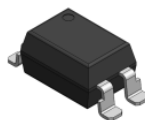


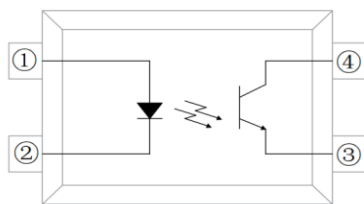
DC Input 4-Pin Phototransistor Optocoupler



Description

PC817B series devices consist of an Gallium Arsenide infrared emitting diodes, optically coupled to a Silicone NPN phototransistor detector.

There are packaged in a 4-pin DIP package and also available in lead formed configuration suitable for surface mounting and are available either on tape and reel, or in standard tube shipping containers.



PIN Configuration

- ① Anode
- ② Cathode
- ③ Emitter
- ④ Collector

Features

- Current transfer ratio
(CTR: 50~600% at $I_F=5\text{mA}$, $V_{CE}=5\text{V}$)
- High input-output isolation voltage
($V_{iso}=5000\text{V}_{rms}$)
- Creepage distance $>7.00\text{mm}$
- Operating temperature up to $+110^\circ\text{C}$
- RoHS REACH compliance
- Compliance Halogen Free
- MSL Level 1

Applications

- Programmable controllers
- System appliances, measuring instruments
- Telecommunication equipments
- Home appliances, such as fan, heaters, etc.

Absolute Maximum Ratings ($T_a=25^{\circ}\text{C}$)

Parameter		Symbol	Rating	Unit
Input	Forward Current	IF	60	mA
	Peak Forward Current*1	IFP	1	A
	Reverse Voltage	VR	6	V
	Power Dissipation	PD	100	mW
	No Derating Required Up to $T_a = 100^{\circ}\text{C}$		2.9	mW/ $^{\circ}\text{C}$
Output	Power Dissipation	PC	150	mW
	Derating Factor (above $T_a = 80^{\circ}\text{C}$)		5.8	mW/ $^{\circ}\text{C}$
	Collector Current	IC	50	mA
	Collector-Emitter Voltage	VCEO	35	V
	Emitter-Collector Voltage	VECO	7	V
Total Power Dissipation		PTOT	200	mW
Isolation Voltage*2		VISO	5000	Vrms
Peak Isolation Voltage		VIORM	890	Vpeak
Transient Isolation Voltage		VIOTM	5000	Vpeak
Operating Temperature		TOPR	-55~110	$^{\circ}\text{C}$
Storage Temperature		TSTG	-55~125	$^{\circ}\text{C}$
Soldering Temperature		TSOL	260	$^{\circ}\text{C}$

*1 100 μs pulse, 100Hz frequency

*2 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.

Electro-Optical Characteristics ($T_a=25^{\circ}\text{C}$)

Input

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward Voltage	V_F	---	1.20	1.4	V	$I_F=10\text{mA}$
Reverse Current	I_R	---	---	10	μA	$V_R=6\text{V}$
Input Capacitance	C_{in}	---	10	100	pF	$V=0$, $f=1\text{kHz}$

Output

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Collector-Emitter Dark Current	I_{CEO}	---	---	100	nA	$V_{CE} = 20\text{V}$, $I_F = 0\text{mA}$
Collector-Emitter Breakdown Voltage	BV_{CEO}	35	---	---	V	$I_C=0.1\text{mA}$
Emitter-Collector Breakdown Voltage	BV_{ECO}	7	---	---	V	$I_E=0.1\text{mA}$

Transfer Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
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	$V_{io}=500V_{dc}$, 40~60% R.H.
Floating Capacitance	C_{io}	---	0.6	1.0	pF	$V_{io}=0, f=1MHz$
Rise Time*3	t_r	---	3	18	us	$V_{CE}=2V, I_C=2mA$, $R_L=100\Omega$
Fall Time*3	t_f	---	4	18	us	
Cut-Off Frequency*4	F_c	---	80	---	kHz	$V_{CE}=2V, I_C=2mA$, $R_L=100\Omega, -3dB$

*3 Fig.12&13

*4 Fig.14

Current Transfer Ratio Binning

Binning		Symbol	Min.	Typ.	Max.	Unit	Condition
Current Transfer Ratio	PC817B	CTR	130	---	260	%	$I_F=5mA$, $V_{CE}=5V$

* Typical values at $T_a = 25^\circ C$

Typical Electro-Optical Characteristics Curves

Fig.1 Forward Current vs. Ambient Temperature

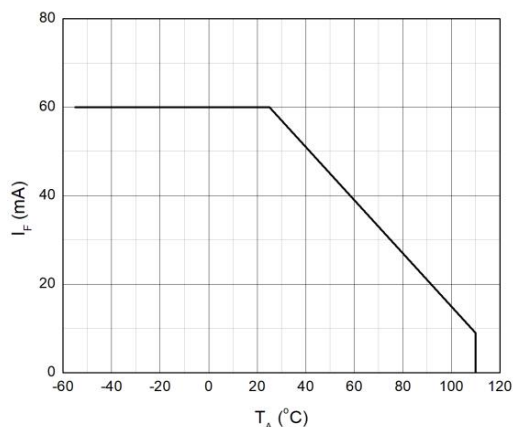


Fig. 2 Collector Power Dissipation Vs.Ambient Temperature

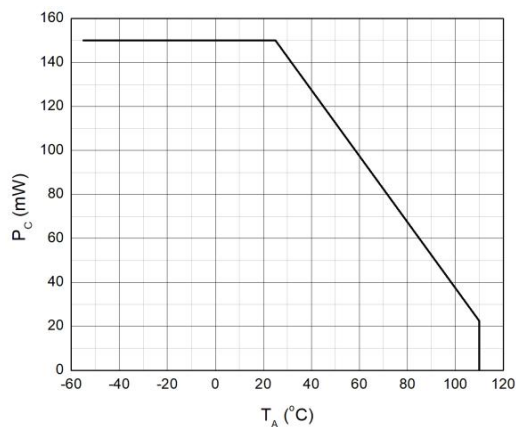


Fig.3 Forward Current vs.Forward Voltage

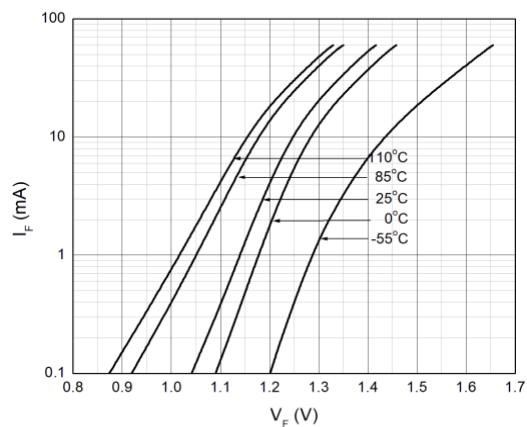


Fig. 4 Collector Dark Current vs.Ambient Temperature

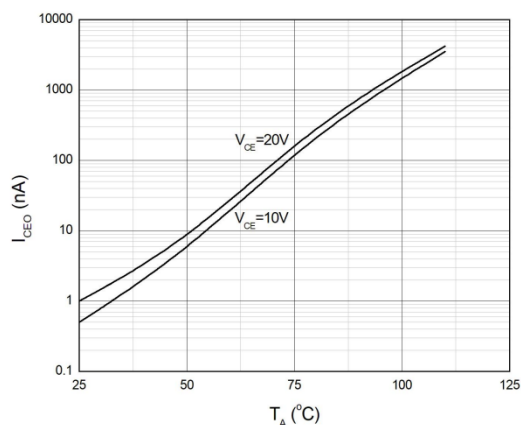


Fig.5 Collector Current vs.Collector-emitter Voltage

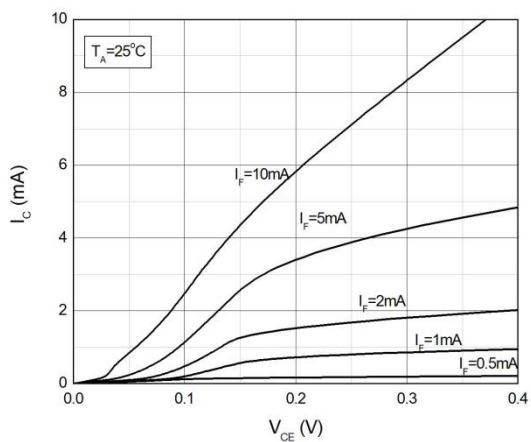
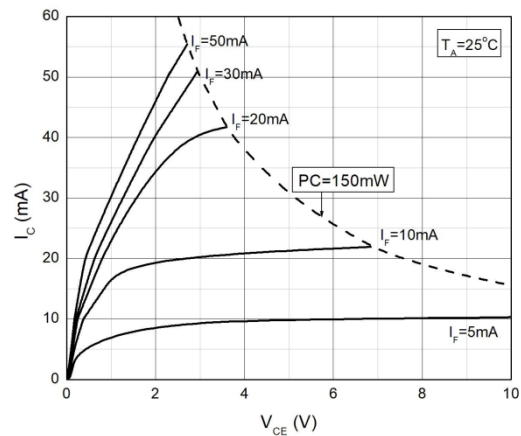


Fig.6 Collector Current vs.Collector-emitter Voltage



Typical Electro-Optical Characteristics Curves

Fig.7 Normalized Current Transfer Ratio
vs. Forward Current

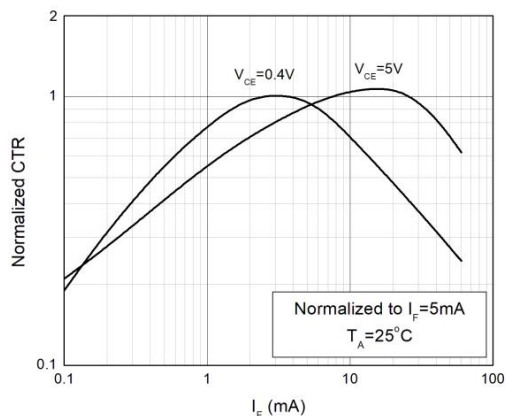


Fig.8 Normalized Current Transfer Ratio
vs. Ambient Temperature

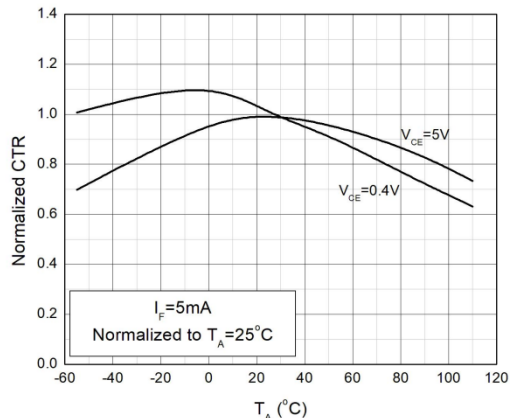


Fig.9 Collector-emitter Saturation Voltage
vs. Ambient Temperature

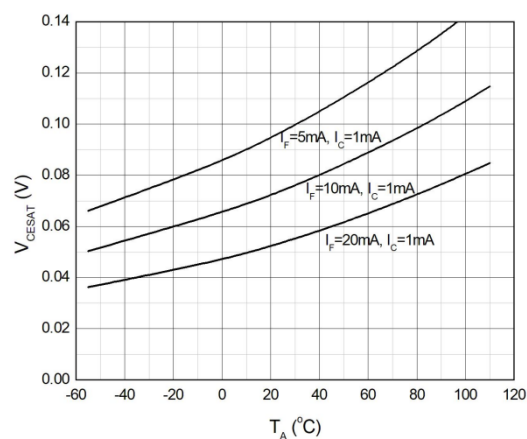


Fig.10 switching Time vs. Load Resistance

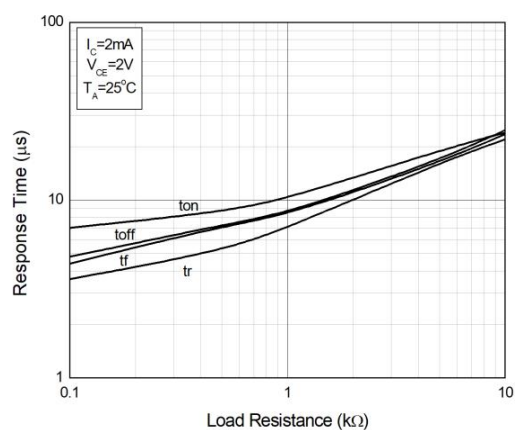


Fig.11 Frequency Response

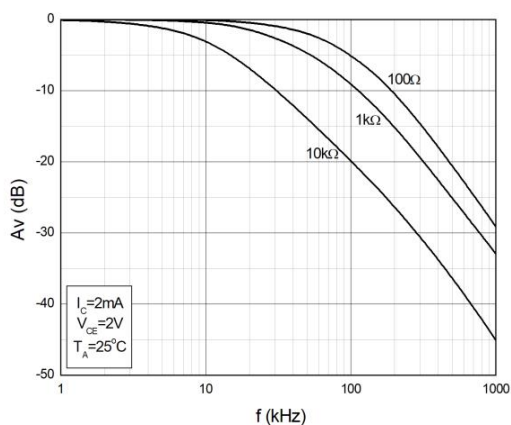
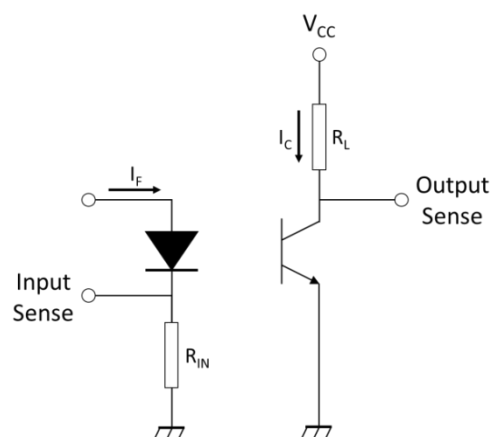


Fig.12 Test Circuits of Response Time



Typical Electro-Optical Characteristics Curves

Fig.13 Curves of Response Time

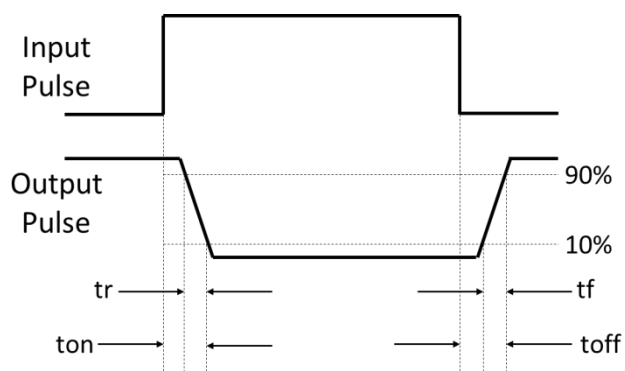
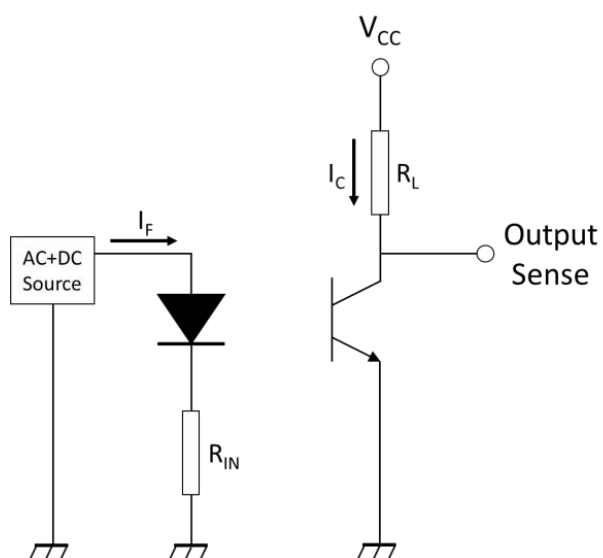
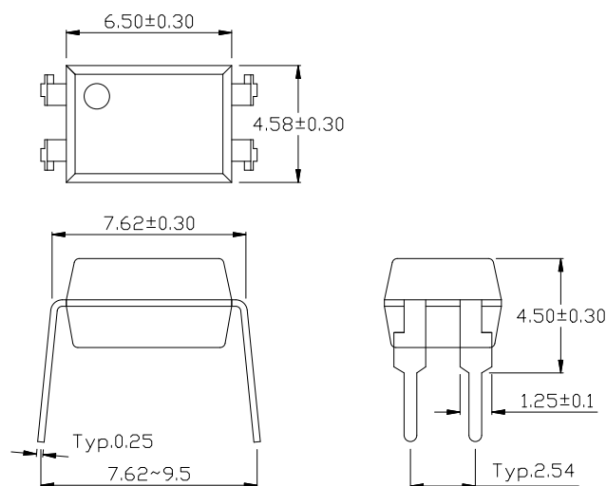


Fig.14 Test Circuits of Frequency Response

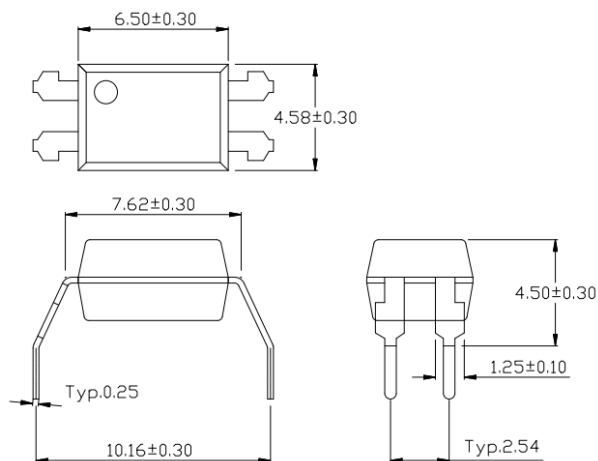


Package Dimension (Unit: mm)

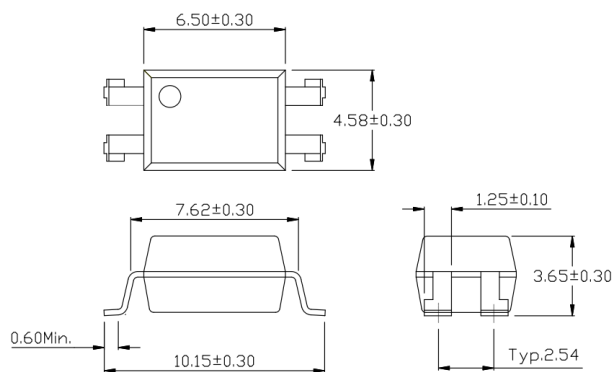
1. Standard DIP - Through Hole (DIP Type)



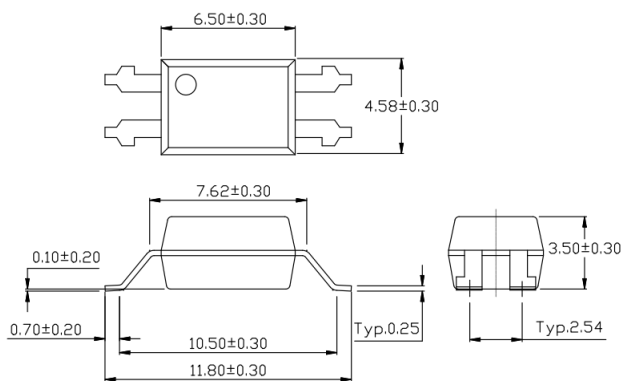
2. Gullwing Lead Forming - Through Hole (M Type)



3. Surface Mount Lead Forming (S1 Type)



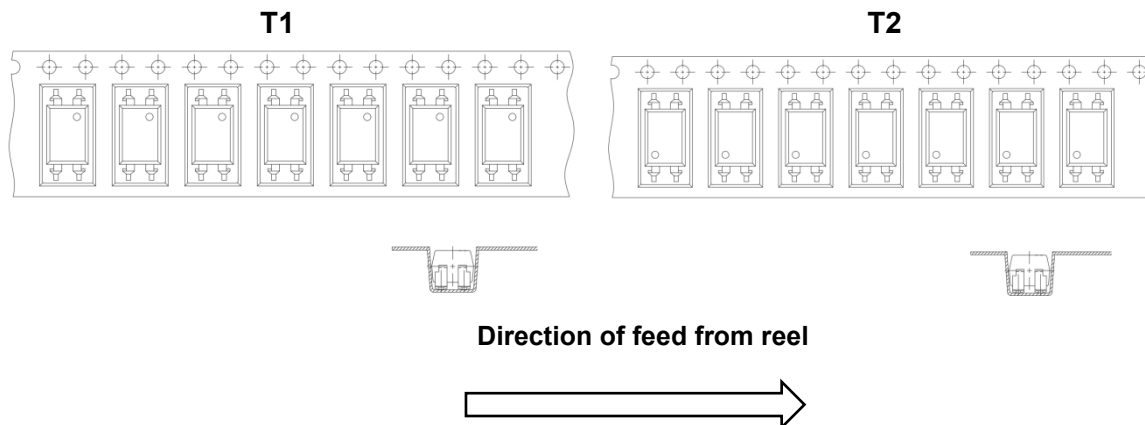
4. Surface Mount (Low Profile) Lead Forming (S2 Type)



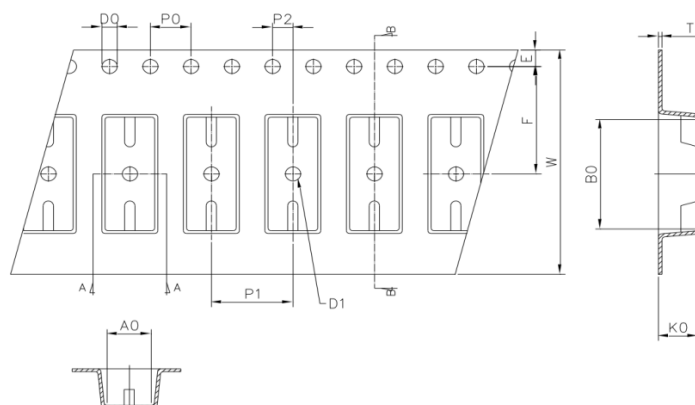
Notes:

1. All dimensions are in millimeters.
2. Tolerances dimensions ±0.3mm unless otherwise specified.

Packing Specification Tape & Reel Packing Specifications

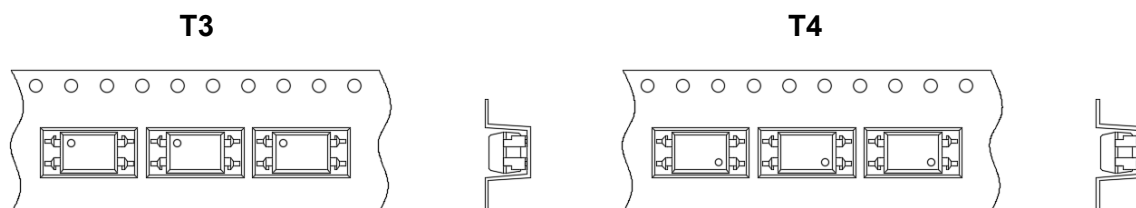


Tape Dimensions

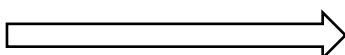


Dimension No.	A0	B0	D0	D1	E	F
Dimension (mm) S1	4.85±0.10	10.45±0.10	1.5±0.10	1.50+0.10	1.75±0.10	7.50±0.05
Dimension (mm) S2	4.70±0.10	12.30±0.10	1.5±0.10	1.50+0.10	1.75±0.10	11.50±0.05
Dimension No.	P0	P1	P2	t	W	K0
Dimension (mm) S1	4.00±0.10	8.00±0.10	2.00±0.10	0.35±0.05	16.00±0.30	4.10±0.10
Dimension (mm) S2	4.00±0.10	8.00±0.10	2.00±0.10	0.40±0.05	24.00±0.3	4.20±0.10

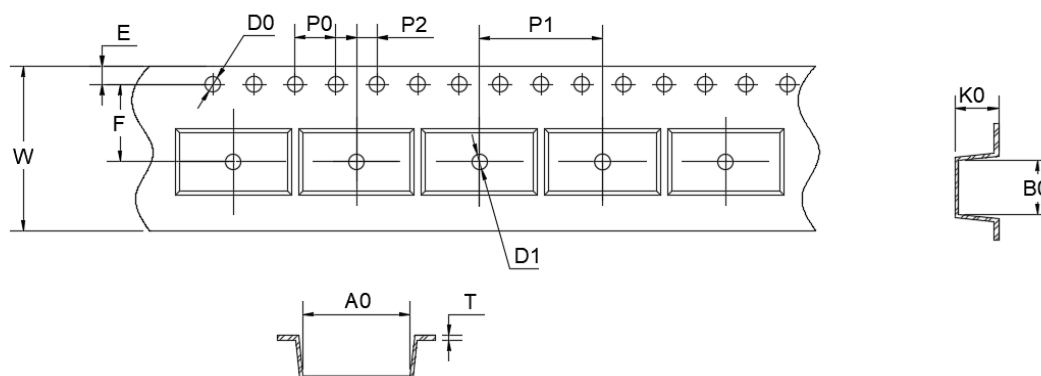
Packing Specification Tape & Reel Packing Specifications



Direction of feed from reel



Tape Dimension



Dimension No.	A0	B0	D0	D1	E	F
Dimension (mm) S1	10.50 ± 0.10	5.20 ± 0.10	1.5 ± 0.10	1.50 ± 0.10	1.75 ± 0.10	7.50 ± 0.10
Dimension No.	P0	P1	P2	T	W	K0
Dimension (mm) S1	4.00 ± 0.10	12.00 ± 0.10	2.00 ± 0.10	0.40 ± 0.05	16.00 ± 0.20	4.00 ± 0.10

1. Soldering Condition (cont.)

Preheat	Condition
Temperature min (T_{smin})	150 °C
Temperature max (T_{smax})	200°C
Time (T_{smin} to T_{smax}) (t_s)	60-120 sec
Average Ramp-Up Rate (T_{smax} to T_P)	3 °C/sec max
Other	Condition
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: $T_P - 5^{\circ}\text{C} / T_c$	30 sec
Ramp- Down Rate From Peak Temperature	6°C /sec max
Time 25°C to Peak Temperature	8 minutes max
Max. Reflow Times	3 times