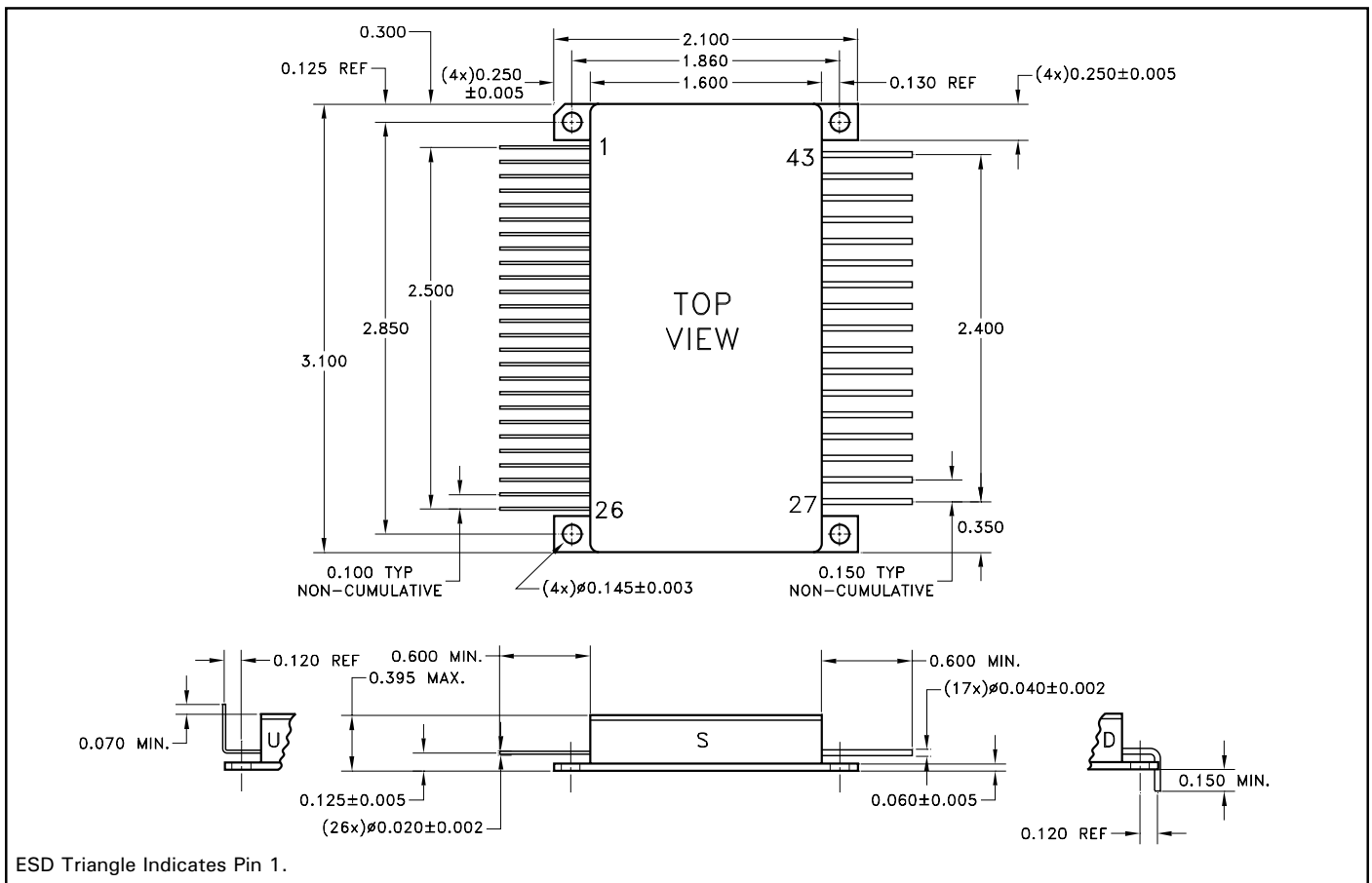
V+	High Voltage Supply	500V	θ_{JC}	Thermal Resistance	1.5°C/W
V _{IN}	Current Command Input	± 13.5V	T _{ST}	Storage Temperature Range	-65°C to + 150°C
+V _{CC}	+ 18V	T _{LD}	Lead Temperature Range	+ 300°C (10 Seconds)
-V _{CC}	-18V	T _C	Case Operating Temperature	-55°C to + 125°C
I _{OUT}	Continuous 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
trr	I _F = 10 Amps, di/dt = 100A/μS	-	-	60	nSec
Dead Time		-	2	-	μSec

MECHANICAL SPECIFICATIONS



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

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