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LAMPIRAN

E50S Series

Diameter ø50mm Shaft type Incremental Rotary Encoder

Line-up

Features

- 12-24VDC power supply of line driver output(Line-up)
- Suitable for measuring angle, position, revolution, speed, acceleration and distance
- Power supply : 5VDC, 12-24VDC ±5%

Applications

- Various tooling machinery, packing machine and general industrial machinery etc.

Please read "Caution for your safety" in operation manual before using.

Ordering information (Former name : ENB)

E50S — 8 — 8000 — 3 — N — 24 — □

Series	Shaft diameter	Pulse/1Revolution	Output phase	Output	Power supply	Cable
Diameter ø50mm, shaft type	ø8mm	Refer to resolution	2: A, B 3: A, B, Z 4: A, B, B, Z 6: A, A, B, B, Z, Z	T: Totem pole output N: NPN open collector output V: Voltage output L: Line driver output	5: 5VDC ±5% 24:12-24VDC ±5%	No mark: Cable type C: Connector cable type(※1) CR: Axial connector type CS: Radial connector type

※Standard : E50S8-□□□-3-N-24 ※Cable length: 250mm

Specifications

Item			Diameter ø50mm shaft type of incremental rotary encoder
Resolution(P/R)※1			1, 2, 5, 10, 12, 15, 20, 23, 25, 30, 35, 40, 45, 50, 60, 75, 100, 120, 125, 150, 192, 200, 240, 250, 256, 300, 360, 400, 500, 512, 600, 800, 1000, 1024, 1200, 1500, 1800, 2000, 2048, 2500, 3000, 3600, 5000, 6000, 8000
Electrical specification	Output phase		A, B, Z phase(Line driver : A, $\overline{A}$, B, $\overline{B}$, Z, $\overline{Z}$ phase)
	Phase difference of output		Phase difference between A and B : $\frac{T}{4} \pm \frac{T}{8}$ (T=1cycle of A phase)
	Control output	Totem pole output	• Low - Load current:Max. 30mA, Residual voltage : Max. 0.4VDC • High - Load current: Max. 10mA, Output voltage(Power voltage 5VDC): Min. (Power voltage-2.0)VDC, Output voltage(Power voltage 12-24VDC):Min. (Power voltage-3.0)VDC
		NPN open collector output	Load current : Max. 30mA, Residual voltage : Max. 0.4VDC
		Voltage output	Load current : Max. 10mA, Residual voltage : Max. 0.4VDC
		Line driver output	• Low - Load current : Max. 20mA, Residual : Max. 0.5VDC • High - Load current : Max. -20mA, Output voltage(Power voltage 5VDC) : Min. 2.5VDC, Output voltage(Power voltage 12-24VDC) : Min. (Power voltage-3.0)VDC
	Response time (Rise/Fall)	Totem pole output NPN open collector output Voltage output	Max. 1μs • Measuring condition - Cable length : 2m, I sink = 20mA
		Line driver output	Max. 0.5μs
	Max. Response frequency		300kHz
	Power supply		• 5VDC ±5%(Ripple P-P : Max. 5%) • 12-24VDC ±5%(Ripple P-P : Max. 5%)
	Current consumption		Max. 80mA(disconnection of the load), Line driver output : Max. 50mA(disconnection of the load)
	Insulation resistance		Min. 100MΩ(at 500VDC megger between all terminals and case)
	Dielectric strength		750VAC 50/60Hz for 1 minute(Between all terminals and case)
	Connection		Cable type, 250mm connector cable type, Connector type(Axial, Radial)
Mechanical specification	Starting torque		Max. 70gf·cm(0.007Nm)※2 / Max. 800gf·cm(0.08Nm)※3
	Moment of inertia		Max. 80g·cm²(8×10⁻⁶ kg·m²)※2 / Max. 400g·cm²(4×10⁻⁵ kg·m²)※3
	Shaft loading		Radial : 10kgf, Thrust : 2.5kgf
	Max. allowable revolution※4		5000rpm
Vibration			1.5mm amplitude or 300m/s² at frequency of 10 to 55Hz(for 1 min.) in each of X, Y, Z directions for 2 hours
Shock			Approx. Max. 75G
Environment		Ambient temperature	-10 to 70°C, storage : -25 to 85°C
		Ambient humidity	35 to 85%RH, storage : 35 to 90%RH
Protection			Cable type, Connector cable type: IP50(IEC standard)※5, Connector type: IP65(IEC standard)
Cable			ø5, 5-wire, Length : 2m, Shield cable(Line driver output : ø5, 8-wire) (AWG 24, Core diameter : 0.08mm, Number of cores : 40, Insulator out diameter : ø1)
Accessory			ø8mm coupling, bracket
Approval			Cable type CE(Except for line driver output)
Unit weight			Approx. 275g, Connector type : 180g

※1: '*' pulse is only for A, B phase(Line driver output is for A, $\overline{A}$, B, $\overline{B}$ phase). ※2: This value is for Cable type, Connector cable type(Protection: IP50).
※3: This value is for Cable type, Connector cable type(Protection: IP64)/Connector type (Protection: IP65)
※4: Make sure that max. response revolution should be lower than or equal to max. allowable revolution when selecting the resolution.

$$\text{Max. response resolution(rpm)} = \frac{\text{Max. response frequency}}{\text{Resolution}} \times 60 \text{ sec}$$

※5: 'Cable type, Connector cable type is option as IP64 protection.
※Environment resistance is rated at no freezing or condensation.

dsPIC30F4011/4012 Enhanced Flash 16-bit Digital Signal Controller

Note: This data sheet summarizes features of this group of dsPIC30F devices and is not intended to be a complete reference source. For more information on the CPU, peripherals, register descriptions and general device functionality, refer to the *dsPIC30F Family Reference Manual* (DS70046). For more information on the device instruction set and programming, refer to the *dsPIC30F Programmer's Reference Manual* (DS70030).

High Performance Modified RISC CPU:

- Modified Harvard architecture
- C compiler optimized instruction set architecture with flexible addressing modes
- 84 base instructions
- 24-bit wide instructions, 16-bit wide data path
- 48 Kbytes on-chip Flash program space (16K Instruction words)
- 2 Kbytes of on-chip data RAM
- 1 Kbytes of non-volatile data EEPROM
- Up to 30 MIPs operation:
  - DC to 40 MHz external clock input
  - 4 MHz-10 MHz oscillator input with PLL active (4x, 8x, 16x)
- 30 interrupt sources
  - 3 external interrupt sources
  - 8 user selectable priority levels for each interrupt source
  - 4 processor trap sources
- 16 x 16-bit working register array

DSP Engine Features:

- Dual data fetch
- Accumulator write back for DSP operations
- Modulo and Bit-Reversed Addressing modes
- Two, 40-bit wide accumulators with optional saturation logic
- 17-bit x 17-bit single cycle hardware fractional/integer multiplier
- All DSP instructions single cycle
- ± 16-bit single cycle shift

Peripheral Features:

- High current sink/source I/O pins: 25 mA/25 mA
- Timer module with programmable prescaler:
  - Five 16-bit timers/counters; optionally pair 16-bit timers into 32-bit timer modules
- 16-bit Capture input functions
- 16-bit Compare/PWM output functions
- 3-wire SPI™ modules (supports 4 Frame modes)
- I^2C™ module supports Multi-Master/Slave mode and 7-bit/10-bit addressing
- 2 UART modules with FIFO Buffers
- 1 CAN modules, 2.0B compliant

Motor Control PWM Module Features:

- 6 PWM output channels
  - Complementary or Independent Output modes
  - Edge and Center Aligned modes
- 3 duty cycle generators
- Dedicated time base
- Programmable output polarity
- Dead-time control for Complementary mode
- Manual output control
- Trigger for A/D conversions

Quadrature Encoder Interface Module Features:

- Phase A, Phase B and Index Pulse input
- 16-bit up/down position counter
- Count direction status
- Position Measurement (x2 and x4) mode
- Programmable digital noise filters on inputs
- Alternate 16-bit Timer/Counter mode
- Interrupt on position counter rollover/underflow

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TOSHIBA Photocoupler GaAlAs Ired & Photo-IC

TLP250

Transistor Inverter

Inverter For Air Conditionor

IGBT Gate Drive

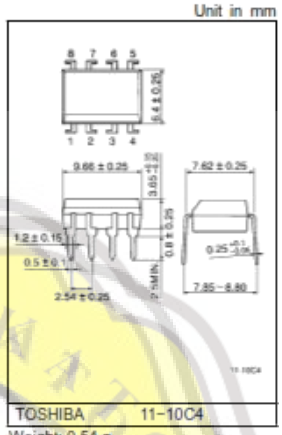
Power MOS FET Gate Drive

The TOSHIBA TLP250 consists of a GaAlAs light emitting diode and a integrated photodetector.
This unit is 8-lead DIP package.
TLP250 is suitable for gate driving circuit of IGBT or power MOS FET.

- Input threshold current: I_F=5mA(max.)
- Supply current (I_{CC}): 11mA(max.)
- Supply voltage (V_{CC}): 10-35V
- Output current (I_O): ±1.5A (max.)
- Switching time (t_{pLH}/t_{pHL}): 1.5μs(max.)
- Isolation voltage: 2500V_{rms}(min.)
- UL recognized: UL1577, file No.E67349
- Option (D4) type
  VDE approved: DIN VDE0884/06.92,certificate No.76823
  Maximum operating insulation voltage: 630V_{PK}
  Highest permissible over voltage: 4000V_{PK}

  (Note) When a VDE0884 approved type is needed, please designate the "option (D4)"
- Creepage distance: 6.4mm(min.)
  Clearance: 6.4mm(min.)

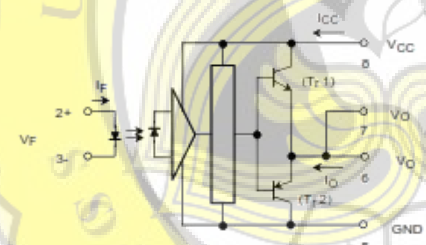
Unit in mm



TOSHIBA 11-10C4

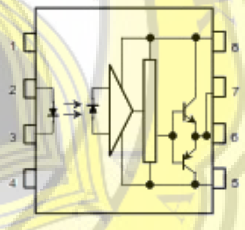
Weight: 0.54 g

Schmatic



A 0.1μF bypass capcitor must be connected between pin 8 and 5 (See Note 5).

Pin Configuration (top view)



1 : N.C.
2 : Anode
3 : Cathode
4 : N.C.
5 : GND
6 : V_O (Output)
7 : V_O
8 : V_{CC}

Truth Table

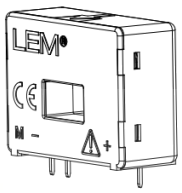
		Tr1	Tr2
Input LED	On	On	Off
	Off	Off	On

Current Transducer LA 55-P/SP1

I_{PN} = 50 A

For the electronic measurement of currents: DC, AC, pulsed..., with galvanic isolation between the primary circuit (high power) and the secondary circuit (electronic circuit).

16024



Electrical data

I_{PN}	Primary nominal current rms				50			A
I_{PM}	Primary current, measuring range				0 .. ± 100			A
R_M	Measuring resistance			T_A = 70°C		T_A = 85°C		
				$R_{M\,min}$	$R_{M\,max}$	$R_{M\,min}$	$R_{M\,max}$	
	with ± 12 V	@ ± 50 A_{max}		0	215	0	210	Ω
		@ ± 100 A_{max}		0	35	0	30	Ω
	with ± 15 V	@ ± 50 A_{max}		0	335	30	330	Ω
		@ ± 100 A_{max}		0	95	30	90	Ω
I_{SN}	Secondary nominal current rms				25			mA
K_N	Conversion ratio				1 : 2000			
V_C	Supply voltage (± 5 %)				± 12 .. 15			V
I_C	Current consumption				10 (@ ± 15 V) + I_S			mA

Accuracy - Dynamic performance data

X	Accuracy @ I_{PN}, T_A = 25°C	@ ± 15 V (± 5 %)		± 0.65		%
		@ ± 12 .. 15 V (± 5 %)		± 0.90		%
ε_L	Linearity error			< 0.15		%
			Typ	Max		
I_O	Offset current @ I_P = 0, T_A = 25°C			± 0.10		mA
I_{OM}	Magnetic offset current [1] @ I_P = 0 and specified R_M, after an overload of 3 x I_{PN}				± 0.15	mA
I_{OT}	Temperature variation of I_O	- 25°C .. + 85°C	± 0.05	± 0.30		mA
		- 40°C .. - 25°C	± 0.10	± 0.50		mA
t_{ra}	Reaction time to 10 % of I_{PN} step		< 500			ns
t_r	Response time [2] to 90 % of I_{PN} step		< 1			µs
di/dt	di/dt accurately followed		> 200			A/µs
BW	Frequency bandwidth (- 1 dB)		DC .. 200			kHz

General data

T_A	Ambient operating temperature		- 40 .. + 85		°C
T_S	Ambient storage temperature		- 40 .. + 90		°C
R_S	Secondary coil resistance	@ T_A = 70°C	145		Ω
		@ T_A = 85°C	150		Ω
m	Mass		18		g
	Standards		EN 50178: 1997		

Notes: [1] Result of the coercive field of the magnetic circuit
[2] With a di/dt of 100 A/µs.

Features

- Closed loop (compensated) current transducer using the Hall effect
- Printed circuit board mounting
- Insulated plastic case recognized according to UL 94-V0.

Special features

- I_{PM} = 0 .. ± 100 A
- K_N = 1 : 2000.

Advantages

- Excellent accuracy
- Very good linearity
- Low temperature drift
- Optimized response time
- Wide frequency bandwidth
- No insertion losses
- High immunity to external interference
- Current overload capability.

Applications

- AC variable speed drives and servo motor drives
- Static converters for DC motor drives
- Battery supplied applications
- Uninterruptible Power Supplies (UPS)
- Switched Mode Power Supplies (SMPS)
- Power supplies for welding applications.

Application domain

- Industrial.

090519/13 LEM reserves the right to carry out modifications on its transducers, in order to improve them, without prior notice. www.lem.com

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