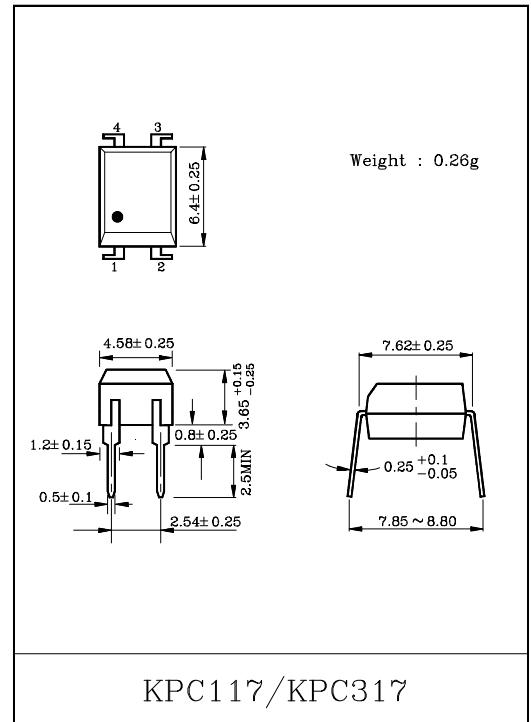


### FEATURES

- Collector-Emitter Voltage : 55V Min.
- Current Transfer Ratio  
CTR : MIN. 50% at  $I_F=5\text{mA}$ ,  $V_{CE}=5\text{V}$ .
- High Input Output Isolation Voltage :  $V_{ISO}=5000V_{rms}$ 
  - UL Recognized : E177885
  - VDE Recognized : 105551
  - SEMKO Recognized : 9822251/01-02
- Compact Dual-In-Line Package.
- KPC317 : 1-Channel Type.

### APPLICATIONS

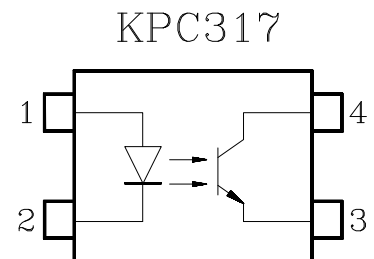
- Computer terminals.
- Switching Mode Power Supply.
- System appliances, Measuring instruments.
- Registers, Copiers, Automatic vending machines.
- Electric home appliances such as fan heaters, etc.
- Medical instruments, physical and chemical equipment.
- Signal transmission between circuits of different potentials and impedances.



### CURRENT TRANSFER RATIO

| TYPE   | CLASSIFI-<br>CATION<br>*1 | CURRENT<br>TRANSFER RATIO<br>(%) (I <sub>C</sub> /I <sub>F</sub> ) |      | MARKING OF<br>CLASSIFICATION            |
|--------|---------------------------|--------------------------------------------------------------------|------|-----------------------------------------|
|        |                           | I <sub>F</sub> =5mA, V <sub>CE</sub> =5V<br>T <sub>a</sub> =25℃    |      |                                         |
|        |                           | MIN.                                                               | MAX. |                                         |
| KPC317 | (None)                    | 50                                                                 | 600  | BLANK, Y, Y □ , G, G □ ,<br>B, B □ , GB |
|        | Rank Y                    | 50                                                                 | 150  | Y, Y □                                  |
|        | Rank GRL                  | 100                                                                | 200  | G                                       |
|        | Rank GRH                  | 150                                                                | 300  | G □                                     |
|        | Rank GR                   | 100                                                                | 300  | G, G □                                  |
|        | Rank YG                   | 50                                                                 | 300  | Y, Y □ , G, G □                         |
|        | Rank BL                   | 200                                                                | 600  | B, B □                                  |
|        | Rank GB                   | 100                                                                | 600  | G, G □ , B, B □ , GB                    |

### PIN CONFIGURATIONS (TOP VIEW)



Note : Application type name for certification test,  
please use standard product type name, i.e.  
KPC317(GB) : KPC317

# KPC317

Isolation Voltage : 5000Vrms (Min.)

• VDE Approved : DIN VDE0884/8.87, Certificate No. 105551

• Creepage Distance : 6.4mm (Min.)  
Clearance : 6.4mm (Min.)  
Insulation Thickness : 0.4mm (Min.)

## MAXIMUM RATINGS (Ta=25℃)

| CHARACTERISTIC                                           |                                                      | SYMBOL                        | RATING                           | UNIT      |
|----------------------------------------------------------|------------------------------------------------------|-------------------------------|----------------------------------|-----------|
| L<br>E<br>D                                              | Forward Current                                      | $I_F$                         | 60                               | mA        |
|                                                          | Forward Current Derating                             | $\Delta I_F / ^\circ\text{C}$ | -0.7 (Ta $\geq$ 39℃)             | mA/℃      |
|                                                          | Pulse Forward Current                                | $I_{FP}$                      | 1 (100μ pulse, 100pps)           | A         |
|                                                          | Power Dissipation                                    | $P_D$                         | 100                              | mW        |
|                                                          | Power Dissipation Derating                           | $\Delta P_D / ^\circ\text{C}$ | -1.0                             | mW/℃      |
|                                                          | Reverse Voltage                                      | $V_R$                         | 5                                | V         |
|                                                          | Junction Temperature                                 | $T_j$                         | 125                              | ℃         |
| D<br>E<br>T<br>E<br>C<br>T<br>O<br>R                     | Collector-Emitter Voltage                            | $V_{CEO}$                     | 55                               | V         |
|                                                          | Emitter-Collector Voltage                            | $V_{ECO}$                     | 7                                | V         |
|                                                          | Collector Current                                    | $I_C$                         | 50                               | mA        |
|                                                          | Collector Power Dissipation                          | $P_C$                         | 150                              | mW        |
|                                                          | Collector Power Dissipation Derating (Ta $\geq$ 25℃) | $\Delta P_C / ^\circ\text{C}$ | -1.5                             | mW/℃      |
|                                                          | Junction Temperature                                 | $T_j$                         | 125                              | ℃         |
| Storage Temperature Range                                |                                                      | $T_{stg}$                     | -55~150                          | ℃         |
| Operating Temperature Range                              |                                                      | $T_{opr}$                     | -55~100                          | ℃         |
| Lead Soldering Temperature                               |                                                      | $T_{sold}$                    | 260 (10sec.)                     | ℃         |
| Total Package Power Dissipation                          |                                                      | $P_T$                         | 250                              | mW        |
| Total Package Power Dissipation Derating (Ta $\geq$ 25℃) |                                                      | $\Delta P_T / ^\circ\text{C}$ | -2.5                             | mW/℃      |
| Isolation Voltage                                        |                                                      | $BV_S$                        | 5000 (AC, 1 min., RH $\leq$ 60%) | $V_{rms}$ |

# KPC317

## INDIVIDUAL ELECTRICAL CHARACTERISTICS (Ta=25℃)

| CHARACTERISTIC                       |                                     | SYMBOL        | TEST CONDITION                            | MIN. | TYP. | MAX. | UNIT          |
|--------------------------------------|-------------------------------------|---------------|-------------------------------------------|------|------|------|---------------|
| L<br>E<br>D                          | Forward Voltage                     | $V_F$         | $I_F=10\text{mA}$                         | 1.0  | 1.15 | 1.3  | V             |
|                                      | Reverse Current                     | $I_R$         | $V_R=5\text{V}$                           | –    | –    | 10   | $\mu\text{A}$ |
|                                      | Capacitance                         | $C_T$         | $V=0, f=1\text{MHz}$                      | –    | 30   | –    | pF            |
| D<br>E<br>T<br>E<br>C<br>T<br>O<br>R | Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C=0.5\text{mA}$                        | 55   | –    | –    | V             |
|                                      | Emitter-Collector Breakdown Voltage | $V_{(BR)ECO}$ | $I_E=0.1\text{mA}$                        | 7    | –    | –    | V             |
|                                      | Collector Dark Current              | $I_{CEO}$     | $V_{CE}=24\text{V}$                       | –    | 10   | 100  | nA            |
|                                      |                                     |               | $V_{CE}=24\text{V}, T_a=85^\circ\text{C}$ | –    | 2    | 50   | $\mu\text{A}$ |
|                                      | Capacitance (Collector to Emitter)  | $C_{CE}$      | $V=0, f=1\text{MHz}$                      | –    | 10   | –    | pF            |

## COUPLED ELECTRICAL CHARACTERISTICS (Ta=25℃)

| CHARACTERISTIC                       | SYMBOL                  | TEST CONDITION                                  | MIN. | TYP. | MAX. | UNIT |
|--------------------------------------|-------------------------|-------------------------------------------------|------|------|------|------|
| Current Transfer Ratio               | $I_C/I_F$               | $I_F=5\text{mA}, V_{CE}=5\text{V}$<br>Rank GB   | 50   | –    | 600  | %    |
|                                      |                         |                                                 | 100  | –    | 600  |      |
| Saturated CTR                        | $I_C/I_F \text{ (sat)}$ | $I_F=1\text{mA}, V_{CE}=0.4\text{V}$<br>Rank GB | –    | 60   | –    | %    |
|                                      |                         |                                                 | 30   | –    | –    |      |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$           | $I_C=2.4\text{mA}, I_F=8\text{mA}$              | –    | –    | 0.4  | V    |
|                                      |                         | $I_C=0.2\text{mA}, I_F=1\text{mA}$<br>Rank GB   | –    | 0.2  | –    |      |
|                                      |                         |                                                 | –    | –    | 0.4  |      |

## ISOLATION CHARACTERISTICS (Ta=25℃)

| CHARACTERISTIC                | SYMBOL | TEST CONDITION         | MIN.               | TYP.      | MAX. | UNIT     |
|-------------------------------|--------|------------------------|--------------------|-----------|------|----------|
| Capacitance (Input to Output) | $C_S$  | $V_S=0, f=1\text{MHz}$ | –                  | 0.8       | –    | pF       |
| Isolation Resistance          | $R_S$  | $V_S=500\text{V}$      | $5 \times 10^{10}$ | $10^{14}$ | –    | $\Omega$ |
| Isolation Voltage             | $BV_S$ | AC, 1 minute           | 5000               | –         | –    | Vrms     |
|                               |        | AC, 1 second           | –                  | 10000     | –    |          |
|                               |        | DC, 1 minute           | –                  | 10000     | –    | Vdc      |

# KPC317

## SWITCHING CHARACTERISTICS (Ta=25°C)

| CHARACTERISTIC | SYMBOL    | TEST CONDITION                                       | MIN. | TYP. | MAX. | UNIT    |
|----------------|-----------|------------------------------------------------------|------|------|------|---------|
| Rise Time      | $t_r$     | $V_{CC}=10V$<br>$I_C=2mA$<br>$R_L=100\Omega$         | -    | 2    | -    | $\mu s$ |
| Fall Time      | $t_f$     |                                                      | -    | 3    | -    |         |
| Turn-on Time   | $t_{on}$  |                                                      | -    | 3    | -    |         |
| Turn-off Time  | $t_{OFF}$ |                                                      | -    | 3    | -    |         |
| Turn-on Time   | $t_{on}$  | $R_L=1.9k\Omega$ (Fig.1)<br>$V_{CC}=5V$ , $I_F=16mA$ | -    | 2    | -    | $\mu s$ |
| Storage Time   | $t_s$     |                                                      | -    | 15   | -    |         |
| Turn-off Time  | $t_{OFF}$ |                                                      | -    | 25   | -    |         |

## RECOMMENDED OPERATING CONDITIONS

| CHARACTERISTIC        | SYMBOL    | MIN. | TYP. | MAX. | UNIT |
|-----------------------|-----------|------|------|------|------|
| Supply Voltage        | $V_{CC}$  | -    | 5    | 24   | V    |
| Forward Current       | $I_F$     | -    | 16   | 20   | mA   |
| Collector Current     | $I_C$     | -    | 1    | 10   | mA   |
| Operating Temperature | $T_{OPR}$ | -25  | -    | 85   | °C   |

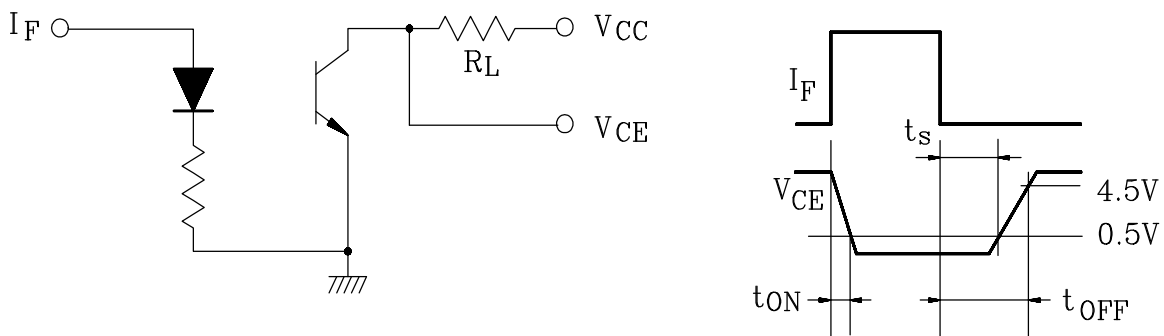
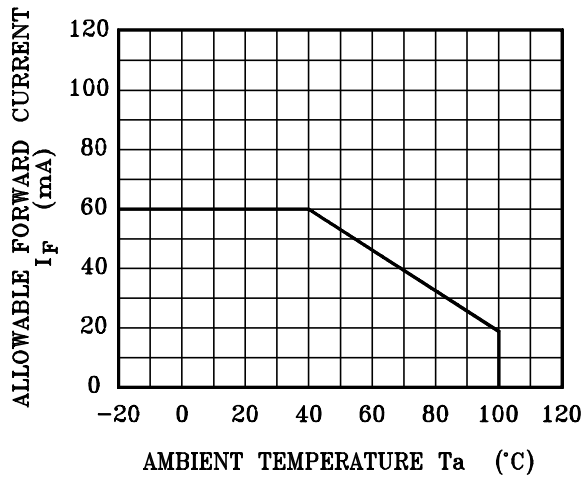
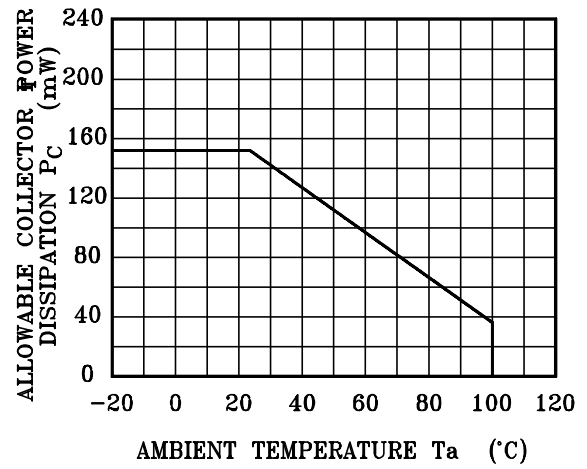


Fig.1 Switching Time Test Circuit

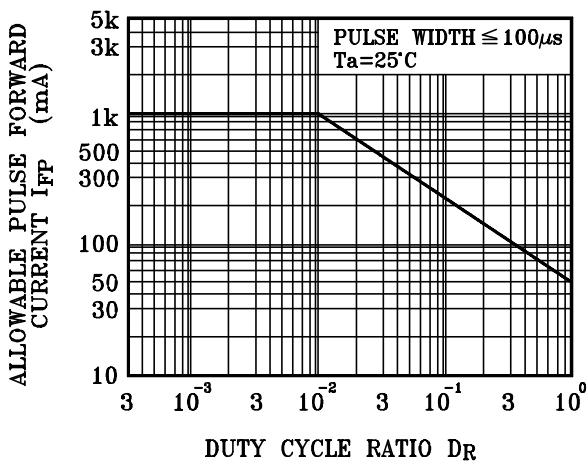
$I_F - T_a$



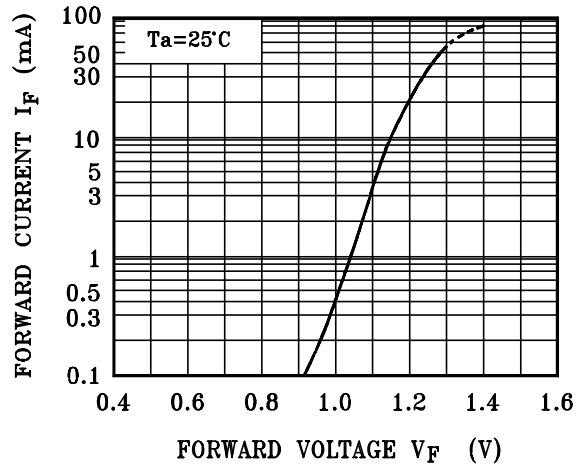
$P_C - T_a$



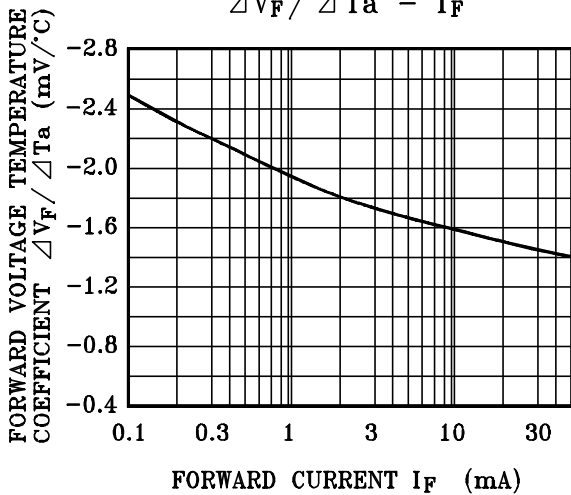
$I_{FP} - D_R$



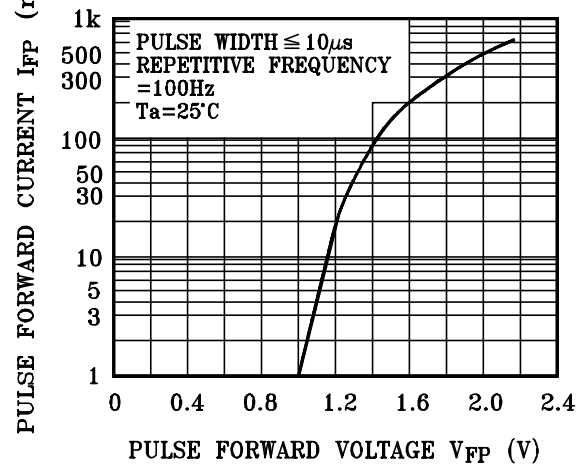
$I_F - V_F$



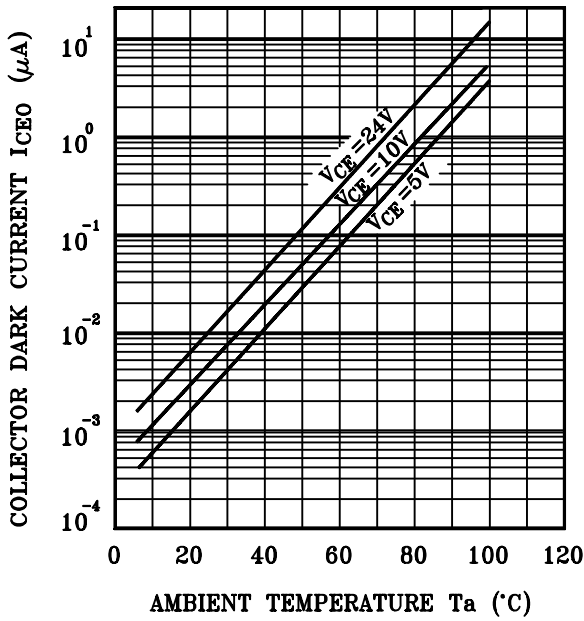
$\Delta V_F / \Delta T_a - I_F$



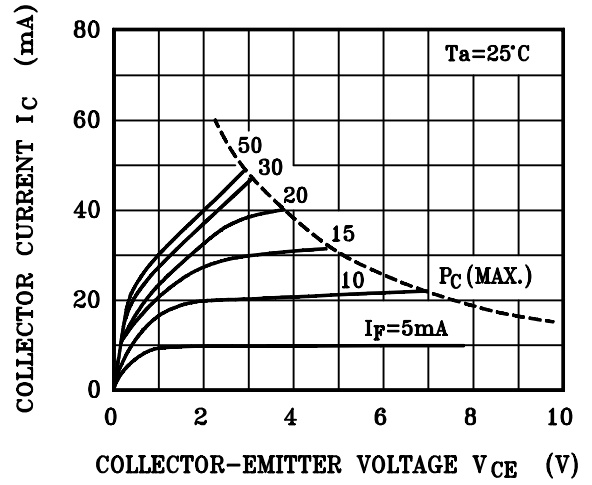
$I_{FP} - V_{FP}$



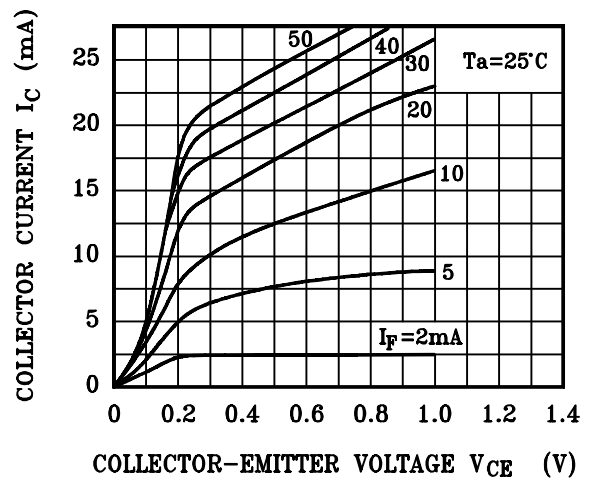
$I_{CE0} - T_a$



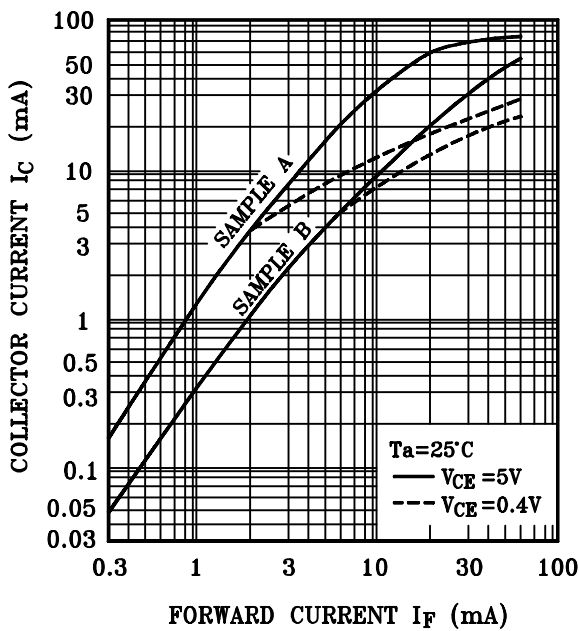
$I_C - V_{CE}$



$I_C - V_{CE}$



$I_C - I_F$



$I_C/I_F - I_F$

