TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

# CNY17-2, CNY17-3, CNY17-4

AC LINE / DIGITAL LOGIC ISOLATOR

DIGITAL LOGIC / DIGITAL LOGIC ISOLATOR

TELEPHONE LINE RECEIVER

TWISTED PAIR LINE RECEIVER

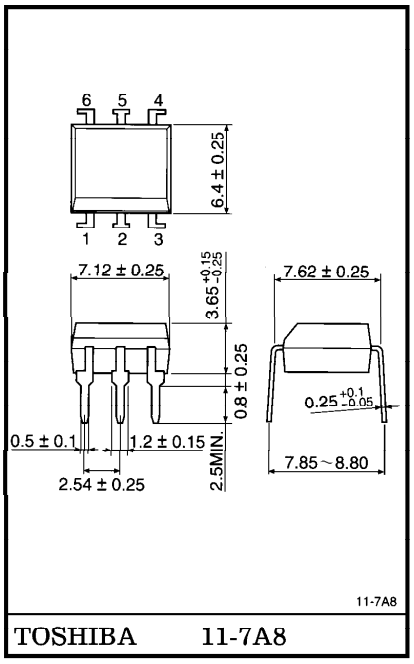
HIGH FREQUENCY POWER SUPPLY FEEDBACK CONTROL

RELAY CONTACT MONITOR

The TOSHIBA Corporation CNY17 consist of a gallium arsenide infrared emitting diode coupled with a silicon photo transistor in a dual in-line package.

- Small Package Size and Low Cost
- Fast Switching Speeds : 5$\mu$s (TYP.)
- High DC Current Transfer Ratio : CTR ($I_F$=10mA, $V_{CE}$=5V)
  CNY17-2 : 63~125%
  CNY17-3 : 100~200%
  CNY17-4 : 160~320%
- High Isolation Resistance : $10^{11}\Omega$ (TYP.)
- High Isolation Voltage : 4400V (MIN.)

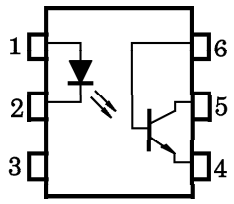
Unit in mm




TOSHIBA 11-7A8

Weight : 0.4g

PIN CONFIGURATION




1 : ANODE
2 : CATHODE
3 : N.C.
4 : EMITTER
5 : COLLECTOR
6 : BASE

961001EBC2


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- The information contained herein is subject to change without notice.

MAXIMUM RATINGS (Ta = 25°C)

| | CHARACTERISTIC | SYMBOL | RATING | UNIT |
|---|---|---|---|---|
| LED | Forward Current | $I_F$ | 60 | mA |
| | Forward Current Derating | $\Delta I_F$ / °C | 0.8 * | mA / °C |
| | Peak Forward Current (Note) | $I_{PF}$ | 3 | A |
| | Power Dissipation | $P_D$ | 100 | mW |
| | Power Dissipation Derating | $\Delta P_D$ / °C | 1.33 * | mW / °C |
| | Reverse Voltage | $V_R$ | 6 | V |
| PHOTO-TRANSISTOR | Collector-Emitter Voltage | $BV_{CEO}$ | 70 | V |
| | Collector-Base Voltage | $BV_{CBO}$ | 70 | V |
| | Emitter-Collector Voltage | $BV_{ECO}$ | 7 | V |
| | Collector Current | $I_C$ | 100 | mA |
| | Power Dissipation | $P_C$ | 150 | mW |
| | Power Dissipation Derating | $\Delta P_C$ / °C | 2.0 * | mW / °C |
| COUPLED | Storage Temperature | $T_{stg}$ | −55~150 | °C |
| | Operating Temperature | $T_{opr}$ | −55~100 | °C |
| | Lead Soldering Temperature (10s) | $T_{sol}$ | 260 | °C |
| | Total Package Dissipation | $P_T$ | 200 | mW |
| | Total Package Power Dissipation Derating | $\Delta P_T$ / °C | 2.6 * | mW / °C |

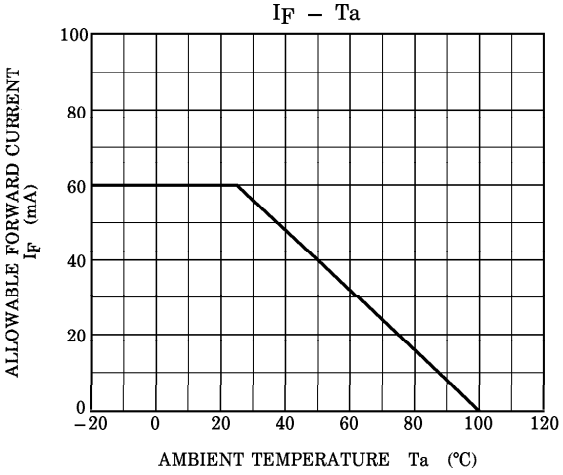
(Note) Pulse Width 1$\mu$s, 300pps.

* Above 25°C ambient.

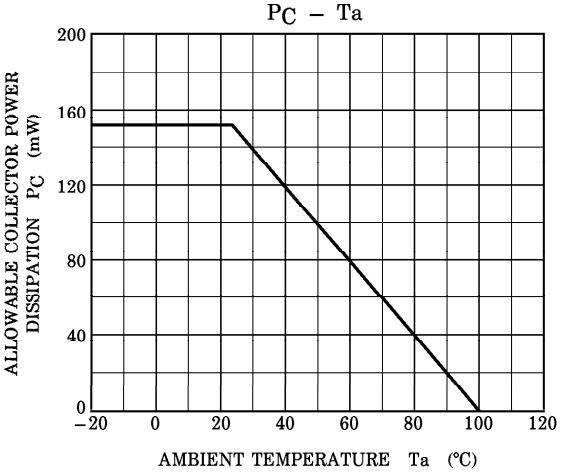
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| | CHARACTERISTIC | | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|---|
| LED | Forward Voltage | | $V_F$ | $I_F$ = 60mA | — | 1.35 | 1.65 | V |
| | Reverse Current | | $I_R$ | $V_R$ = 3V | — | — | 10 | μA |
| | Capacitance | | $C_D$ | V = 0, f = 1MHz | — | 30 | — | pF |
| PHOTO−TRANSISTOR | DC Forward Current Gain | | $h_{FE}$ | $V_{CE}$ = 5, $I_C$ = 500μA | 100 | 200 | — | |
| | Collector-Emitter Breakdown Voltage | | $V_{(BR)CEO}$ | $I_C$ = 1mA, $I_F$ = 0 | 70 | — | — | V |
| | Collector-Base Breakdown Voltage | | $V_{(BR)CBO}$ | $I_C$ = 100μA, $I_F$ = 0 | 70 | — | — | V |
| | Emitter-Collector Breakdown Voltage | | $V_{(BR)ECO}$ | $I_E$ = 100μA, $I_F$ = 0 | 7 | — | — | V |
| | Collector Dark Current | | $I_{CEO}$ | $V_{CE}$ = 10V, $I_F$ = 0 | — | 1 | 50 | nA |
| | Collector Dark Current | | $I_{CBO}$ | $V_{CB}$ = 10V, $I_F$ = 0 | — | 0.1 | 20 | nA |
| | Collector-Emitter Capacitance | | $C_{CE}$ | V = 0, f = 1MHz | — | 10 | — | pF |
| COUPLED | Current Transfer Ratio | CNY17-2 | CTR | $I_F$ = 10mA, $V_{CE}$ = 5V | 63 | — | 125 | % |
| | | CNY17-3 | | | 100 | — | 200 | |
| | | CNY17-4 | | | 160 | — | 320 | |
| | Saturation Voltage | | $V_{CE(sat)}$ | $I_F$ = 10mA, $I_C$ = 2.5mA | — | — | 0.4 | V |
| | Capacitance Input to Output | | $C_S$ | V = 0, f = 1MHz | — | 0.8 | — | pF |
| | Isolation Resistance | | $R_S$ | V = 500V | — | $10^{11}$ | — | Ω |
| | DC Isolation Voltage | | $BV_S$ | DC 1 minute | 4400 | — | — | V |
| | Rise Fall Time | | $t_r$ / $t_f$ | $V_{CE}$ = 10V, $I_C$ = 2mA<br>$R_L$ = 100Ω | — | 5 | 10 | μs |
| | Rise / Fall Time Photo Diode | | $t_r$ / $t_f$ | $V_{CB}$ = 10V, $I_{CB}$ = 50μA<br>$R_L$ = 100Ω | — | 200 | — | ns |

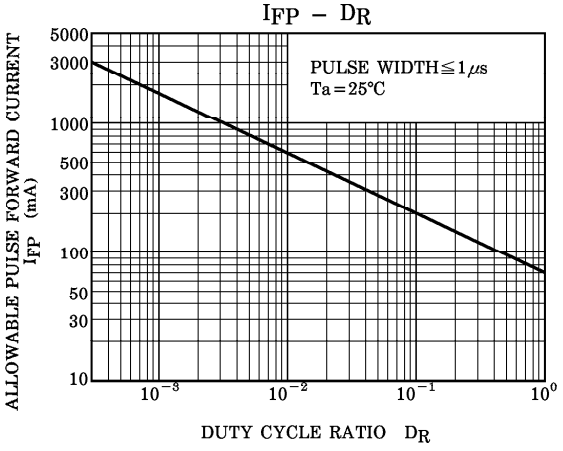
$I_F$ – Ta



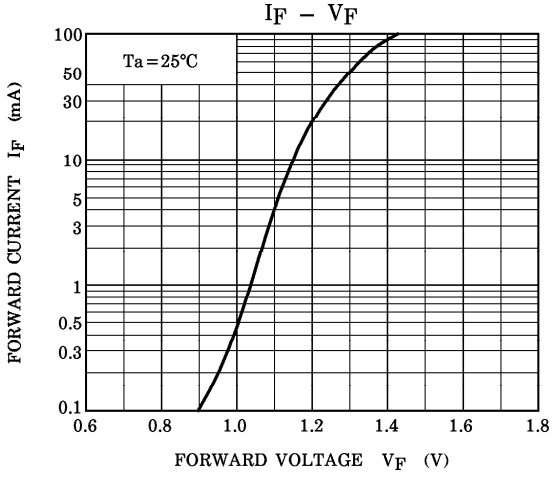

$P_C$ – Ta



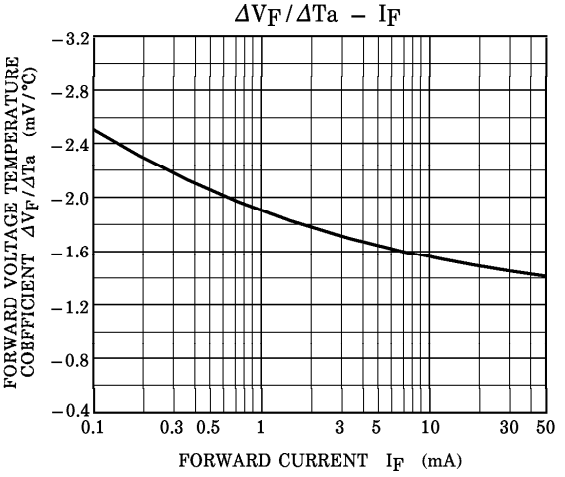

$I_{FP}$ – $D_R$



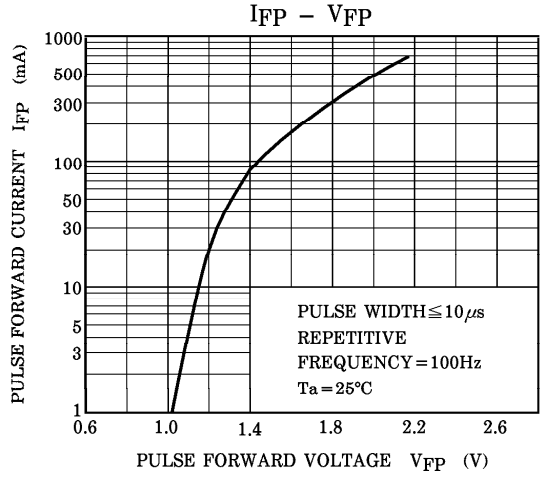

$I_F$ – $V_F$



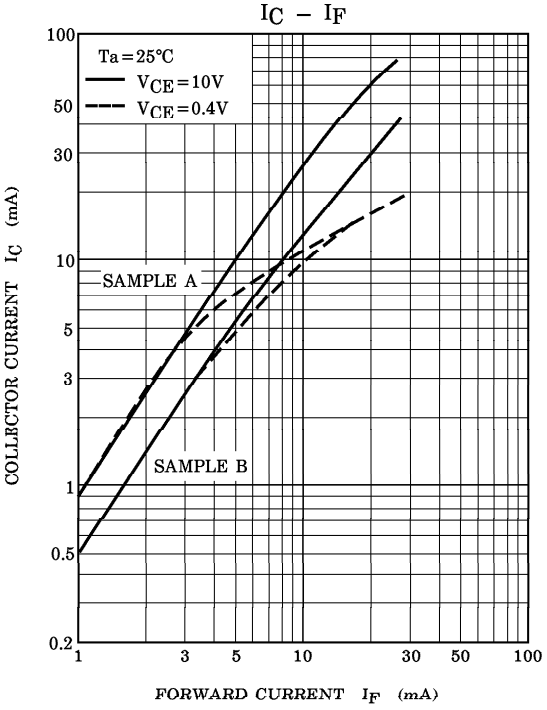

$\Delta V_F / \Delta Ta$ – $I_F$



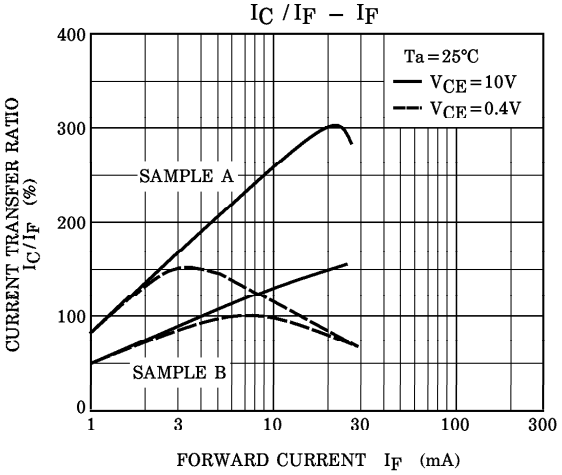

$I_{FP}$ – $V_{FP}$



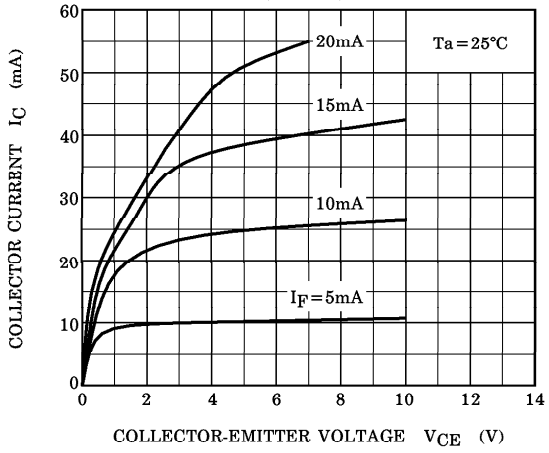
$I_C - I_F$



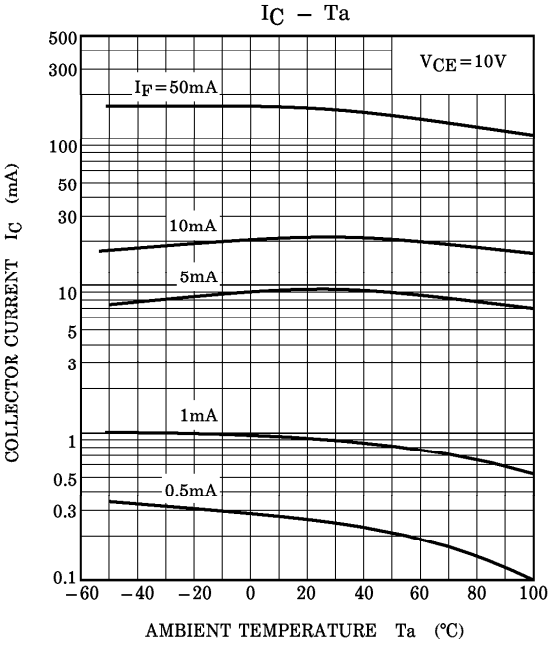

$I_C / I_F - I_F$



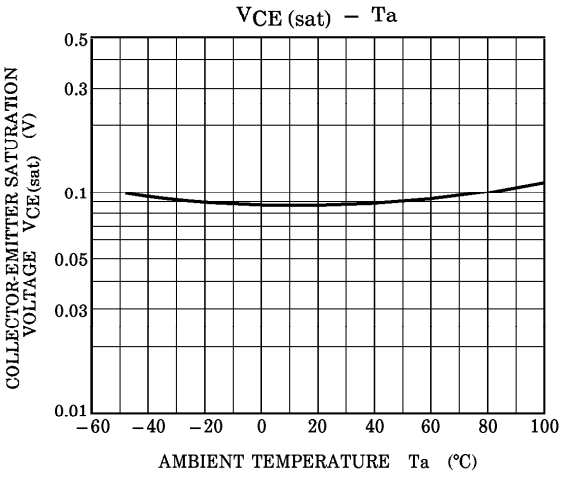

$I_C - V_{CE}$



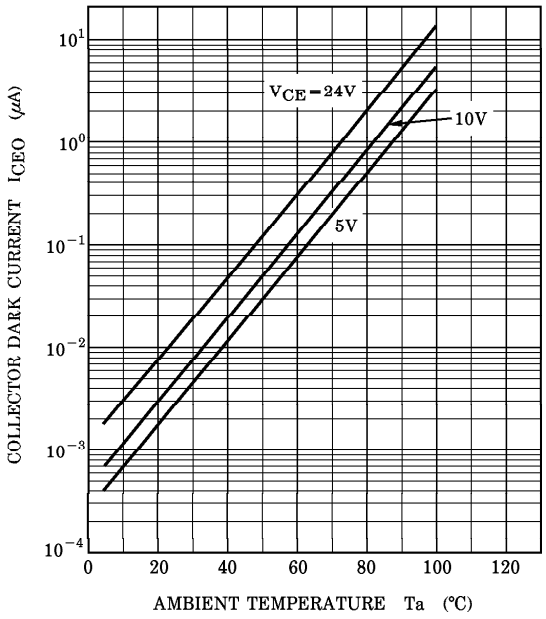

$I_C - Ta$



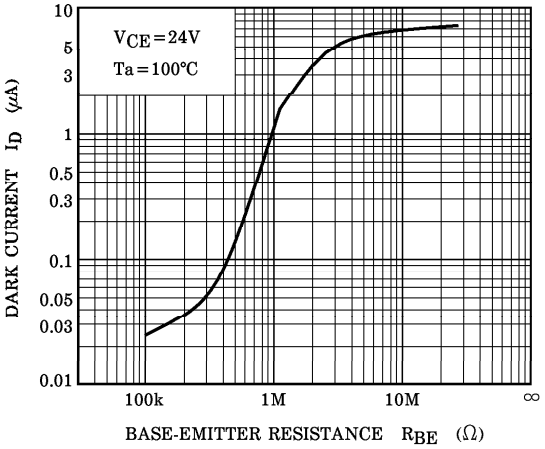

$V_{CE(sat)} - Ta$



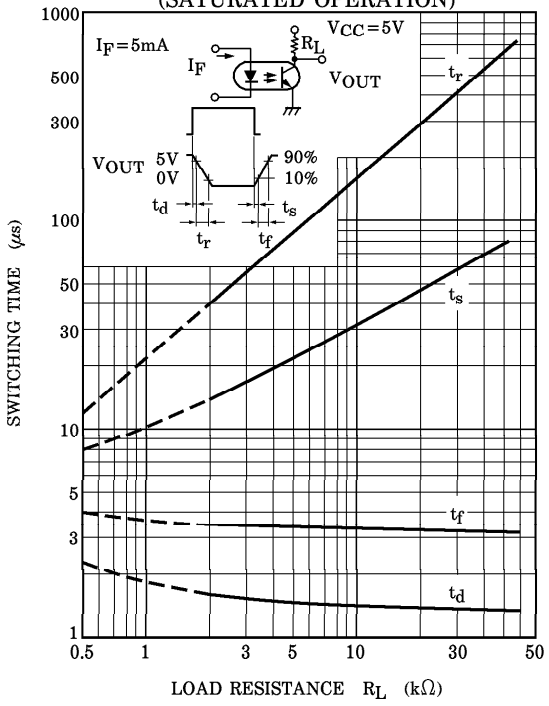
$I_{CEO}$ – Ta




$I_D$ – $R_{BE}$




SWITCHING CHARACTERISTICS – $R_L$
(SATURATED OPERATION)




$R_{BE}$ – SWITCHING CHARACTERISTICS
(SATURATED OPERATION)

