MIL-PRF-38534 CERTIFIED

M.S.KENNEDY CORP.

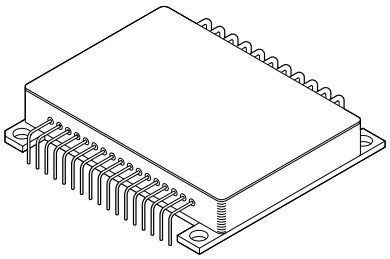
600V ISOLATED HALF BRIDGE GATE DRIVER

4900

4707 Dey Road Liverpool, N.Y. 13088 (315) 701-6751

FEATURES:

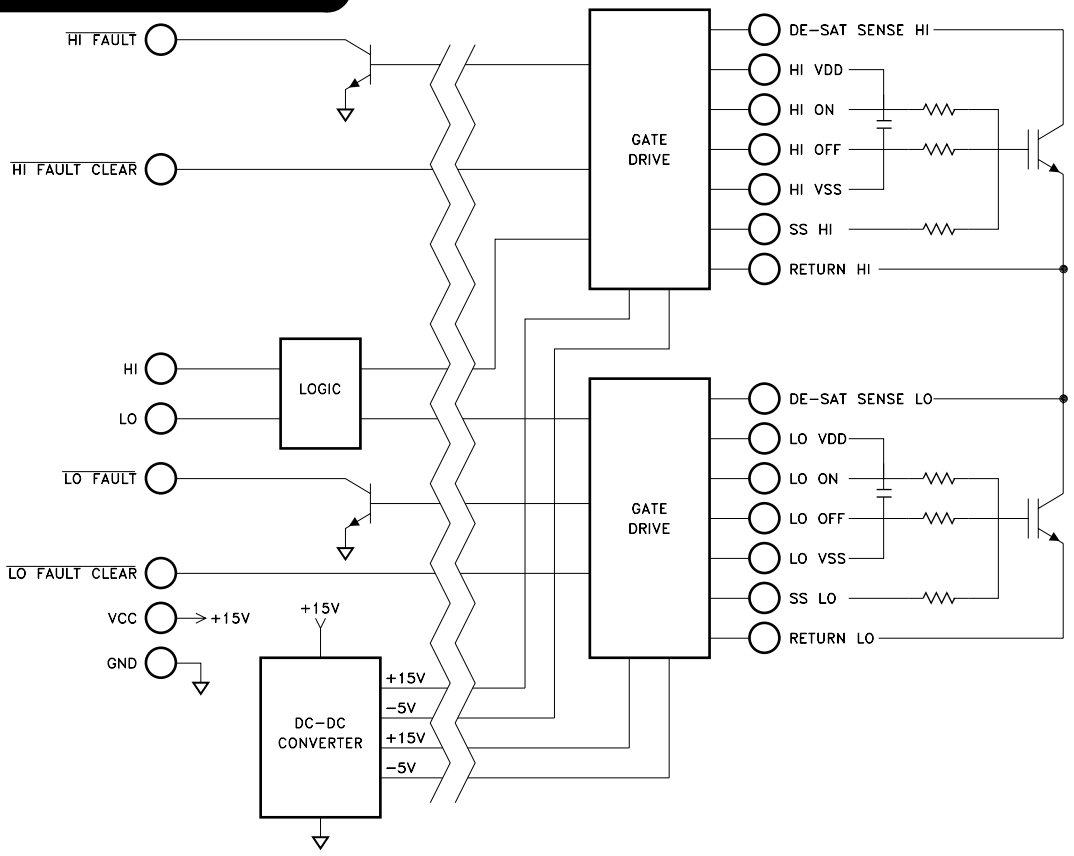
- Floating Channels up to 600V
- Up to 8 Amp Peak Source and Sink Current
- De-Saturation Protection/Shutdown
- Individual ON, OFF and Soft Shutdown Pins for Each IGBT Gate
- Undervoltage Lockout
- Simultaneous Conduction Lockout
- Contact MSK for MIL-PRF-38534 Qualification Status



DESCRIPTION:

The MSK 4900 is a complete isolated half bridge gate driver hybrid capable of working to 600V channel isolation and 8 amps peak turn-on and turn-off current. Housed in an isolated, convenient bolt-down hermetic package, the MSK 4900 houses the entire isolated DC-DC converter circuitry and opto-isolators for logic signals. The input logic prevents simultaneous conduction by locking out both high side and low side drives in case both inputs are asserted ON at the same time. Each gate drive is capable of sourcing and sinking up to 8 amps peak current. The turn-on and turn-off pins are separate to allow separate gate current control. Upon detection of a de-saturation condition, a FAULT is presented and the transistor is shutdown by a separate controlled shutdown pin. The FAULT will have to be cleared before normal operation will begin again. The MSK 4900 has good thermal conductivity due to an isolated substrate/package design that allows direct heat sinking of the device without insulators.

EQUIVALENT SCHEMATIC



TYPICAL APPLICATIONS

- Inverter Bridge Gate Drive
- Motor Control Gate Drive Bridge

PIN-OUT INFORMATION

TBD

ABSOLUTE MAXIMUM RATINGS ⑥

High Voltage Isolation 600V
Logic Input Voltage 5.5V
Vcc Supply 18V
Continuous Output Current . . . . . TBD
Peak Ouput Current 8A
Thermal Resistance
(output drivers - junction to case) . . . . . TBD

T_{ST} Storage Temperature Range . . . . -65°C to +150°C
T_{LD} Lead Temperature Range
(10 Seconds) . . . . . +300°C
T_C Case Operating Temperature
MSK4900 . . . . . -40°C to +85°C
MSK4900H/E . . . . . -55°C to +125°C
T_J Junction Temperature . . . . . +150°C

ELECTRICAL SPECIFICATIONS

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

Parameter	Test Conditions	Group A Subgroup	MSK 4900H/E			MSK 4900			Units
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Vcc SUPPLY CHARACTERISTICS									
Vcc Voltage	$C_L = 0.33\mu F$, 20KHz pulse		14.25	15.00	15.75	14.25	15.00	15.75	V
Vcc Current			TBD	TBD	TBD	TBD	TBD	TBD	mA
INPUT/OUTPUT LOGIC									
Positive Trigger Input Voltage			2.0	-	-	2.0	-	-	V
Negative Trigger Input Voltage			-	-	0.8	-	-	0.8	V
Open Collector Ouput - VOL	$I_{OL} = 1.5mA$		-	0.15	0.4	-	0.15	0.4	V
Open Collector Ouput - IOL			-	-	1.5	-	-	1.5	mA
OUTPUT CHARACTERISTICS - GATE DRIVE									
VOH	$C_L = 0.33\mu F$, 20KHz pulse		14.25	15.0	15.75	14.25	15.0	15.75	V
VOL			-5.75	-5.0	-4.25	-5.75	-5.0	-4.25	V
IOH			8	-	-	8	-	-	A
IOL			8	-	-	8	-	-	A
ISD			TBD	TBD	TBD	TBD	TBD	TBD	μS
tplh - Propagation Delay Time			TBD	TBD	TBD	TBD	TBD	TBD	μS
tphl - Propagation Delay Time			TBD	TBD	TBD	TBD	TBD	TBD	μS
tr - Rise Time			TBD	TBD	TBD	TBD	TBD	TBD	μS
tf - Fall Time			TBD	TBD	TBD	TBD	TBD	TBD	μS
td - De-Sat Delay Time			TBD	TBD	TBD	TBD	TBD	TBD	μS
De-Sat Trip Voltage			TBD	TBD	TBD	TBD	TBD	TBD	V

NOTES:

① Guaranteed by design but not tested. Typical parameters are representative of actual device performance but are for reference only.
② Industrial grade and "E" suffix devices shall be tested to subgroups 1 and 4 unless otherwise specified.
③ Military grade devices ("H" Suffix) shall be 100% tested to Subgroups 1, 2, 3 and 4.
④ Subgroups 5 and 6 testing available upon request.
⑤ Subgroup 1, 4 $T_A = T_C = +25°C$
2, 5 $T_A = T_C = +125°C$
3, 6 $T_A = T_C = -55°C$
⑥ Continuous operation at or above absolute maximum ratings may adversly effect the device performance and/or life cycle.

APPLICATION NOTES

MSK 4900 PIN DESCRIPTIONS

VCC - is the bias supply voltage for supplying the input logic and the power supply for the isolated output. This pin should be bypassed to GND with a 4.7μF tantalum capacitor and a 0.1μF ceramic capacitor as close this pin and GND as possible.

GND - is the Vcc supply return for the input logic and the internal isolated supply. This GND is completely isolated from the output section. No output returns should connect to this GND in order to preserve isolation. All Vcc bias supply bypass connections should be made as close to this pin as possible. An input ground plane is the most preferred layout for assuring good, low impedance ground, shielding of inputs from noise, etc.

HI - is the input logic pin for commanding the high-side gate drive to turn on. This logic input is TTL compatible. This input is exclusive OR'd with LO to protect against simultaneous turn on of both the high-side and low-side gate drive.

LO - is the input logic pin for commanding the low-side gate drive to turn on. This logic input is TTL compatible. This input is exclusive OR'd with HI to protect against simultaneous turn on of both the high-side and low-side gate drive.

$\overline{\text{X FAULT}}$ - is an open collector output for indicating either a de-saturation condition or an undervoltage condition for the gate drive. This output will be cleared upon activation of $\overline{\text{X FAULT CLEAR}}$.

$\overline{\text{X FAULT CLEAR}}$ - is a logic input pin for clearing a FAULT condition. This input should not be activated until shutdown of the affected gate is complete. Allow (TBD) μSec after FAULT before activation of this pin.

X ON - is the gate drive output pin for turning the gate on. This pin will source TBD current. A separate gate resistor shall be selected to tailor the turn-on characteristics. This pin will turn on to +15V.

NOTE: X = HI or LO

X OFF - is the gate drive output pin for turning the gate off. This pin will sink TBD current. A separate gate resistor shall be selected to tailor the turn-off characteristics. This pin will turn off to -5V.

DE-SAT SENSE X - is the input connection for sensing de-saturation. This pin shall be connected to the collector of the IGBT. This pin is blanked during switching so that it will not false trip.

X VDD - is the pin for the floating gate supply voltage. TBD capacitance shall be connected between this pin and X VSS as close to the pin as possible. Nominally, this voltage will be +15V with respect to the RETURN X pin and the emitter of the IGBT.

X VSS - is the return pin for the floating gate supply voltage. TBD capacitance shall be connected between this pin and X VDD as close to the pins as possible. Nominally, this voltage will be -5V with respect to the RETURN X pin and the emitter.

SS X - is the soft shutdown pin for slowly turning the gate off after a de-saturation condition. This pin is a separate gate turn-off path and requires a separate gate resistor for this special turn-off approach. The resistor should be sized to keep di/dt from being too high after the de-sat condition.

RETURN X - is the pin for the emitter reference. This pin will be at zero volts to +15V to -5V for the gate drive voltage.

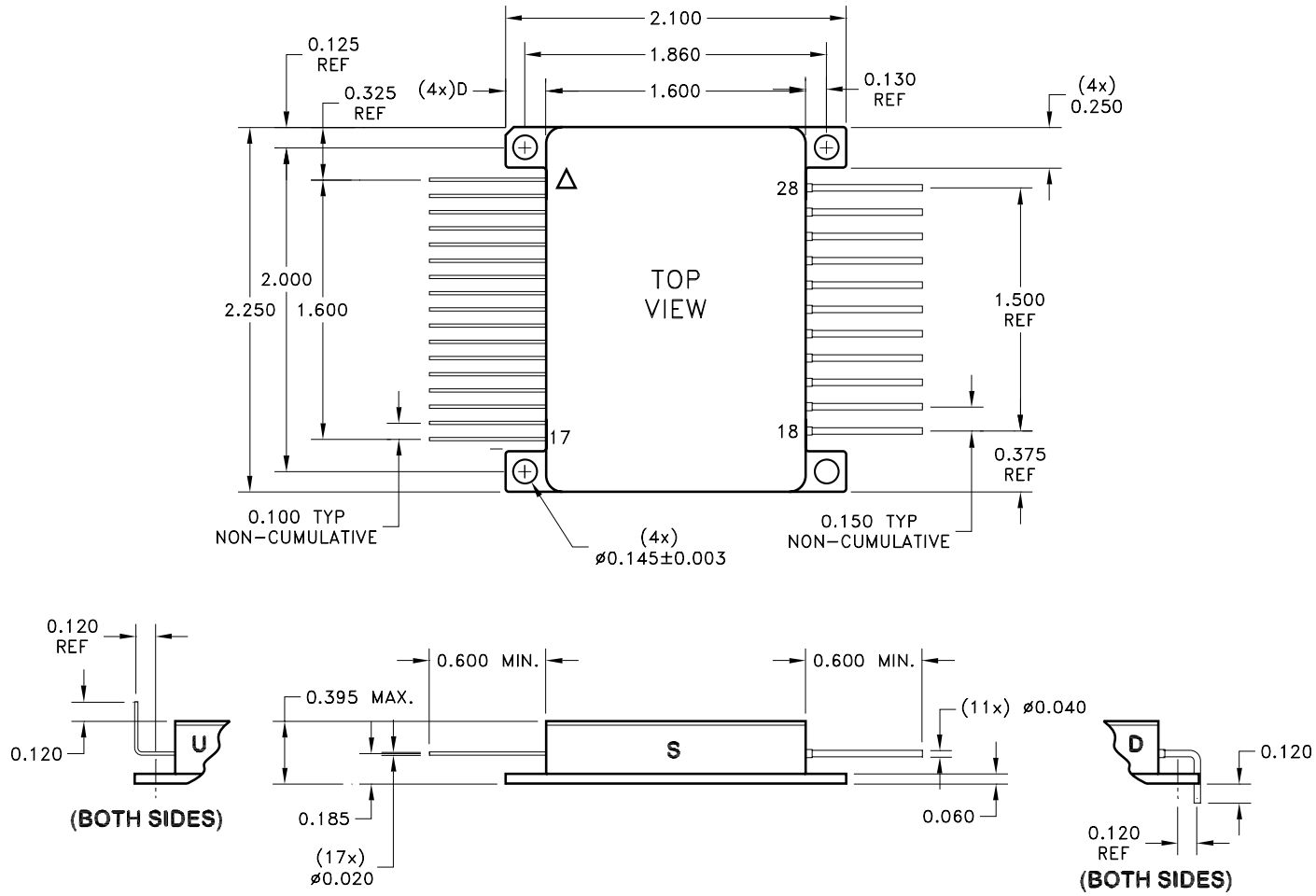
TYPICAL APPLICATION

TBD

MSK4900 TEST CIRCUIT

TBD

MECHANICAL SPECIFICATIONS



WEIGHT = TBD GRAMS TYPICAL

NOTE: ALL DIMENSIONS ARE ±0.010 INCHES UNLESS OTHERWISE LABELED.
ESD Triangle indicates Pin 1.

ORDERING INFORMATION

MSK4900 H U

LEAD CONFIGURATION
S = STRAIGHT, U = BENT UP, D = BENT DOWN

SCREENING
BLANK = INDUSTRIAL; E = EXTENDED RELIABILITY;
H = MIL-PRF-38534 CLASS H

GENERAL PART NUMBER

THE ABOVE EXAMPLE IS A MILITARY GRADE HYBRID WITH LEADS BENT UP.

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Contact MSK for MIL-PRF-38534 qualification status.