

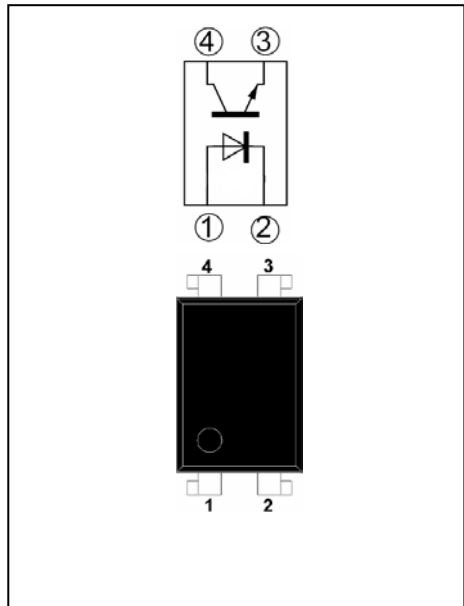
## 4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

## BL816 Series

### FEATURES

- Current transfer ratio  
(CTR: MIN.50%at  $I_F=5mA, V_{CE}=5V$ )
- High isolation voltage between inputc  
and output ( $V_{iso}=5000V$  rms)
- High collector-emitter voltage ( $V_{CEO}:70V$ )
- Pb free and ROHS compliant
- Recognized by UL, file No. E340048

HF



### APPLICATIONS

- Programmable controllers
- System appliances, measuring instruments
- Signal transmission between circuits of different potentials
- And impedances

### MAXIMUM RATING @ $T_a=25^{\circ}C$ unless otherwise specified

Parameter		Symbol	Rating	Unit
Input	Forward Current	$I_F$	50	mA
	Peak forward Current (Note 1)	$I_{FM}$	1	A
	Reverse Voltage	$V_R$	6	V
	Power Dissipation	$P$	70	mW
Output	Collector-emitter voltage	$V_{CEO}$	70	V
	Emitter-collector voltage	$V_{ECO}$	6	V
	Collector Current	$I_C$	50	mA
	Collector power dissipation	$P_C$	150	mW
Total power dissipation		$P_{tot}$	200	mW
Isolation voltage (Note 2)		$V_{iso}$	5000	$V_{rms}$
Rated repetitive peak isolation voltage		$V_{IORM}$	630	V
Thermal resistance, junction to ambient air		$R_{\theta JA}$	430	$^{\circ}C/W$
Thermal Resistance Junction-to-Case		$R_{\theta JC}$	350	$^{\circ}C/W$
Operating temperature		$T_{opr}$	-30 to +100	$^{\circ}C$
Storage temperature		$T_{stg}$	-55 to +125	$^{\circ}C$
Soldering temperature (Note 3)		$T_{sol}$	260	$^{\circ}C$

Note 1: Pulse width  $\leq 100ms$ , Duty ratio : 0.001

2: 40 to 60% RH, AC for 1 minute

3: For 10 seconds

**4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER**
**BL816 Series**
**ELECTRICAL CHARACTERISTICS @ Ta=25°C unless otherwise specified**

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage	$V_F$	$I_F=20mA$	-	1.2	1.4	V
	Peak forward voltage	$V_{FM}$	$I_{FM}=0.5A$	-	-	3.0	V
	Reverse current	$I_R$	$V_R=4V$	-	-	10	$\mu A$
	Terminal capacitance	$C_t$	$V=0, f=1kHz$	-	30	250	pF
Output	Collector dark current	$I_{CEO}$	$V_{CE}=20V, I_F=0$	-	-	$10^{-7}$	A
	Collector-Emitter breakdown voltage	$BV_{CEO}$	$I_C=0.1mA, I_F=0$	80	-	-	V
	Emitter-Collector breakdown voltage	$BV_{ECO}$	$I_E=10\mu A, I_F=0$	6	-	-	V
Transfer Characteristics	Current transfer ratio (Note 4)	CTR	$I_F=5mA, V_{CE}=5V$	50	-	600	%
	Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_F=20mA, I_C=1mA$	-	0.1	0.2	V
	Isolation resistance	$R_{ISO}$	DC500V, 40 to 60%RH	$5 \times 10^{10}$	$10^{11}$	-	$\Omega$
	Floating capacitance	$C_f$	$V=0, f=1MHz$	-	0.6	1.0	pF
	Cut-off frequency	$f_c$	$V_{CE}=5V, I_C=2mA,$ $R_L=100\Omega, -3dB$	-	80	-	KHz
	Response time	Rise time	$t_r$	$V_{CE}=2V, I_C=2mA$	-	4	18
Fall time		$t_f$	$R_L=100\Omega$	-	3	18	$\mu s$

Note 4: Classification table of current transfer ratio is shown below.

**Rank Table of Current Transfer Ratio CTR**

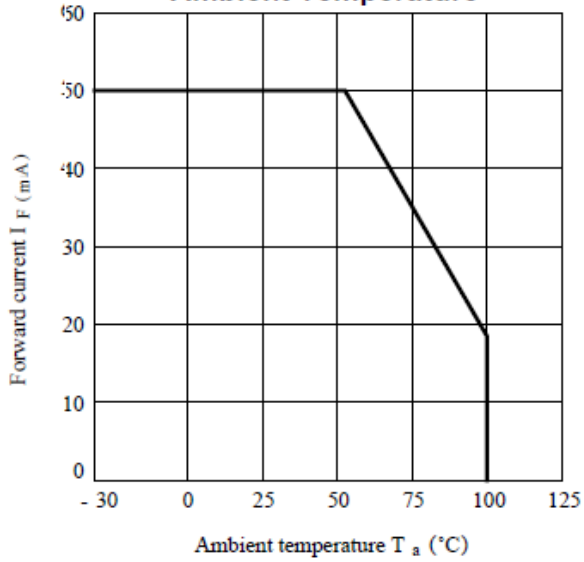
Model No.	RANK MARK	MIN.(%)	MAX.(%)
BL816A	A	80	160
BL816B	B	130	260
BL816C	C	200	400
BL816D	D	300	600
BL816	A,B,C,D or No mark	50	600

**4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER**

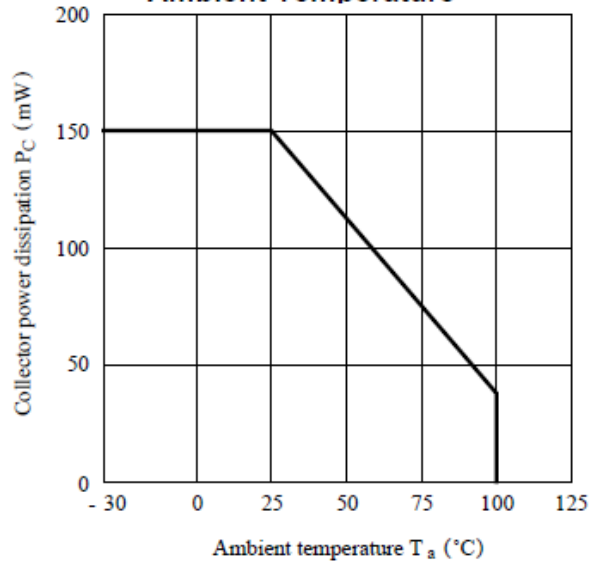
**BL816 Series**

TYPICAL CHARACTERISTICS @  $T_a=25^\circ\text{C}$  unless otherwise specified

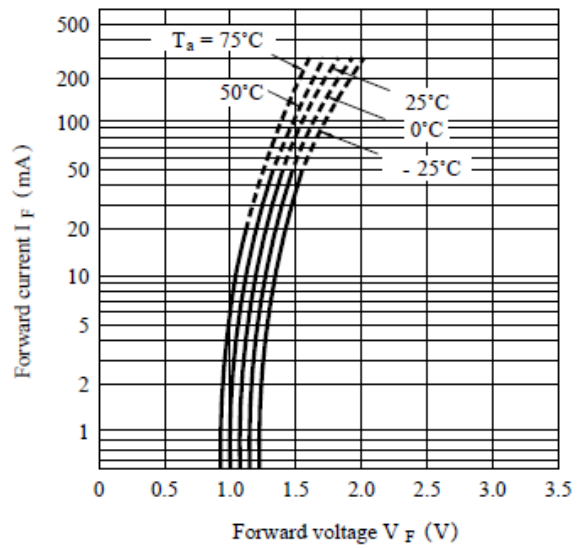
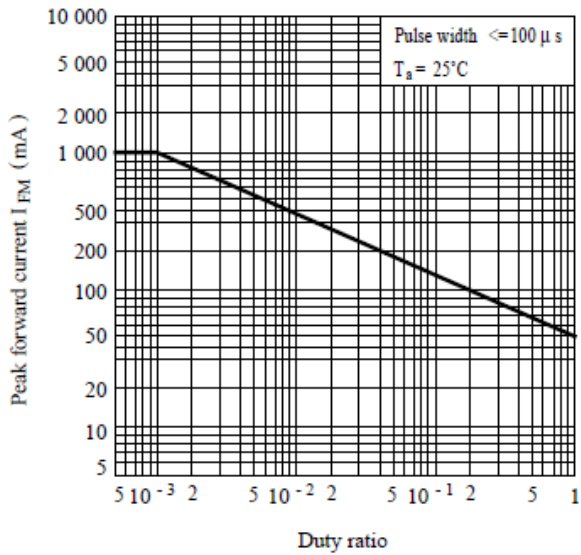
**Fig. 1 Forward Current vs. Ambient Temperature**



**Fig. 2 Collector Power Dissipation VS. Ambient Temperature**



**Fig. 3 Peak Forward Current vs. Duty Ratio**      **Fig. 4 Forward Current vs. Forward Voltage**



4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

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Fig. 5 Current Transfer Ratio vs. Forward Current

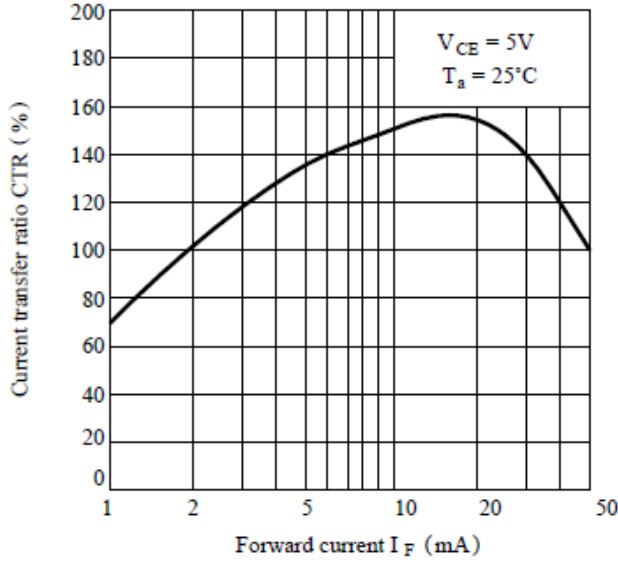


Fig. 6 Collector Current vs. Collector-emitter Voltage

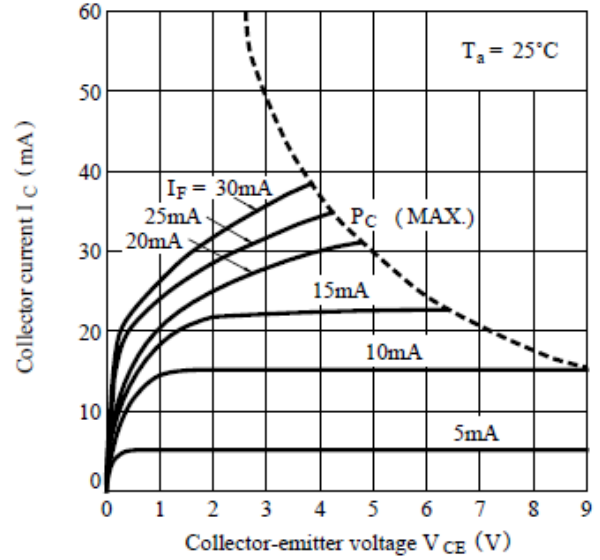


Fig. 7 Relative Current Transfer Ratio vs. Ambient Temperature

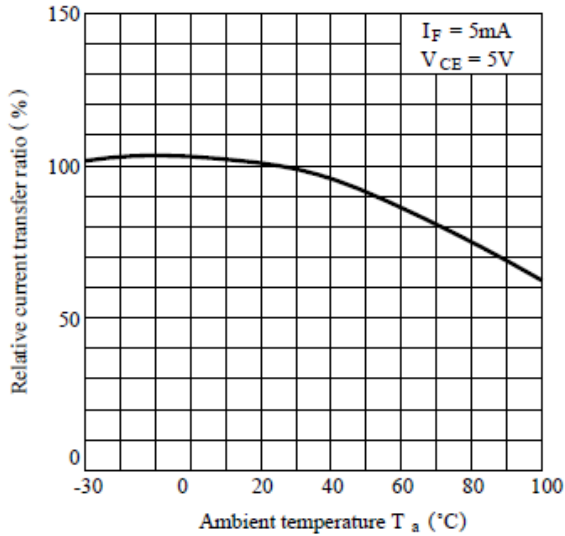
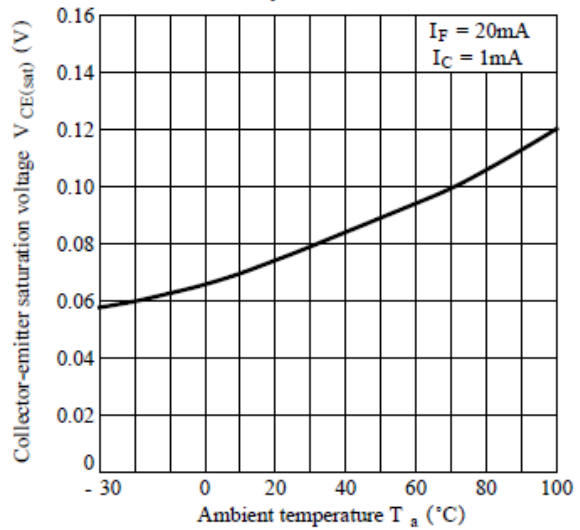


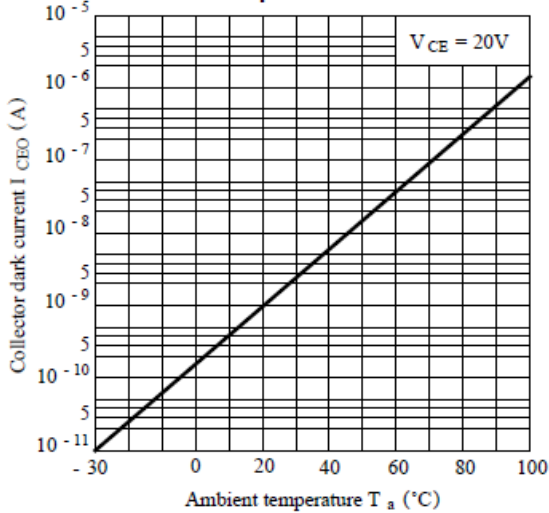
Fig. 8 Collector-emitter Saturation Voltage vs. Ambient Temperature



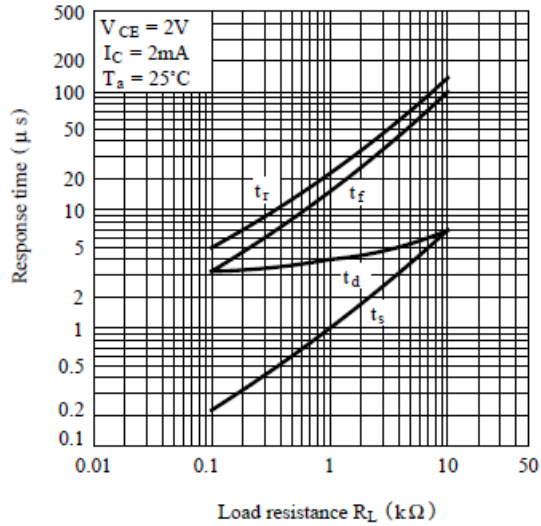
**4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER**

**BL816 Series**

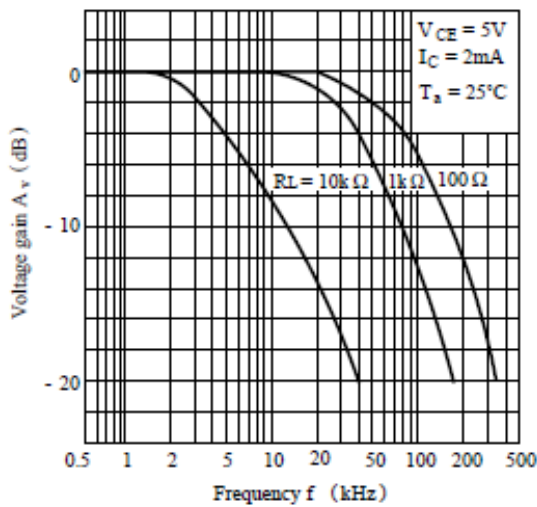
**Fig. 9 Collector Dark Current vs. Ambient Temperature**



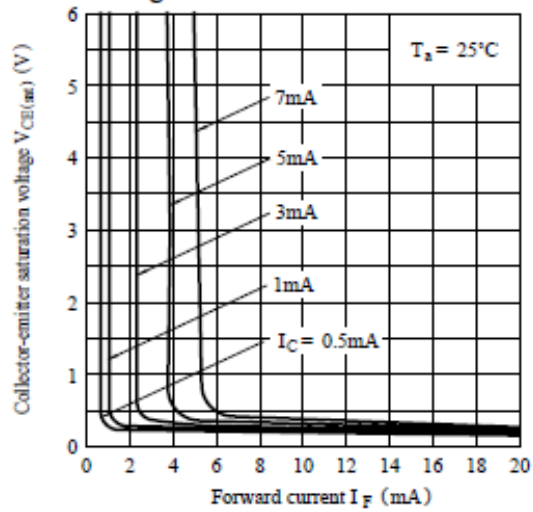
**Fig.10 Response Time vs. Load Resistance**



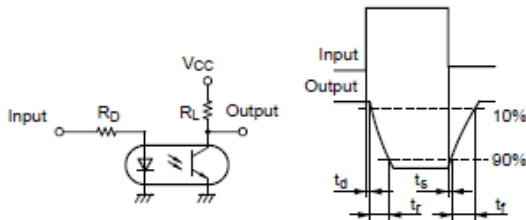
**Fig.11 Frequency Response**



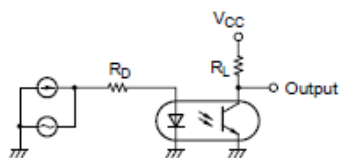
**Fig.12 Collector-emitter Saturation Voltage vs. Forward Current**



**Test Circuit for Response Time**



**Test Circuit for Frequency Response**

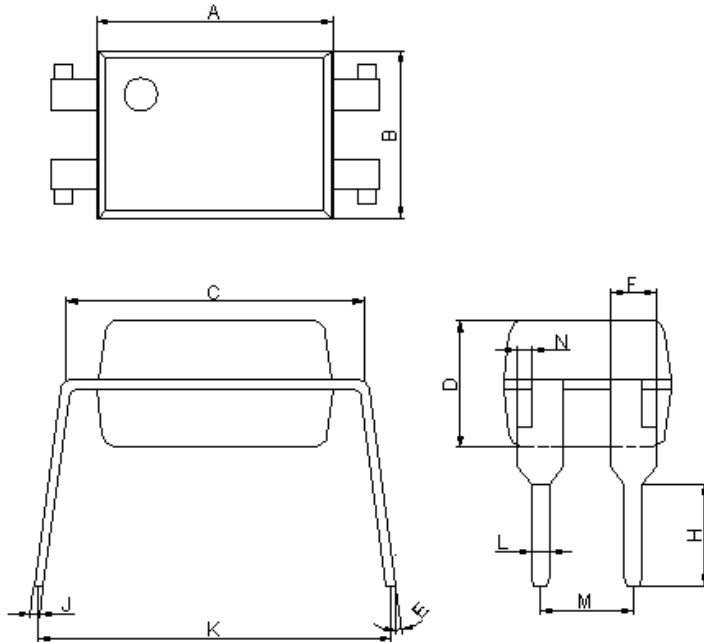


## 4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

## BL816 Series

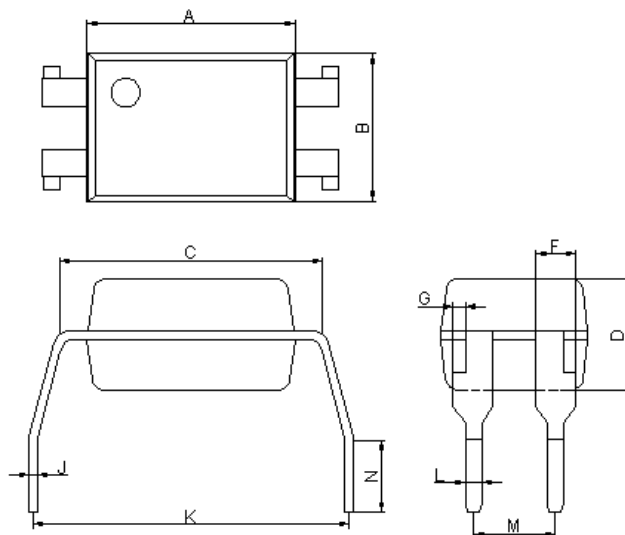
### Package Dimensions (All Dimensions in mm)

#### BL816



Dim	Min	Max
A	6.40	6.60
B	4.50	4.70
C	7.90	8.30
D	3.28	3.68
E	2°	8°
F	1.15	1.35
H	2.70	2.90
J	0.20	0.30
K	8.86	9.31
L	0.40	0.60
M	2.44	2.64
N	0.30	0.50

#### BL816M

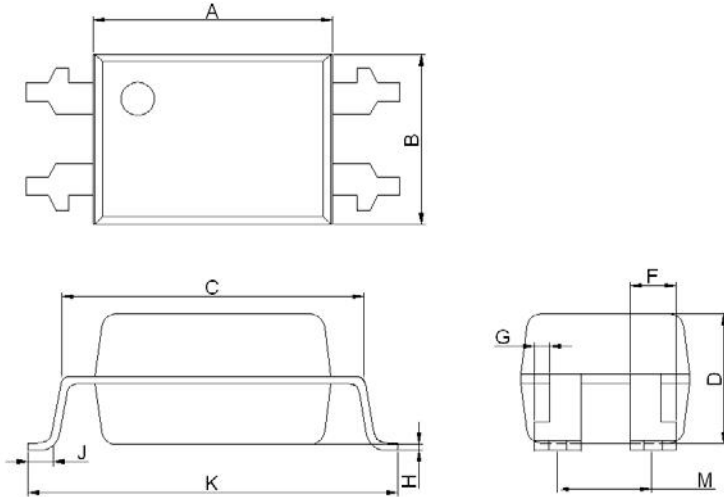


Dim	Min	Max
A	6.40	6.60
B	4.50	4.70
C	7.90	8.30
D	3.28	3.68
F	1.15	1.35
G	0.30	0.50
J	0.20	0.30
K	9.86	10.46
L	0.40	0.60
M	2.44	2.64
N	2.40	2.90

## 4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

## BL816 Series

### BL816S

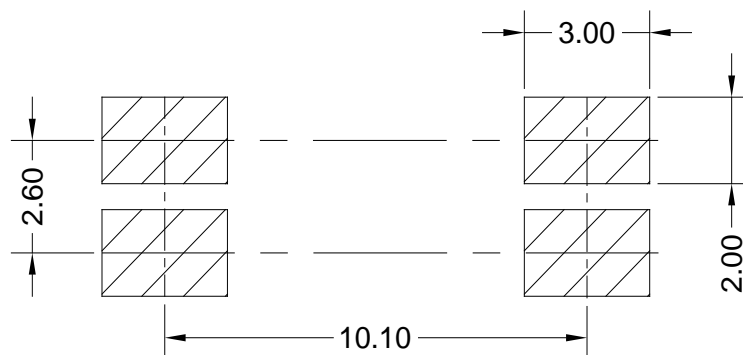


Dim	Min	Max
A	6.40	6.60
B	4.50	4.70
C	7.90	8.30
D	3.28	3.68
F	1.15	1.35
G	0.30	0.50
H	0.00	0.20
J	0.9	1.2
K	9.80	10.30
M	2.49	2.69

### Ordering Information

Part Number	Package	Application part number
BL816	4-pin DIP	BL816
BL816S	4-pin (tape and reel packaging)	
BL816M	4-pin (leads with 0.4" spacing)	

### SOLDERING FOOTPRINT



UNIT:mm