SERIES 67C
Hall Effect Joystick with Integrated Pushbutton & Optical Encoder

FEATURES
• Proportional joystick, pushbutton & optical encoder functions from a single shaft
• Analog joystick outputs are proportional to angle of shaft deflection
• Long life, high reliability
• Choices of cable length and termination
• Customized solutions available

APPLICATIONS
• Global positioning / Driver information systems
• Entertainment equipment
• Medical equipment controls
• Radio control belly boxes
• Robotics
• Aerospace
• Avionics
• Security camera controls

DIMENSIONS in inches

ANALOG JOYSTICK OUTPUT CHARACTERISTICS

OUTPUT SHOWN IS TYPICAL FOR VDD = 5.00V AND NOT NECESSARILY TO SCALE
BEHAVIOR IS SHOWN FOR X-AXIS AS EXAMPLE
BEHAVIOR OF Y-AXIS IS SAME AS X-AXIS

JOYSTICK DIRECTIONAL OUTPUT DIAGRAM

CODE REPEATS EVERY 4 POSITIONS
20 POSITIONS PER REVOLUTION
SPECIFICATIONS
General Electrical Specifications
Operating Voltage on Pin 6 (VDD): 5.0 ± 0.25V
Absolute Maximum Voltage* on Pin 6 (VDD): -0.3 V min, 6.5 V max.
Operating Current: 8 mA typ., 12 mA, max.

Joystick Electrical and Mechanical Ratings
Sensing Method: Hall effect, proportional to angle of deflection
Output Voltage (Pins 7 & 8): Analog (Ratio-metric to Operating Voltage)
Output at Center Position: 50% VDD
Output at Full Travel: 10% VDD (for X-, Y- directions)
90% VDD (for X+, Y+ directions)
Output Tolerance: ± 2% VDD (at Center and Full Travel)
Output Current: 200 µA, max.
Angle of Throw: 6.5° + 2° / -1° in main directions; 9.0° ± 0.1° in diagonals
Life: 500,000 actuations in each of the four main directions

Pushbutton Electrical and Mechanical Ratings
Rating: 10 mA at 5 Vdc resistive
Absolute Maximum Voltage* on Pins 2 & 3: 6.0 V
Contact Resistance: less than 10 ohms
Life: 1 million actuations minimum
Contact Bounce: < 4 mS make, <10 mS break
Actuation Force: 960 ± 150 grams (700 grams Dome)

Rotary Electrical and Mechanical Ratings
Output Code (Pins 4 & 5): 2-Bit quadrature: Channel "A" leads channel "B" by 90° electrically during clockwise rotation of the shaft
Output Type: Push/Pull
Output Low Voltage: 0.6V maximum for IOL = 2 mA.
Output High Voltage: 4.3V minimum for IOH = -1.5 mA, (VDD = 5.0V)
Mechanical Life: 1 million rotational cycles of operation (1 cycle is a rotation through all positions and a full return)
Mounting Torque: 15 in-oz maximum
Shaft Push-Out Force: 45 lbs minimum
Shaft Pull-Out Force: 45 lbs minimum
Solderability: 95% free of pin holes and voids
Detents: 20 Position
Torque: Initially 3.5 ± 1.5 in-oz average of all positions, with a 1.5 in-oz maximum range (Max position - Min position) = Range
After 1 million cycles, average torque shall not change by more than 50% of the initial value

Soldering Recommendation
Hand solder only per IPC J-STD-001

Environmental Ratings
Operating Temperature Range: -40°C to 85°C
Storage Temperature Range: -55°C to 100°C
Relative Humidity: 96 hours at 90-95% humidity at 40°C
Vibration: Harmonic motion with amplitude of 15g, within a varied 10 to 2000 Hz frequency for 12 hours
Mechanical Shock:
Test 1: 100g for 6ms half-sine wave with a velocity change of 12.3 ft/s
Test 2: 100g for 6ms sawtooth wave with a velocity change of 9.7 ft/s

Materials and Finishes
Pin Header: Terminals: Phosphor bronze; Insulator: Nylon 4/6; Plated with tin
Cable: Copper stranded with silver plating in PVC insulation, 28 AWG
Connector: Nylon 4/6; 30% Glass-filled; Tin-plated phosphor bronze terminals
Mounting Nut: Polyurethane
Shaft: Thermoplastic
ROHS Compliant.

EMC Ratings
Radiated Immunity: Passed 10 V/m: 80-2700 MHz per IEC 61000-4-3
Conducted Immunity: Passed 10 V/m: 0.15 80 MHz per IEC 61000-4-6
Radiated Emissions: Passed EN 55022 Class B
Conducted Emissions: Passed EN 55022 Class B
Electrostatic Discharge: Passed 15kV contact/25kV air discharge per IEC 61000-4-2
Power Frequency Magnetic Field: Passed 30 A/m per IEC 61000-4-8

ORDERING INFORMATION
CABLE LENGTH
020 = 2” 040 = 4” 060 = 6” 2” Increments
Leave blank if choosing pin header
Examples:
67C18-8-M-020 = 2.0” cable with connector
67C18-8-M-P = Pin header

TERMINATION
S = Stripped Cable
C = Cable with Connector
P = Pin Header

force option
M = Medium Forces

For prices and custom configurations, contact a local sales office, an authorized distributor, or Grayhill’s sales department.

* Exceeding the Absolute Maximum Voltage may result in permanent damage to the device. This is a stress rating only and functional operation of the device at those or any other conditions above those indicated in the operation listings of this specification is not implied.