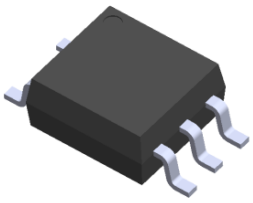
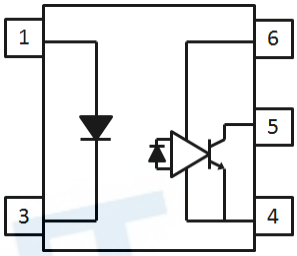
DATASHEET

5 PIN SOP INTELLIGENT POWER MODULE PHOTOCOUPLER
ELM456 series

Prelimirary



Schematic



0.1μF bypass capacitor must be connected between pins 6 and 4 *3

Pin Configuration
1: Anode
3: Cathode
4: GND
5: V_{out}
6: V_{CC}

Features

- Compliance Halogen Free.
  (Br <900 ppm, CI <900 ppm, Br+Cl < 1500 ppm).
- Pb free and RoHS compliant
- Compliance with EU REACH.
- High isolation voltage between input and output
  (Viso=3750 Vrms)
- UL and cUL approved (PENDING)
- VDE approved (PENDING)
- NEMKO approved (PENDING)
- FIMKO approved (PENDING)
- SEMKO approved (PENDING)
- DEMKO approved (PENDING)
- CQC approved (PENDING)

Description

The ELM456 serie devices are consists of an infrared emitting diode optically coupled to a high gain photo detector. The devices are packaged in industry standard 5pin SOP packages and are suitable for surface mounting.

Applications

- IPM Isolation
- Isolated IGBT/MOSFET Gate Drive
- AC and Brushless DC Motor Drives
- Industrial Inverters

Absolute Maximum Ratings (Ta=25℃)

Parameter		Symbol	Rating	Unit
Input	Forward current	I_F	20	mA
	Reverse voltage	V_R	5	V
	Power dissipation	P_D	40	mW
Output	Power dissipation	P_C	85	mW
	Output current	I_O	15	mA
	Output voltage	V_O	30	V
	Supply voltage	V_{CC}	30	V
Output Power Dissipation		P_O	100	mW
Isolation voltage *1		V_{ISO}	3750	V rms
Operating temperature		T_{OPR}	-40 ~ +85	°C
Storage temperature		T_{STG}	-55 ~ +125	°C
Soldering temperature *2		T_{SOL}	260	°C

Notes:
*1 AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1 &3 are shorted together, and pins 4, 5 & 6 are shorted together.

*2 For 10 seconds.

Electrical Characteristics

Input

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward voltage	V_F	-	1.45	1.8	V	I_F = 10mA
Reverse Current	I_R	-	-	10	μA	V_R = 5V
Input capacitance	C_{IN}	-	60	-	pF	V_F=0, f=1MHz

Output

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
High Level supply current	I_{CCH}	-	0.7	1.5	mA	I_F=0mA, V_{CC}=5V
Low Level supply current	I_{CCL}	-	0.7	-	mA	I_F=10mA, V_{CC}=5V

Transfer Characteristics

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Low Level Output Current	V_{OL}	-	0.15	0.6	V	V_{CC} = 5V, I_F=5mA, I_O=2.4mA
Input Threshold Current	I_{TH}	-	-	5	mA	V_{CC}= 5.5V, V_O=0.6V, I_{OL}=13mA
Low Level Output Current	I_{OL}		22		mA	I_F=10mA, V_O=0.6V V_{CC}=5V
Current Transfer Ratio	CTR		220		%	I_F=10mA, V_O=0.6V V_{CC}=5V

Switching Characteristics (V_{CC}=5V, I_F=10mA unless specified otherwise)

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Propagation delay time to output High level	T_{PHL}	-	150	-	ns	C_L = 10pF, R_L=350Ω,
Propagation delay time to output Low level	T_{PLH}	-	450	-	ns	C_L = 10pF, R_L=350Ω,
Pulse width distortion	$\|T_{PHL} - T_{PLH}\|$	-	300	-	ns	C_L = 15pF, R_L=350Ω,

Switching Characteristics

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Common Mode Transient Immunity at Logic High *4	CM_H	10		-	KV/µS	I_F = 0mA , V_{OH}=2.0V, R_L=350Ω, T_A=25°C V_{CM}=1000Vp-p
Common Mode Transient Immunity at Logic Low *5	CM_L	10	-	-	KV/µS	I_F = 7.5mA , V_{OL}=0.8V, R_L=350Ω, T_A=25°C V_{CM}=1000Vp-p

Typical Electro-Optical Characteristics Curves

Figure 1. Output Current vs Forward currnet

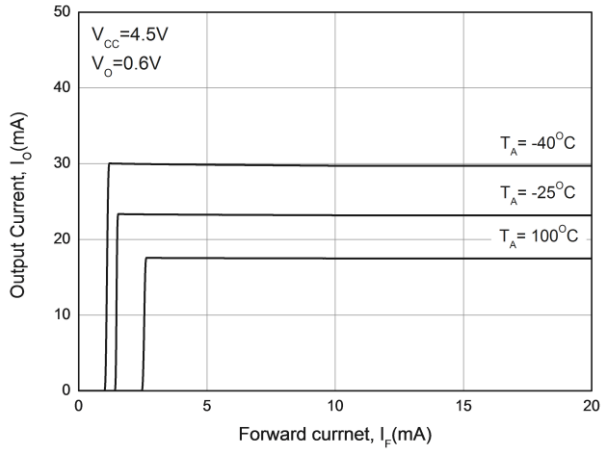


Figure 2. Normalized Output Current vs Temperature

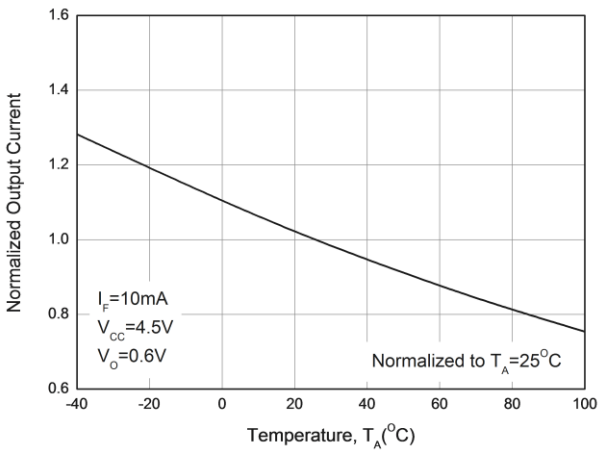


Figure 3. Propagation Delay vs Temperature

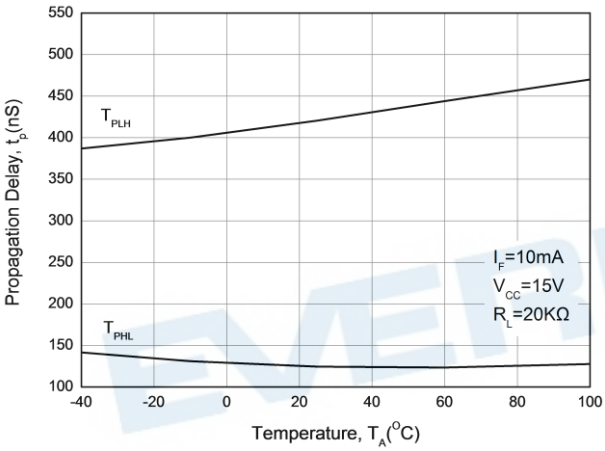


Figure 4. Propagation Delay vs Load Resistance

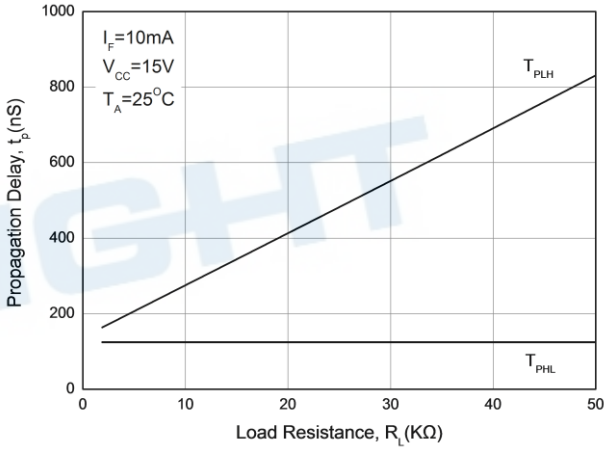


Figure 5. Propagation Delay vs Supply Voltage

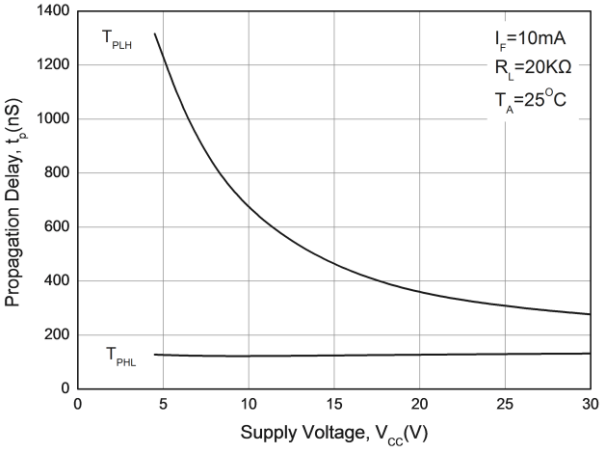
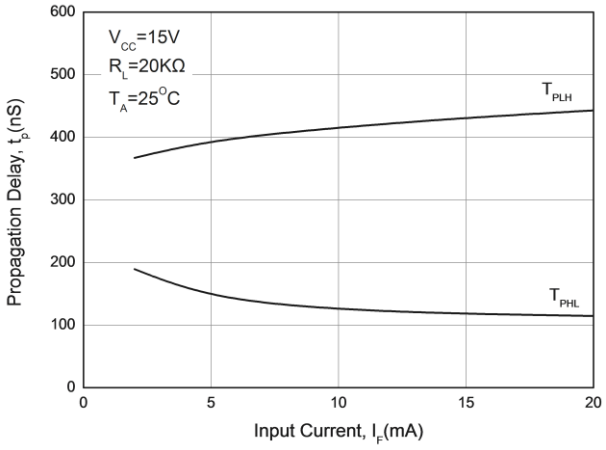


Figure 6. Propagation Delay vs Input Current



Order Information

Part Number

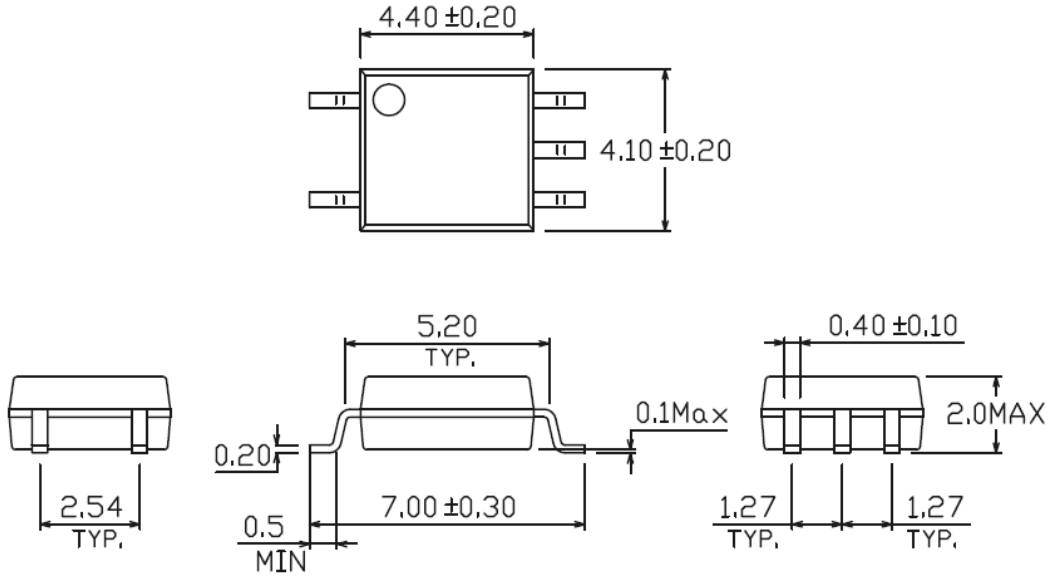
ELM456(Y)-VG

Note

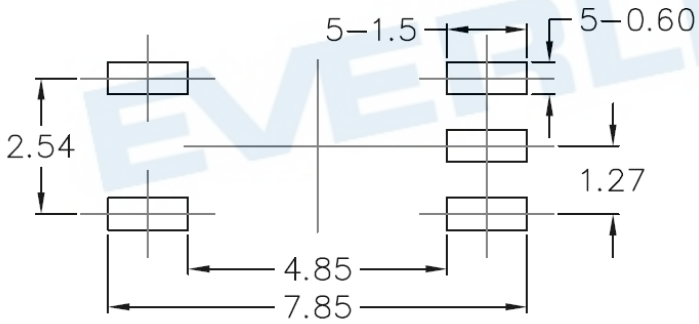
EL = denotes EVERLIGHT
M456 = part no.
Y = Tape and reel option (TA, TB)
V = VDE (optional)
G = Halogens free

Option	Description	Packing quantity
(TA)	Surface mount lead form + TA tape & reel option	1000 units per reel
(TB)	Surface mount lead form + TB tape & reel option	1000 units per reel

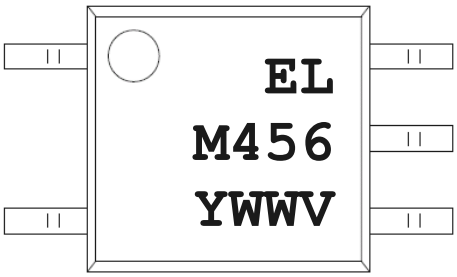
Package Dimension
(Dimensions in mm)



Recommended pad layout for surface mount leadform



Device Marking

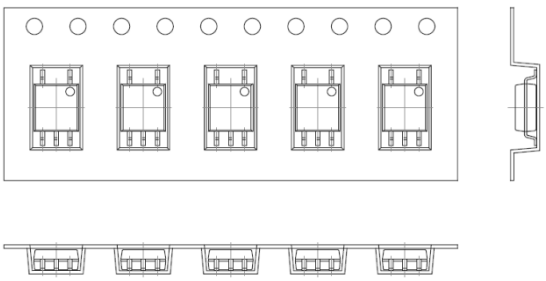


Notes

EL	denotes EVERLIGHT
M456	denotes Device Number
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE (optional)

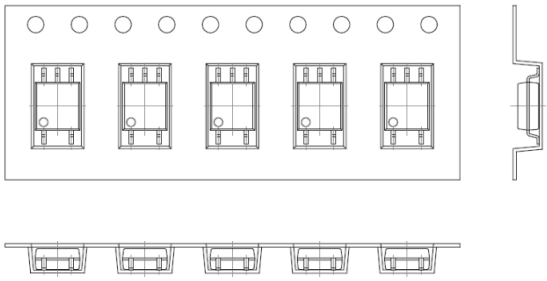
Tape & Reel Packing Specifications

Option TA



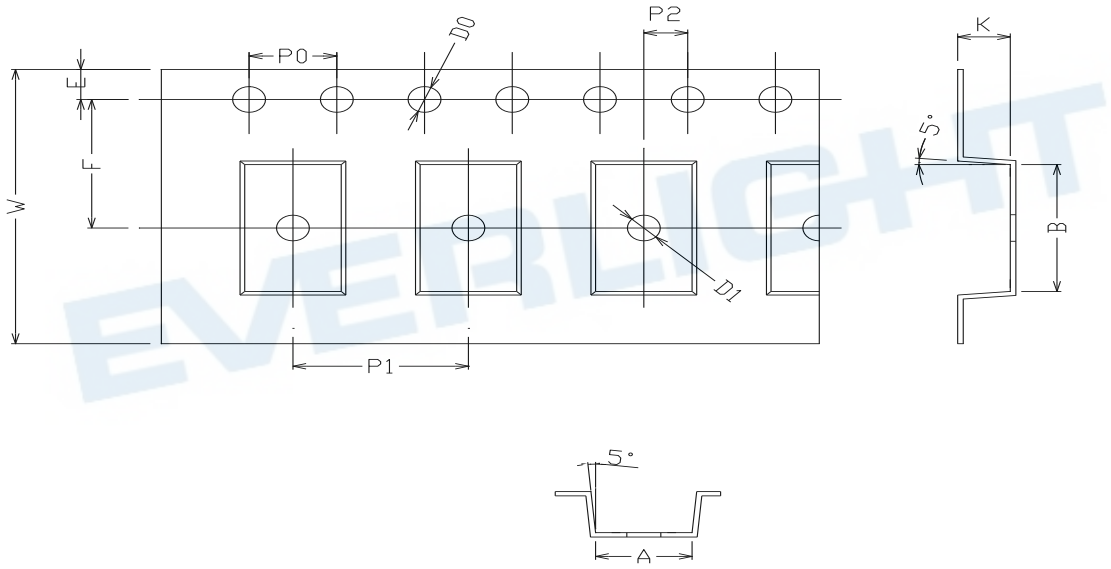
Direction of feed from reel

Option TB



Direction of feed from reel

Tape dimensions

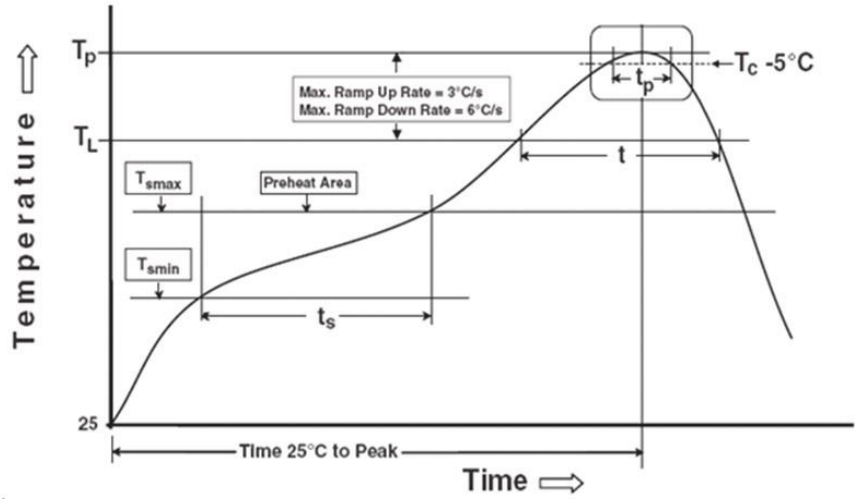


Dimension No.	A	B	Do	D1	E	F
Dimension (mm)	4.4 ± 0.1	7.4 ± 0.1	1.5 + 0.1/-0	1.5 ± 0.1	1.75± 0.1	7.5 ± 0.05
Dimension No.	Po	P1	P2	t	W	K
Dimension (mm)	4.0 ± 0.15	8.0 ± 0.1	2.0 ± 0.1	0.25 ± 0.03	16.0 ± 0.2	2.4± 0.1

Precautions for Use

1. Soldering Condition

1.1 (A) Maximum Body Case Temperature Profile for evaluation of Reflow Profile



Note: Reference: IPC/JEDEC J-STD-020D

Preheat	
Temperature min (T_{smin})	150 °C
Temperature max (T_{smax})	200°C
Time (T_{smin} to T_{smax}) (t_s)	60-120 seconds
Average ramp-up rate (T_{smax} to T_p)	3 °C/second max
Other	
Liquidus Temperature (T_L)	217 °C
Time above Liquidus Temperature (t_L)	60-100 sec
Peak Temperature (T_P)	260°C
Time within 5 °C of Actual Peak Temperature: T_P - 5°C	30 s
Ramp- Down Rate from Peak Temperature	6°C /second max.
Time 25°C to peak temperature	8 minutes max.
Reflow times	3 times

DISCLAIMER

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