



# SILEGO

# SLG5NT1477V

## 9.8 mΩ Nanopower Mobile 6.0 A Load Switch with Discharge

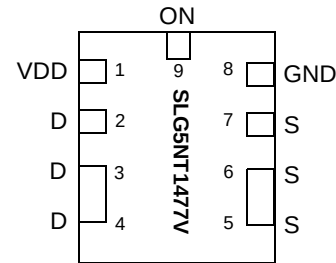
### General Description

The SLG5NT1477V is a 9.8 mΩ 6.0 A single-channel load switch that is able to switch 0.95 to 3.3 V power rails. The product is packaged in an ultra-small 1.5 x 2.0 mm package.

### Features

- 1.5 x 2.0 mm FC-TDFN 9L package (2 fused pins for drain and 2 fused pins for source)
- Logic level ON pin capable of supporting 0.85 V CMOS Logic
- Discharged Load when off
- Fast Turn On time
- Low  $R_{DS(ON)}$  while supporting 6.0 A
- Pb-Free / Halogen-Free / RoHS compliant
- Operating Temperature: -40 °C to 85°C
- Operating Voltage: 3.0 V to 5.25 V

### Pin Configuration

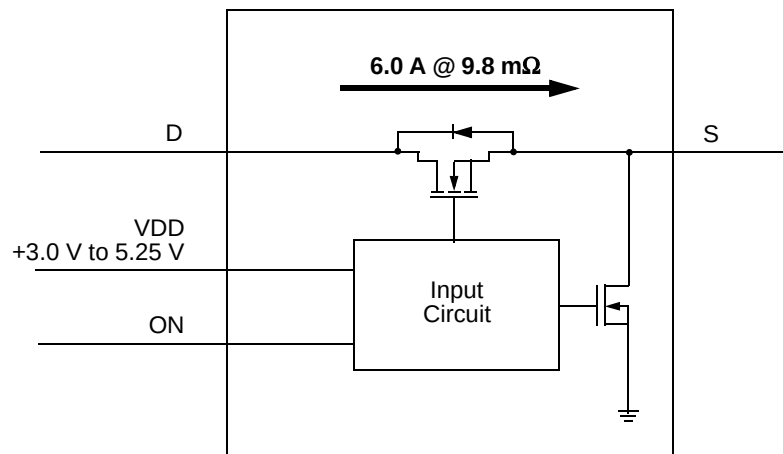


**9-pin FC-TDFN**  
(Top View)

### Applications

- Watch Power Rail Switching
- Tablet Power Rail Switching
- Smartphone Power Rail Switching
- Notebook Power Rail Switching

### Block Diagram



**RoHS Compliant**  
**Directive**  
**2002/95/EC**



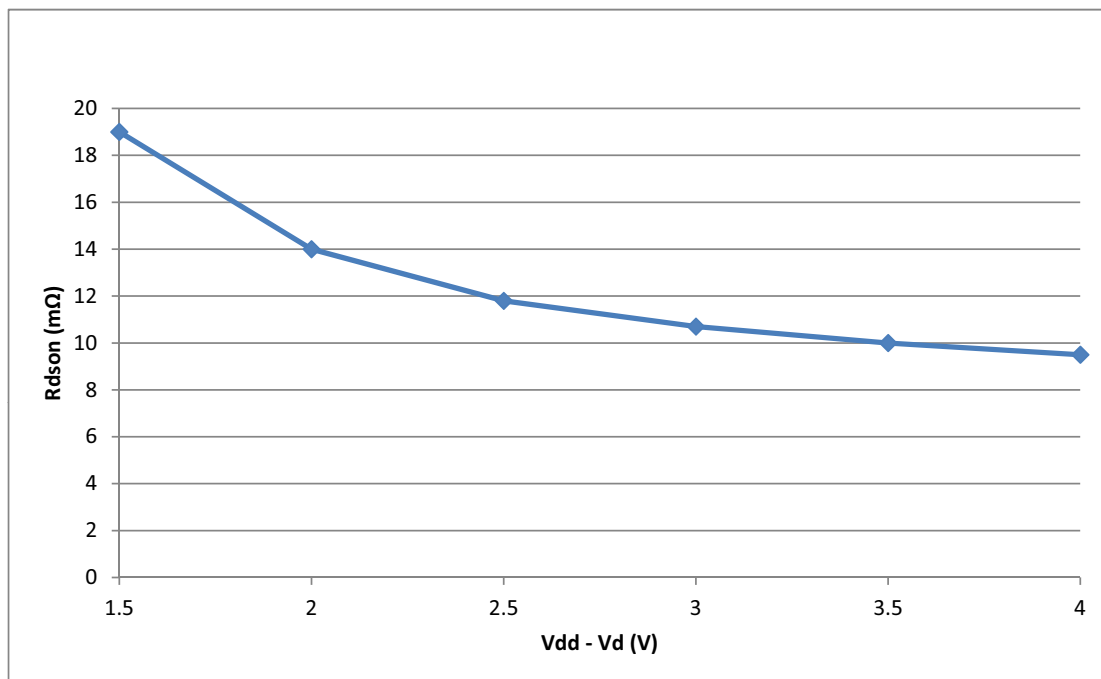
### Pin Description

| Pin # | Pin Name | Type   | Pin Description                                                                                |
|-------|----------|--------|------------------------------------------------------------------------------------------------|
| 1     | VDD      | PWR    | VDD power for load switch control (3.0 V to 5.25 V)                                            |
| 2     | D        | MOSFET | Drain of Power MOSFET                                                                          |
| 3     | D        | MOSFET | Drain of Power MOSFET (fused with pin 4)                                                       |
| 4     | D        | MOSFET | Drain of Power MOSFET (fused with pin 3)                                                       |
| 5     | S        | MOSFET | Source of Power MOSFET (fused with pin 6)                                                      |
| 6     | S        | MOSFET | Source of Power MOSFET (fused with pin 5)                                                      |
| 7     | S        | MOSFET | Source of Power MOSFET                                                                         |
| 8     | GND      | GND    | Ground                                                                                         |
| 9     | ON       | Input  | Turns MOSFET ON (4 M $\Omega$ pull down resistor)<br>CMOS input with VIL < 0.2 V, VIH > 0.85 V |

### Ordering Information

| Part Number   | Type                       | Production Flow             |
|---------------|----------------------------|-----------------------------|
| SLG5NT1477V   | FC-TDFN 9L                 | Industrial, -40 °C to 85 °C |
| SLG5NT1477VTR | FC-TDFN 9L (Tape and Reel) | Industrial, -40 °C to 85 °C |

### SLG5NT1477V RDS<sub>ON</sub>





### Absolute Maximum Ratings

| Parameter         | Description                       | Conditions                               | Min. | Typ. | Max. | Unit |
|-------------------|-----------------------------------|------------------------------------------|------|------|------|------|
| $V_{DD}$          | Power Supply                      |                                          | --   | --   | 7    | V    |
| $T_S$             | Storage Temperature               |                                          | -65  | --   | 150  | °C   |
| $ESD_{HBM}$       | ESD Protection                    | Human Body Model                         | 2000 | --   | --   | V    |
| $W_{DIS}$         | Package Power Dissipation         |                                          | --   | --   | 1.0  | W    |
| MOSFET $IDS_{PK}$ | Peak Current from Drain to Source | For no more than 1 ms with 1% duty cycle | --   | --   | 9    | A    |

Note: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

### Electrical Characteristics

$T_A = -20$  to  $70$  °C (unless otherwise stated)

| Parameter     | Description                               | Conditions                                         | Min. | Typ.  | Max.           | Unit |
|---------------|-------------------------------------------|----------------------------------------------------|------|-------|----------------|------|
| $V_{DD}$      | Power Supply Voltage                      | -20 to 70°C                                        | 3.0  | --    | 5.25           | V    |
| $I_{DD}$      | Power Supply Current (PIN 1) <sup>1</sup> | when OFF @ 25°C                                    | --   | 30    | 60             | nA   |
|               |                                           | when ON, No load, ON Input level = $V_{DD}$ @ 25°C | --   | 35    | 70             | nA   |
|               |                                           | when OFF @ 70°C                                    | --   | 100   | 900            | nA   |
|               |                                           | when ON, No load, ON Input level = $V_{DD}$ @ 70°C | --   | 200   | 900            | nA   |
| $R_{DS_{ON}}$ | Static Drain to Source ON Resistance      | $T_A$ 25°C @ 300 mA, $V_{DD} - V_D = 1.5$ V        | --   | 16.2  | 18.6           | mΩ   |
|               |                                           | $T_A$ 25°C @ 300 mA, $V_{DD} - V_D = 2.0$ V        | --   | 11.5  | 13.2           | mΩ   |
|               |                                           | $T_A$ 25°C @ 300 mA, $V_{DD} - V_D = 2.5$ V        | --   | 9.5   | 10.9           | mΩ   |
|               |                                           | $T_A$ 25°C @ 300 mA, $V_{DD} - V_D = 3.0$ V        | --   | 8.5   | 9.8            | mΩ   |
|               |                                           | $T_A$ 25°C @ 300 mA, $V_{DD} - V_D = 3.5$ V        | --   | 7.9   | 9.1            | mΩ   |
|               |                                           | $T_A$ 25°C @ 300 mA, $V_{DD} - V_D = 4.0$ V        | --   | 7.4   | 8.5            | mΩ   |
| $R_{DS_{ON}}$ | Static Drain to Source ON Resistance      | $T_A$ 70°C @ 300 mA, $V_{DD} - V_D = 1.5$ V        | --   | 19.2  | 22.1           | mΩ   |
|               |                                           | $T_A$ 70°C @ 300 mA, $V_{DD} - V_D = 2.0$ V        | --   | 14.1  | 16.2           | mΩ   |
|               |                                           | $T_A$ 70°C @ 300 mA, $V_{DD} - V_D = 2.5$ V        | --   | 11.7  | 13.5           | mΩ   |
|               |                                           | $T_A$ 70°C @ 300 mA, $V_{DD} - V_D = 3.0$ V        | --   | 10.5  | 12.1           | mΩ   |
|               |                                           | $T_A$ 70°C @ 300 mA, $V_{DD} - V_D = 3.5$ V        | --   | 9.7   | 11.2           | mΩ   |
|               |                                           | $T_A$ 70°C @ 300 mA, $V_{DD} - V_D = 4.0$ V        | --   | 9.2   | 10.6           | mΩ   |
| $R_{DS_{ON}}$ | Static Drain to Source ON Resistance      | $T_A$ 85°C @ 300 mA, $V_{DD} - V_D = 1.5$ V        | --   | 24.96 | 28.73          | mΩ   |
|               |                                           | $T_A$ 85°C @ 300 mA, $V_{DD} - V_D = 2.0$ V        | --   | 18.33 | 21.06          | mΩ   |
|               |                                           | $T_A$ 85°C @ 300 mA, $V_{DD} - V_D = 2.5$ V        | --   | 15.21 | 17.55          | mΩ   |
|               |                                           | $T_A$ 85°C @ 300 mA, $V_{DD} - V_D = 3.0$ V        | --   | 13.65 | 15.73          | mΩ   |
|               |                                           | $T_A$ 85°C @ 300 mA, $V_{DD} - V_D = 3.5$ V        | --   | 12.61 | 14.56          | mΩ   |
|               |                                           | $T_A$ 85°C @ 300 mA, $V_{DD} - V_D = 4.0$ V        | --   | 11.96 | 13.78          | mΩ   |
| $IDS$         | Operating Current                         | $V_D = 1.0$ V to 3.3 V                             | --   | --    | 6.0            | A    |
| $V_D$         | Drain Voltage                             |                                                    | 0.95 | --    | $V_{DD} - 1.5$ | V    |



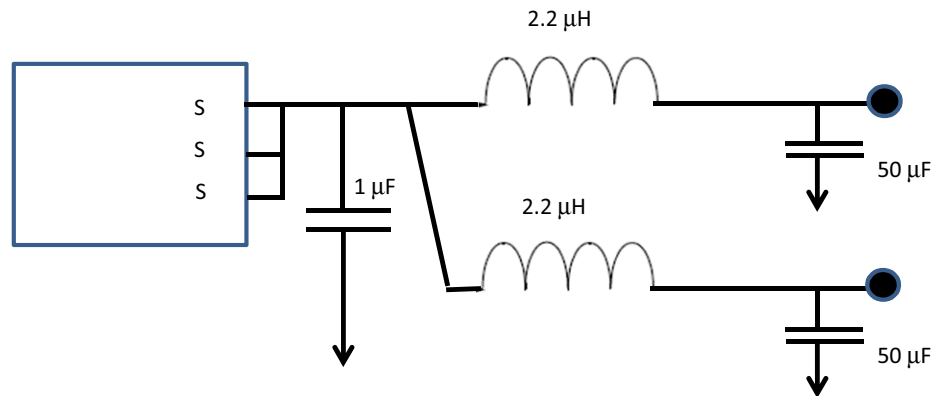
T<sub>A</sub> = -20 to 70 °C (unless otherwise stated)

| Parameter                                    | Description                  | Conditions                                                                                                                           | Min. | Typ. | Max.            | Unit |
|----------------------------------------------|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|------|------|-----------------|------|
| T <sub>Total_ON</sub>                        | Total Turn On Time           | 50% ON to 90% V <sub>S</sub> , V <sub>DD</sub> = 5.25 V, V <sub>D</sub> = 1.0 V, Source_Cap = 10 μF                                  | 12   | 15   | 25              | μs   |
|                                              |                              | 50% ON to 90% V <sub>S</sub> , V <sub>DD</sub> = 5 V, V <sub>D</sub> = 1.0 V, Source_Cap = 2 μF                                      | 7.6  | 9.5  | 25              | μs   |
|                                              |                              | 50% ON to 90% V <sub>S</sub> , V <sub>DD</sub> = 5 V, V <sub>D</sub> = 1.0 V, Source_Cap = 2 x (50 μF + 2.2 μH Inductor) *           | 36   | 45   | 65              | μs   |
| T <sub>SLEW RATE</sub>                       | Slew Rate                    | 10% V <sub>S</sub> to 90% V <sub>S</sub> , V <sub>DD</sub> = 5.25 V, V <sub>D</sub> = 1.0 V, Source_Cap = 10 μF                      | --   | 80   | --              | V/ms |
| CAP <sub>SOURCE</sub>                        | Source Cap                   | Source to GND                                                                                                                        | --   | --   | 10              | μF   |
| R <sub>DIS</sub>                             | Discharge Resistance         |                                                                                                                                      | 100  | 180  | 300             | Ω    |
| ON_V <sub>IH</sub>                           | High Input Voltage on ON pin |                                                                                                                                      | 0.85 | --   | V <sub>DD</sub> | V    |
| ON_V <sub>IL</sub>                           | Low Input Voltage on ON pin  |                                                                                                                                      | -0.3 | 0    | 0.2             | V    |
| T <sub>OFF_Delay</sub>                       | OFF Delay Time               | 50% ON to V <sub>S</sub> Fall, V <sub>DD</sub> = 5.0 V, V <sub>D</sub> = 1.0 V, R <sub>L</sub> = 20 Ω, no C <sub>L</sub>             | --   | --   | 65              | μs   |
| T <sub>FALL</sub>                            | V <sub>S</sub> Fall Time     | 90% V <sub>S</sub> to 10% V <sub>S</sub> , V <sub>DD</sub> = 5.0 V, V <sub>D</sub> = 1.0 V, R <sub>L</sub> = 20 Ω, no C <sub>L</sub> | --   | 35   | --              | μs   |
| Notes:                                       |                              |                                                                                                                                      |      |      |                 |      |
| 1. Guaranteed by design and characterization |                              |                                                                                                                                      |      |      |                 |      |

Note: \* See application diagram for Source Cap load 2 x (50 μF + 2.2 μH)



### Application Diagram (Source loading > 10 $\mu\text{F}$ )

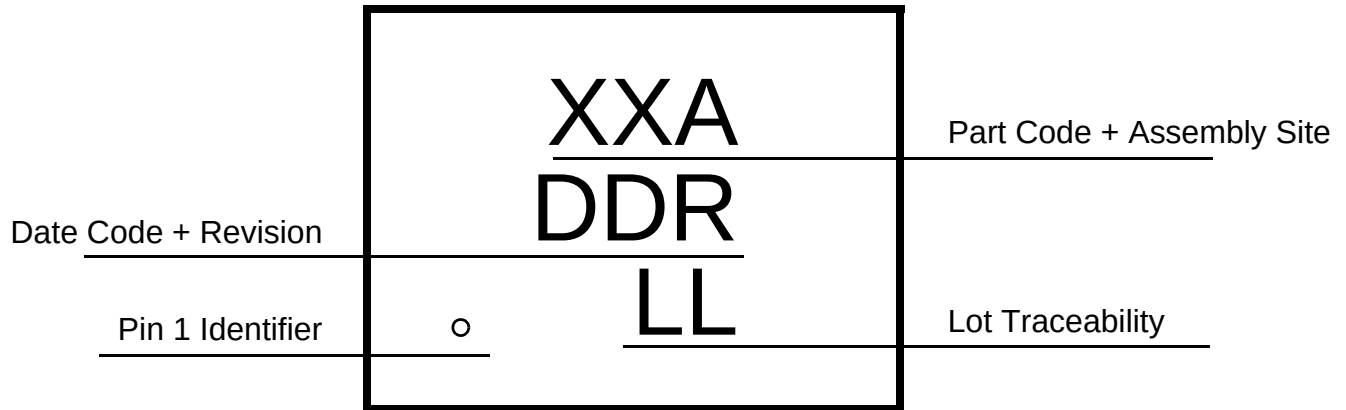


For application source cap loading > 10  $\mu\text{F}$ , 2.2  $\mu\text{H}$  inductor and 1  $\mu\text{F}$  capacitor must be added as shown above for proper operation





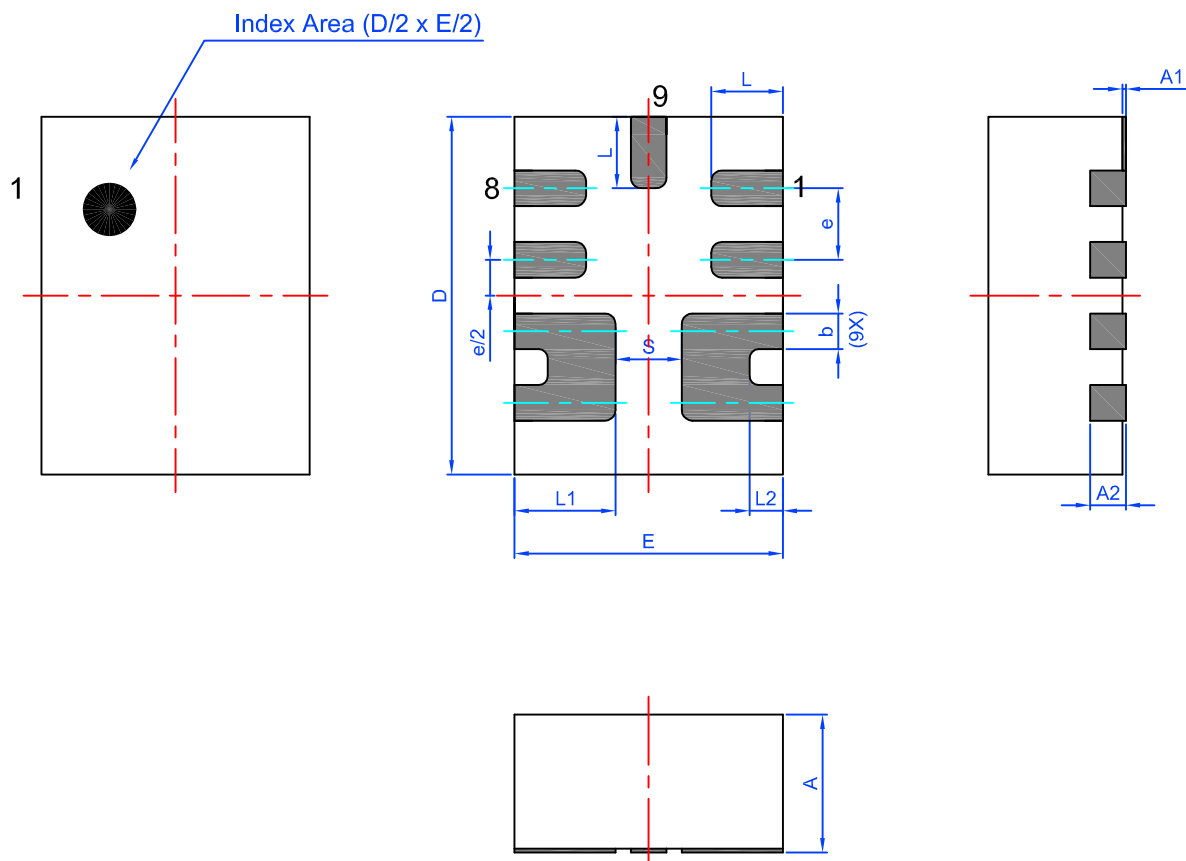
**Package Top Marking System Definition**





### Package Drawing and Dimensions

9 Lead TDFN FC Package 1.5 x 2.0 mm (Fused Lead)  
JEDEC MO-252, Variation W2015D



Unit: mm

| Symbol | Min   | Nom. | Max   | Symbol | Min      | Nom.  | Max   |
|--------|-------|------|-------|--------|----------|-------|-------|
| A      | 0.70  | 0.75 | 0.80  | L      | 0.35     | 0.40  | 0.45  |
| A1     | 0.005 | -    | 0.060 | L1     | 0.515    | 0.565 | 0.615 |
| A2     | 0.15  | 0.20 | 0.25  | L2     | 0.135    | 0.185 | 0.235 |
| b      | 0.15  | 0.20 | 0.25  | e      | 0.40 BSC |       |       |
| D      | 1.95  | 2.00 | 2.05  | S      | 0.37 REF |       |       |
| E      | 1.45  | 1.50 | 1.55  |        |          |       |       |



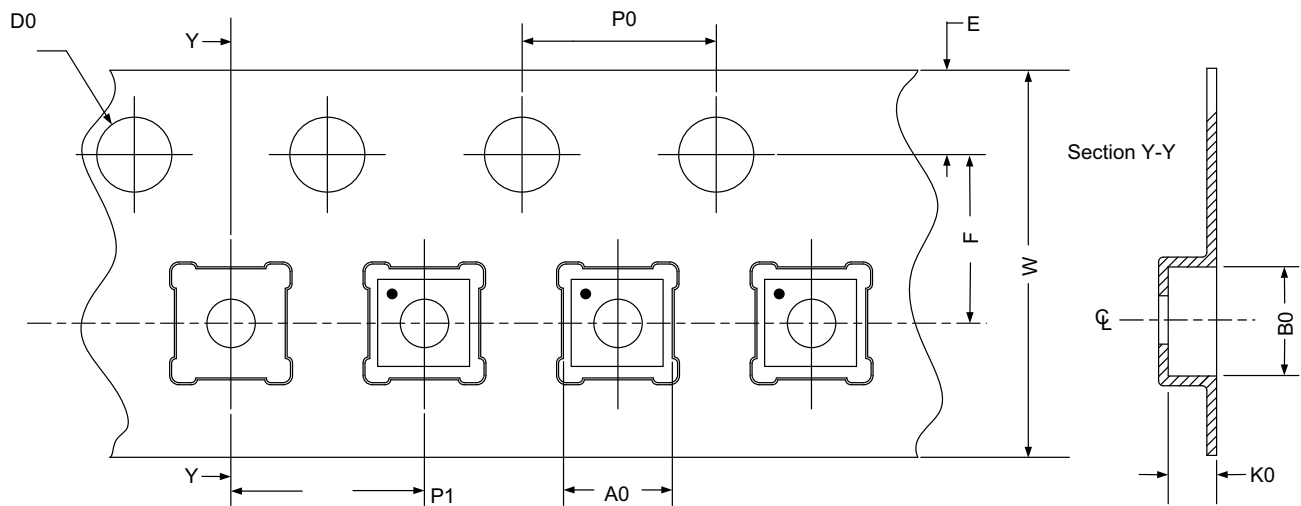


### Tape and Reel Specifications

| Package Type     | # of Pins | Nominal Package Size [mm] | Max Units |         | Reel & Hub Size [mm] | Leader (min) |             | Trailer (min) |             | Tape Width [mm] | Part Pitch [mm] |
|------------------|-----------|---------------------------|-----------|---------|----------------------|--------------|-------------|---------------|-------------|-----------------|-----------------|
|                  |           |                           | per Reel  | per Box |                      | Pockets      | Length [mm] | Pockets       | Length [mm] |                 |                 |
| TDFN 9L FC Green | 9         | 1.5 x 2.0 x 0.75          | 3000      | 3000    | 178 / 60             | 100          | 400         | 100           | 400         | 8               | 4               |

### Carrier Tape Drawing and Dimensions

| Package Type     | PocketBTM Length | PocketBTM Width | Pocket Depth | Index Hole Pitch | Pocket Pitch | Index Hole Diameter | Index Hole to Tape Edge | Index Hole to Pocket Center | Tape Width |
|------------------|------------------|-----------------|--------------|------------------|--------------|---------------------|-------------------------|-----------------------------|------------|
|                  | A0               | B0              | K0           | P0               | P1           | D0                  | E                       | F                           | W          |
| TDFN 9L FC Green | 1.68             | 2.18            | 0.9          | 4                | 4            | 1.5                 | 1.75                    | 3.5                         | 8          |



Refer to EIA-481 specification

### Recommended Reflow Soldering Profile

Please see IPC/JEDEC J-STD-020: latest revision for reflow profile based on package volume of 2.25 mm<sup>3</sup> (nominal). More information can be found at [www.jedec.org](http://www.jedec.org).