## ELECTRICAL CHARACTERISTICS (Ambient Temperature = 25°C unless otherwise specified)

### INPUT

| Parameter | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| Forward Voltage | $V_F$ | $I_F$ = 20mA | | 1.2 | 1.4 | V |
| Reverse Leakage | $I_R$ | $V_R$ = 4V | | | 10 | µA |
| Terminal Capacitance | $C_t$ | V = 0V, f = 1KHz | | 30 | 250 | pF |

### OUTPUT

| Parameter | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| Collector−Emitter Breakdown Voltage | $BV_{CEO}$ | $I_C$ = 0.1mA, $I_F$ = 0mA<br>ISP817<br>ISP827 / ISP847 | <br>80<br>35 | | | V |
| Emitter−Collector Breakdown Voltage | $BV_{ECO}$ | $I_E$ = 10µA, $I_F$ = 0mA | 6 | | | V |
| Collector−Emitter Dark Current | $I_{CEO}$ | $V_{CE}$ = 20V, $I_F$ = 0mA | | | 100 | nA |

## ELECTRICAL CHARACTERISTICS (Ambient Temperature = 25°C unless otherwise specified)

### COUPLED

| Parameter | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| Current Transfer Ratio | CTR | $I_F$ = 5mA, $V_{CE}$ = 5V | 50 | | 600 | % |
| | | Optional CTR Grades | | | | |
| | | GB | 100 | | 600 | |
| | | BL | 200 | | 600 | |
| | | GR | 100 | | 300 | |
| | | A | 80 | | 160 | |
| | | B | 130 | | 260 | |
| | | C | 200 | | 400 | |
| | | D | 300 | | 600 | |
| Collector−Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_F$ = 20mA, $I_C$ = 1mA | | 0.1 | 0.2 | V |
| Floating Capacitance | $C_f$ | V = 0V, f = 1MHz | | 0.6 | 1 | pF |
| Cut-Off Frequency | fc | $V_{CE}$ = 5V, $I_C$ = 2mA, $R_L$ = 100Ω, -3dB | | 80 | | kHz |
| Output Rise Time | $t_r$ | $V_{CE}$ = 2V, Ic = 2mA, $R_L$ = 100Ω | | 4 | 18 | µs |
| Output Fall Time | $t_f$ | | | 3 | 18 | |

### ISOLATION

| Parameter | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| Input to Output Isolation Voltage | $V_{ISO}$ | AC 1 minute, RH = 40% to 60% Note 1 | 5300 | | | $V_{RMS}$ |
| Input to Output Isolation Resistance | $R_{ISO}$ | $V_{IO}$= 500V, RH = 40% to 60% Note 1 | $5x10^{10}$ | $1x10^{11}$ | | Ω |

Note 1 : Measure with input leads shorted together and output leads shorted together.

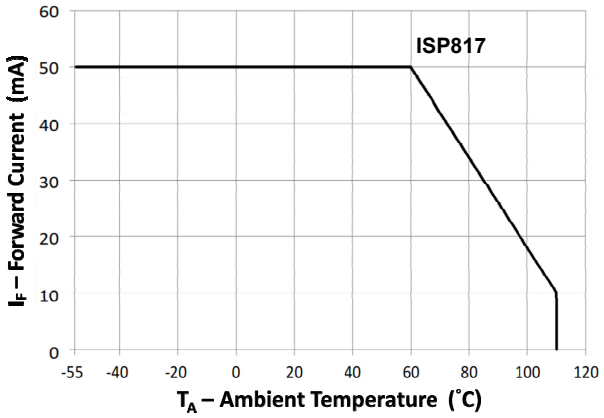



Fig 1 Forward Current vs Ambient Temperature (1)

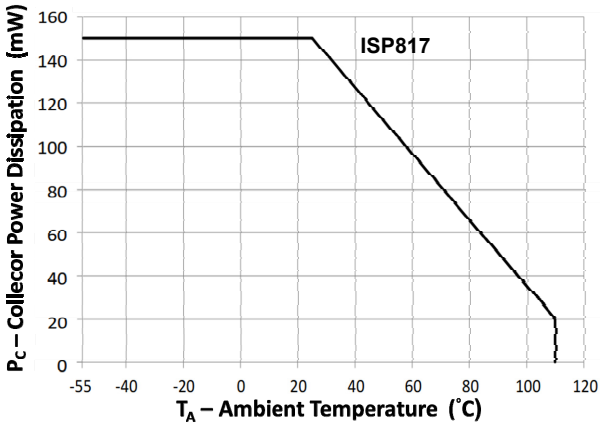



Fig 2 Collector Power Dissipation vs Ambient Temperature (1)

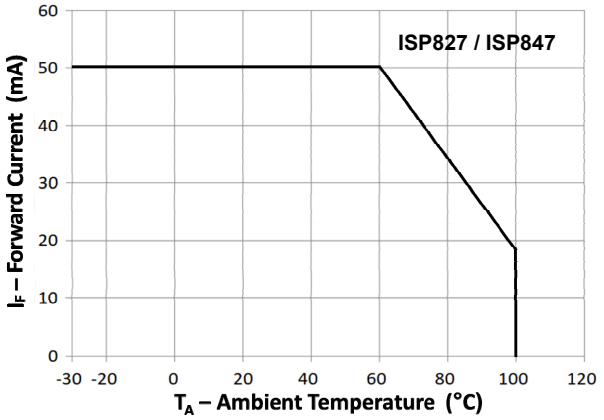



Fig 3 Forward Current vs Ambient Temperature (2)

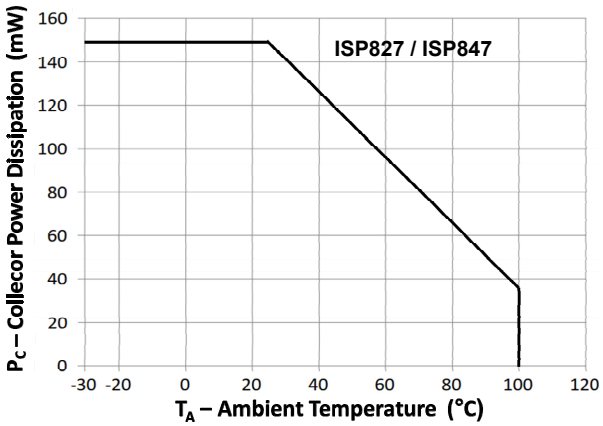



Fig 4 Collector Power Dissipation vs Ambient Temperature (2)

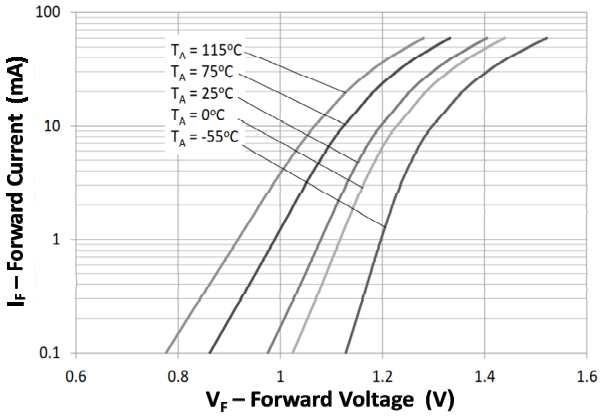



Fig 5 Forward Current vs Forward Voltage

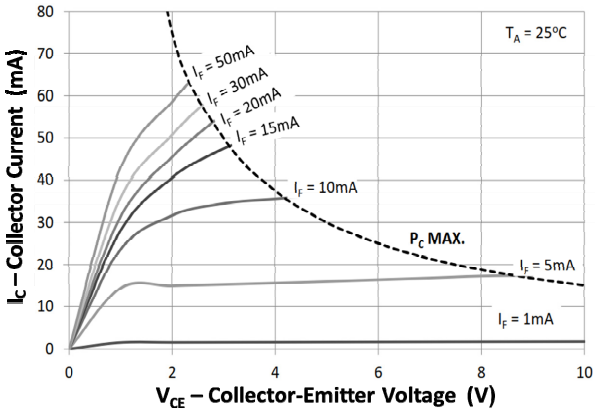



Fig 6 Collector Current vs Collector-Emitter Voltage

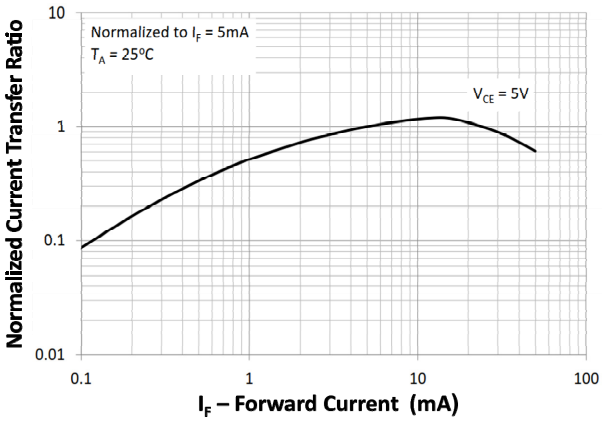



Fig 7 Normalized Current Transfer Ratio vs Forward Current

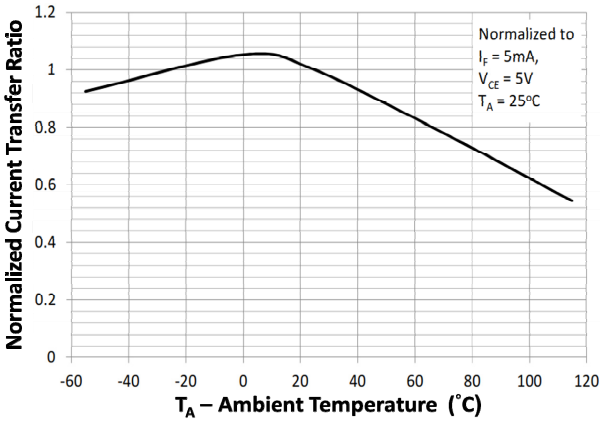



Fig 8 Normalized Current Transfer Ratio vs Ambient Temperature

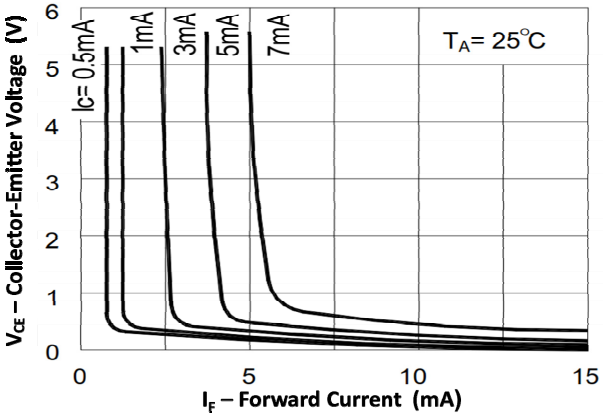



Fig 9 Collector-Emitter Voltage vs Forward Current

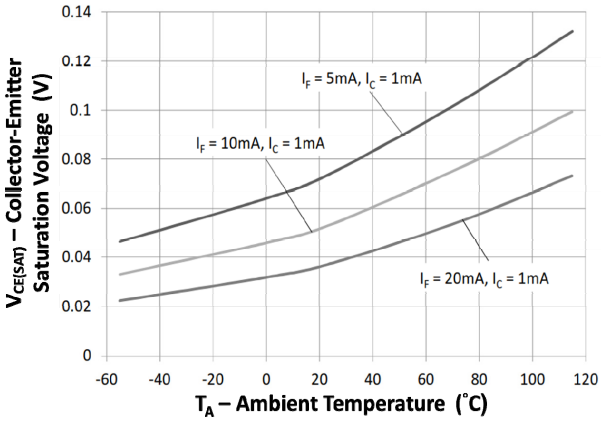



Fig 10 Collector-Emitter Saturation Voltage vs Ambient Temperature

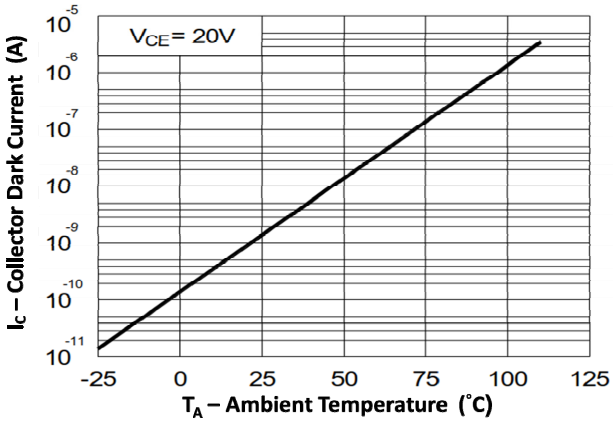



Fig 11 Collector Dark Current vs Ambient Temperature

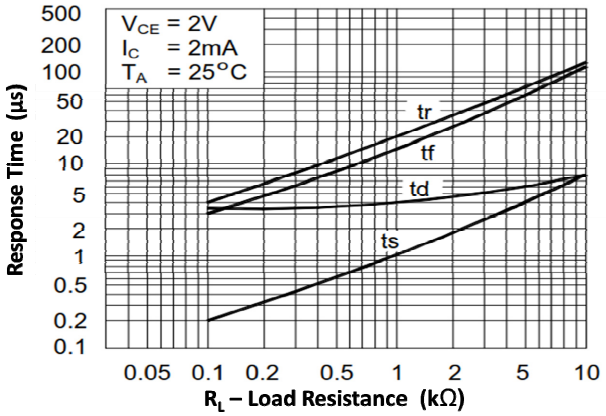
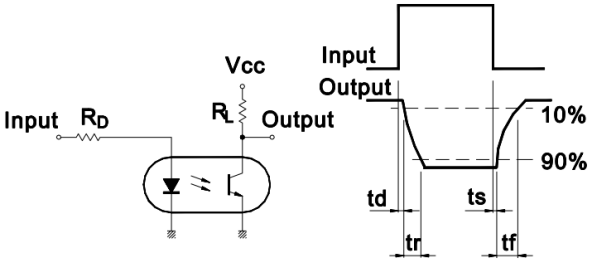



Fig 12 Response Time vs Load Resistance




Response Time Test Circuit

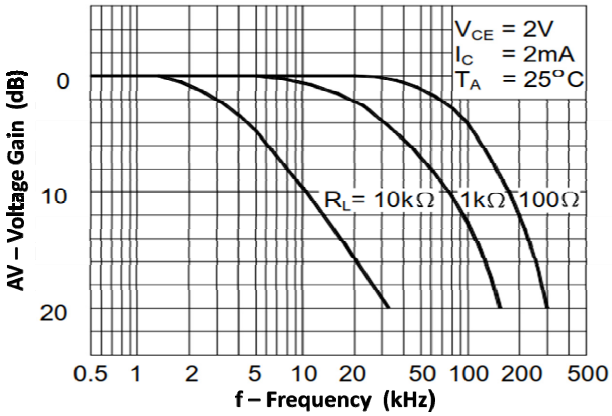
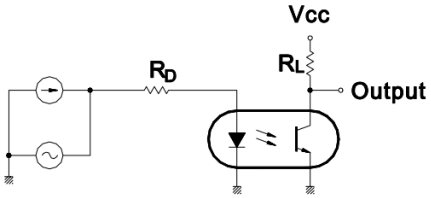



Fig 13 Frequency Response




Frequency Response Test Circuit

## ORDER INFORMATION

| ISP817 (UL Approval) | | | |
|---|---|---|---|
| **After PN** | **PN** | **Description** | **Packing quantity** |
| None | ISP817, ISP817GB, ISP817BL, ISP817GR, ISP817A, ISP817B, ISP817C, ISP817D | Standard DIP4 | 100 pcs per tube |
| G | ISP817G, ISP817GBG, ISP817BLG, ISP817GRG, ISP817AG, ISP817BG, ISP817CG, ISP817DG | 10mm Lead Spacing | 100 pcs per tube |
| SM | ISP817SM, ISP817GBSM, ISP817BLSM, ISP817GRSM, ISP817ASM, ISP817BSM, ISP817CSM, ISP817DSM | Surface Mount | 100 pcs per tube |
| SMT&R | ISP817SMT&R, ISP817GBSMT&R, ISP817GRSMT&R, ISP817BLSMT&R, ISP817ASMT&R, ISP817BSMT&R, ISP817CSMT&R, ISP817DSMT&R | Surface Mount Tape & Reel | 1000 pcs per reel |

| ISP827 (UL Approval) | | | |
|---|---|---|---|
| **After PN** | **PN** | **Description** | **Packing quantity** |
| None | ISP827, ISP827GB, ISP827BL, ISP827GR, ISP827A, ISP827B, ISP827C, ISP827D | Standard DIP8 | 50 pcs per tube |
| G | ISP827G, ISP827GBG, ISP827BLG, ISP827GRG, ISP827AG, ISP827BG, ISP827CG, ISP827DG | 10mm Lead Spacing | 50 pcs per tube |
| SM | ISP827SM, ISP827GBSM, ISP827BLSM, ISP827GRSM, ISP827ASM, ISP827BSM, ISP827CSM, ISP827DSM | Surface Mount | 50 pcs per tube |
| SMT&R | ISP827SMT&R, ISP827GBSMT&R, ISP827GRSMT&R, ISP827BLSMT&R, ISP827ASMT&R, ISP827BSMT&R, ISP827CSMT&R, ISP827DSMT&R | Surface Mount Tape & Reel | 1000 pcs per reel |

| ISP847 (UL Approval) | | | |
|---|---|---|---|
| **After PN** | **PN** | **Description** | **Packing quantity** |
| None | ISP847, ISP847GB, ISP847BL, ISP847GR, ISP847A, ISP847B, ISP847C, ISP847D | Standard DIP16 | 25 pcs per tube |
| G | ISP847G, ISP847GBG, ISP847BLG, ISP847GRG, ISP847AG, ISP847BG, ISP847CG, ISP847DG | 10mm Lead Spacing | 25 pcs per tube |
| SM | ISP847SM, ISP847GBSM, ISP847BLSM, ISP847GRSM, ISP847ASM, ISP847BSM, ISP847CSM, ISP847DSM | Surface Mount | 25 pcs per tube |

## ORDER INFORMATION

| ISP817X (UL and VDE Approvals) | | | |
|---|---|---|---|
| **After PN** | **PN** | **Description** | **Packing quantity** |
| None | ISP817X, ISP817XGB, ISP817XBL, ISP817XGR, ISP817XA, ISP817XB, ISP817XC, ISP817XD | Standard DIP4 | 100 pcs per tube |
| G | ISP817XG, ISP817XGBG, ISP817XBLG, ISP817XGRG, ISP817XAG, ISP817XBG, ISP817XCG, ISP817XDG | 10mm Lead Spacing | 100 pcs per tube |
| SM | ISP817XSM, ISP817XGBSM, ISP817XGRSM, ISP817XBLSM, ISP817XASM, ISP817XBXSM, ISP817XCSM, ISP817XDSM | Surface Mount | 100 pcs per tube |
| SMT&R | ISP817XSMT&R, ISP817XGBSMT&R, ISP817XGRSMT&R, ISP817XBLSMT&R, ISP817XASMT&R, ISP817XBSMT&R, ISP817XCSMT&R, ISP817XDSMT&R | Surface Mount Tape & Reel | 1000 pcs per reel |

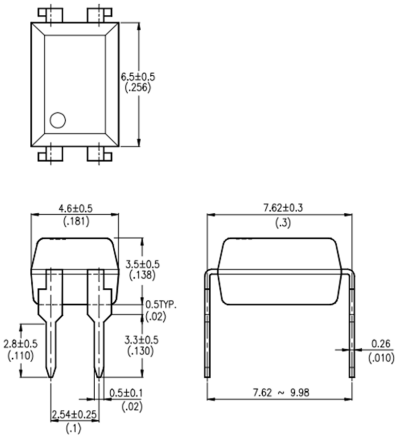
| ISP827X (UL and VDE Approvals) | | | |
|---|---|---|---|
| **After PN** | **PN** | **Description** | **Packing quantity** |
| None | ISP827X, ISP827XGB, ISP827XBL, ISP827XGR, ISP827XA, ISP827XB, ISP827XC, ISP827XD | Standard DIP8 | 50 pcs per tube |
| G | ISP827XG, ISP827XGBG, ISP827XBLG, ISP827XGRG, ISP827XAG, ISP827XBG, ISP827XCG, ISP827XDG | 10mm Lead Spacing | 50 pcs per tube |
| SM | ISP827XSM, ISP827XGBSM, ISP827XGRSM, ISP827XBLSM, ISP827XASM, ISP827XBSM, ISP827XCSM, ISP827XDSM | Surface Mount | 50 pcs per tube |
| SMT&R | ISP827XSMT&R, ISP827XGBSMT&R, ISP827XGRSMT&R, ISP827XBLSMT&R, ISP827XASMT&R, ISP827XBSMT&R, ISP827XCSMT&R, ISP827XDSMT&R | Surface Mount Tape & Reel | 1000 pcs per reel |

| ISP847 (UL and VDE Approvals) | | | |
|---|---|---|---|
| **After PN** | **PN** | **Description** | **Packing quantity** |
| None | ISP847X, ISP847XGBL, ISP847XBL, ISP847XGR, ISP847XA, ISP847XB, ISP847XC, ISP847XD | Standard DIP16 | 25 pcs per tube |
| G | ISP847XG, ISP847XGBG, ISP847XBLG, ISP847XGRG, ISP847XAG, ISP847XBG, ISP847XCG, ISP847XDG | 10mm Lead Spacing | 25 pcs per tube |
| SM | ISP847XSM, ISP847XGBSM, ISP847XGRSM, ISP847XBLSM, ISP847XASM, ISP847XBSM, ISP847XCSM, ISP847XDSM | Surface Mount | 25 pcs per tube |

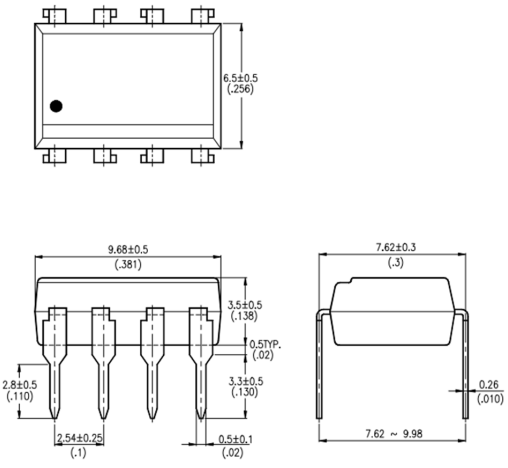
## PACKAGE DIMENSIONS in mm (inch)

### DIP

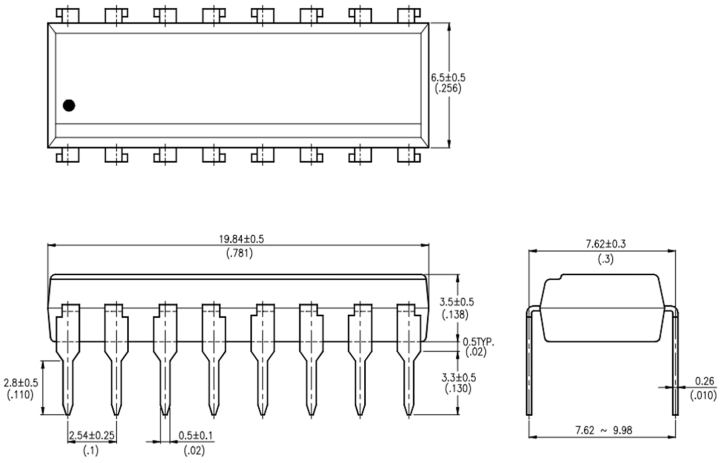
**ISP817**




**ISP827**



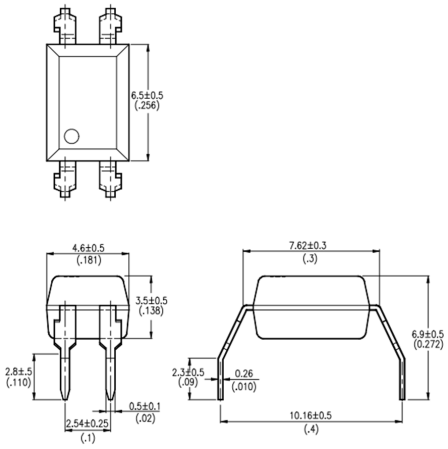

**ISP847**



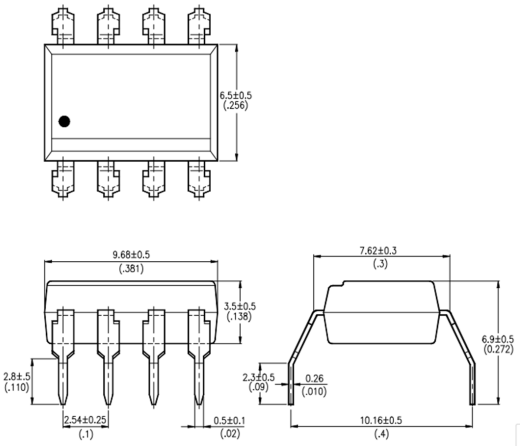
## PACKAGE DIMENSIONS in mm (inch)

### G Form

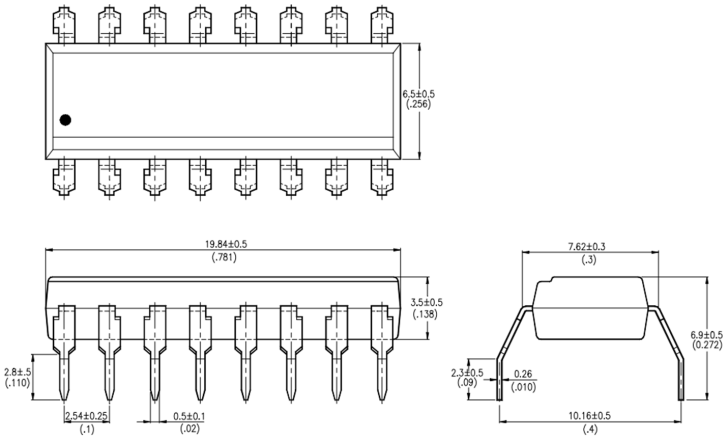
**ISP817G**




**ISP827G**



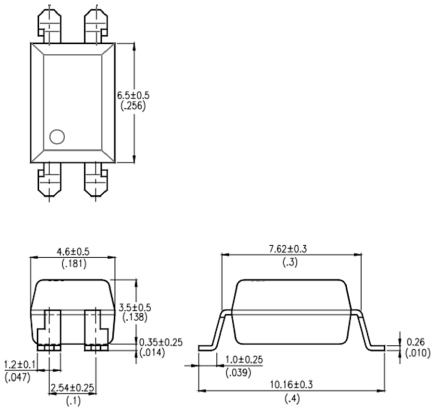

**ISP847G**



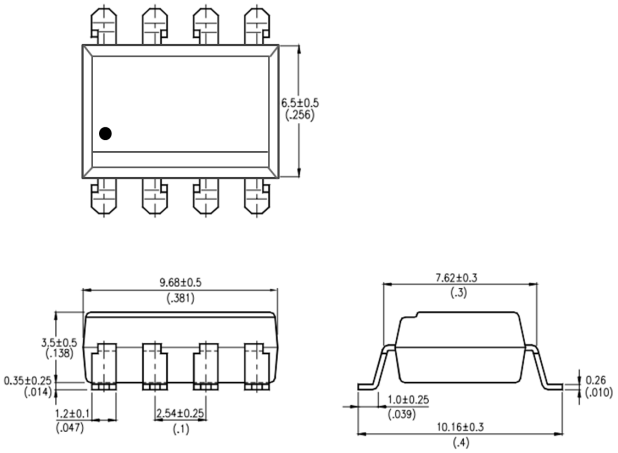
## PACKAGE DIMENSIONS in mm (inch)

### SMD

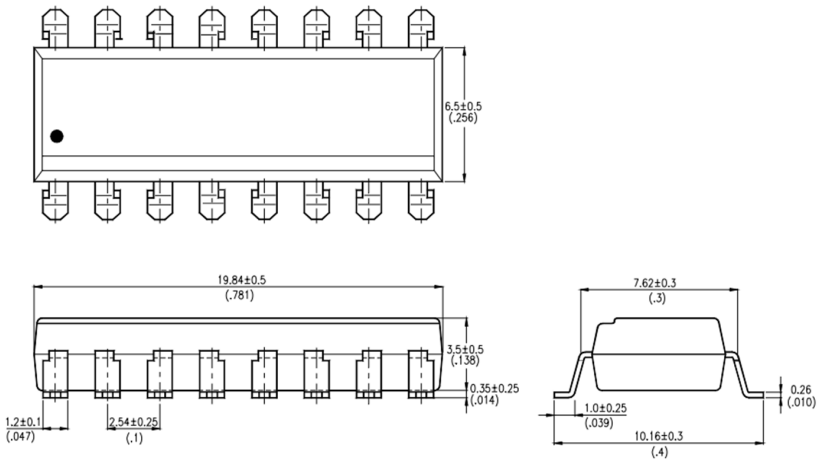
**ISP817SM**




**ISP827SM**

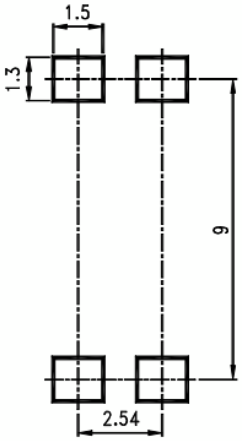



**ISP847SM**

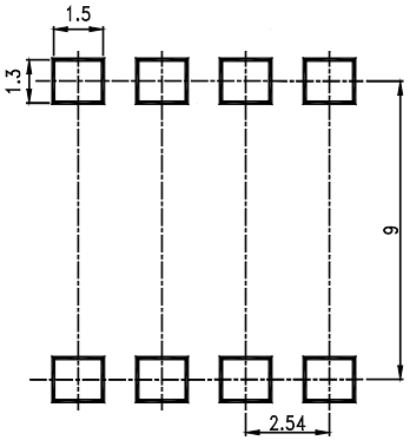


## RECOMMENDED PAD LAYOUT FOR SMD (mm)

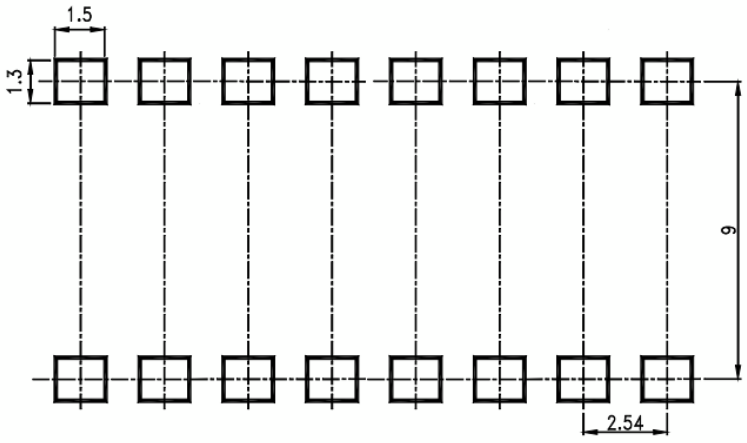
**ISP817SM**




**ISP827SM**

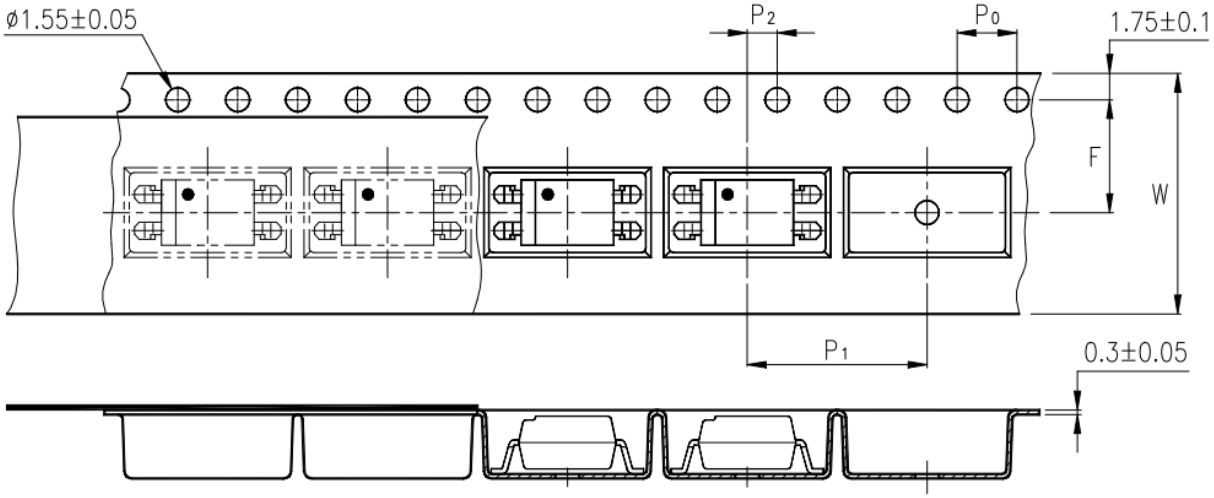



**ISP847SM**

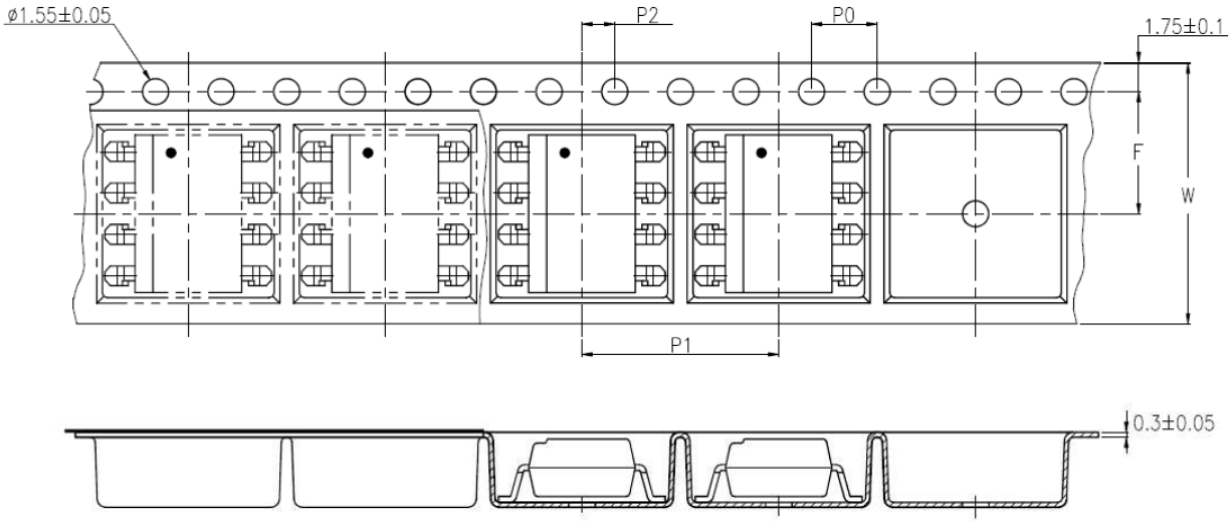


## TAPE AND REEL PACKAGING

### ISP817SMT&R

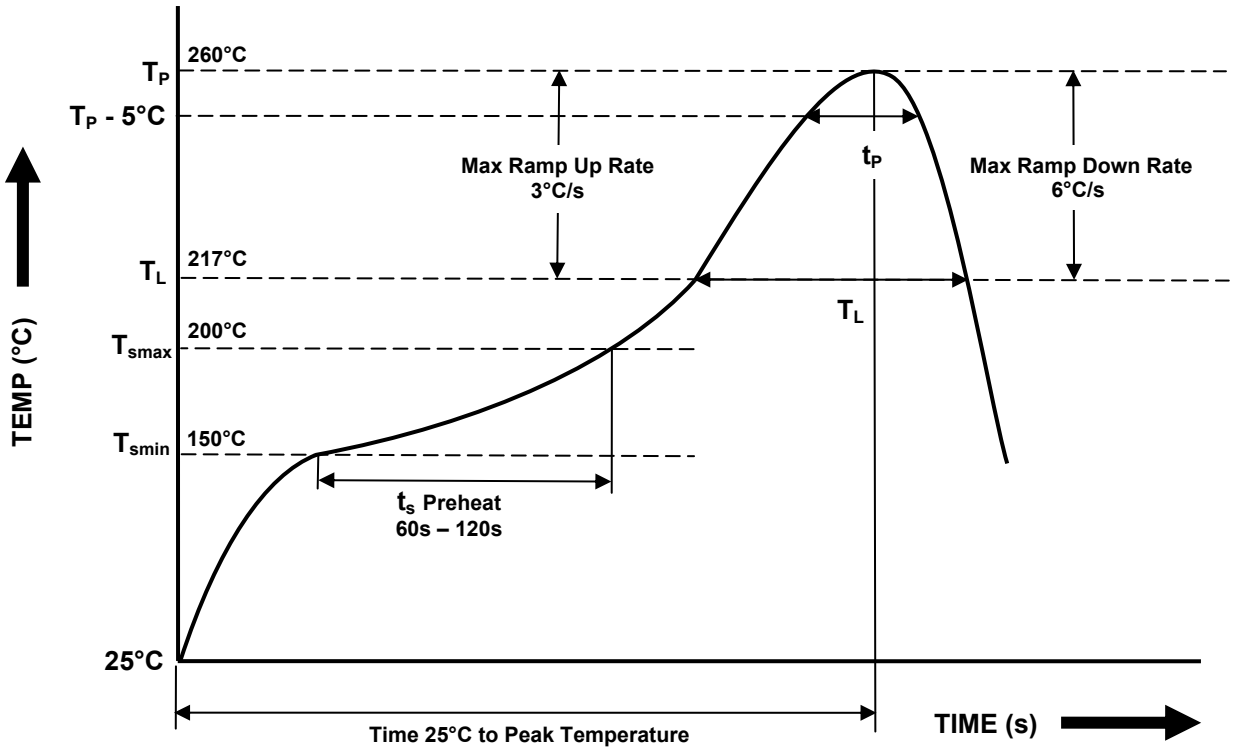



### ISP827SMT&R




| Description | Symbol | Dimension mm (inch) |
|---|---|---|
| Tape Width | W | 16 ± 0.3 (0.63) |
| Pitch of Sprocket Holes | $P_0$ | 4 ± 0.1 (0.15) |
| Distance of Compartment to Sprocket Holes | F | 7.5 ± 0.1 (0.295) |
| | $P_2$ | 2 ± 0.1 (0.079) |
| Distance of Compartment to Compartment | $P_1$ | 12 ± 0.1 (0.472) |

**IR REFLOW SOLDERING TEMPERATURE PROFILE FOR SMD**
**One Time Reflow Soldering is Recommended.**
**Do not immerse device body in solder paste.**




| Profile Details | Conditions |
|---|---|
| **Preheat**<br>- Min Temperature ($T_{SMIN}$)<br>- Max Temperature ($T_{SMAX}$)<br>- Time $T_{SMIN}$ to $T_{SMAX}$ ($t_s$) | <br>150°C<br>200°C<br>60s - 120s |
| **Soldering Zone**<br>- Peak Temperature ($T_P$)<br>- Time at Peak Temperature<br>- Liquidous Temperature ($T_L$)<br>- Time within 5°C of Actual Peak Temperature ($T_P$ – 5°C)<br>- Time maintained above $T_L$ ($t_L$)<br>- Ramp Up Rate ($T_L$ to $T_P$)<br>- Ramp Down Rate ($T_P$ to $T_L$) | <br>260°C<br>10s max<br>217°C<br>30s max<br>60s - 100s<br>3°C/s max<br>6°C/s max |
| Average Ramp Up Rate ($T_{smax}$ to $T_P$) | 3°C/s max |
| Time 25°C to Peak Temperature | 8 minutes max |

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