



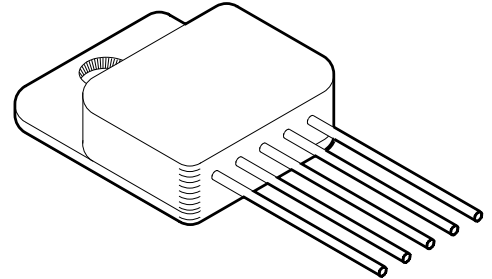
M.S.KENNEDY CORP.

HIGH TEMPERATURE LOW DROPOUT REGULATOR

5501 SERIES

FEATURES:

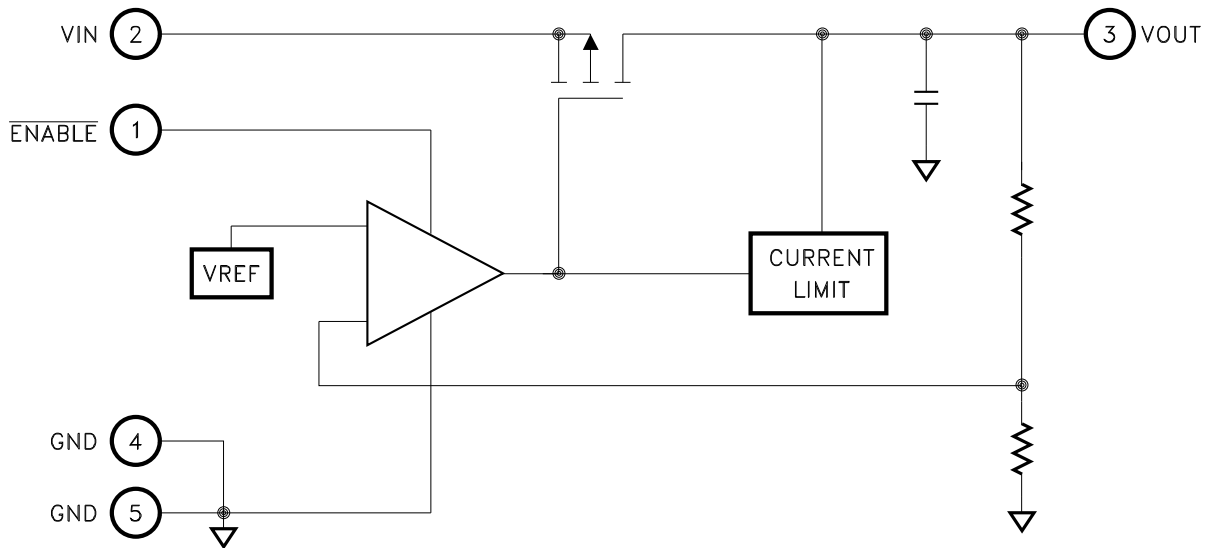
- Operational from -55°C to +200°C
- Input Voltage range from +5V to +10V
- Available in 1.8V output voltage
- Alternate output voltages available
- Ultra low dropout for reduced power consumption
- Output Current up to 100mA @ 200°C
- Over Current Limiting
- Standby Quiescent Current is typically 1μA
- External Enable (Active Low)
- Available in four lead options: Straight, Up, Down, and Gull Wing
- Contact MSK for Qualification Status



DESCRIPTION:

The MSK5501 is an ultra low dropout, high temperature linear voltage regulator capable of delivering 100mA of output current at 200°C. Typical dropout voltage is 71mV with a 100mA load. This is a voltage controlled device and drive current does not increase with output current. The device's supply current is typically constant from no load to maximum load. This device also has internal current limit protection. When the current limiting engages, the output voltage will decrease linearly until the over current condition ends. The MSK5501 is specifically designed for automotive, aeronautics and aerospace, and down-hole applications. The device is packaged in a hermetically sealed 5 pin SIP that is electrically isolated from internal circuitry for direct heat sinking.

EQUIVALENT SCHEMATIC



TYPICAL APPLICATIONS

- Reliable-Critical
- Automotive
- Aeronautics & Aerospace
- Down-Hole
- Precision Regulators / References
- A/D and D/A Converters
- Current Sources.

PIN-OUT INFORMATION

- 1 $\overline{\text{ENABLE}}$
- 2 VIN
- 3 VOUT
- 4 GND
- 5 GND

ABSOLUTE MAXIMUM RATINGS ^⑧

V _{IN}	Respect to GND.	-0.3V to 13.5V
ENABLE	Respect to GND.	-0.3 to V _{IN} + 0.3V
T _{ST}	Storage Temperature Range	-65 °C to + 200 °C
T _C	Case Operating Temperature Range.	-55 °C to + 200 °C

ELECTRICAL SPECIFICATIONS

Parameter	Test Conditions	Group A Subgroup	MSK5501H SERIES			MSK5501 SERIES			Units
			Min.	Typ.	Max.	Min.	Typ.	Max.	
OUTPUT CHARACTERISTICS									
Dropout Voltage	I _{OUT} = 100 mA	1,2,3	-	71	TBD	-	71	TBD	mV
Output Voltage Tolerance	V _{IN} = + 5V, I _{OUT} = 10mA	1	-0.2	TBD	+0.2	-0.2	TBD	+0.2	%
		2,3	TBD	TBD	TBD	-	-	-	%
Line Regulation	5V < V _{IN} < 10V, I _{OUT} = 0mA	1	TBD	0.4	TBD	TBD	0.4	TBD	%
		2	TBD	0.9	TBD	-	-	-	%
		3	TBD	0.4	TBD	-	-	-	%
Output Voltage Load Regulation	V _{IN} = + 5V, 0mA < I _{OUT} < 100mA	1	-5	TBD	+3	-5	TBD	+3	%
		2	TBD	TBD	TBD	-	-	-	%
		3	-5	TBD	+3	-	-	-	%
SUPPLY CURRENT									
Supply Current	V _{IN} = + 5V, I _{OUT} = 0mA	1	-	1	2	-	1	2	mA
		2	-	1.2	2	-	-	-	mA
		3	-	1	2	-	-	-	mA
	V _{IN} = + 10V, I _{OUT} = 0mA	1	-	1	2	-	1	-	mA
		2	-	1.2	2	-	-	-	mA
		3	-	1	2	-	-	-	mA
Standby Current	V _{IN} = + 5V, ENABLE = 5V	1,2,3	-	17	25	-	17	25	µA
	V _{IN} = + 10V, ENABLE = 5V	1,2,3	-	17	25	-	17	25	µA
ENABLE									
ENABLE Input Current	V _{ENABLE} = 5V	1,2,3	-	TBD	10	-	TBD	10	µA
ENABLE Voltage	V _{ENABLE} Going Down	1,2,3	-	TBD	0.9	-	TBD	0.9	V
ENABLE Voltage	V _{ENABLE} Going Up	1,2,3	1.7	TBD	-	1.7	TBD	-	V
PROTECTION FEATURES									
Short-Circuit Current	V _{IN} = + 5V ^①	1	300	350	400	300	350	400	mA
Over Temperature Protection		-	-	TBD	-	-	TBD	-	°C

NOTES:

- ① Guaranteed by design but not tested. Typical parameters are representative of actual device performance but are for reference only.
- ② Military grade devices ("H" suffix) shall be 100% tested to subgroups 1,2 and 3.
- ③ Subgroup 1 T_C = +25 °C
 Subgroup 2 T_C = 200 °C
 Subgroup 3 T_C = -55 °C
- ④ Industrial grade devices shall be tested 100% tested at 25 °C only.
- ⑤ Continuous operation at or above absolute maximum ratings may adversely effect the device performance and/or life cycle.

APPLICATION NOTES

PIN FUNCTION

VIN - This pin provides the input power connection to the MSK5501.

GND - These pins provide the input and output ground reference.

VOUT - This pin is the output for the device.

ENABLE - When tied low, the MSK5501 is enabled and operates normally. When tied high, the MSK5501 is disabled.

INPUT AND OUTPUT POWER SUPPLY BYPASSING

The MSK5501 has an internal output capacitor, which in most cases, is sufficient to stabilize the internal control loop. Additional capacitance can be added, and improves load transient response. Although not required, a 0.047 μ F ceramic capacitor connected between VIN and GND, can be used to maximize transient response and minimize power supply transients.

THERMAL LIMITING

TBD

OVER CURRENT PROTECTION

The MSK5501 has an internal current limiting feature. The typical current limit threshold is 350mA. During an over current event, the output voltage will be reduced linearly until the over current state ends.

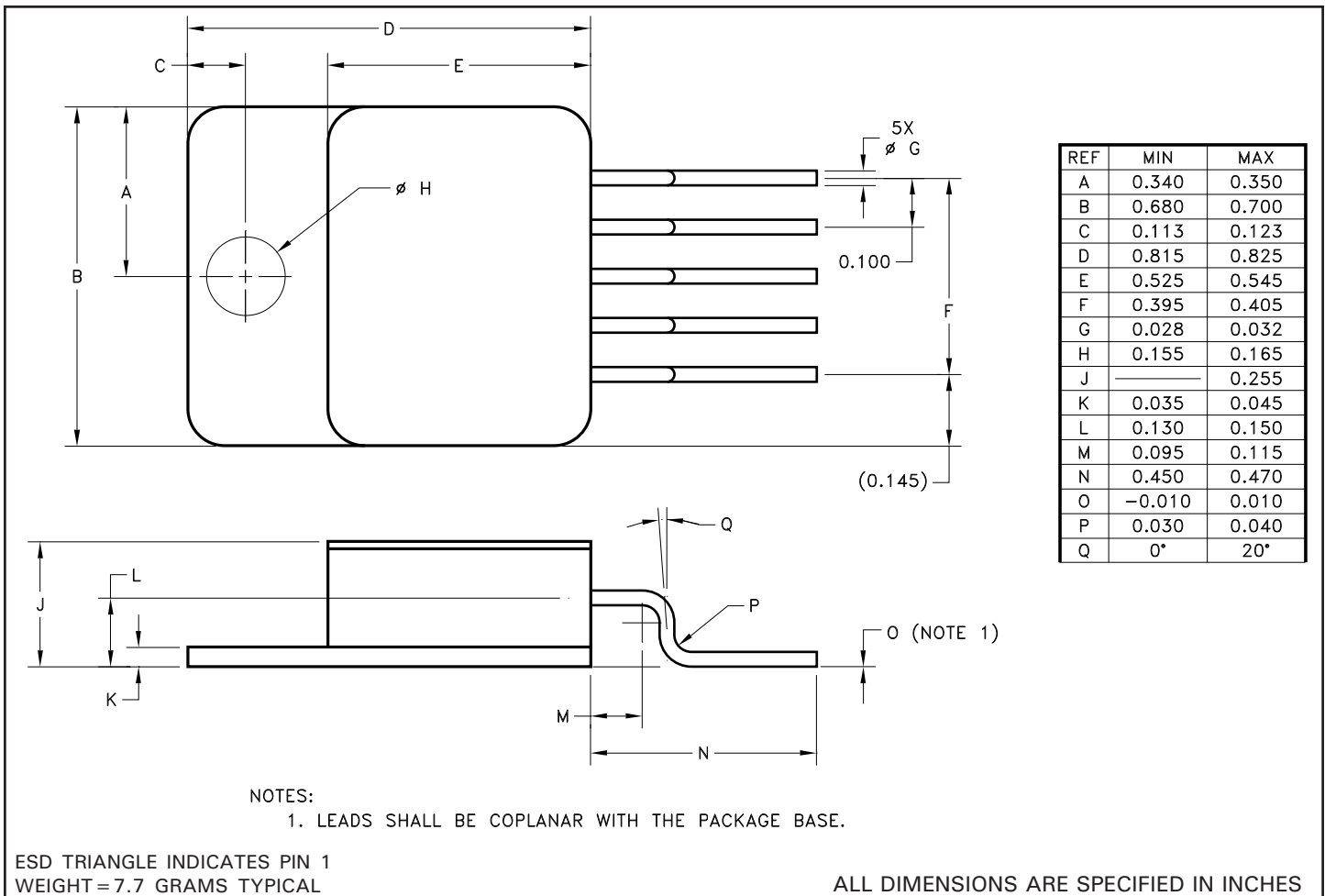
ENABLE FUNCTION

When the enable pin is tied low ($< 0.9V$), the MSK5501 is enabled and operates normally. When the enable pin is tied high ($> 1.7V$), the MSK5501 is disabled and VOUT is floating. Should the output voltage rise above VIN, or VIN drop below the output voltage, an internal back diode will conduct reverse current. Supply current, when disabled, is typically 1 μ A.

TYPICAL PERFORMANCE CURVES

TBD

MECHANICAL SPECIFICATIONS



ORDERING INFORMATION

MSK5501-1.8 H GW

LEAD CONFIGURATIONS

GW = GULL WING

SCREENING

BLANK = INDUSTRIAL; H = MIL-PRF-38534 CLASS H

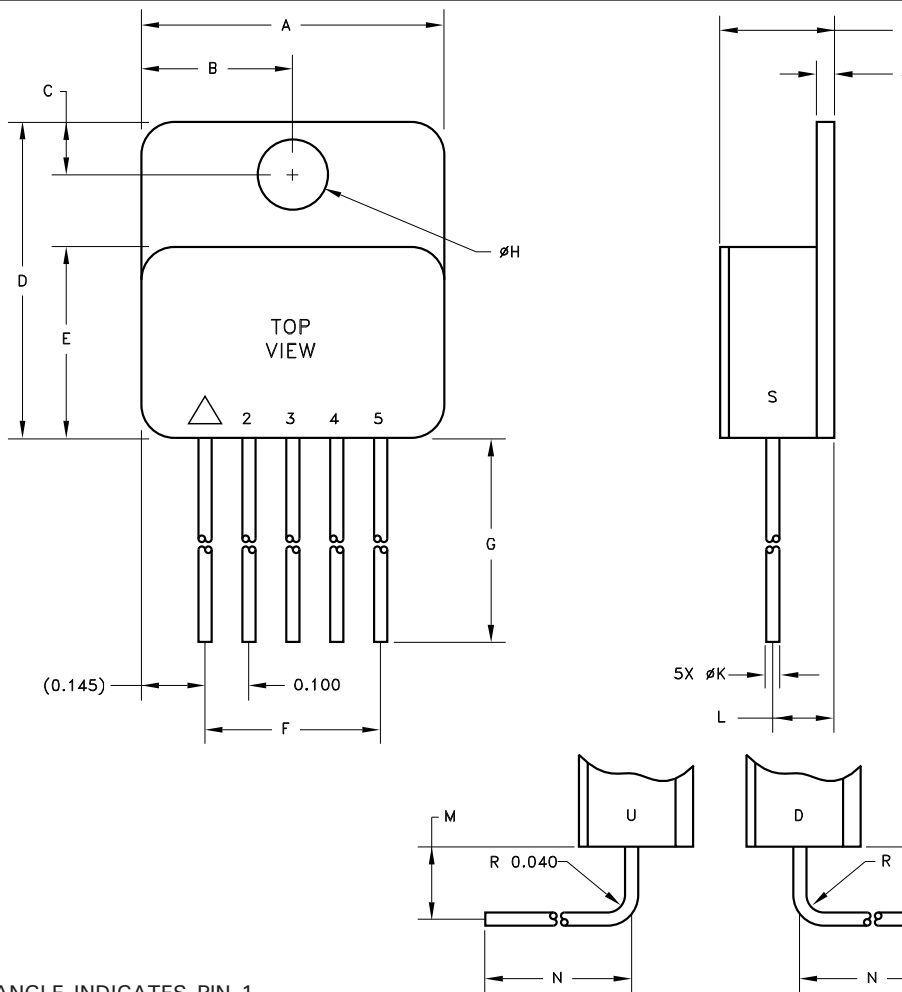
OUTPUT VOLTAGE

1.8 = +1.8V

GENERAL PART NUMBER

The above example is a +1.8, Class H regulator with gull wing leads.

MECHANICAL SPECIFICATIONS



REF	MIN	MAX
A	0.680	0.700
B	0.340	0.350
C	0.113	0.123
D	0.815	0.825
E	0.525	0.545
F	0.395	0.405
G	0.500	
H	0.155	0.165
I		0.255
J	0.035	0.045
K	0.028	0.032
L	0.130	0.150
M	0.185	0.215
N	0.330	

ESD TRIANGLE INDICATES PIN 1
WEIGHT = 7.7 GRAMS TYPICAL

ALL DIMENSIONS ARE SPECIFIED IN INCHES

ORDERING INFORMATION

MSK5501-1.8 H U

LEAD CONFIGURATIONS

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

SCREENING

BLANK = INDUSTRIAL; H = MIL-PRF-38534 CLASS H

OUTPUT VOLTAGE

1.8 = +1.8V

GENERAL PART NUMBER

The above example is a +1.8V, Class H regulator with leads bent up.

REVISION HISTORY

REV	STATUS	DATE	DESCRIPTION
-	Preliminary	09/14	Initial Release

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