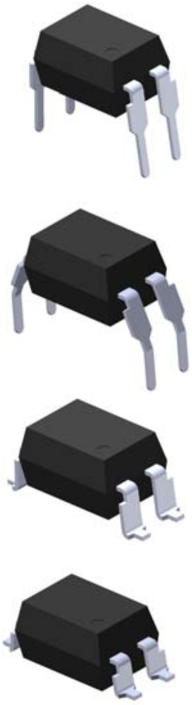
4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

EL816 Series

Features:

- Current transfer ratio
  (CTR: 50~600% at I_F =5mA, V_{CE} =5V)
- High isolation voltage between inputs
  and output (Viso=5000 V rms)
- Creepage distance >7.62 mm
- Operating temperature up to +110°C
- Compact small outline package
- Pb free and RoHS compliant.
- UL approved (No. E214129)
- VDE approved (No. 132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CSA approved (No. 1143607)



Description

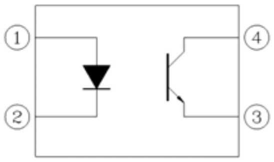
The EL816 series of devices each consist of an infrared emitting diodes, optically coupled to a phototransistor detector.

They are packaged in a 4-pin DIP package and available in wide-lead spacing and SMD option.

Applications

- Programmable controllers
- System appliances, measuring instruments
- Telecommunication equipments
- Home appliances, such as fan heaters, etc.
- Signal transmission between circuits of different potentials and impedances

Schematic



Pin Configuration
1. Anode
2. Cathode
3. Emitter
4. Collector

Absolute Maximum Ratings (T_a=25°C)

Parameter		Symbol	Rating	Unit
Input	Forward current	I_F	50	mA
	Peak forward current (1us, pulse)	I_{FP}	1	A
	Reverse voltage	V_R	6	V
	Power dissipation No derating required up to T_a = 100°C	P_D	70	mW
Output	Power dissipation Derating factor (above T_a = 80˚C)	P_C	150	mW
			5.8	mW/˚C
	Collector current	I_C	80	mA
	Collector-Emitter voltage	V_{CEO}	80	V
	Emitter-Collector voltage	V_{ECO}	6	V
Total power dissipation		P_{TOT}	200	mW
Isolation voltage [*1]		V_{ISO}	5000	V rms
Operating temperature		T_{OPR}	-55 ~ +110	°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 & 2 are shorted together, and pins 3 & 4 are shorted together.

*2 For 10 seconds.

Electrical Characteristics (T_a=25°C unless specified otherwise)

Input

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Forward voltage	V_F	-	1.2	1.4	V	I_F = 20mA
Reverse current	I_R	-	-	10	µA	V_R = 4V
Input capacitance	C_{in}	-	30	250	pF	V = 0, f = 1kHz

Output

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Collector-Emitter dark current	I_{CEO}	-	-	100	nA	V_{CE} = 20V, I_F = 0mA
Collector-Emitter breakdown voltage	BV_{CEO}	80	-	-	V	I_C = 0.1mA
Emitter-Collector breakdown voltage	BV_{ECO}	6	-	-	V	I_E = 0.1mA

Transfer Characteristics (T_a=25°C unless specified otherwise)

Parameter		Symbol	Min.	Typ.*	Max.	Unit	Condition
Current Transfer ratio	EL816	CTR	50	-	600	%	I_F = 5mA ,V_{CE} = 5V
	EL816A		80	-	160		
	EL816B		130	-	260		
	EL816C		200	-	400		
	EL816D		400	-	600		
	EL816X		100	-	200		
	EL816Y		150	-	300		
Collector-Emitter saturation voltage		$V_{CE(sat)}$	-	0.1	0.2	V	I_F = 20mA ,I_C = 1mA
Isolation resistance		R_{IO}	5×10^{10}	-	-	Ω	V_{IO} = 500Vdc, 40~60% R.H.
Floating capacitance		C_{IO}	-	0.6	1.0	pF	V_{IO} = 0, f = 1MHz
Cut-off frequency		fc	-	80	-	kHz	V_{CE} = 5V, I_C = 2mA R_L = 100Ω, -3dB
Rise time		t_r	-	4	18	µs	V_{CE} = 2V, I_C = 2mA, R_L = 100Ω
Fall time		t_f	-	3	18	µs	

* Typical values at T_a = 25°C

Typical Performance Curves

Figure 1. Forward Current vs Forward Voltage

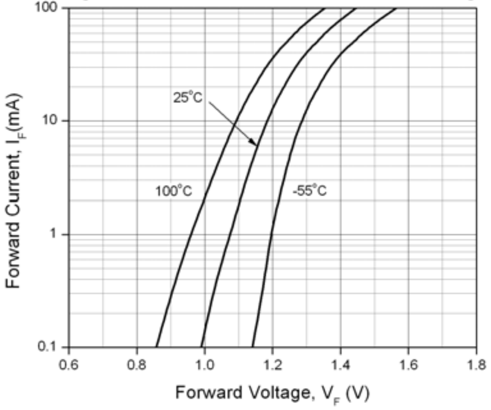


Figure 2. Normalized Collector Current vs Forward Current

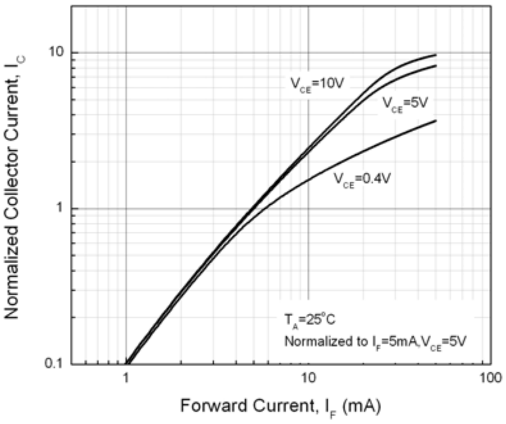


Figure 3. Normalized Current Transfer Ratio vs Forward Current

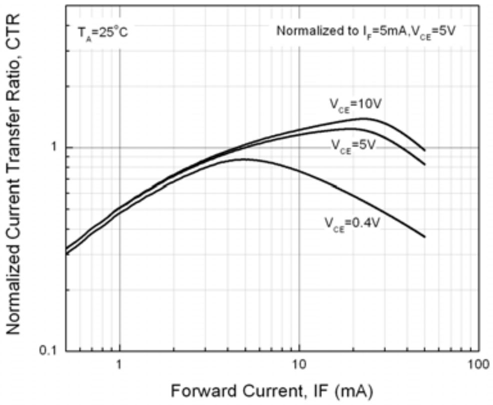


Figure 4. Normalized Collector Current vs Ambient Temperature

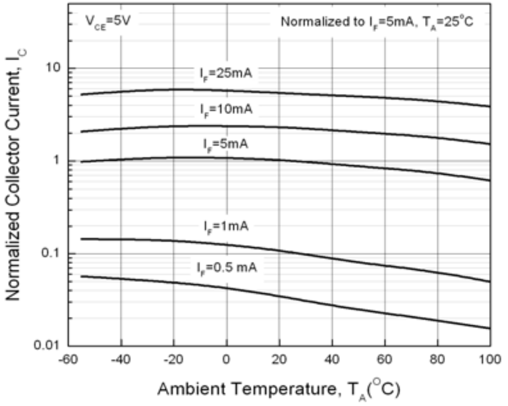


Figure 5. Collector Current vs Collector-Emitter Voltage

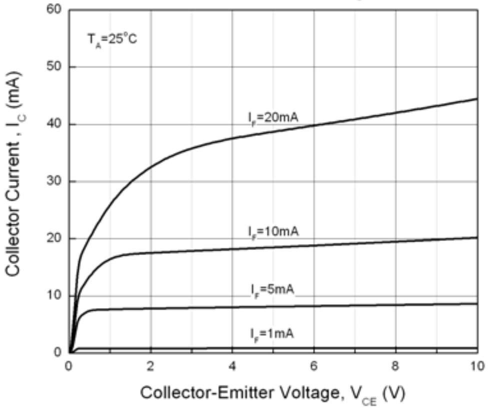


Figure 6. Collector Current vs Collector-Emitter Voltage

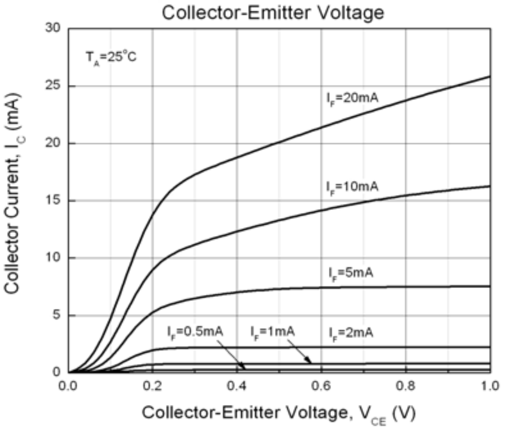


Figure 7. Collector Dark Current vs Ambient Temperature

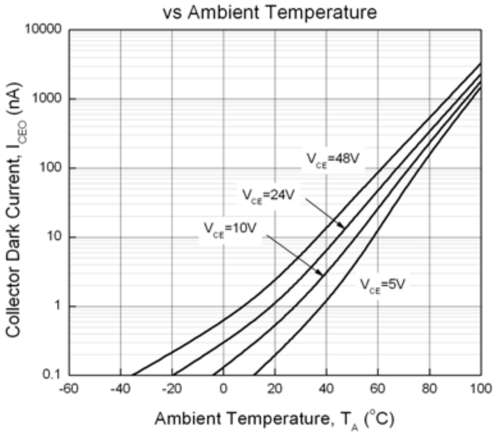


Figure 8. Switching Time vs Load Resistance

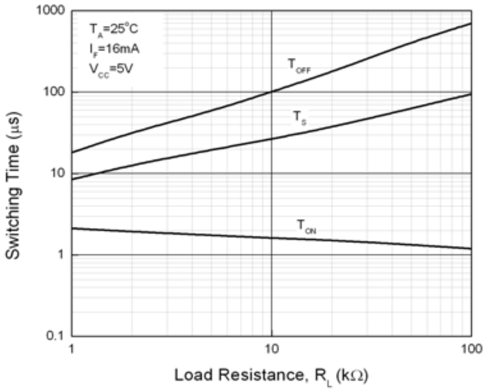
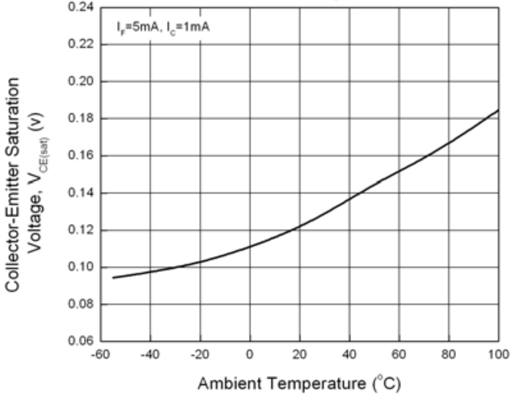


Figure 9. Collector-Emitter Saturation Voltage vs Ambient Temperature



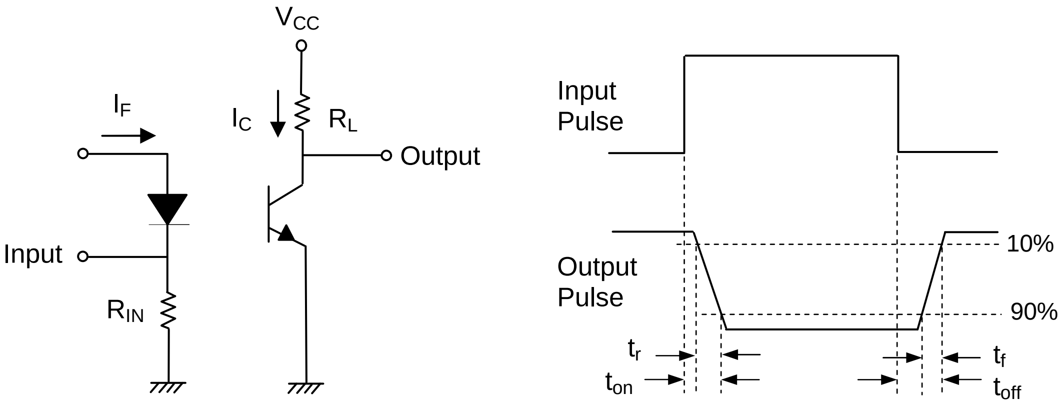


Figure 10. Switching Time Test Circuit & Waveforms

Order Information

Part Number

EL816(X)(Y)(Z)-FV

Note

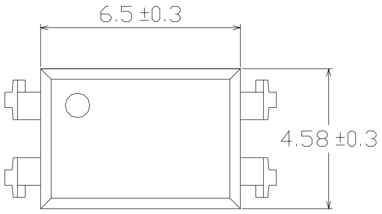
X = Lead form option (S, S1, M or none)
Y = CTR Rank (A, B, C, D, X, Y or none)
Z = Tape and reel option (TA, TB, TU, TD or none)
F = Lead frame option (F: Iron, None: copper)
V = VDE (option)

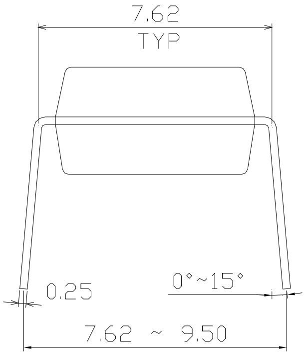
Option	Description	Packing quantity
None	Standard DIP-4	100 units per tube
M	Wide lead bend (0.4 inch spacing)	100 units per tube
S (TA)	Surface mount lead form + TA tape & reel option	1000 units per reel
S (TB)	Surface mount lead form + TB tape & reel option	1000 units per reel
S1 (TA)	Surface mount lead form (low profile) + TA tape & reel option	1000 units per reel
S1 (TB)	Surface mount lead form (low profile) + TB tape & reel option	1000 units per reel
S (TU)	Surface mount lead form + TU tape & reel option	1500 units per reel
S (TD)	Surface mount lead form + TD tape & reel option	1500 units per reel
S1 (TU)	Surface mount lead form (low profile) + TU tape & reel option	1500 units per reel
S1 (TD)	Surface mount lead form (low profile) + TD tape & reel option	1500 units per reel

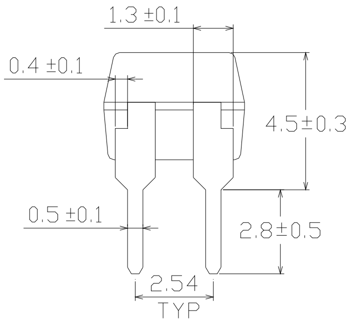
Package Drawing

(Dimensions in mm)

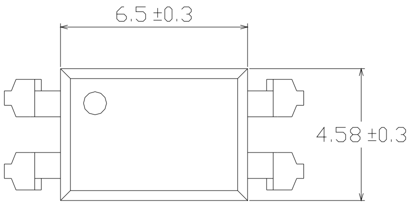
Standard DIP Type

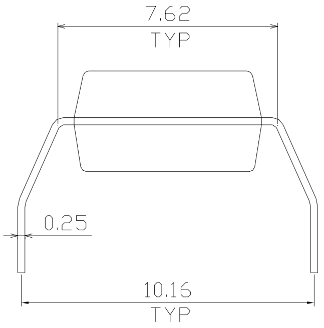


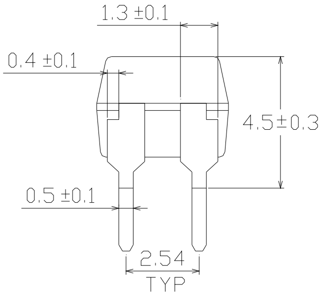




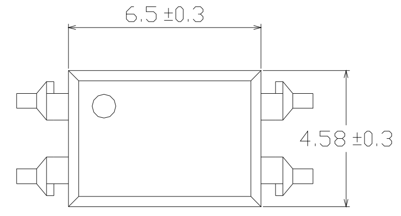
Option M Type

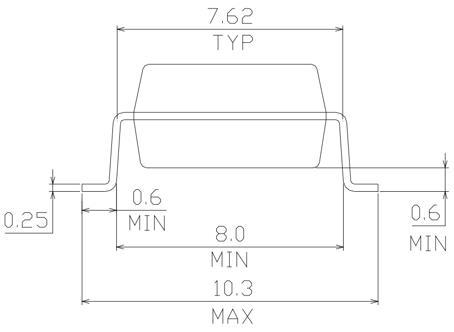


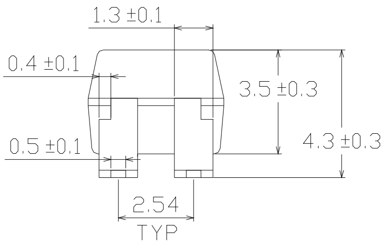




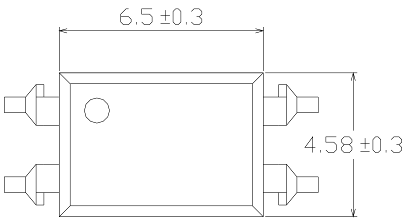
Option S Type

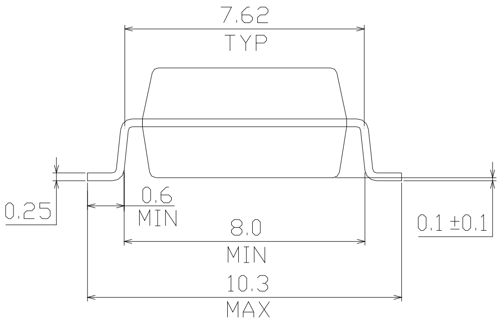


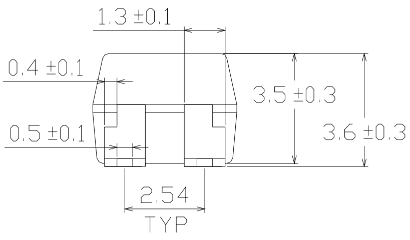




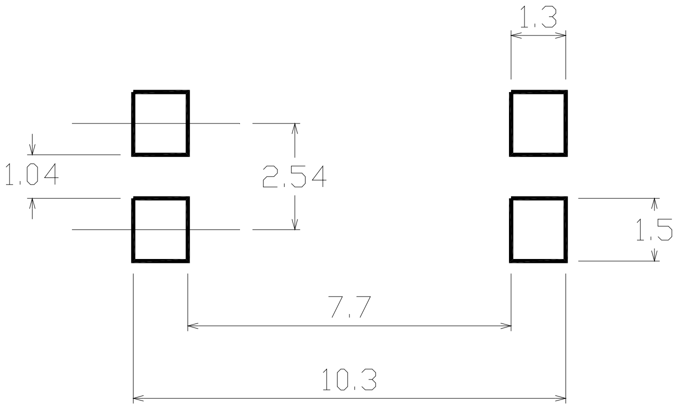
Option S1 Type







Recommended pad layout for surface mount leadform



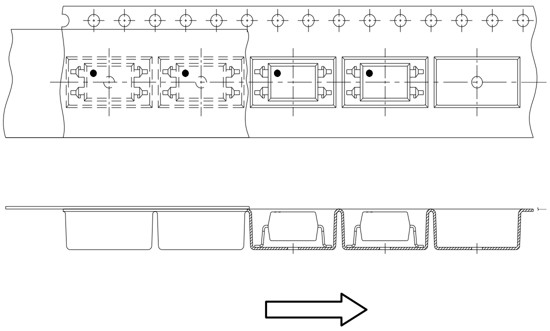
Device Marking

Notes

EL	denotes EVERLIGHT
816	denotes Device Number
F	denotes Factory Code (None: China, T: Taiwan)
R	denotes CTR Rank (A, B, C, D or none)
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE (option)

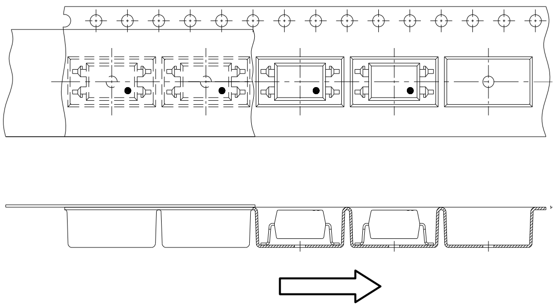
Tape & Reel Packing Specifications

Option TA



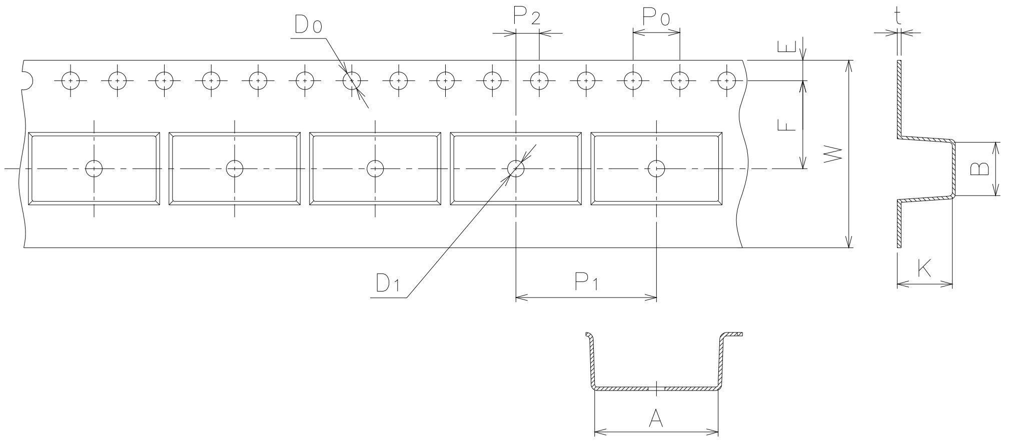
Direction of feed from reel

Option TB



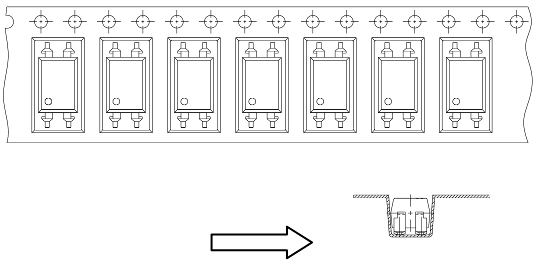
Direction of feed from reel

Tape dimensions



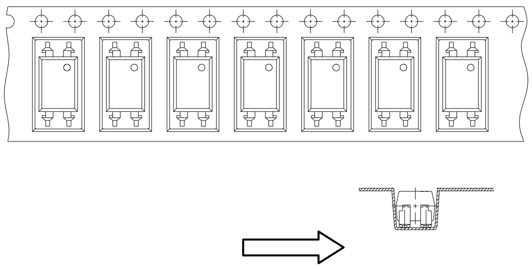
Dimension No.	**A**	**B**	**Do**	**D1**	**E**	**F**
Dimension(mm)	10.4±0.1	4.55±0.1	1.5±0.1	1.5±0.05	1.75±0.1	7.5±0.1
Dimension No.	**Po**	**P1**	**P2**	**t**	**W**	**K**
Dimension(mm)	4.0±0.1	12.0±0.1	2.0±0.1	0.33±0.1	16.0+0.3/ -0.1	4.55±0.1

Option TD



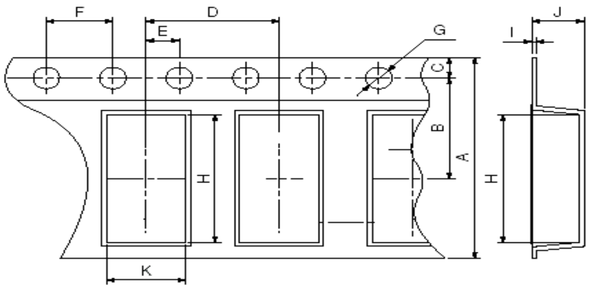
Direction of feed from reel

Option TU



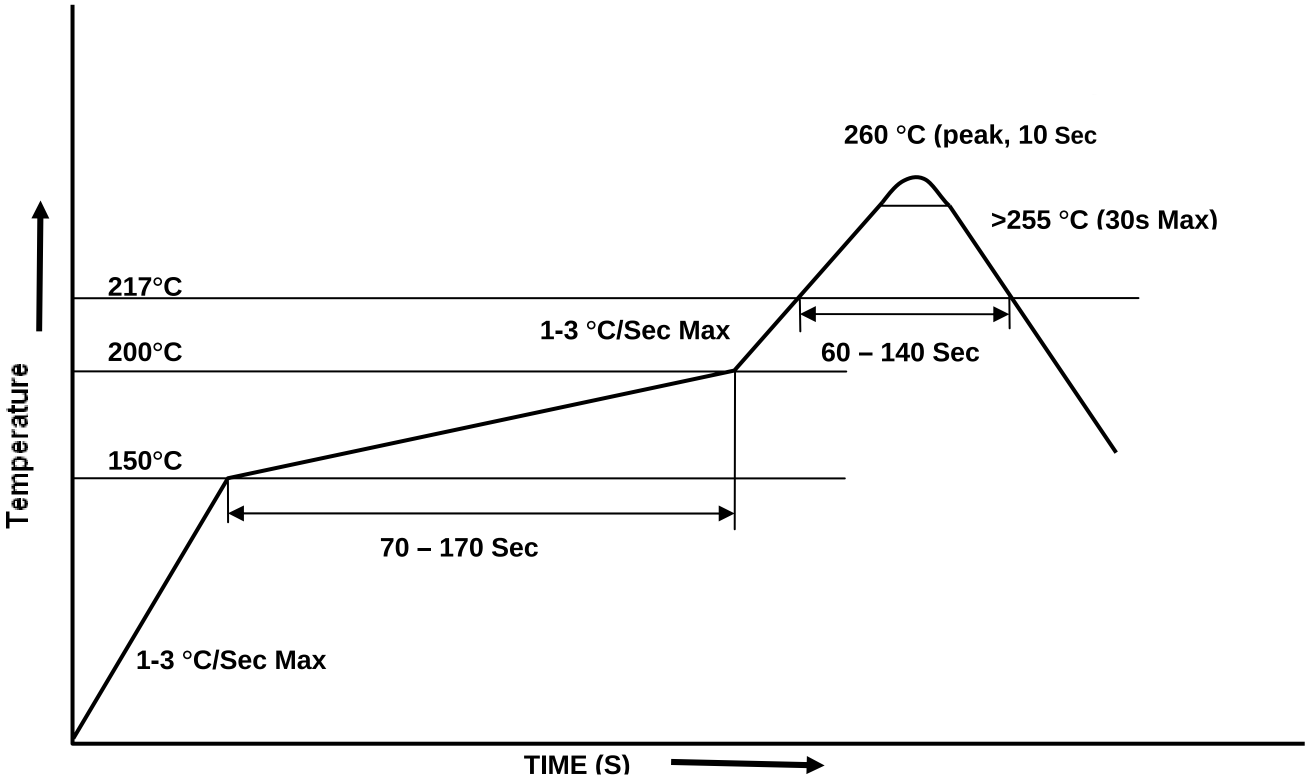
Direction of feed from reel

Tape dimensions



Dimension No.	A	B	C	D	E	F
Dimension(mm)	16.00±0.3	7.5±0.1	1.75±0.1	8.0±0.1	2.0±0.1	4.0±0.1
Dimension No.	G	H	I	J	K	
Dimension(mm)	1.5+0.1/-0	10.4±0.1	0.4±0.05	4.55±0.1	5.1±0.1	

Solder Reflow Temperature Profile



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