

**TECHNICAL DATA**

DATA SHEET 470, REV. -

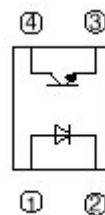
## Phototransistor Optocoupler

**Features:**

- High Current Transfer Ratio: 100% at  $I_F = 1$  mA.
- Current transfer ratio guaranteed over  $-55$  °C to  $+125$  °C ambient temp. range.
- 5000 Vdc electrical isolation.
- High collector-emitter voltage,  $V_{CE} = 70$  V.

**Applications:**

- Solid State relay circuits.
- System appliances, measuring instruments.

**Outline Dimensions**

- ① Anode                      ③ Emitter  
 ② Cathode                    ④ Collector

**Optocoupler Absolute Maximum Rating (at 25 °C)**

PARAMETER		SYMBOL	RATING	UNIT
Input	Forward Current	$I_F$	50	mA
	Peak Forward Current*	$I_{FM}$	1	A
	Reverse Voltage	$V_R$	6	V
	Power Dissipation	$P$	80	mW
Output	Collector-Emitter Voltage	$V_{CEO}$	70	V
	Emitter-Collector Voltage	$V_{ECO}$	6	V
	Collector Current	$I_C$	50	mA
	Collector Power Dissipation	$P_C$	140	mW
Total Power Dissipation		$P_{tot}$	190	mW
Isolation Voltage**		$V_{iso}$	5000	$V_{rms}$
Operating Temperature		$T_{opr}$	-30 to +100	°C
Storage Temperature		$T_{stg}$	-55 to +125	°C
Soldering Temperature***		$T_{sol}$	250	°C

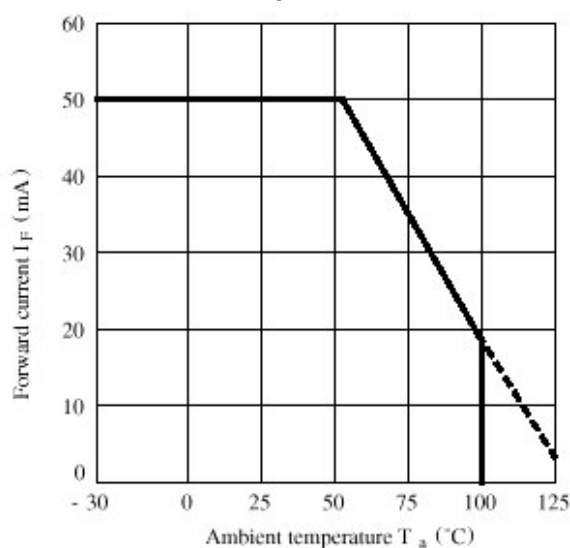
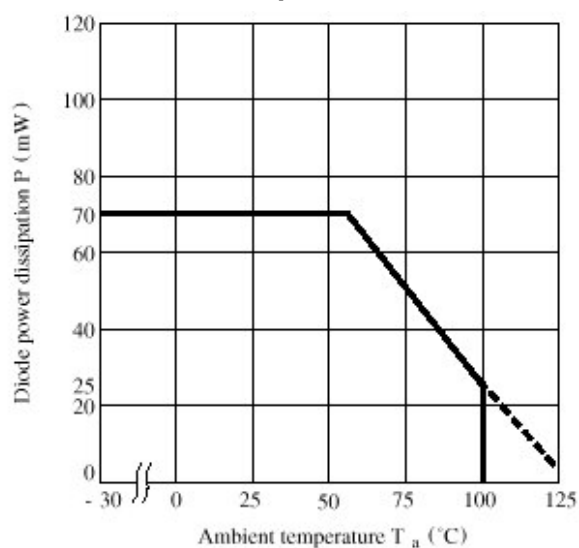
\* &lt; 1 ms duration

\*\* AC for 1 min, 40 to 60% RH

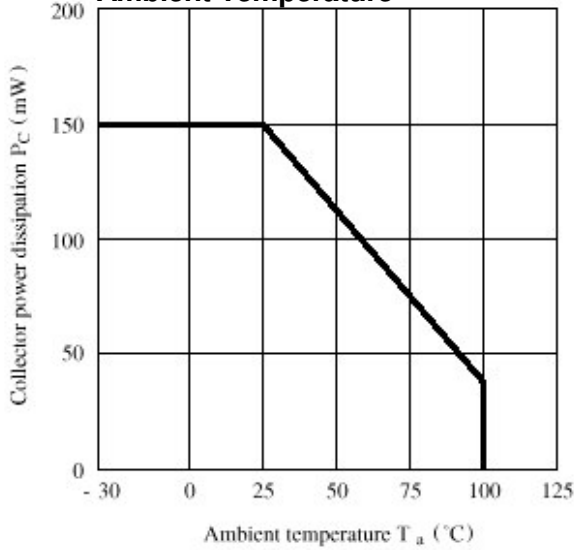
\*\*\* For 10 seconds

**Electro-Optical Characteristics (at 25 °C)**

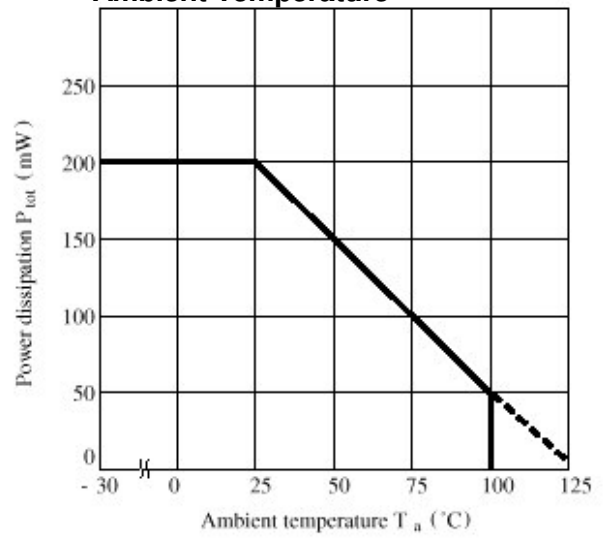
PARAMETER		SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Input	Forward Voltage	$V_F$	$I_F=1\text{ mA}$	-	1.1	1.4	V
	Peak Forward Voltage	$V_{FM}$	$I_{FM}=0.5\text{ A}$	-	-	2.8	V
	Reverse Breakdown Voltage	$BV_R$	$I_R=15\text{ }\mu\text{A}$	6	-	-	V
	Reverse Current	$I_R$	$V_R=4\text{ V}$	-	-	12	$\mu\text{A}$
	Terminal Capacitance	$C_t$	$V=0, f=1\text{ kHz}$	-	35	240	pF
Output	Collector-Emitter Breakdown Voltage	$BV_{CEO}$	$I_C=0.1\text{ mA}, I_F=0$	70	-	-	V
	Emitter-Collector Breakdown Voltage	$BV_{ECO}$	$I_E=10\text{ }\mu\text{A}, I_F=0$	6	-	-	V
	Collector Dark Current	$I_{CEO}$	$V_{CE}=24\text{ V}, I_F=0$	-	-	100	nA
	Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_F=1\text{ mA}, I_C=0.2\text{ mA}$	-	-	0.4	V
Current Transfer Ratio		CTR	$I_F=10\text{ mA}, V_{CE}=0.5\text{ V}$	100	-	-	%
Input to Output Leakage Current		$I_{I-O}$		-	-	0.8	$\mu\text{A}$
Isolation Resistance		$R_{ISO}$	$500\text{ V}_{DC}, 40\text{--}60\% \text{ RH}$	$4 \times 10^1_0$	$10^{11}$	-	$\Omega$
Floating Capacitance		$C_F$	$V=0, f=1\text{ MHz}$	-	0.6	1.0	pF
Response Time		$t_r, t_f$	$V_{CE}=2\text{ V}, I_C=2\text{ mA}, R_L=100\Omega$	-	8	-	$\mu\text{s}$
Cut-off Frequency		$f_c$	$V_{CE}=5\text{ V}, I_C=2\text{ mA}, R_L=100\Omega$	-	50	-	kHz

**Forward Current vs. Ambient Temperature****Diode Power Dissipation vs. Ambient Temperature**

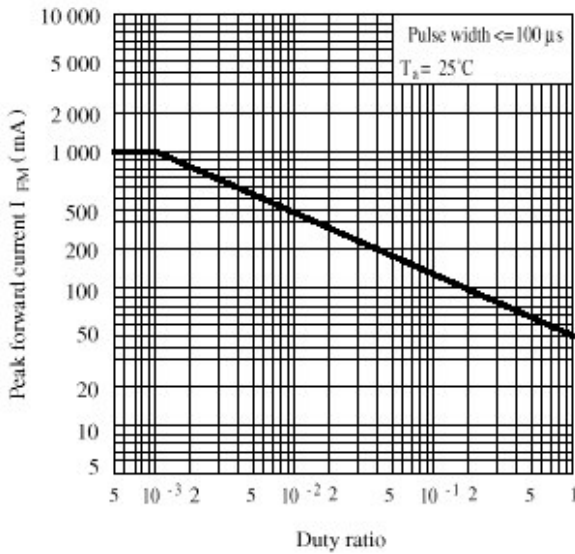
### Collector Power Dissipation vs. Ambient Temperature



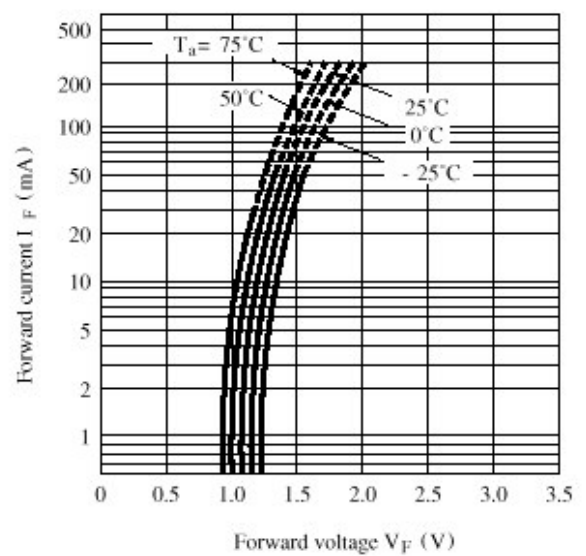
### Power Dissipation vs. Ambient Temperature



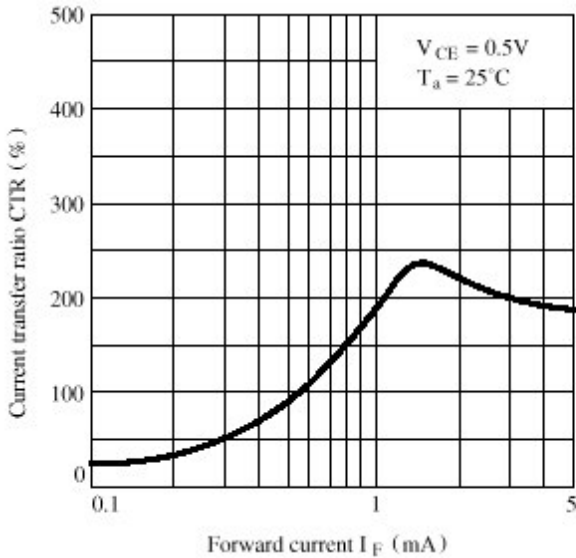
### Peak Forward Current vs Duty Ratio



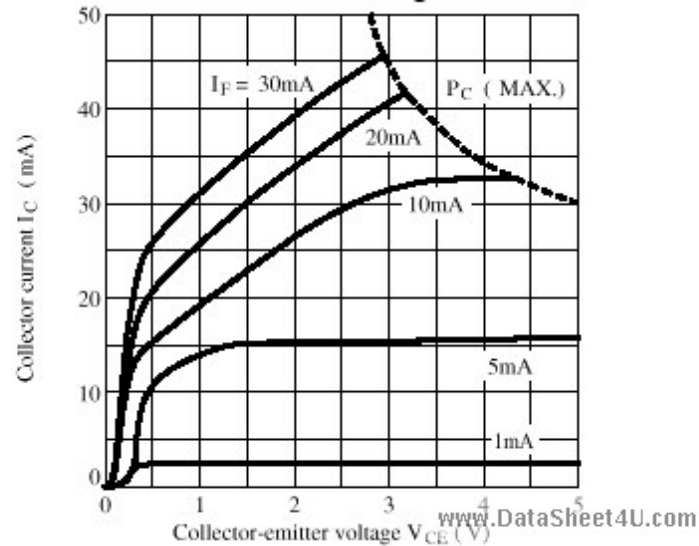
### Forward Current vs. Forward Voltage



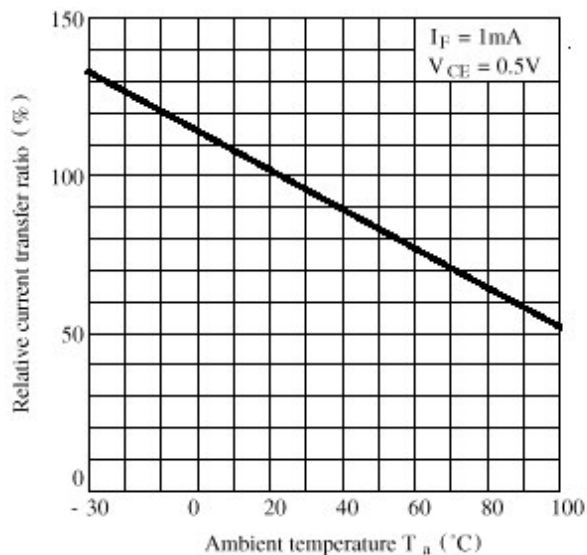
### CTR vs. Forward Current



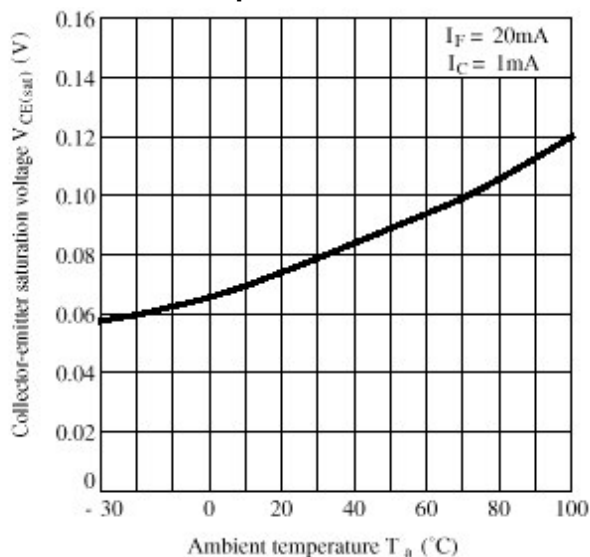
### Collector Current vs. C-E Voltage



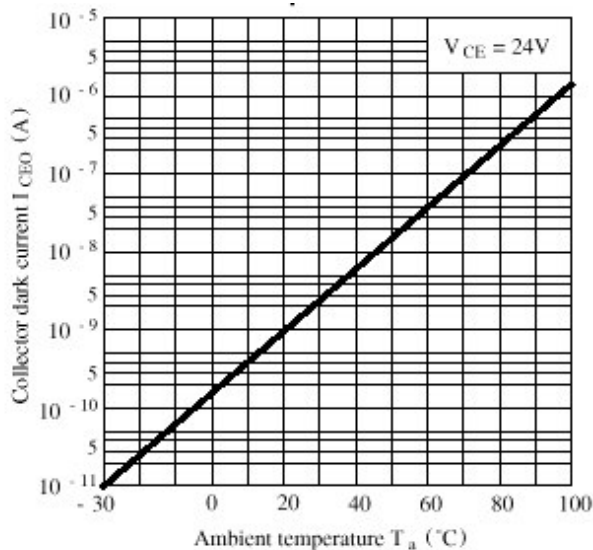
### Relative CTR vs. Ambient Temperature



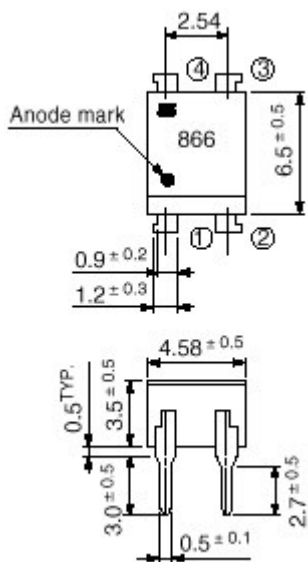
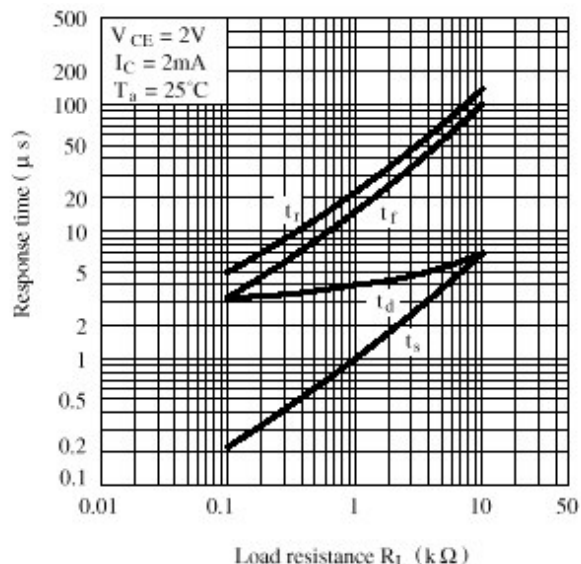
### C-E Saturation Voltage vs. Ambient Temperature



### Collector Dark Current vs. Ambient Temperature



### Response Time vs. Load Resistance



### MECHANICAL DIMENSIONS: In mm

