Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

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Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

IXYS
INTEGRATED CIRCUITS DIVISION

ITC117PL
Integrated Telecom Circuits

Parameter	Rating	Units
Relay Blocking Voltage	350	V
Relay Load Current	120	mA_{rms} / mA_{DC}
Relay On-Resistance (max)	20	Ω
Bridge Rectifier Reverse Voltage	100	V
Darlington Collector Current	120	mA
Darlington Current Gain	10,000	-

Features
- Current Limiting
- 3750V_{rms} Input/Output Isolation
- 2mW Hook Switch Drive Power (Logic Compatible)
- Full-Wave Bridge Rectifier
- Darlington Transistor for Electronic Inductor “Dry” Circuits
- Full-Wave Current Detector for Ring Signal or Loop Current Detect
- JEDEC Standard Lead Configuration
- No Moving Parts
- Board Space and Cost Savings
- Small 16-Pin SOIC Package (PCMCIA Compatible)

Applications
- Data/Fax Modem
- Voice Mail Systems
- Telephone Sets
- Computer Telephony Integration
- Set Top Box Modems

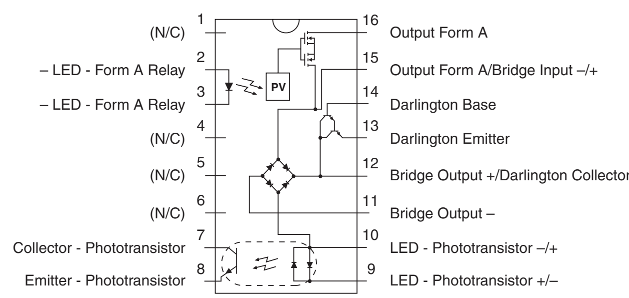
Description
The Integrated Telecom Circuit combines a single-pole, normally open (1-Form-A) solid state relay, a bridge rectifier, a Darlington transistor, and an optocoupler into one 16-pin SOIC package, consolidating designs and reducing component count in telecom applications. The ITC117PL's relay features the added benefit of current limiting, and the optocoupler provides for full-wave detection of ring signals.

Approvals
- UL Recognized Component: File E76270
- CSA Certified Component: Certificate 1305490
- EN/IEC 60950-1 Certified Component: TUV Certificate: B 12 11 82667 002

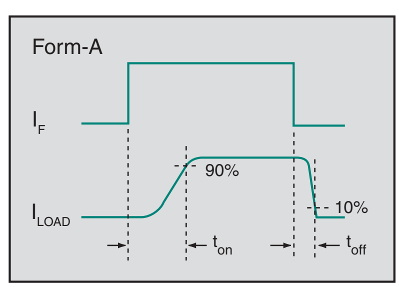
Ordering Information

Part #	Description
ITC117PL	16-Pin SOIC (50/Tube)
ITC117PLTR	16-Pin SOIC (1000/Reel)

Pin Configuration



Switching Characteristics of Normally Open Devices



Absolute Maximum Ratings @ 25ºC

Parameter	Ratings	Units
Input Control Current, Relay	50	mA
Input Control Current, Detector	100	mA
Total Package Dissipation [1]	1	W
Isolation Voltage, Input to Output	3750	V_{rms}
Operational Temperature	-40 to +85	°C
Storage Temperature	-40 to +125	°C

[1] Derate linearly 8.33 mW / °C

Total Power Dissipation (PD):

$P_D = P_{HOOKSWITCH} + P_{BRIDGE} + P_{DARLINGTON} + P_{LED}$

$P_D = (R_{DS}(on))(I^2_L) + 2(V_F)(I_L) + (V_{CE})(I_L) + (V_{LED})(I_F)$

WHERE:

$R_{DS}(on)$ = Maximum relay on-resistance

I_L = Maximum loop current

V_F = Maximum diode forward voltage

V_{CE} = Maximum voltage collector to emitter

V_{LED} = Maximum LED forward voltage

I_F = Maximum LED current

Absolute Maximum Ratings are stress ratings. Stresses in excess of these ratings can cause permanent damage to the device. Functional operation of the device at conditions beyond those indicated in the operational sections of this data sheet is not implied.

Electrical Characteristics @25ºC: Relay Section

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Blocking Voltage (Peak)	-	V_L	-	-	350	V_P
Load Current, Continuous	-	I_L	-	-	120	mA_{rms} / mA_{DC}
On-Resistance	I_L=120mA	R_{ON}	-	-	20	Ω
Off-State Leakage Current	V_L=350V_P, T_J=25ºC	I_{LEAK}	-	-	1	µA
Switching Speeds						
Turn-On	I_F=5mA, V_L=10V	t_{on}	-	-	5	ms
Turn-Off		t_{off}	-	-	3	ms
Output Capacitance	V_L=50V, f=1MHz	C_{OUT}	-	25	-	pF
Current Limit	I_F=5mA	I_{CL}	190	235	280	mA
Input Characteristics						
Input Control Current to Activate	I_L=120mA	I_F	-	-	5	mA
Input Voltage Drop	I_F=5mA	V_F	0.9	1.2	1.4	V
Reverse Input Voltage	-	V_R	-	-	5	V
Reverse Input Current	V_R=5V	I_R	-	-	10	µA

Electrical Characteristics @25ºC: Detector Section

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Phototransistor Blocking Voltage	I_C=10µA	BV_{CEO}	20	50	-	V
Phototransistor Dark Current	V_{CE}=5V, I_F=0mA	I_{CEO}	-	50	500	nA
Saturation Voltage	I_C=2mA, I_F=16mA	V_{SAT}	-	0.3	0.5	V
Current Transfer Ratio	I_F=6mA, V_{CE}=0.5V	CTR	33	400	-	%
Input Characteristics						
Input Control Current	I_C=2mA, V_{CE}=0.5V	I_F	-	2	6	mA
Input Voltage Drop	I_F=5mA	V_F	0.9	1.2	1.4	V
Input Current (Detector Must be Off)	I_C=1µA, V_{CE}=5V	I_F	5	25	-	µA

Electrical Characteristics @25ºC (Unless Otherwise Noted): Bridge Rectifier Section

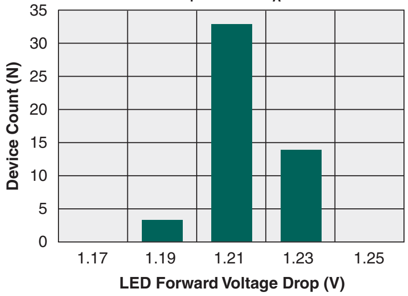
Parameter	Conditions	Symbol	Min	Typ	Max	Units
Reverse Voltage	-	V_{RD}	-	-	100	V
Forward Voltage Drop	I_{FD}=120mA	V_{FD}	-	-	1.5	V
Reverse Leakage Current	T_J=25ºC, V_R=100V	I_{RD}	-	-	10	µA
	T_J=85ºC		-	50	-	
Forward Current						
Continuous	-	I_{FD}	-	-	140	mA
Peak	t=10ms		-	-	500	

Electrical Characteristics @25ºC: Darlington Transistor Section

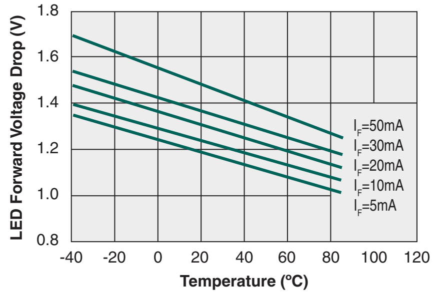
Parameter	Conditions	Symbol	Min	Typ	Max	Units
Collector-Emitter Voltage	I_C=10mA_{DC}, I_B=0mA	V_{CEO}	40	-	-	V
Collector Current, Continuous	V_C=3.5V	I_C	-	-	120	mA
Power Dissipation	-	P_D	-	-	500	mW
Off-State Collector-Emitter Leakage Current	V_{CE}=10V, I_B=0mA	I_{CEX}	-	-	1	µA
DC Current Gain	V_{CE}=10V_{DC}, I_C=120mA	h_{FE}	10,000	-	-	-
Saturation Voltage	I_C=120mA	$V_{CE(sat)}$	-	-	1.5	V
Total Harmonic Distortion	I_C=40mA, f_O=300Hz @ -10dBm	-	-	-	-80	dB

DEVICE PERFORMANCE DATA*

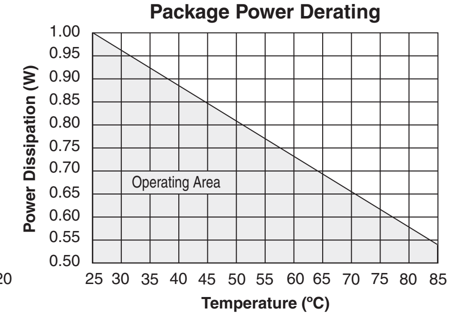
Typical LED Forward Voltage Drop ($N=50$, $I_F=5mA$, $T_A=25°C$)



Typical LED Forward Voltage Drop vs. Temperature

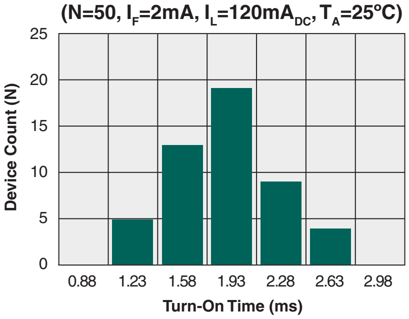


Package Power Derating

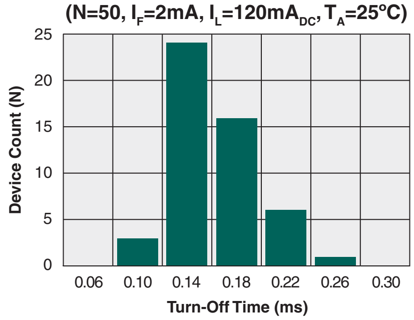


RELAY PERFORMANCE DATA*

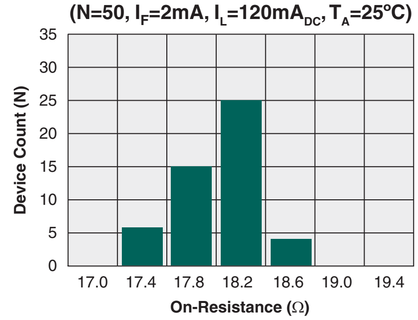
Typical Turn-On Time ($N=50$, $I_F=2mA$, $I_L=120mA_{DC}$, $T_A=25°C$)



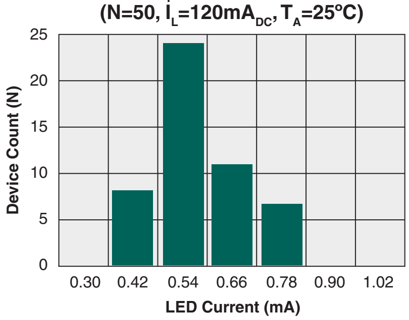
Typical Turn-Off Time ($N=50$, $I_F=2mA$, $I_L=120mA_{DC}$, $T_A=25°C$)



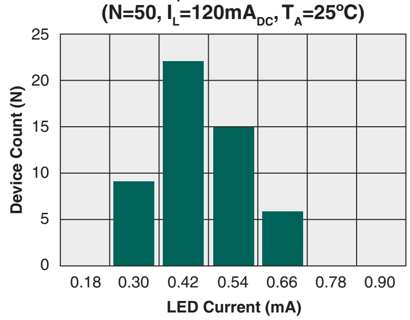
Typical On-Resistance Distribution ($N=50$, $I_F=2mA$, $I_L=120mA_{DC}$, $T_A=25°C$)



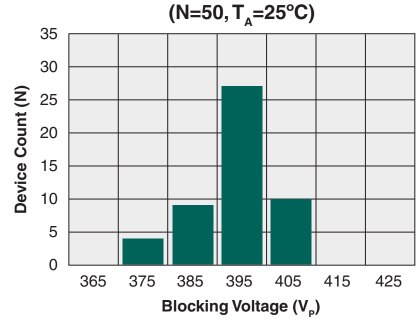
Typical I_F for Switch Operation ($N=50$, $I_L=120mA_{DC}$, $T_A=25°C$)



Typical I_F for Switch Dropout ($N=50$, $I_L=120mA_{DC}$, $T_A=25°C$)



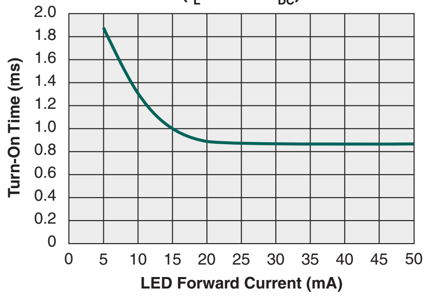
Typical Blocking Voltage Distribution ($N=50$, $T_A=25°C$)



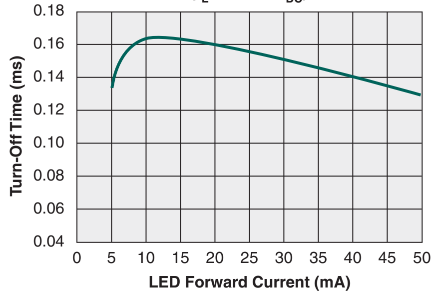
* The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

RELAY PERFORMANCE DATA (cont)*

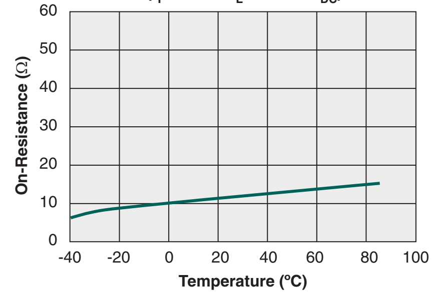
Typical Turn-On Time vs. LED Forward Current (I_L=120mA_{DC})



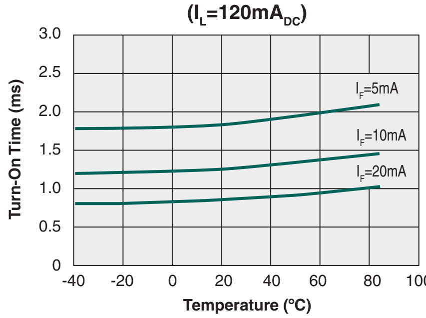
Typical Turn-Off Time vs. LED Forward Current (I_L=120mA_{DC})



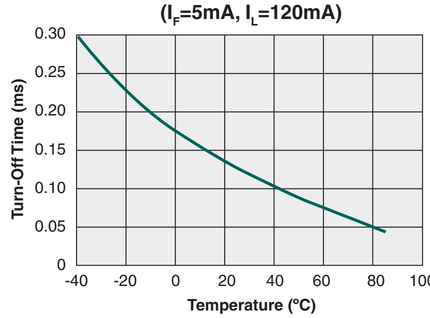
Typical On-Resistance vs. Temperature (I_F=5mA, I_L=120mA_{DC})



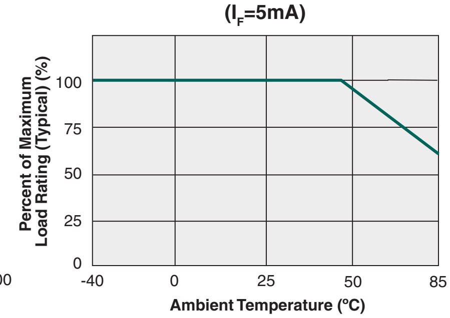
Typical Turn-On Time vs. Temperature (I_L=120mA_{DC})



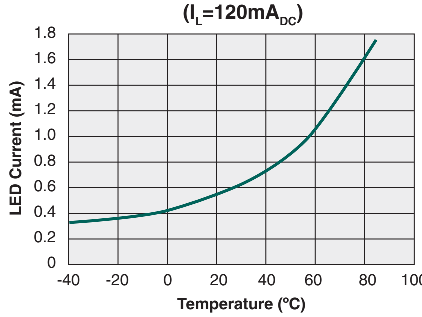
Typical Turn-Off Time vs. Temperature (I_F=5mA, I_L=120mA)



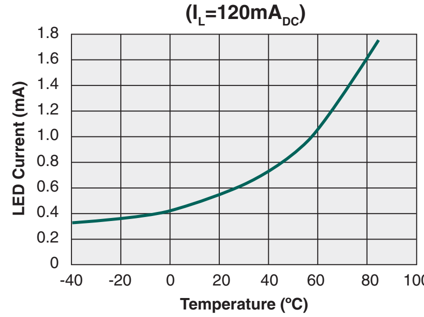
Load Current vs. Ambient Temperature (I_F=5mA)



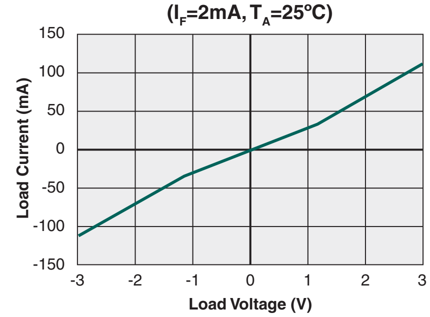
Typical I_F for Switch Operation vs. Temperature (I_L=120mA_{DC})



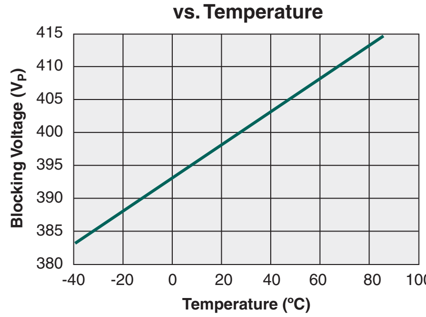
Typical I_F for Switch Dropout vs. Temperature (I_L=120mA_{DC})



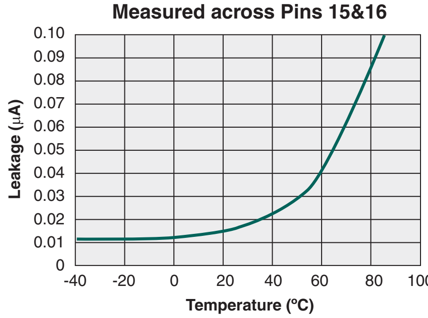
Typical Load Current vs. Load Voltage (I_F=2mA, T_A=25°C)



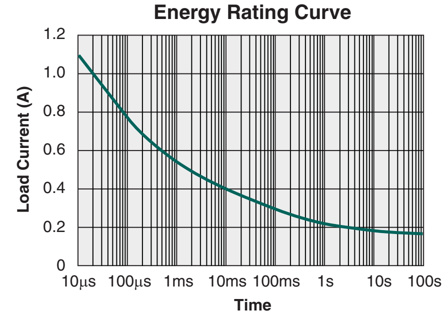
Typical Blocking Voltage vs. Temperature



Typical Leakage vs. Temperature Measured across Pins 15&16



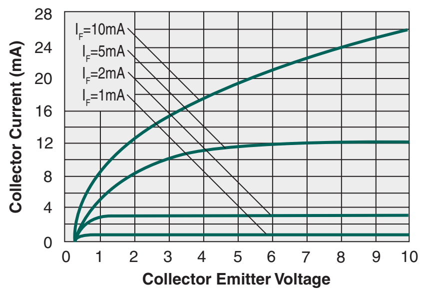
Energy Rating Curve



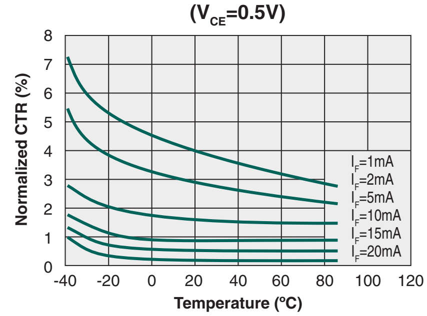
* The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PHOTOTRANSISTOR PERFORMANCE DATA*

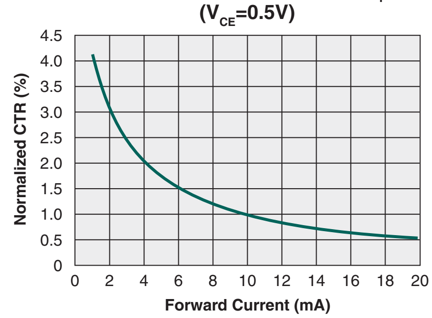
Typical Transfer Characteristics of Single Transistor Detector



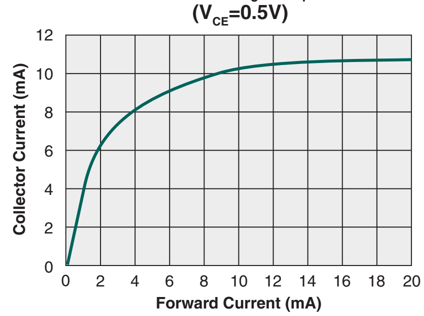
Single Transistor Typical Normalized CTR vs. Temperature (V_{CE}=0.5V)



Single Transistor Typical Normalized CTR vs. I_F (V_{CE}=0.5V)

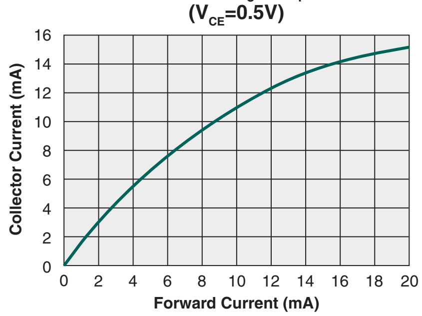


Single Transistor Typical I_C vs. I_F (V_{CE}=0.5V)

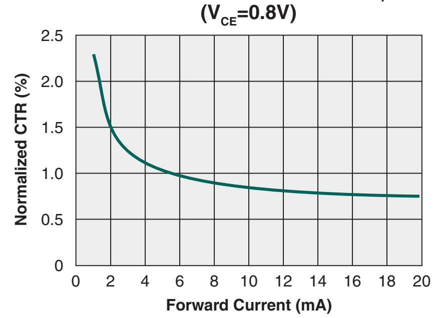


DARLINGTON PERFORMANCE DATA*

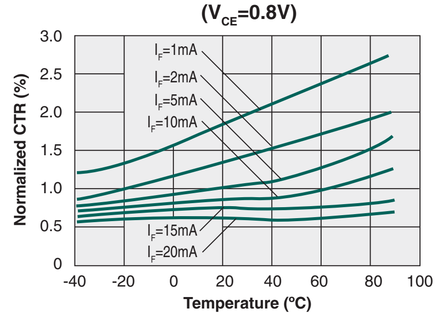
Darlington Transistor Typical I_C vs. I_F (V_{CE}=0.5V)



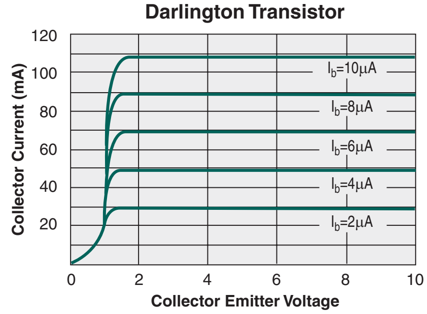
Darlington Transistor Typical Normalized CTR vs. I_F (V_{CE}=0.8V)



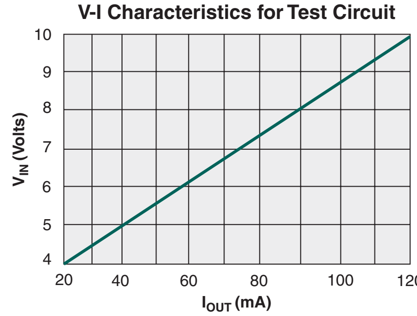
Darlington Transistor Typical Normalized CTR vs. Temperature (V_{CE}=0.8V)



Typical Transfer Characteristics of Darlington Transistor



V-I Characteristics for Test Circuit



* The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

Manufacturing Information

Moisture Sensitivity

All plastic encapsulated semiconductor packages are susceptible to moisture ingression. IXYS Integrated Circuits Division classified all of its plastic encapsulated devices for moisture sensitivity according to the latest version of the joint industry standard, **IPC/JEDEC J-STD-020**, in force at the time of product evaluation. We test all of our products to the maximum conditions set forth in the standard, and guarantee proper operation of our devices when handled according to the limitations and information in that standard as well as to any limitations set forth in the information or standards referenced below.

Failure to adhere to the warnings or limitations as established by the listed specifications could result in reduced product performance, reduction of operable life, and/or reduction of overall reliability.

This product carries a **Moisture Sensitivity Level (MSL) rating** as shown below, and should be handled according to the requirements of the latest version of the joint industry standard **IPC/JEDEC J-STD-033**.

Device	Moisture Sensitivity Level (MSL) Rating
ITC117PL	MSL 1

ESD Sensitivity

This product is **ESD Sensitive**, and should be handled according to the industry standard **JESD-625**.

Reflow Profile

This product has a maximum body temperature and time rating as shown below. All other guidelines of **J-STD-020** must be observed.

Device	Maximum Temperature x Time
ITC117PL	260°C for 30 seconds

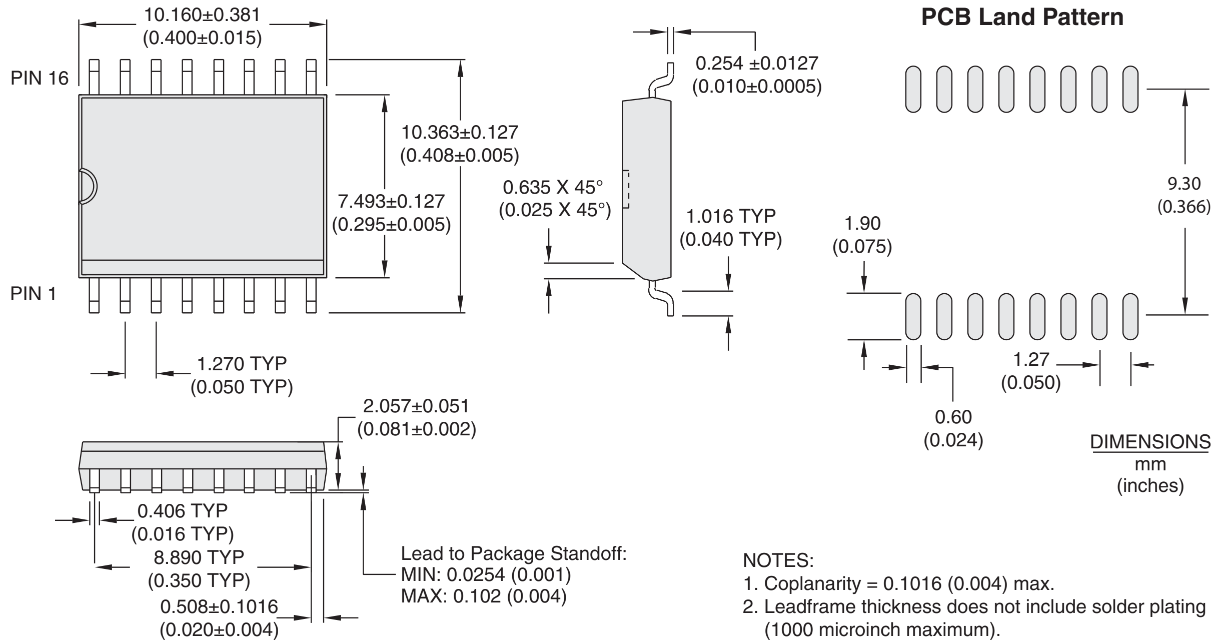
Board Wash

IXYS Integrated Circuits Division recommends the use of no-clean flux formulations. However, board washing to remove flux residue is acceptable. Since IXYS Integrated Circuits Division employs the use of silicone coating as an optical waveguide in many of its optically isolated products, the use of a short drying bake could be necessary if a wash is used after solder reflow processes. Chlorine- or Fluorine-based solvents or fluxes should not be used. Cleaning methods that employ ultrasonic energy should not be used.

Pb RoHS e3

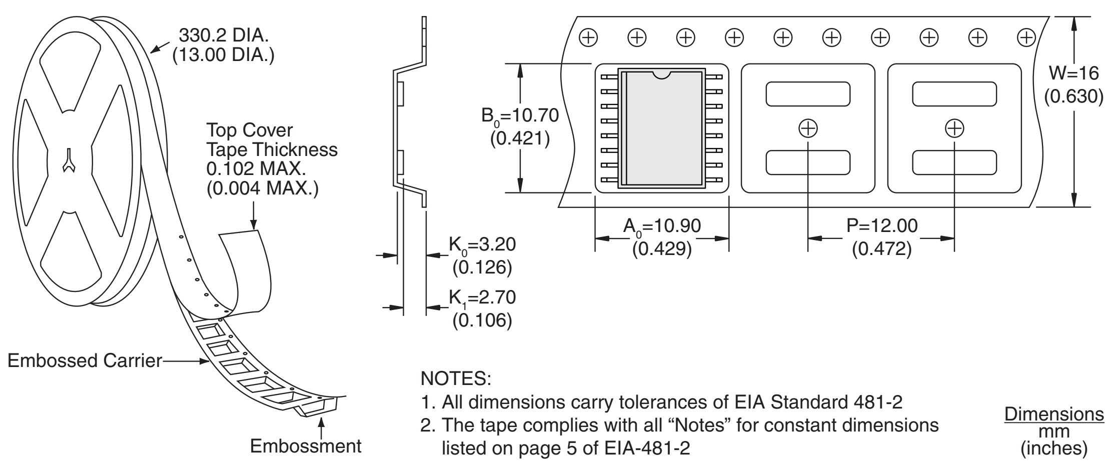
MECHANICAL DIMENSIONS

ITC117PL



NOTES:
1. Coplanarity = 0.1016 (0.004) max.
2. Leadframe thickness does not include solder plating (1000 microinch maximum).

ITC117PLTR Tape & Reel



NOTES:
1. All dimensions carry tolerances of EIA Standard 481-2
2. The tape complies with all "Notes" for constant dimensions listed on page 5 of EIA-481-2

Dimensions
mm
(inches)

For additional information please visit our website at: www.ixysic.com

Specification: DS-ITC117PL_R04

9/27/2013