

200mW, 4 PIN DIP Phototransistor Photocoupler

FEATURES

- Current transfer ratio
(CTR: MIN.80% at $I_F=5\text{mA}$, $V_{CE}=5\text{V}$)
- High isolation voltage between input and output
(Viso=5000V rms)
- Creepage distance > 7.62mm
- UL Recognized File # E478892
- Compliant to RoHS directive 2011/65/EU and
in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21

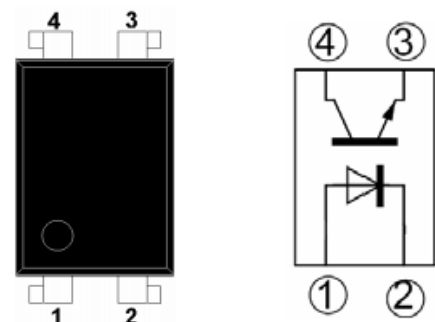
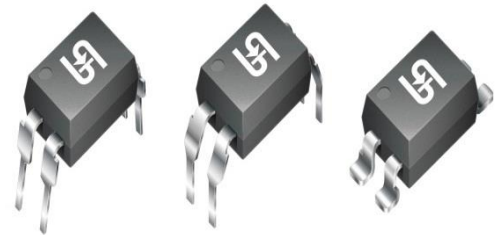
APPLICATIONS

- Programmable controllers
- System appliances, measuring instruments
- Telecommunication equipments
- Home appliances, such as fan heaters, etc
- Signal transmission between circuits of different potentials
and impedances

MECHANICAL DATA

- Case: DIP-4, DIP-4M, SOP-4
- Molding compound: UL flammability classification
rating 94V-0
- Moisture sensitivity level: level 1, per J-STD-020
- Packing code with suffix "G" means green compound
(halogen-free)
- Terminal: Matte tin plated leads, solderable per J-STD-002
- Meet JESD 201 class 1A whisker test
- Polarity: Indicated by cathode band

KEY PARAMETERS		
PARAMETER	VALUE	UNIT
CTR	80-600	%
V_{CEO}	80	V
P_{tot}	200	mW
I_C	50	mA
V_{iso}	5000	Vrms
Package	DIP-4 DIP-4M SOP-4	
Configuration	Single Dice	



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

PARAMETER		SYMBOL	PART NUMBER	UNIT
Input	Forward current	I_F	50	mA
	Reverse voltage	V_R	6	V
	Power dissipation	P	70	mW
Output	Collector-emitter voltage	V_{CEO}	80	V
	Emitter-collector voltage	V_{ECO}	6	V
	Collector current	I_C	50	mA
	Collector power dissipation	P_C	150	mW
Total power dissipation		P_{tot}	200	mW
Isolation voltage		V_{iso}	5000	Vrms
Rated impulse isolation voltage		V_{IOTM}	6000	V
Rated repetitive peak isolation voltage		V_{IORM}	630	V
Operating temperature		T_{opr}	-40 to +100	$^\circ\text{C}$
Storage temperature		T_{stg}	-55 to +125	$^\circ\text{C}$
Soldering temperature		T_{sol}	260	$^\circ\text{C}$

ELECTRICAL SPECIFICATIONS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

PARAMETER			CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
Input	Forward voltage		I _F =20mA	V _F		1.2	1.4	V
	Reverse current		V _R =4V	I _R			10	μA
	Terminal capacitance		V=0, f=1kHz	C _t		30	250	pF
Output	Collector dark current		V _{CE} =20V, I _F =0	I _{CEO}			10 ⁻⁷	A
	Collector-emitter breakdown voltage		I _C =0.1mA, I _F =0	BV _{CEO}	80			V
	Emitter-collector breakdown voltage		I _E =10μA, I _F =0	BV _{ECO}	6			V
Transfer Characteristics	Collector current		I _F =5mA, V _{CE} =5V	I _C	2.5		30	mA
	Current transfer ration(Note 1)			CTR	80		600	%
	Collector-emitter saturation voltage		I _F =20mA, I _C =1mA	V _{CE(sat)}		0.1	0.2	V
	Isolation resistance		DC500V, 40 to 60%RH	R _{ISO}	5x10 ¹⁰	10 ¹¹		Ω
	Floating capacitance		V=0, f=1MHz	C _f		0.6	1.0	pF
	Cut-off frequency		V _{CE} =5V, I _C =2mA, R _L =100Ω, -3dB	f _c		80		KHz
	Response time	Rise time	V _{CE} =2V, I _C =2mA, R _L =100Ω	t _r		4	18	μs
		Fall time		t _f		3	18	μs

Notes:

- Classification table of current transfer ratio is shown below

RANK TABLE OF CURRENT TRANSFER RATIO, CTR

RANK MARK	MIN (%)	MAX (%)
A	80	160
B	130	260
C	200	400
D	300	600

ORDERING INFORMATION				
PART NO. (Note 1&2)	PACKING CODE	PACKING CODE SUFFIX	PACKAGE	PACKING
TPC817x	C9	G	DIP-4	100 / TUBE
TPC817Mx	C9		DIP-4M (Leads with 0.4" spacing)	100 / TUBE
TPC817S1x	RA		SOP-4	2K / 13" Reel

Notes:

1. "x" defines CTR rank from "A" to "D"
2. Whole series with green compound

EXAMPLE				
EXAMPLE P/N	PART NO.	PACKING CODE	PACKING CODE SUFFIX	DESCRIPTION
TPC817A C9G	TPC817A	C9	G	Green compound

CHARACTERISTICS CURVES

($T_A = 25^\circ\text{C}$ unless otherwise noted)

Fig. 1 Forward Current vs. Ambient Temperature

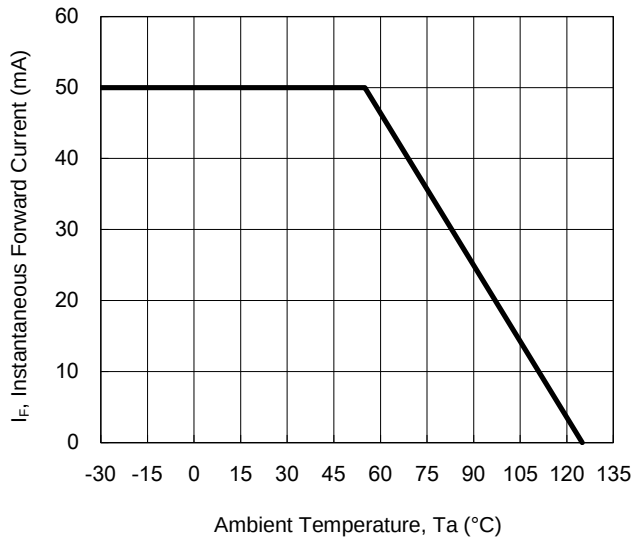


Fig.2 Collector Power Dissipation vs. Ambient Temperature

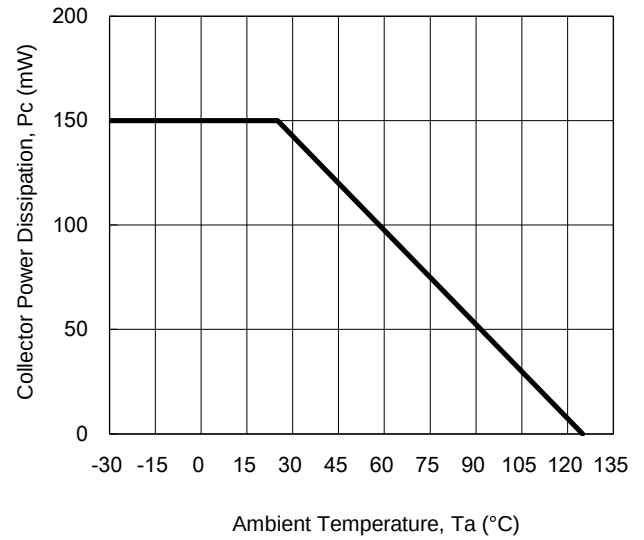


Fig.3 Collector-Emitter Saturation Voltage vs Forward Current

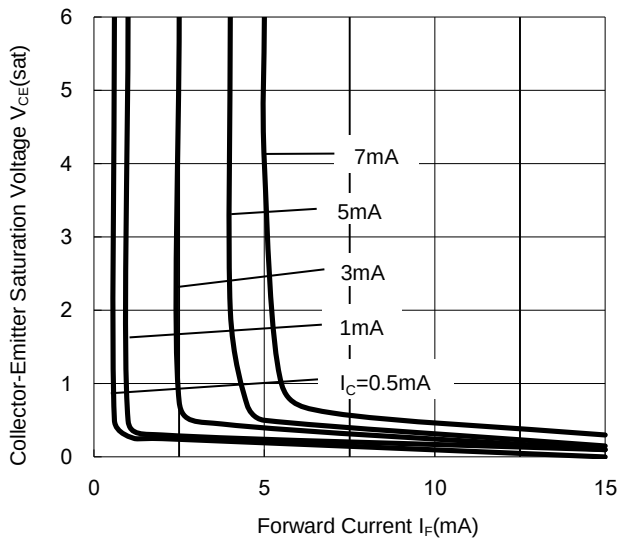
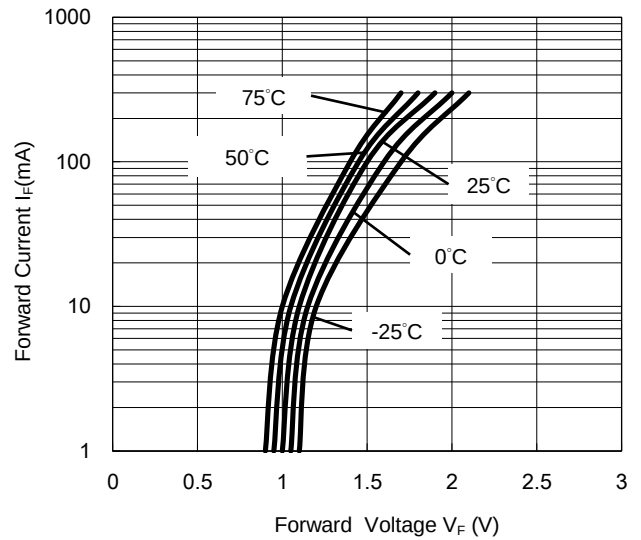


Fig.4 Forward Current vs. Forward Voltage



CHARACTERISTICS CURVES

($T_A = 25^\circ\text{C}$ unless otherwise noted)

Fig. 5 Current Transfer Ratio vs. Forward Current

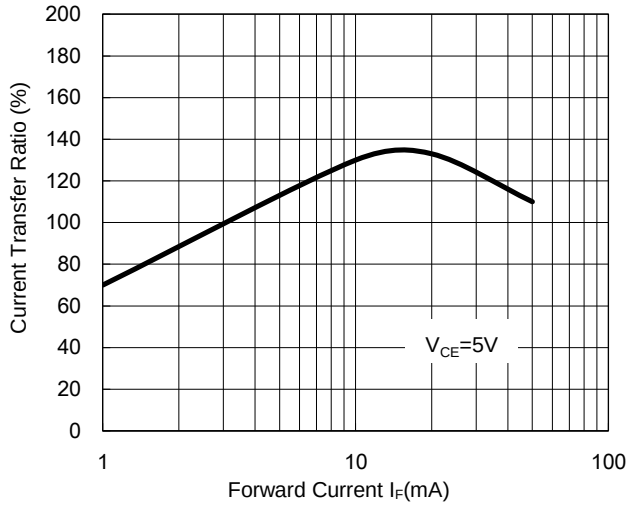


Fig.6 Collector Current vs. Collector-Emitter Voltage

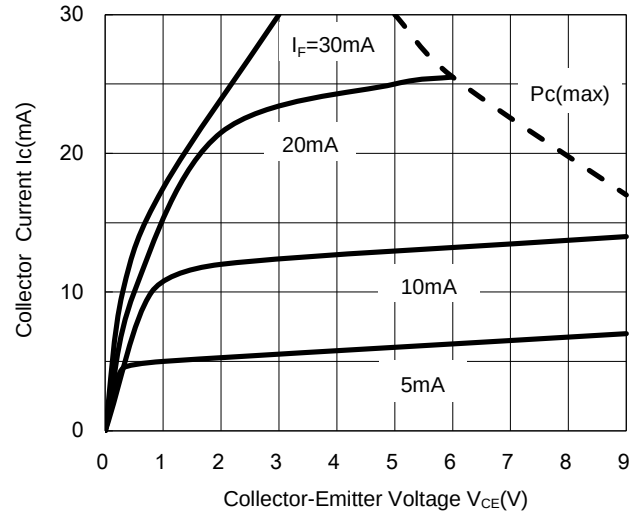


Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

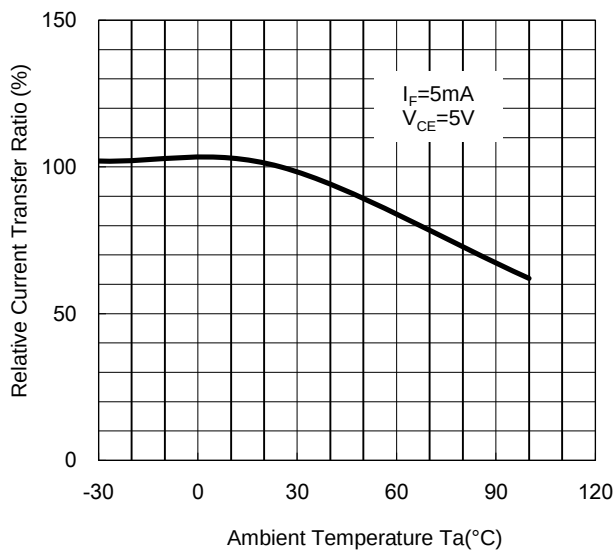
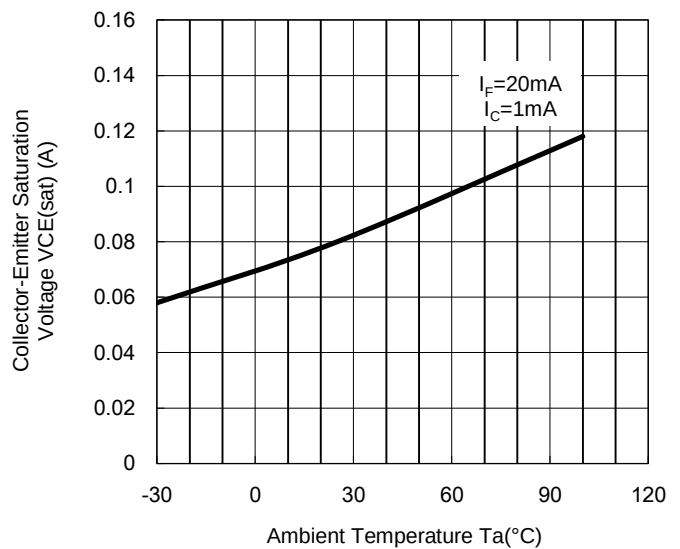


Fig.8 Collector-emitter Saturation Voltage vs Ambient Temperature



CHARACTERISTICS CURVES

($T_A = 25^\circ\text{C}$ unless otherwise noted)

Fig. 9 Collector Dark Current vs. Ambient Temperature

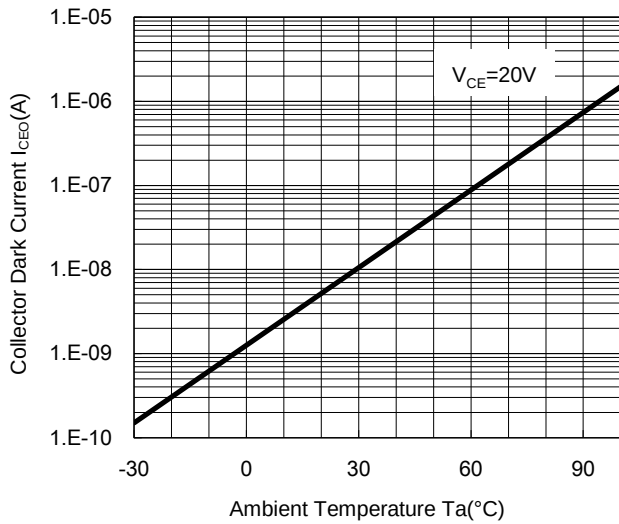


Fig.10 Response Time vs. Load Resistance

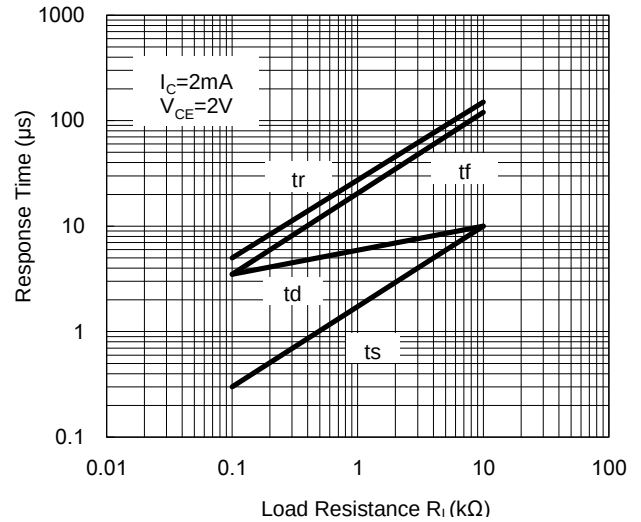
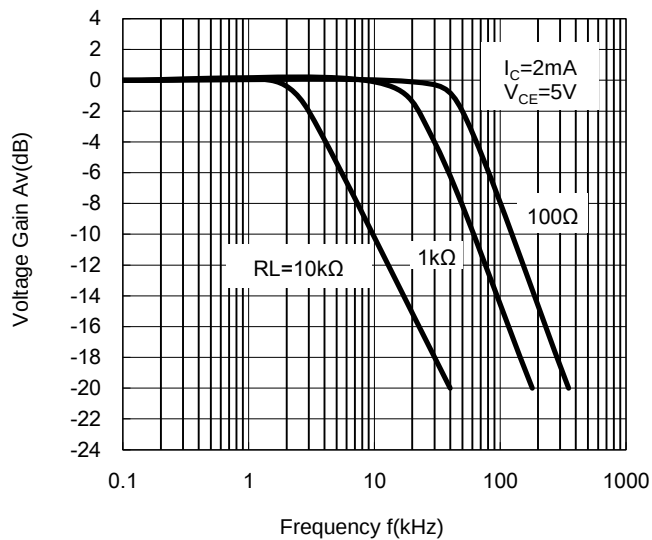
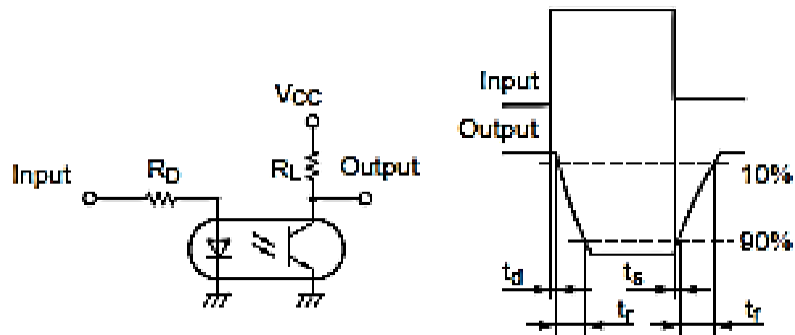


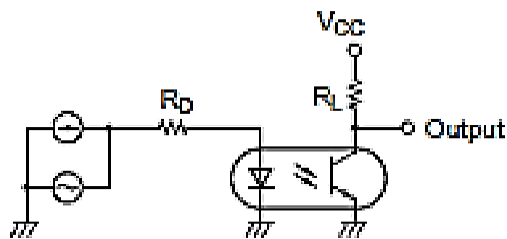
Fig.11 Frequency Response



TEST CIRCUIT RESPONSE TIME

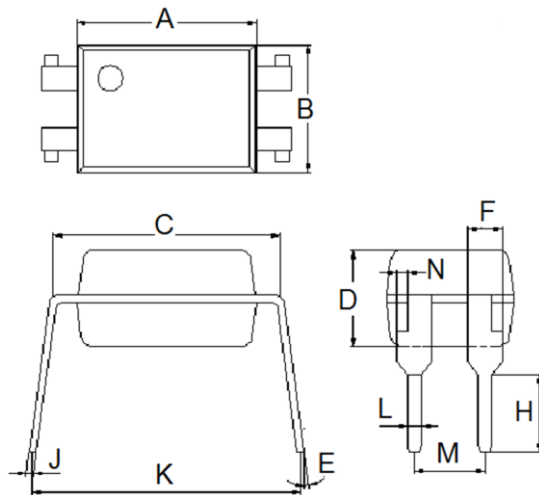


TEST CIRCUIT FOR FREQUENCY RESPONSE



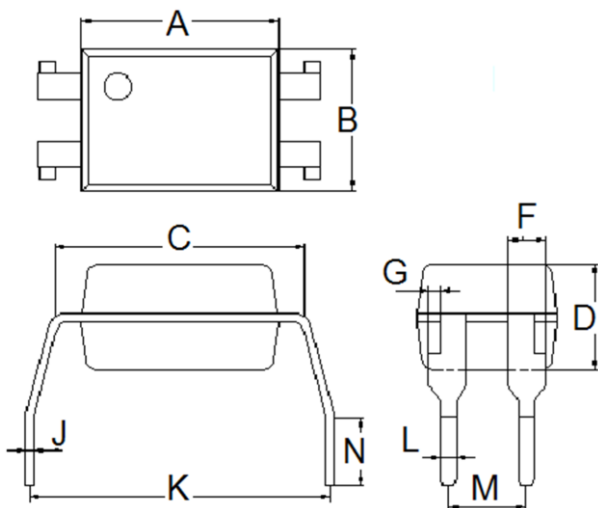
PACKAGE OUTLINE DIMENSION

DIP-4



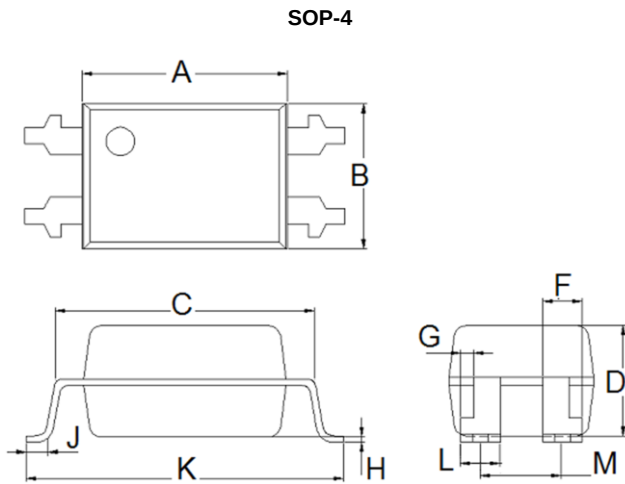
DIM.	Unit(mm)	
	Min	Max
A	6.40	6.60
B	4.50	4.70
C	7.90	8.30
D	3.28	3.68
E	2°	8°
F	1.25 typ.	
H	2.70	2.90
J	0.23	0.26
K	8.86	9.31
L	0.50 typ.	
M	2.44	2.64
N	0.40 typ.	

DIP-4M (Leads with 0.4" spacing)



DIM.	Unit(mm)	
	Min	Max
A	6.40	6.60
B	4.50	4.70
C	7.90	8.30
D	3.28	3.68
F	1.25 typ.	
G	0.40 typ.	
J	0.23	0.26
K	9.86	10.46
L	0.50 typ.	
M	2.44	2.64
N	2.40	2.90

PACKAGE OUTLINE DIMENSION



DIM.	Unit(mm)	
	Min	Max
A	6.40	6.60
B	4.50	4.70
C	7.90	8.30
D	3.28	3.68
F	1.25 typ.	
G	0.40 typ.	
H	0.00	0.20
J	0.90	1.20
K	9.80	10.30
L	1.25 typ.	
M	2.49	2.69

MARKING



Notes :

- 817: Product type
- B: CTR rank mark
- YWW: Date code

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