## Absolute Maximum Ratings @ 25ºC

| Parameter | Ratings | Units |
|---|---|---|
| Blocking Voltage | 350 | $V_P$ |
| Input Power Dissipation [1] | 150 | mW |
| Input Control Current, Relay | 50 | mA |
| Peak (10ms) | 1 | A |
| Input Control Current, Detector | 100 | mA |
| Reverse Input Voltage | 5 | V |
| Total Power Dissipation [2] | 800 | mW |
| Isolation Voltage, Input to Output | 3750 | $V_{rms}$ |
| Operational Temperature | -40 to +85 | °C |
| Storage Temperature | -40 to +125 | °C |

[1] Derate linearly 1.33 mW / ºC
[2] Derate linearly 6.67 mW / ºC

*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** | | | | | | |
| Load Current | | | | | | |
| Continuous | - | $I_L$ | - | - | 120 | $mA_{rms}$ / $mA_{DC}$ |
| Peak | t=10ms | $I_{LPK}$ | - | - | ±350 | $mA_P$ |
| On-Resistance | $I_L$=120mA | $R_{ON}$ | - | 25 | 35 | Ω |
| Off-State Leakage Current | $V_L$=350V | $I_{LEAK}$ | - | - | 1 | µA |
| Switching Speeds | | | | | | |
| Turn-On | $I_F$=5mA, $V_L$=10V | $t_{on}$ | - | - | 3 | ms |
| Turn-Off | | $t_{off}$ | - | - | 3 | ms |
| Output Capacitance | $V_L$=50V, f=1MHz | $C_{OUT}$ | - | 25 | - | pF |
| **Input Characteristics** | | | | | | |
| Input Control Current to Activate | $I_L$=120mA | $I_F$ | - | - | 5 | mA |
| Input Control Current to Deactivate | - | $I_F$ | 0.4 | 0.7 | - | mA |
| Input Voltage Drop | $I_F$=5mA | $V_F$ | 0.9 | 1.2 | 1.4 | V |
| Reverse Input Current | $V_R$=5V | $I_R$ | - | - | 10 | µA |
| **Common Characteristics** | | | | | | |
| Input to Output Capacitance | - | $C_{I/O}$ | - | 3 | - | pF |

## 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 | 100 | - | % |
| **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 |
| Input to Output Capacitance | - | - | - | 3 | - | pF |
| Isolation, Input to Output | - | $V_{I/O}$ | 3750 | - | - | $V_{rms}$ |



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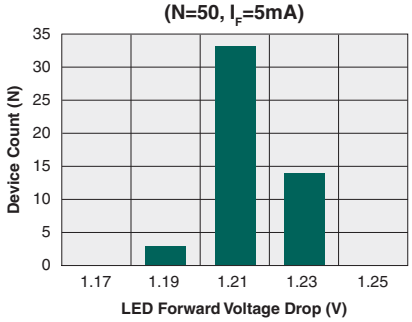
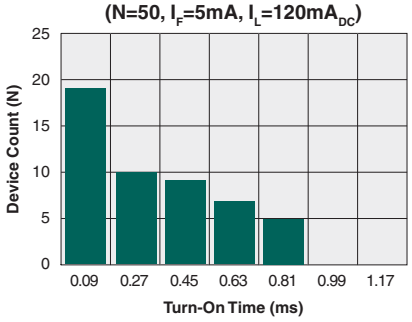
## RELAY PERFORMANCE DATA @25°C (Unless Otherwise Noted)*

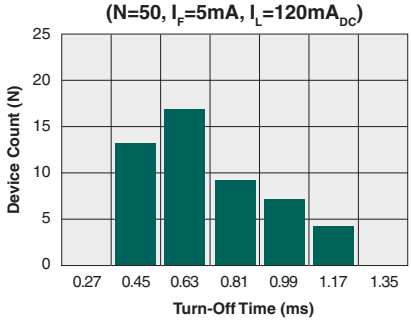
Typical LED Forward Voltage Drop
(N=50, $I_F$=5mA)



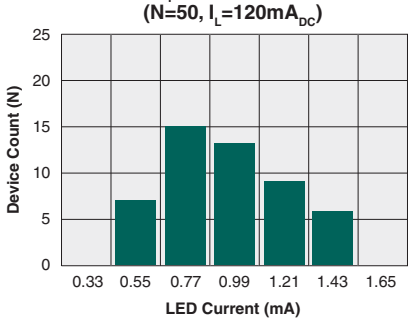

Typical Turn-On Time
(N=50, $I_F$=5mA, $I_L$=120mA$_{DC}$)



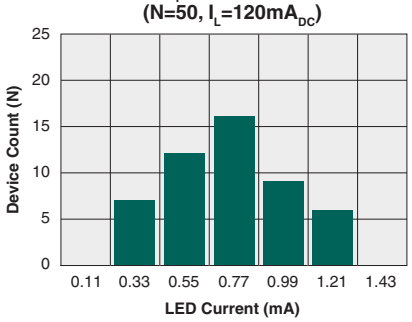

Typical Turn-Off Time
(N=50, $I_F$=5mA, $I_L$=120mA$_{DC}$)



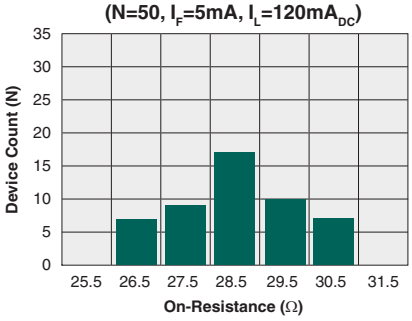

Typical $I_F$ for Switch Operation
(N=50, $I_L$=120mA$_{DC}$)



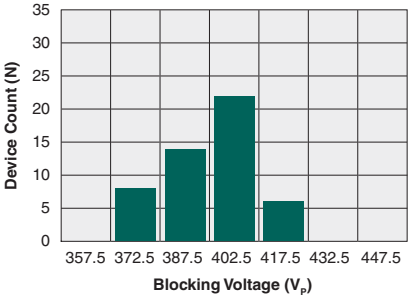

Typical $I_F$ for Switch Dropout
(N=50, $I_L$=120mA$_{DC}$)



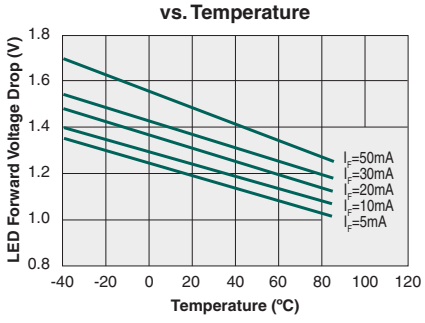

Typical On-Resistance Distribution
(N=50, $I_F$=5mA, $I_L$=120mA$_{DC}$)



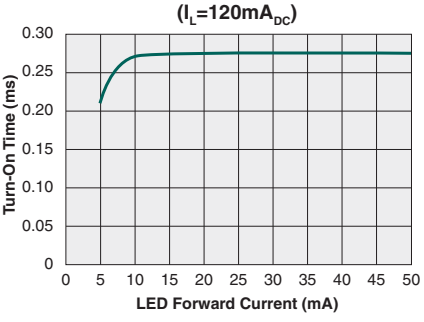

Typical Blocking Voltage Distribution
(N=50)



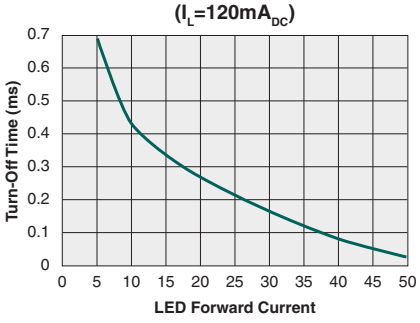

Typical LED Forward Voltage Drop
vs. Temperature




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




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




* 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.



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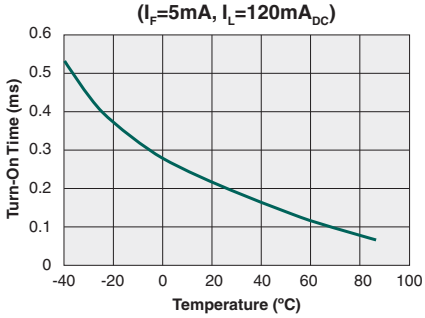
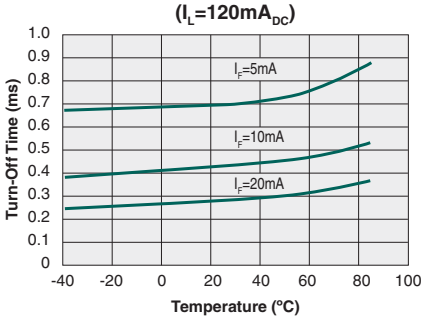
## RELAY PERFORMANCE DATA @25°C (Unless Otherwise Noted)*

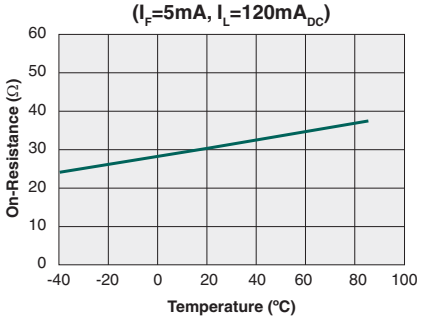
**Typical Turn-On Time vs. Temperature ($I_F$=5mA, $I_L$=120mA$_{DC}$)**



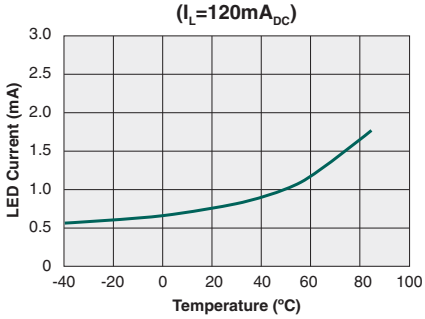

**Typical Turn-Off Time vs. Temperature ($I_L$=120mA$_{DC}$)**



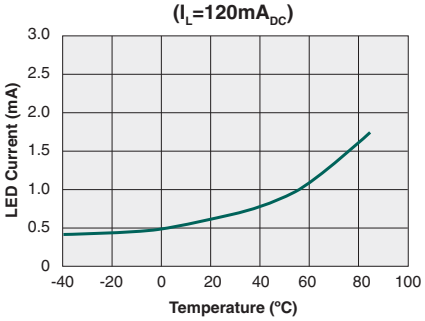

**Typical On-Resistance vs. Temperature ($I_F$=5mA, $I_L$=120mA$_{DC}$)**



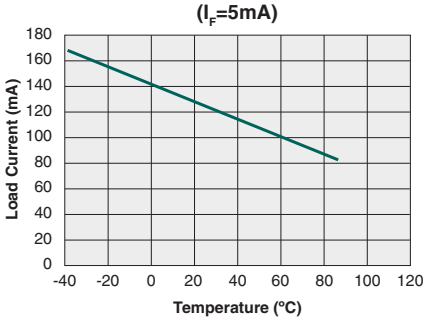

**Typical $I_F$ for Switch Operation vs. Temperature ($I_L$=120mA$_{DC}$)**



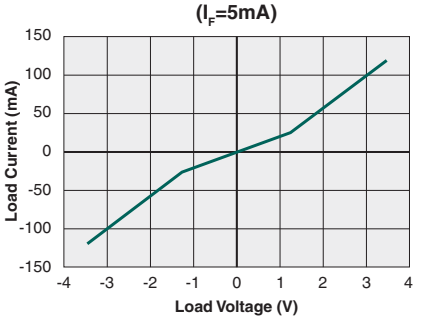

**Typical $I_F$ for Switch Dropout vs. Temperature ($I_L$=120mA$_{DC}$)**



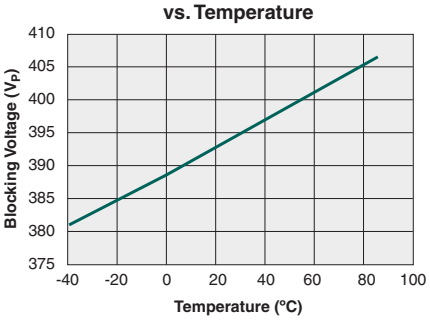

**Maximum Load Current vs. Temperature ($I_F$=5mA)**



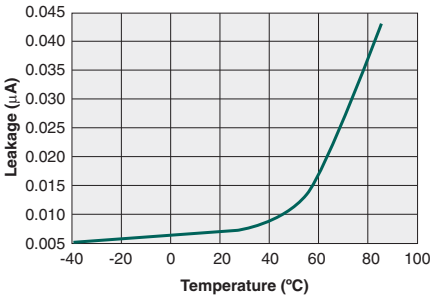

**Typical Load Current vs. Load Voltage ($I_F$=5mA)**



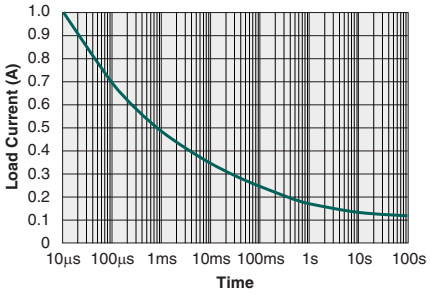

**Typical Blocking Voltage vs. Temperature**




**Typical Leakage vs. Temperature Measured across Pins 7&8**




**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.



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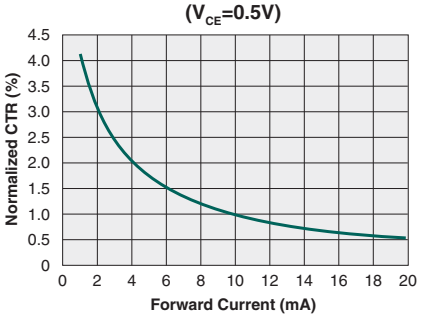
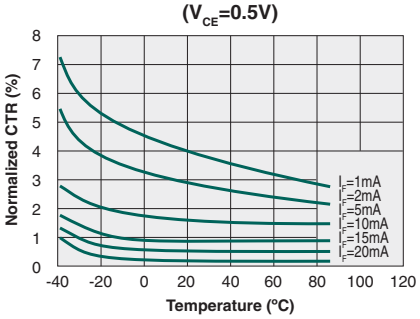
## DETECTOR PERFORMANCE DATA @25°C (Unless Otherwise Noted)*

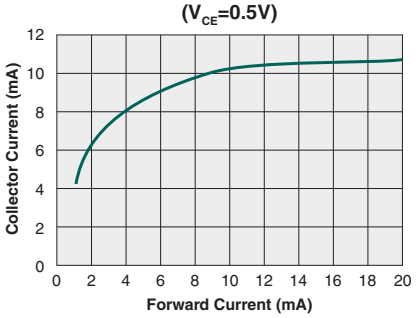
**Typical Normalized CTR vs. Forward Current ($V_{CE}$=0.5V)**




**Typical Normalized CTR vs. Temperature ($V_{CE}$=0.5V)**




**Typical Collector Current vs. Forward Current ($V_{CE}$=0.5V)**




* 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.



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## 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 |
|---|---|
| TS118 / TS118P / TS118S | 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 |
|---|---|
| TS118 / TS118S | 250°C for 30 seconds |
| TS118P | 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.



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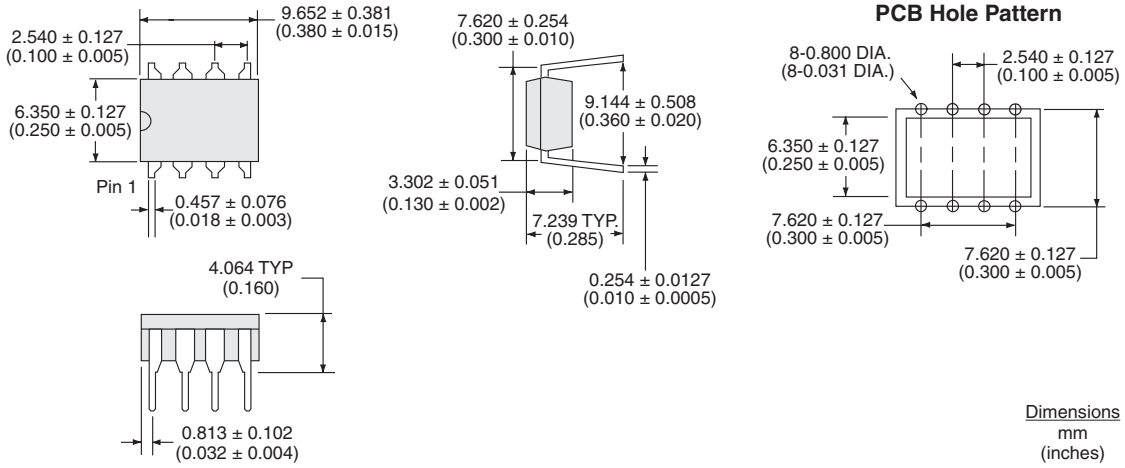
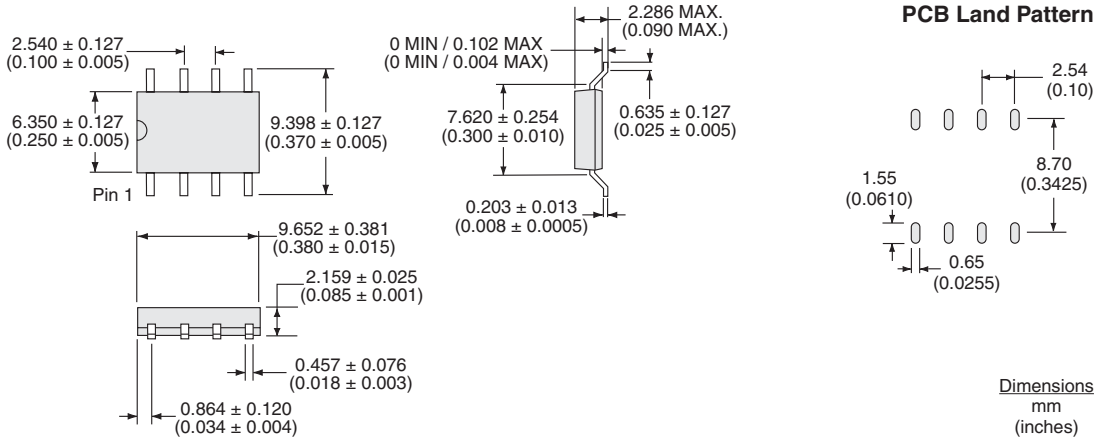
## Mechanical Dimensions

### TS118



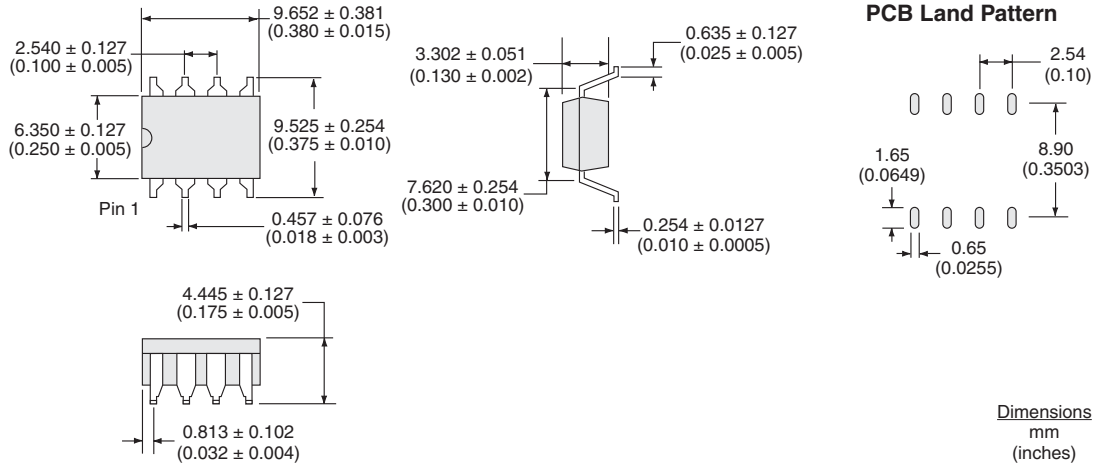

Dimensions
mm
(inches)

### TS118P




Dimensions
mm
(inches)

### TS118S




Dimensions
mm
(inches)



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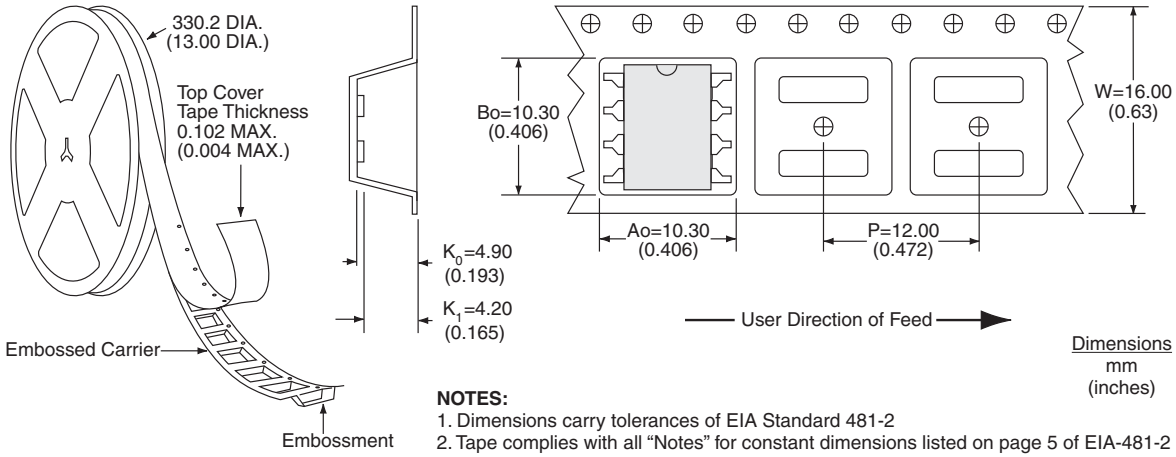
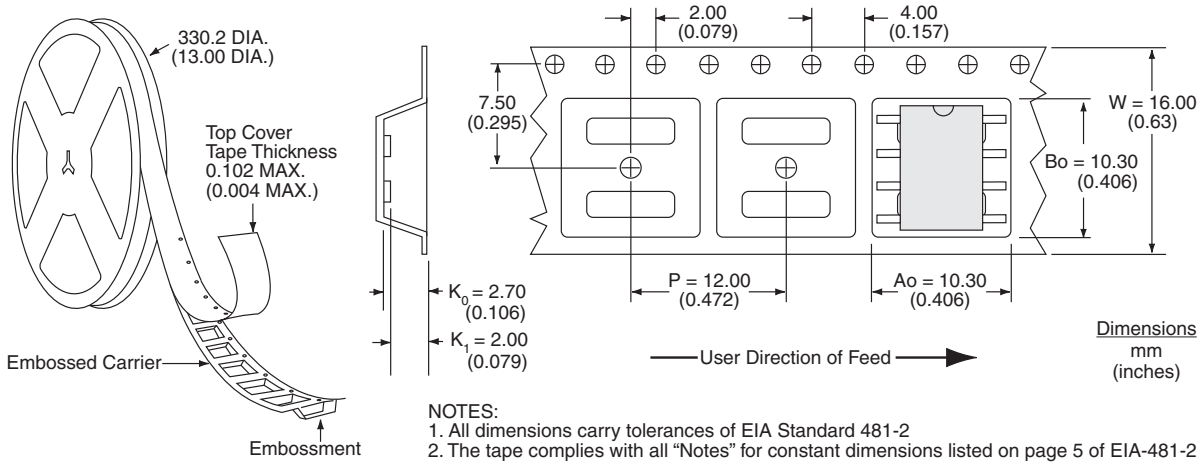
## TS118STR Tape & Reel




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

## TS118PTR 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

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

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