

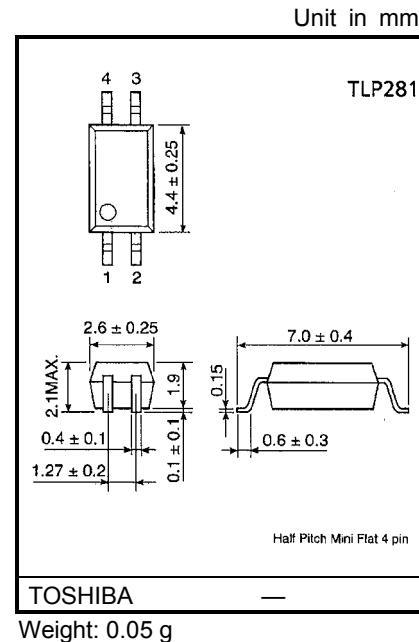
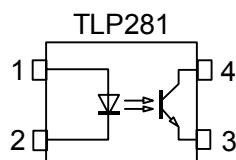
TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

TLP281,TLP281-4**PROGRAMMABLE CONTROLLERS****AC/DC-INPUT MODULE****PC CARD MODEM(PCMCIA)**

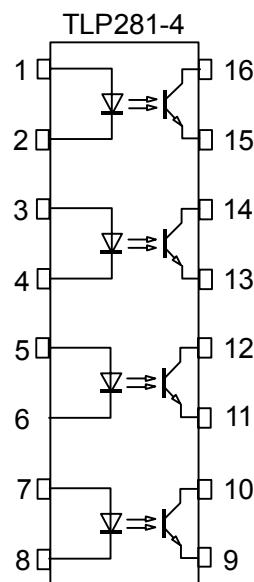
TLP281 and TLP281-4 is a very small and thin coupler,suitable for surface mount assembly in applications such as PCMCIA Fax modem,programmable controllers.

TLP281 and TLP281-4 consist of photo transistor,optically coupled to a gallium arsenide infrared emitting diode.

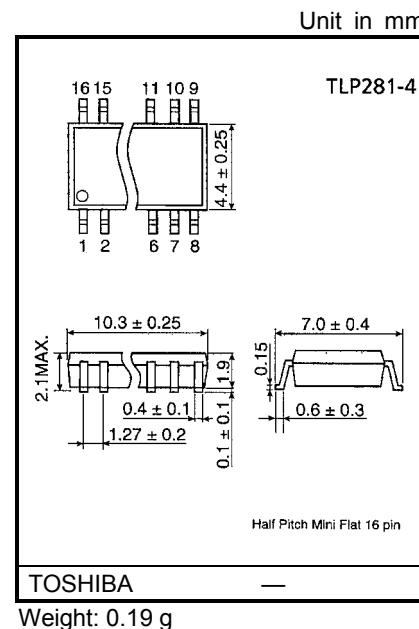
- Collector-Emitter Voltage : 80 V (MIN)
- Current Transfer Ratio : 50% (MIN)
- Rank GB : 100% (MIN)
- Isolation Voltage : 2500 Vrms (MIN)
- UL Recognized : UL1577 , File No. E67349
- BSI Approved : BS EN 60065: 1994,
: BS EN 41003: 1997
Certificate No. 8143, 8144

**PIN CONFIGURATION(Top view)**

1:ANODE
2:CATHODE
3:EMITTER
4:COLLECTOR



1,3,5,7 :ANODE
2,4,6,8 :CATHODE
9,11,13,15 :EMITTER
10,12,14,16 :COLLECTOR



MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	RATING		UNIT	
		TLP281	TLP281-4		
LED	Forward Current	I_F	50	mA	
	Forward Current Derating	$\Delta I_F / ^\circ\text{C}$	-0.7 ($T_a \geq 53^\circ\text{C}$)	$\text{mA} / ^\circ\text{C}$	
	Pulse Forward Current	I_{FP}	1	A	
	Reverse Voltage	V_R	5	V	
	Junction Temperature	T_j	125	$^\circ\text{C}$	
DETECTOR	Collector-Emitter Voltage	V_{CEO}	80	V	
	Emitter-Collector Voltage	V_{ECO}	7	V	
	Collector Current	I_C	50	mA	
	Collector Power Dissipation (1 Circuit)	P_C	150	mW	
	Collector Power Dissipation Derating($T_a \geq 25^\circ\text{C}$) (1 Circuit)	$\Delta P_C / ^\circ\text{C}$	-1.5	$\text{mW} / ^\circ\text{C}$	
	Junction Temperature	T_j	125	$^\circ\text{C}$	
Operating Temperature Range		T_{opr}	-55~100	$^\circ\text{C}$	
Storage Temperature Range		T_{stg}	-55~125	$^\circ\text{C}$	
Lead Soldering Temperature		T_{sol}	260 (10s)	$^\circ\text{C}$	
Total Package Power Dissipation (1 Circuit)		P_T	200	170	mW
Total Package Power Dissipation Derating ($T_a \geq 25^\circ\text{C}$) (1 Circuit)		$\Delta P_T / ^\circ\text{C}$	-2.0	-1.7	$\text{mW} / ^\circ\text{C}$
Isolation Voltage (Note1)	BV_S	2500(AC,1min,R.H. $\leq 60\%$)		Vrms	

(Note1)Device considered a two terminal device : LED side pins shorted together and DETECTOR side pins shorted together.

INDIVIDUAL ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
LED	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	μA
	Capacitance	C_T	$V = 0, f = 1 \text{ MHz}$	—	30	—	pF
DETECTOR	Collector-Emitter Breakdown Voltage	$V_{(BR) CEO}$	$I_C = 0.5 \text{ mA}$	80	—	—	V
	Emitter-Collector Breakdown Voltage	$V_{(BR) ECO}$	$I_E = 0.1 \text{ mA}$	7	—	—	V
	Collector Dark Current (Note2)	I_{CEO}	$V_{CE} = 48 \text{ V},$ Ambient Light Below (100 lx)	—	0.01 (2)	0.1 (10)	μA
			$V_{CE} = 48 \text{ V}, T_a = 85^\circ\text{C}$ Ambient Light Below (100 lx)	—	2 (4)	50 (50)	μA
	Capacitance (Collector to Emitter)	C_{CE}	$V = 0, f = 1 \text{ MHz}$	—	10	—	pF

(Note 2) Because of the construction, leak current might be increased by ambient light.
Please use photocoupler with less ambient light.

COUPLED ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ C$)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Current Transfer Ratio	I_C / I_F	$I_F = 5 \text{ mA}, V_{CE} = 5 \text{ V}$ Rank GB	50	—	600	%
			100	—	600	
Saturated CTR	$I_C / I_F (\text{sat})$	$I_F = 1 \text{ mA}, V_{CE} = 0.4 \text{ V}$ Rank GB	—	60	—	%
			30	—	—	
Collector-Emitter Saturation Voltage	$V_{CE} (\text{sat})$	$I_C = 2.4 \text{ mA}, I_F = 8 \text{ mA}$	—	—	0.4	V
		$I_C = 0.2 \text{ mA}, I_F = 1 \text{ mA}$	—	0.2	—	
Off-State Collector Current	$I_C (\text{off})$	$V_F = 0.7 \text{ V}, V_{CE} = 48 \text{ V}$	—	—	0.4	μA
			—	—	10	

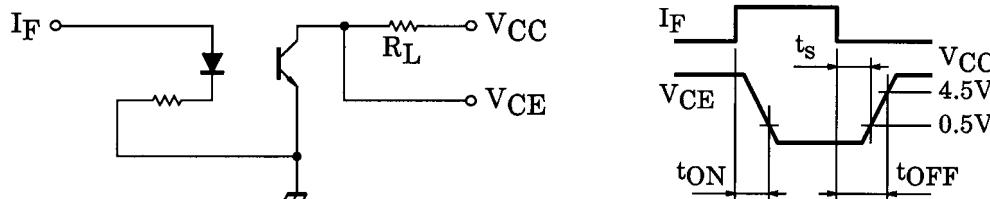
ISOLATION CHARACTERISTICS ($T_a = 25^\circ C$)

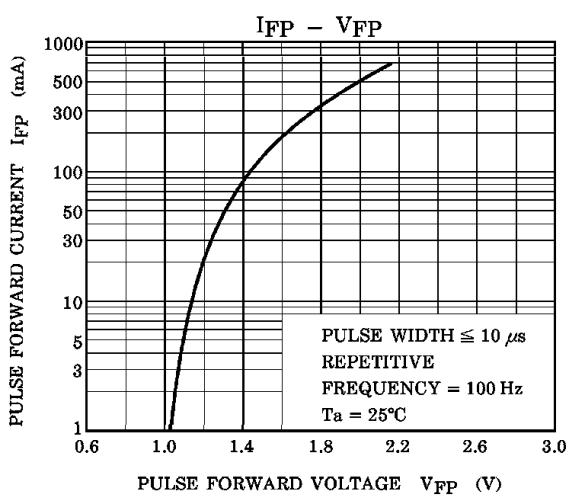
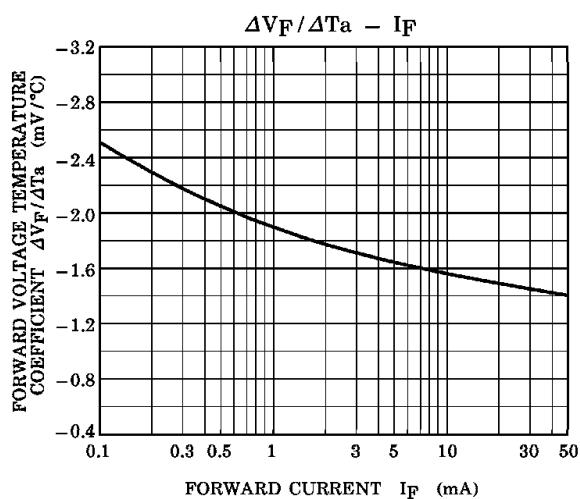
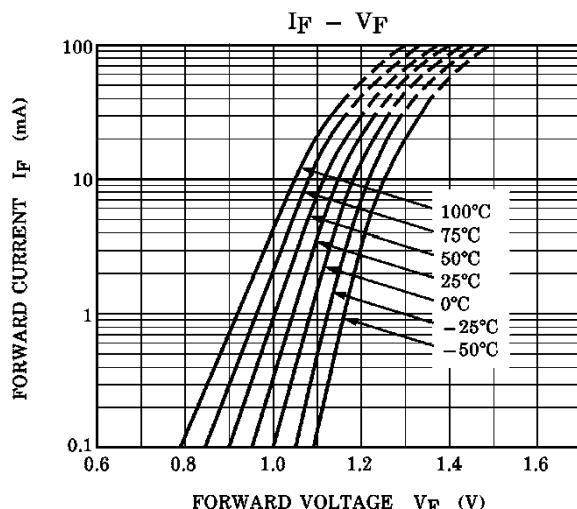
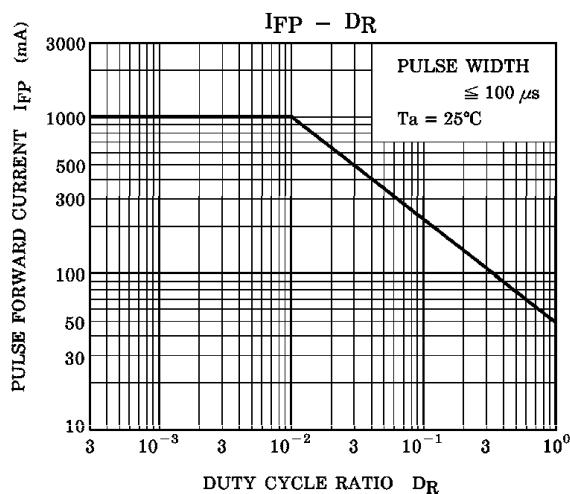
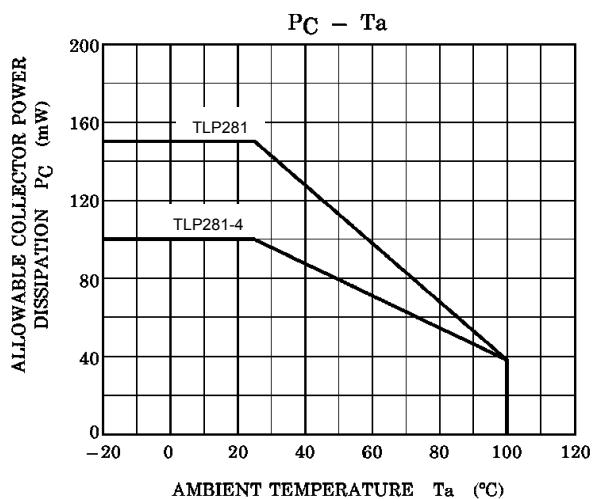
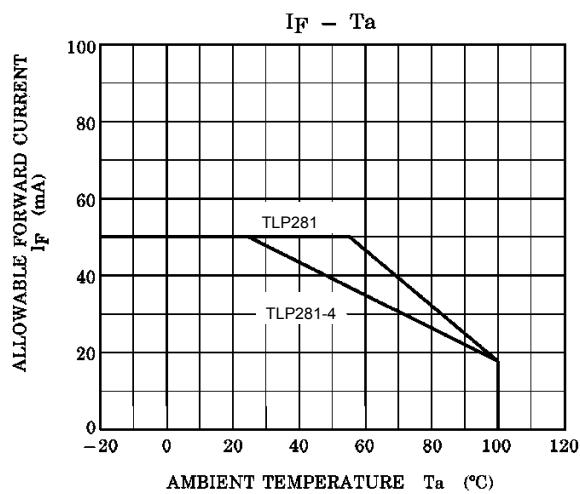
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Capacitance (Input to Output)	C_S	$V_S = 0 \text{ V}, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation Resistance	R_S	$V_S = 500 \text{ V}, R.H.\leq 60\%$	5×10^{10}	10^{14}	—	Ω
Isolation Voltage	BV_S	AC , 1 minute	2500	—	—	Vrms
		AC , 1 second,in OIL	—	5000	—	
		DC , 1 minute, in OIL	—	5000	—	Vdc

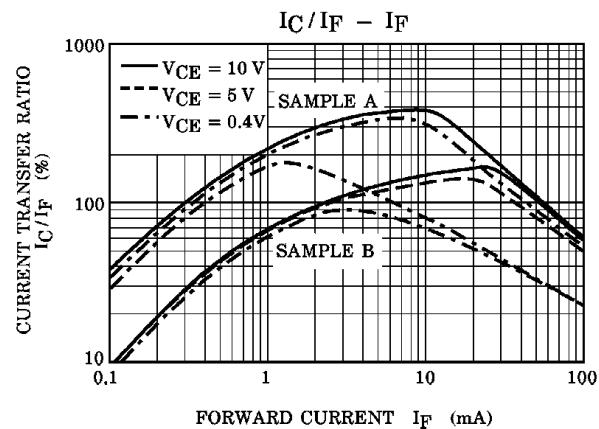
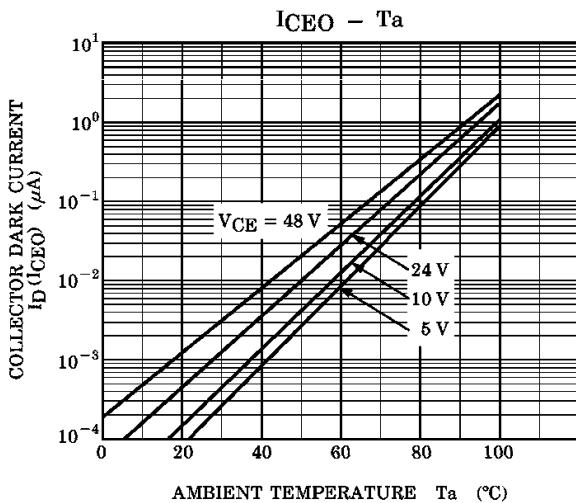
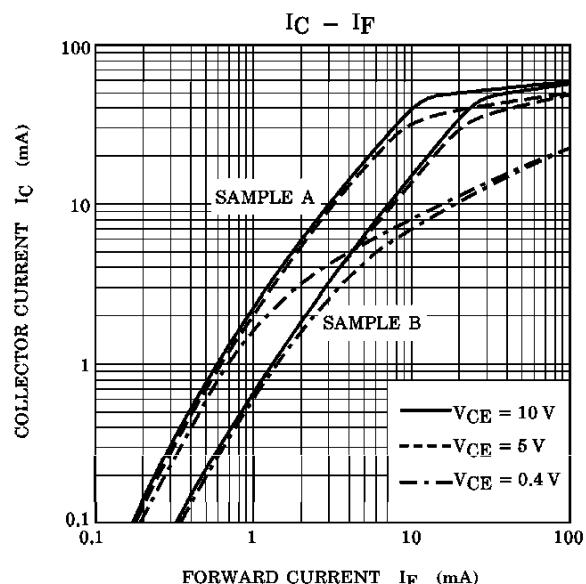
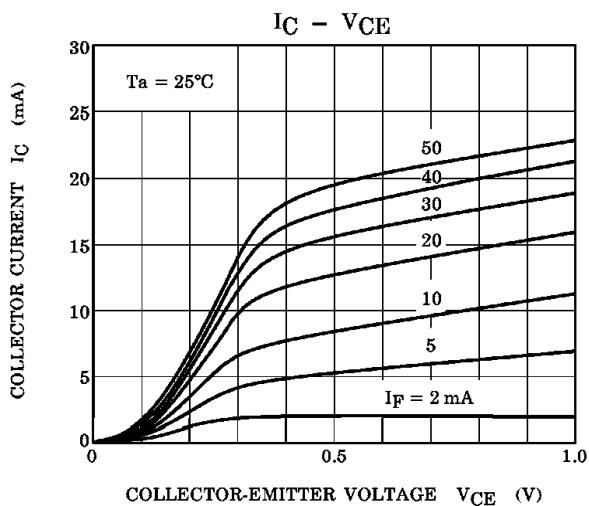
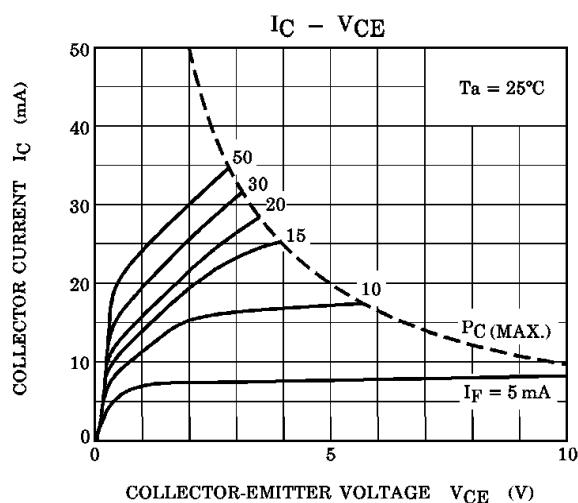
SWITCHING CHARACTERISTICS ($T_a = 25^\circ C$)

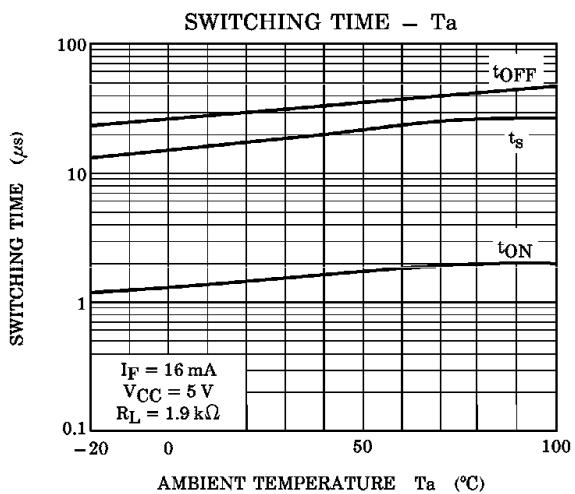
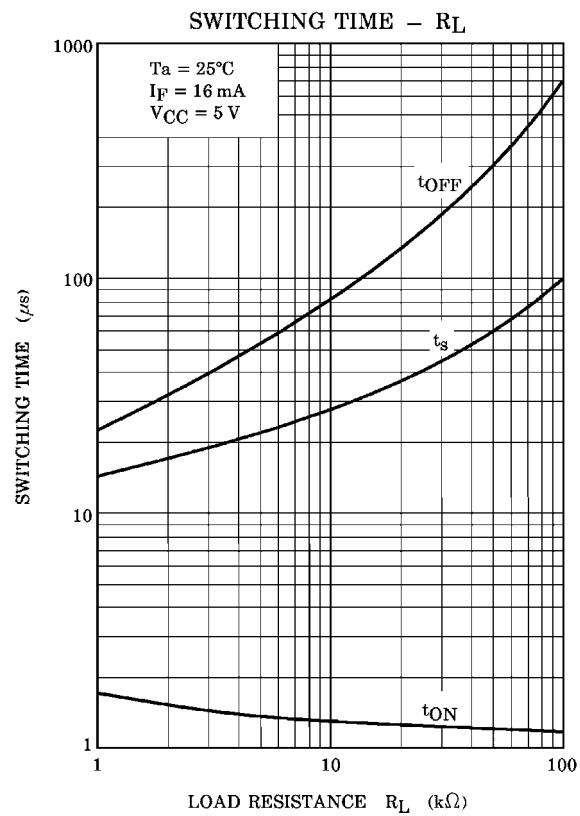
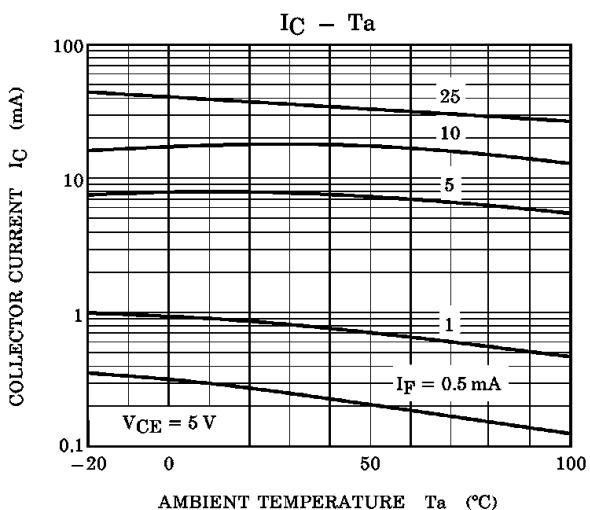
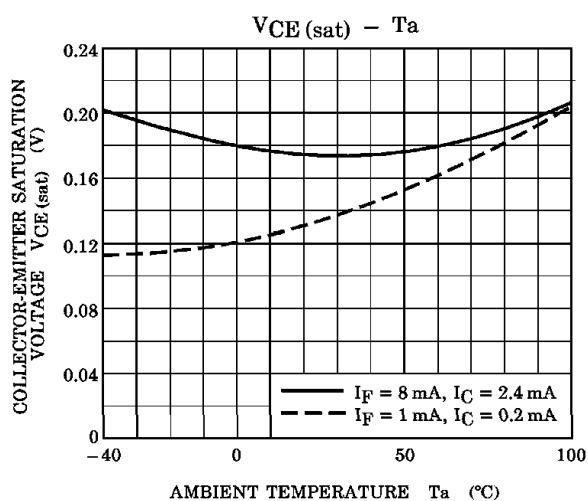
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Rise Time	t_r	$V_{CC} = 10 \text{ V}, I_C = 2 \text{ mA}$ $R_L = 100\Omega$	—	2	—	μs
Fall Time	t_f		—	3	—	
Turn-On Time	t_{on}		—	3	—	
Turn-Off Time	t_{off}		—	3	—	
Turn-On Time	t_{ON}	$R_L = 1.9 \text{ k}\Omega$ (Fig.1) $V_{CC} = 5 \text{ V}, I_F = 16 \text{ mA}$	—	2	—	μs
Storage Time	t_s		—	25	—	
Turn-Off Time	t_{OFF}		—	40	—	

(Fig.1)SWITCHING TIME TEST CIRCUIT









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000707EBC

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