Infineon technologies

CNY17F

No Base Connection Phototransistor Optocoupler

- **FEATURES**
- **High Current Transfer Ratio**
  CNY17F-1, 40-80%
  CNY17F-2, 63-125%
  CNY17F-3, 100-200%
  CNY17F-4, 160-320%
- **Breakdown Voltage, 5300 V_{RMS}**
- **High Collector-Emitter Voltage**
- **V_{CEO}=70 V**
- **No Base Terminal Connection for Improved Common Mode Interface Immunity**
- **Field-Effect Stable by TRIOS—TRansparent IOn Shield**
- **Long Term Stability**
- **Industry Standard Dual-in-Line Package**
- **Underwriters Lab File #E52744**
- **VDE #0884, Available with Option 1**

Maximum Ratings T_A=25°C

Emitter

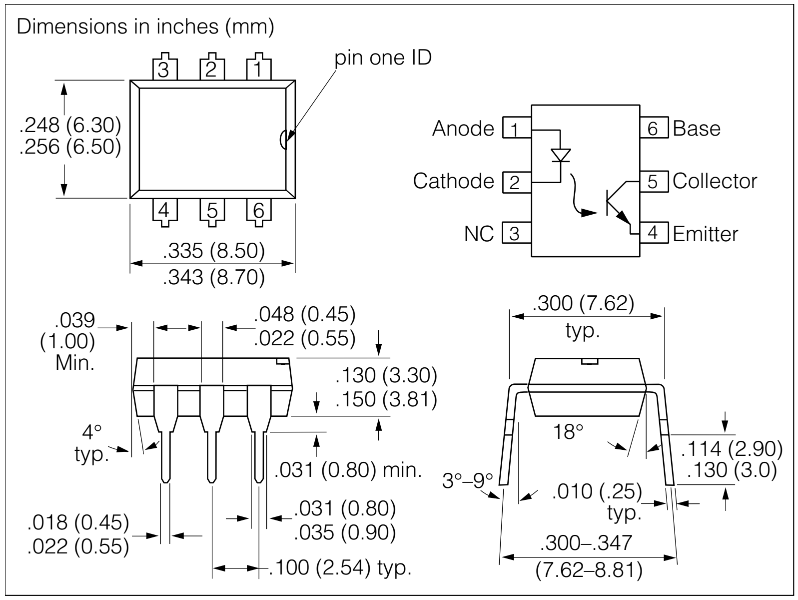
Reverse Voltage .... 6.0 V
DC Forward Current .... 60 mA
Surge Forward Current (t ≤10 µs)..................... 2.5 A
Total Power Dissipation .... 100 mW

Detector

Collector-Emitter Breakdown Voltage................ 70 V
Collector Current .... 50 mA
Collector Current (t≤1.0 ms)......................... 100 mA
Total Power Dissipation .... 150 mW

Package

Isolation Test Voltage (between emitter and detector referred to standard climate 23/50 DIN 50014).................... 5300 V_{RMS}
Creepage .... ≥7.0 mm
Clearance... ≥7.0 mm
Isolation Thickness between Emitter and Detector... ≥0.4 mm
Comparative Tracking Index per DIN IEC 112/VDE 0303, part 1 175
Isolation Resistance (V_{IO}=500 V) .... $\geq 10^{11}\ \Omega$
Storage Temperature Range .... –55 to +150°C
Ambient Temperature Range .... –55 to +100°C
Junction Temperature.................................... 100°C
Soldering Temperature (max. 10 s, dip soldering: distance to seating plane ≥1.5 mm) .... 260°C



DESCRIPTION

The CNY17F is an optocoupler consisting of a Gallium Arsenide infrared emitting diode optically coupled to a silicon planar phototransistor detector in a plastic plug-in DIP-6 package.

The coupling device is suitable for signal transmission between two electrically separated circuits. The potential difference between the circuits to be coupled is not allowed to exceed the maximum permissible reference voltages.

In contrast to the CNY17 Series, the base terminal of the F type is not connected, resulting in a substantially improved common-mode interference immunity.

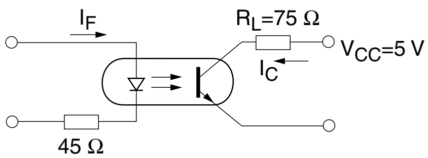
Characteristics T_A=25°C

Parameter	Symbol	Value	Unit	Condition
Emitter				
Forward Voltage	V_F	1.25 (≤1.65)	V	I_F=60 mA
Breakdown Voltage	V_{BR}	≥6.0		I_R=10 µA
Reverse Current	I_R	0.01 (≤10)	µA	V_R=6.0 V
Capacitance	C_O	25	pF	V_R=0 V, f=1.0 MHz
Thermal Resistance	R_{thJA}	750	K/W	—
Detector				
Capacitance	C_{CE}	5.2	pF	V_{CE}=5.0 V, f=1.0 MHz
	C_{BC}	6.5		
	C_{EB}	7.5		
Thermal Resistance	R_{thJA}	500	K/W	—
Package				
Saturation Voltage, Collector-Emitter	V_{CEsat}	0.25 (≤0.4)	V	I_F=10 mA, I_C=2.5 mA
Coupling Capacitance	C_C	0.6	pF	—

Current Transfer Ratio I_C/I_F at V_{CE}=5.0 V, 25°C and Collector-Emitter Leakage Current by dash number

	-1	-2	-3	-4	Unit
I_C/I_F at V_{CE}=5.0 V (I_F=10 mA)	40–80	63-125	100–200	160–320	%
I_C/I_F at V_{CE}=5.0 V (I_F=1.0 mA)	30 (>13)	45 (>22)	70 (>34)	90 (>56)	
Collector-Emitter Leakage Current (V_{CE}=10 V) (I_{CEO})	2.0 (≤ 50)	2.0 (≤ 50)	5.0 (≤ 100)		nA

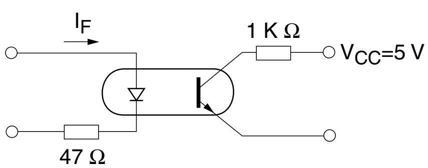
Figure 1. Linear operation (without saturation)



I_F=10 mA, V_{CC}=5.0 V, T_A=25°C

Load Resistance	R_L	**75**	**W**
Turn-On Time	t_{ON}	3.0	μs
Rise Time	t_r	2.0	
Turn-Off Time	t_{OFF}	2.3	
Fall Time	t_f	2.0	
Cut-Off Frequency	f_{CO}	250	kHz

Figure 2. Switching operation (with saturation)



		-1 (I_F=20 mA)	**-2 and -3** (I_F=10 mA)	**-4** (I_F=5.0 mA)	
Turn-On Time	t_{ON}	3.0	4.2	6.0	μs
Rise Time	t_r	2.0	3.0	4.6	
Turn-Off Time	t_{OFF}	18	23	25	
Fall Time	t_f	11	14	15	

Figure 3. Current transfer ratio versus diode current (T_A=–25°C, V_{CE}=5.0 V) I_C/I_F=f (I_F)

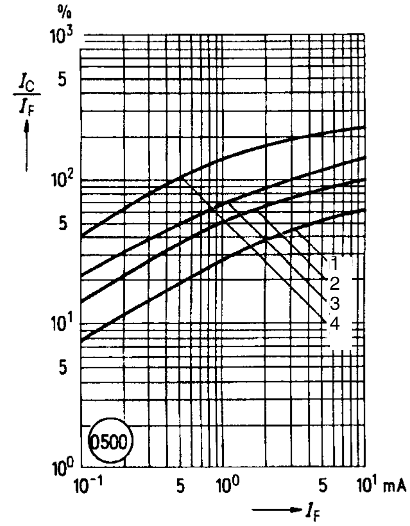


Figure 4. Current transfer ratio versus diode current (T_A=0°C, V_{CE}=5.0 V) I_C/I_F=f (I_F)

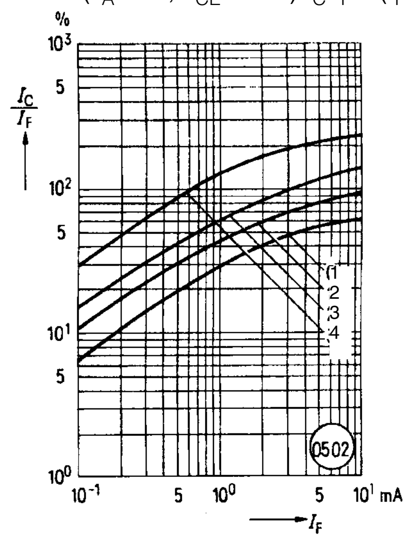


Figure 5. Current transfer ratio versus diode current (T_A=25°C, V_{CE}=5.0 V) I_C/I_F=f (I_F)

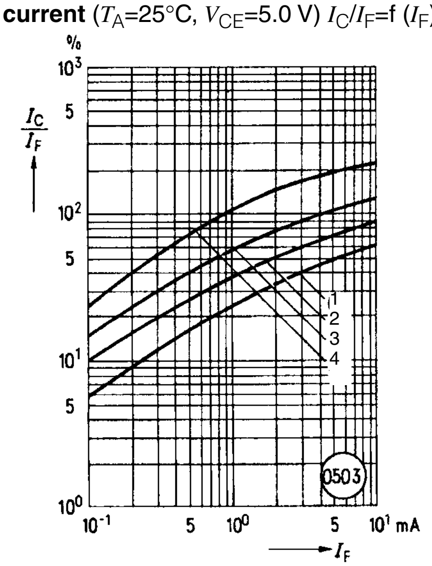


Figure 6. Current transfer ratio versus diode current (T_A=50°C) V_{CE}=5.0 V

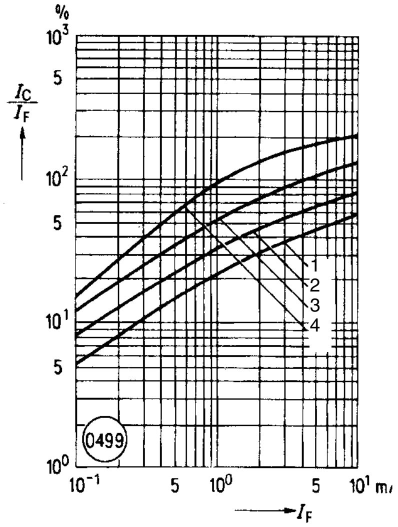


Figure 9. Output characteristics CNY17F-2, -3 (T_A=25°C) I_C=f(V_{CE})

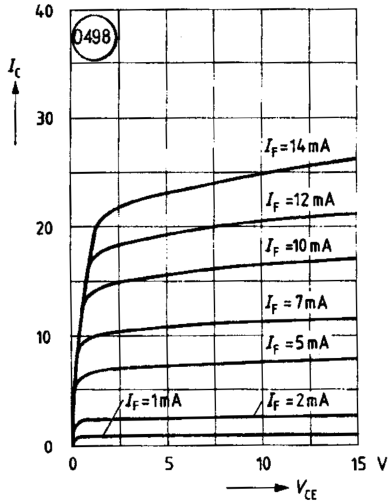


Figure 12. Saturation voltage current and modulation CNY17F-1
V_{CEsat}=f (I_C) (T_A=25°C)

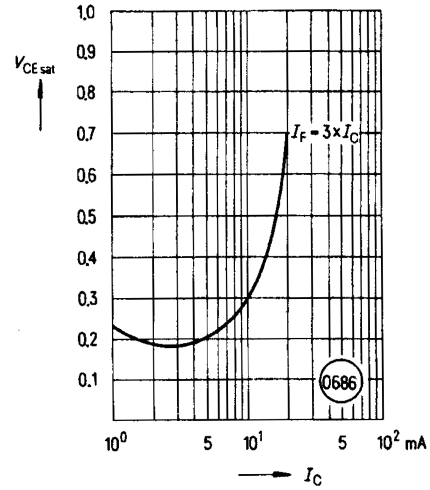


Figure 7. Current transfer ratio versus diode current (T_A=75°C) V_{CE}=5.0 V

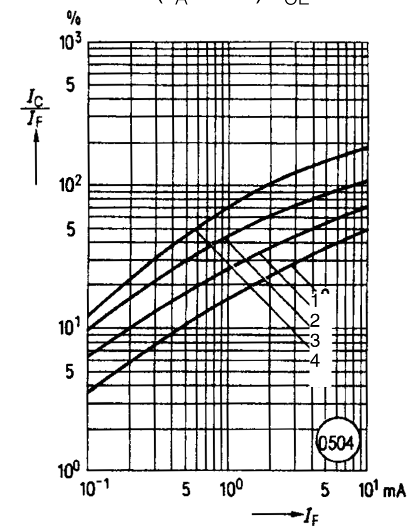


Figure 10. Forward voltage V_F=f(I_F)

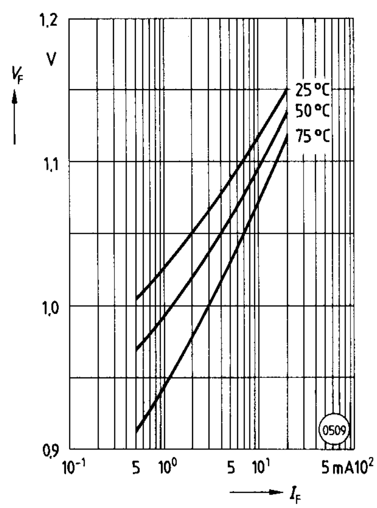


Figure 13. Saturation voltage versus collector current and modulation depth CNY17F-2 V_{CEsat}=f (I_C) (T_A=25°C)

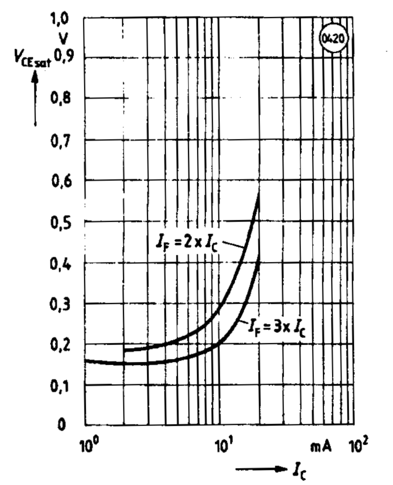


Figure 8. Current transfer ratio versus temperature (I_F=10 mA, V_{CE}=5.0 V) I_C/I_F=f (T)

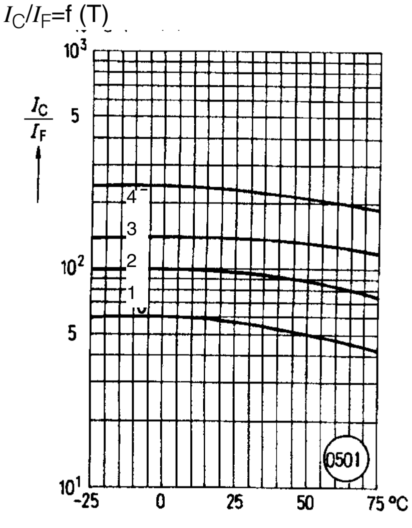


Figure 11. Collector emitter off-state current I_{CEO}=f(V,T) (T_A=75°C, I_F=0)

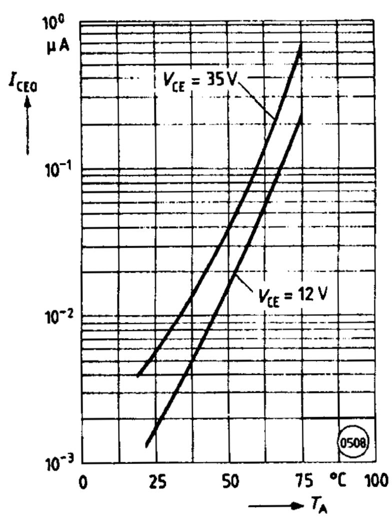


Figure 14. Saturation voltage versus collector current and modulation depth CNY17F-3 V_{CEsat}=f (I_C) (T_A=25°C)

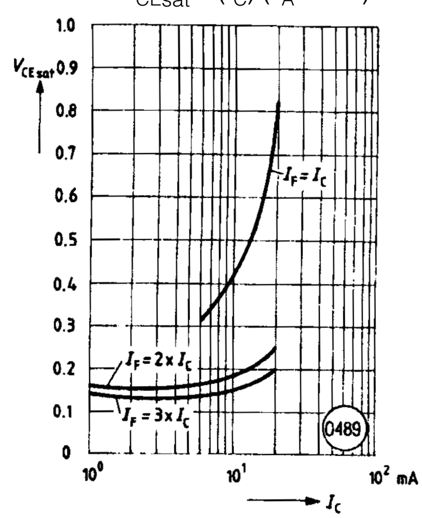


Figure 15. Saturation voltage versus collector current and modulation depth CNY17F-4 V_{CEsat}=f (I_C) (T_A=25°C)

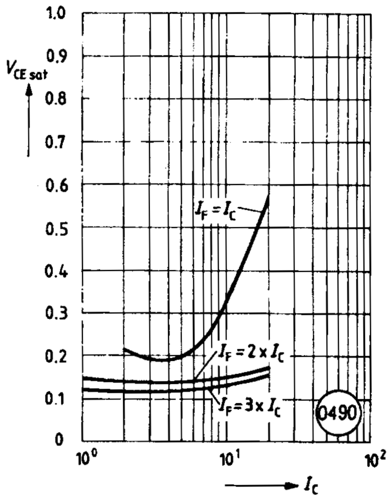


Figure 16. Permissible pulse load D=parameter, T_A=25°C, I_F=f(t_p)

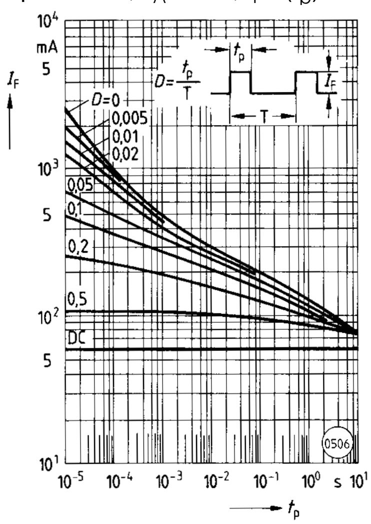


Figure 17. Permissible power dissipation transistor and diode P_{tot}=f(T_A)

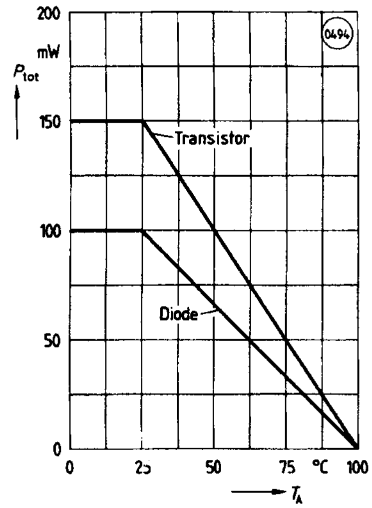


Figure 18. Permissible forward current diode I_F=f(T_A)

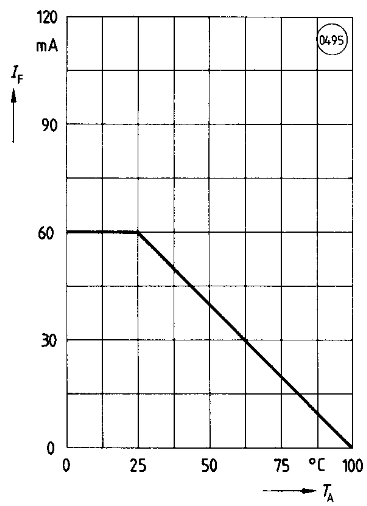


Figure 19. Transistor capacitance C=f(V_O)(T_A=25°C, f=1.0 MHz)