# TM15N10SI

## N-Channel Enhancement Mosfet

### General Description

- Low $R_{DS(ON)}$
- RoHS and Halogen-Free Compliant

### Applications

- Load switch
- PWM

### General Features

$V_{DS}$=100V $I_D$ =15A

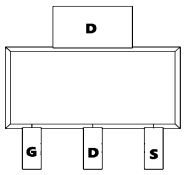
$R_{DS(ON)}$= 75mΩ(typ.) @ $V_{GS}$= 10V

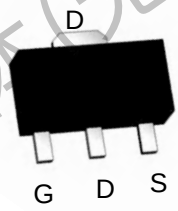
100% UIS Tested

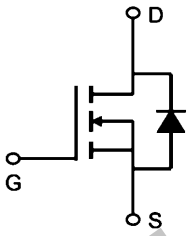
100% $R_g$ Tested

Green Product

SI:SOT-89-3L




Marking: 15N10 OR 9968

### Absolute Maximum Ratings ($T_C$ = 25°C Unless Otherwise Noted)

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 100 | V |
| $V_{GS}$ | Gate-Source Voltage | ±20 | V |
| $I_D$@$T_C$=25°C | Continuous Drain Current, $V_{GS}$ @ 10V | 15 | A |
| $I_D$@$T_C$=100°C | Continuous Drain Current, $V_{GS}$ @ 10V | 13 | A |
| $I_{DM}$ | Pulsed Drain Current | 26 | A |
| EAS | Single Pulse Avalanche Energy | 12 | mJ |
| $I_{AS}$ | Avalanche Current, Single pulse (L=0.5mH) | 7 | A |
| $P_D$ $T_A$=25°C | Total Power Dissipation | 3.5 | W |
| $T_{STG}$ | Storage Temperature Range | -55 to 175 | °C |
| $T_J$ | Operating Junction Temperature Range | -55 to 175 | °C |

### Thermal Data

| Symbol | Parameter | Typ. | Max. | Unit |
|---|---|---|---|---|
| $R_{\theta JA}$ | Thermal Resistance Junction-ambient | --- | 62 | °C/W |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case | --- | 6.6 | °C/W |

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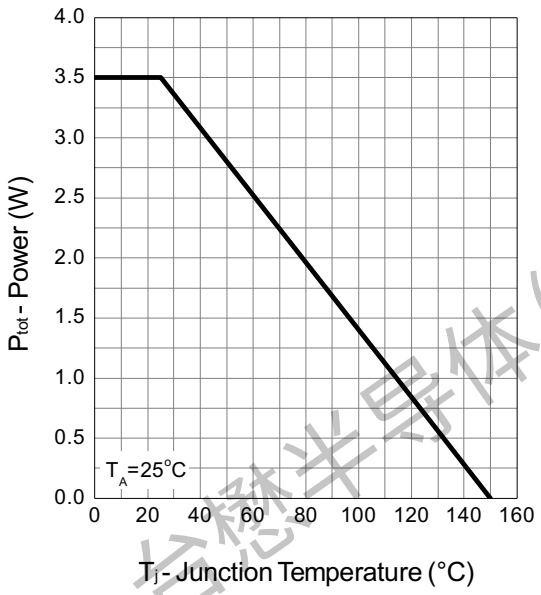
**Electrical Characteristics ($T_C$=25℃unless otherwise noted)**

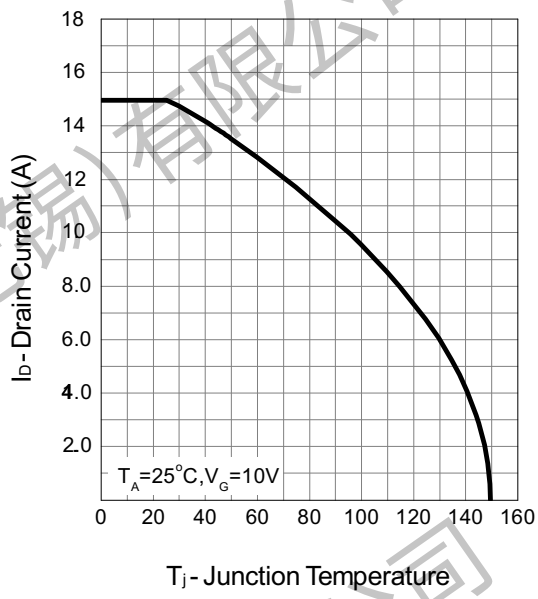
| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Static Characteristics** | | | | | | |
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V, $I_{DS}$=250μA | 100 | - | - | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=80V, $V_{GS}$=0V | - | - | 1 | μA |
| | | $T_J$=85°C | - | - | 30 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$, $I_{DS}$=250μA | 1 | 2 | 3 | V |
| $I_{GSS}$ | Gate Leakage Current | $V_{GS}$=±20V, $V_{DS}$=0V | - | - | ±100 | nA |
| $R_{DS(ON)}$ [d] | Drain-Source On-state Resistance | $V_{GS}$=10V, $I_{DS}$=4A | - | 75 | 100 | mΩ |
| | | $V_{GS}$=4.5V, $I_{DS}$=3.5A | | --- | --- | mΩ |
| **Diode Characteristics** | | | | | | |
| $V_{SD}$ [d] | Diode Forward Voltage | $I_{SD}$=3A, $V_{GS}$=0V | - | 0.8 | 1.3 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_{SD}$=3A, $dI_{SD}$/dt=100A/μs | - | 27 | - | ns |
| $Q_{rr}$ | Reverse Recovery Charge | | - | 36 | - | nC |
| **Dynamic Characteristics** [e] | | | | | | |
| $R_G$ | Gate Resistance | $V_{GS}$=0V,$V_{DS}$=0V,f=1MHz | - | 2.5 | - | Ω |
| $C_{iss}$ | Input Capacitance | $V_{GS}$=0V, $V_{DS}$=30V, Frequency=1.0MHz | - | 740 | 960 | pF |
| $C_{oss}$ | Output Capacitance | | - | 45 | - | |
| $C_{rss}$ | Reverse Transfer Capacitance | | - | 24 | - | |
| $t_{d(ON)}$ | Turn-on Delay Time | $V_{DD}$=30V, $R_L$=30Ω, $I_{DS}$=1A, $V_{GEN}$=10V, $R_G$=6Ω | - | 11 | 20 | ns |
| $t_r$ | Turn-on Rise Time | | - | 6 | 11 | |
| $t_{d(OFF)}$ | Turn-off Delay Time | | - | 27 | 49 | |
| $t_f$ | Turn-off Fall Time | | - | 5 | 10 | |
| **Gate Charge Characteristics** [e] | | | | | | |
| $Q_g$ | Total Gate Charge | $V_{DS}$=30V, $V_{GS}$=4.5V, $I_{DS}$=4A | - | 7.7 | - | nC |
| $Q_g$ | Total Gate Charge | $V_{DS}$=30V, $V_{GS}$=10V, $I_{DS}$=4A | - | 16 | 23 | |
| $Q_{gs}$ | Gate-Source Charge | | - | 2.5 | - | |
| $Q_{gd}$ | Gate-Drain Charge | | - | 3 | - | |

## Typical Characteristics

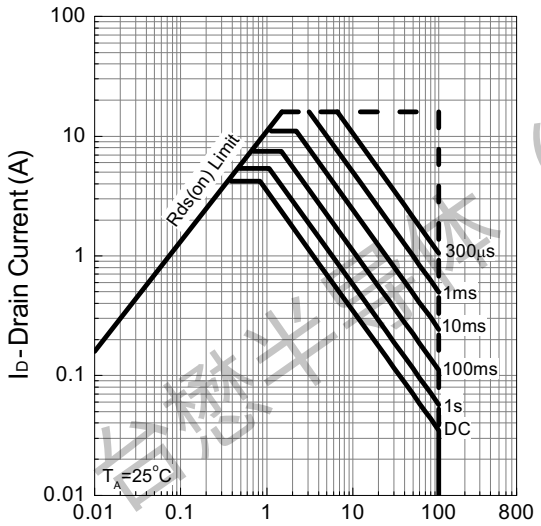
**Power Dissipation**



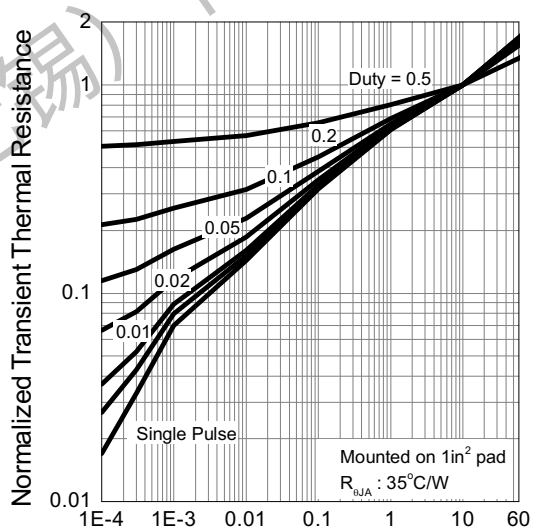

**Drain Current**




**Safe Operation Area**




**Thermal Transient Impedance**



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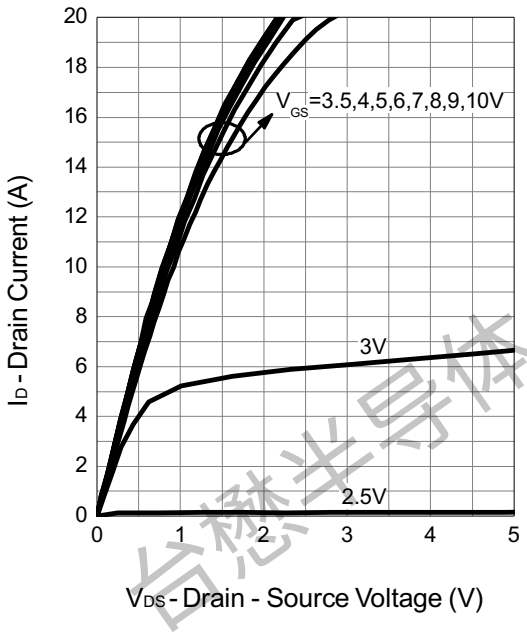
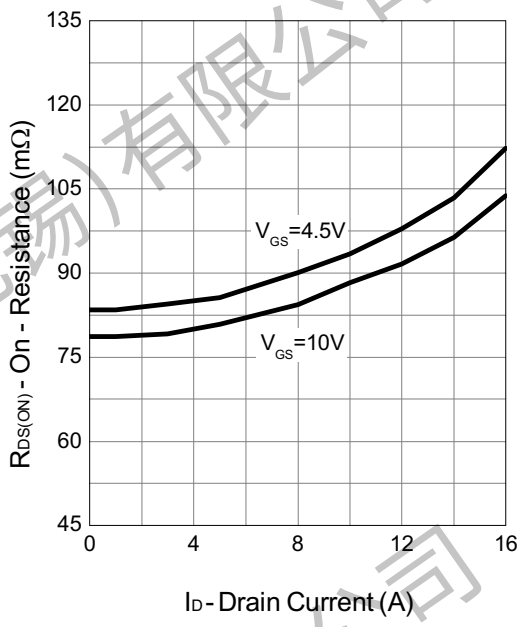
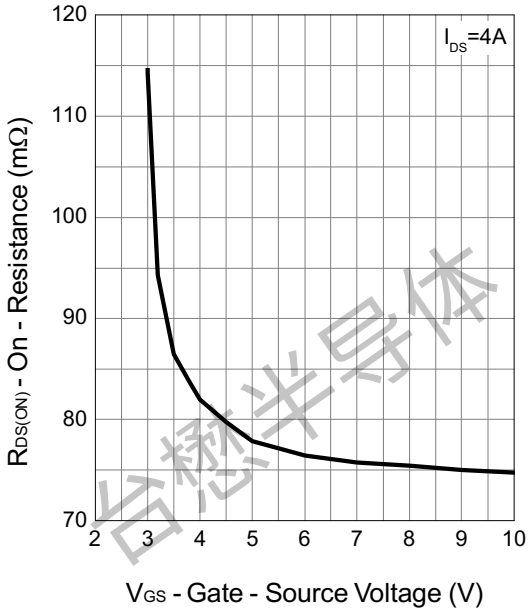
**Output Characteristics**



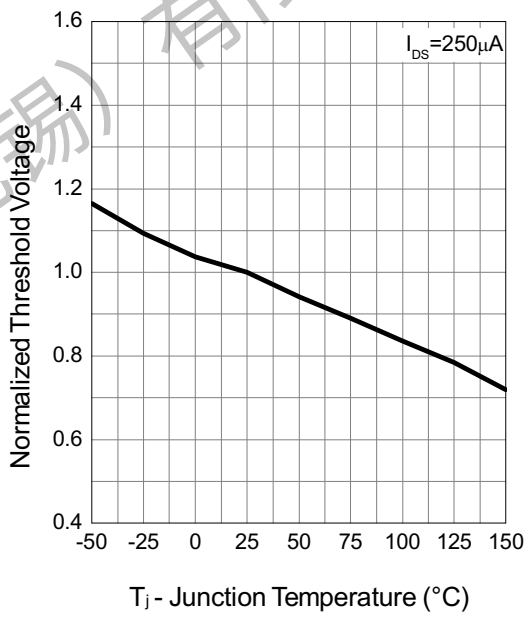

**Drain-Source On Resistance**




**Gate-Source On Resistance**




**Gate Threshold Voltage**



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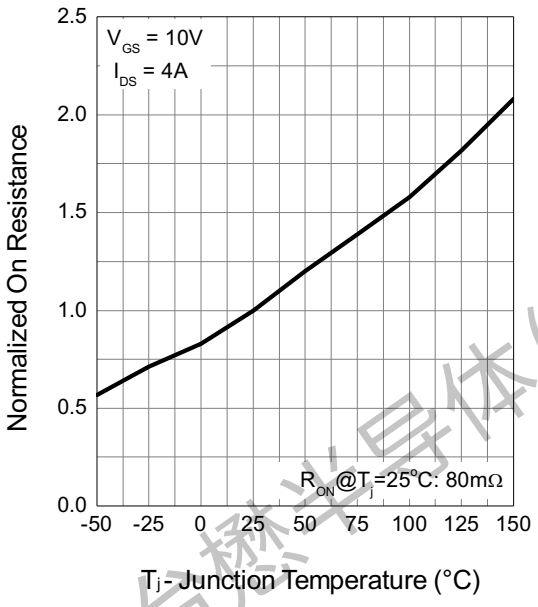
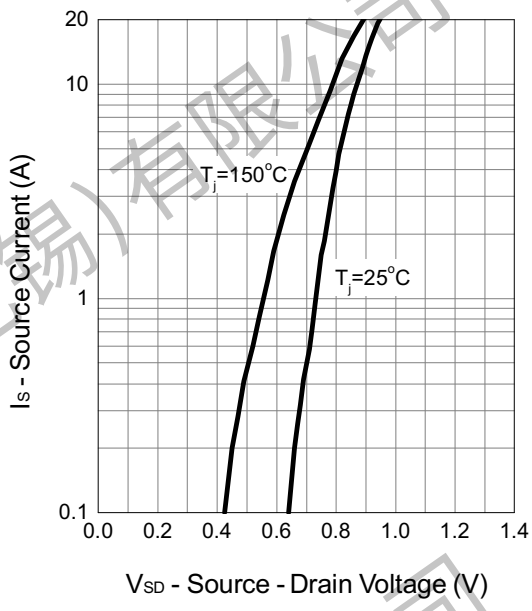
## N-Channel Enhancement Mosfet

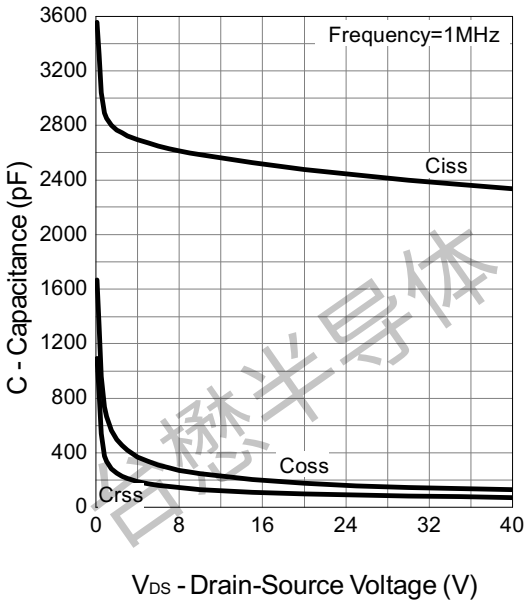
**Drain-Source On Resistance**



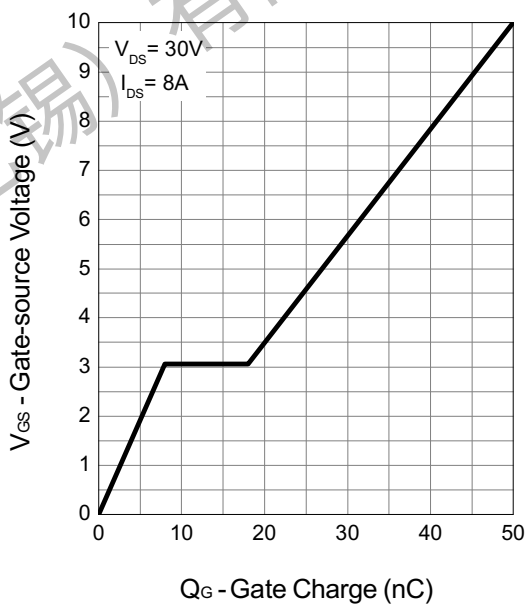

**Source-Drain Diode Forward**



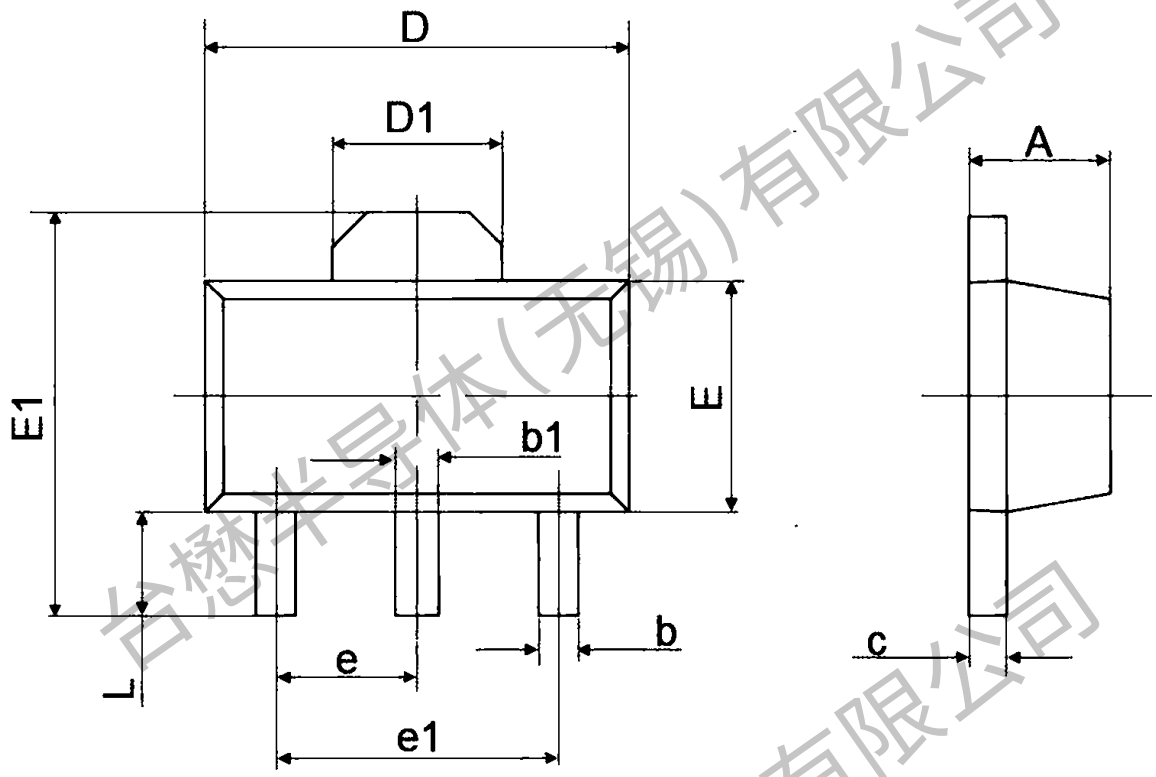

**Capacitance**




**Gate Charge**



## Package Mechanical Data:SOT-89-3L




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 1.400 | 1.600 | 0.055 | 0.063 |
| b | 0.320 | 0.520 | 0.013 | 0.020 |
| b1 | 0.400 | 0.580 | 0.016 | 0.023 |
| c | 0.350 | 0.440 | 0.014 | 0.017 |
| D | 4.400 | 4.600 | 0.173 | 0.181 |
| D1 | 1.550 REF. | | 0.061 REF. | |
| E | 2.300 | 2.600 | 0.091 | 0.102 |
| E1 | 3.940 | 4.250 | 0.155 | 0.167 |
| e | 1.500 TYP. | | 0.060 TYP. | |
| e1 | 3.000 TYP. | | 0.118 TYP. | |
| L | 0.900 | 1.200 | 0.035 | 0.047 |

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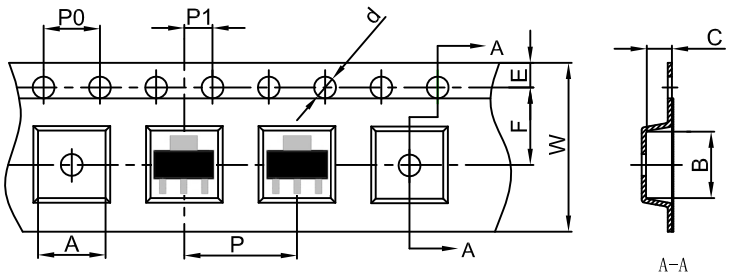
## SOT-89-3L Embossed Carrier Tape



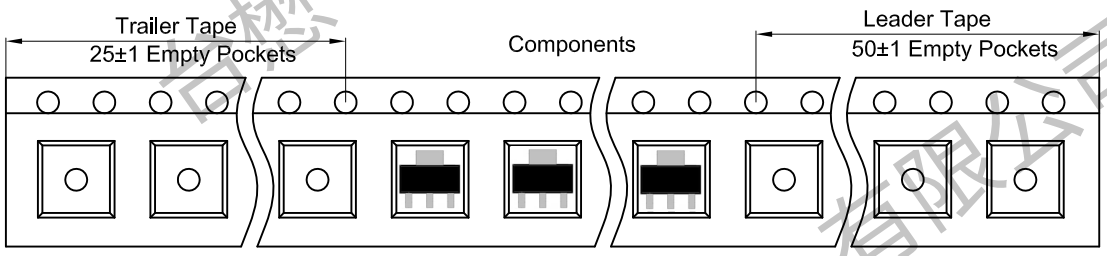

Packaging Description:

SOT-89-3L parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 1,000 units per 7" or 18.0 cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

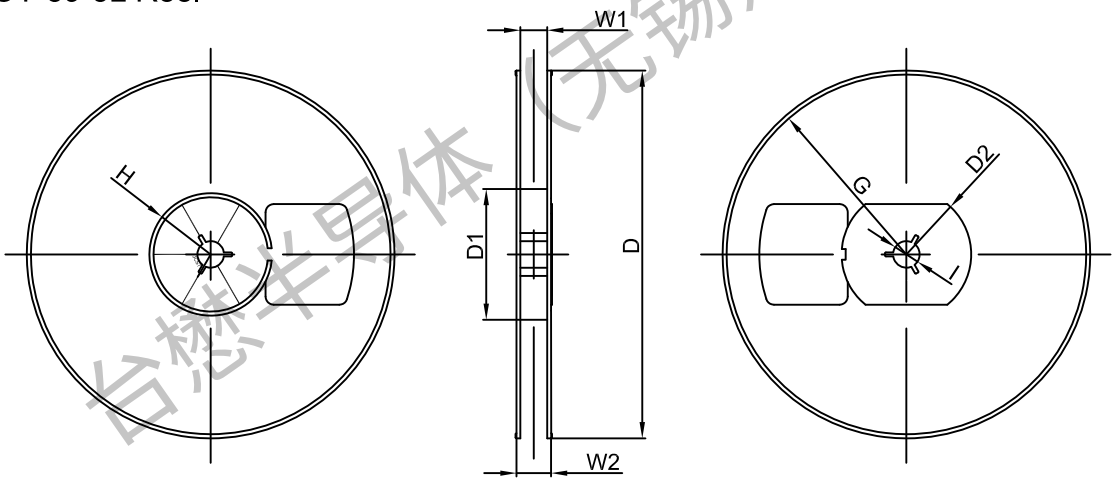
ALL DIM IN mm

| Dimensions are in millimeter | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Pkg type | A | B | C | d | E | F | P0 | P | P1 | W |
| SOT-89-3L | 4.85 | 4.45 | 1.85 | Ø1.50 | 1.75 | 5.50 | 4.00 | 8.00 | 2.00 | 12.00 |

## SOT-89-3L Tape Leader and Trailer




## SOT-89-3L Reel




| Dimensions are in millimeter | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Reel Option | D | D1 | D2 | G | H | I | W1 | W2 |
| 7"Dia | Ø180.00 | 60.00 | R32.00 | R86.50 | R30.00 | Ø13.00 | 13.20 | 16.50 |

| REEL | Reel Size | Box | Box Size(mm) | Carton | Carton Size(mm) | G.W.(kg) |
|---|---|---|---|---|---|---|
| 1000 pcs | 7 inch | 10,000 pcs | 205×195×220 | 40,000 pcs | 430×415×240 | |

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Revision history:

| Date | Rev | Description | Page |
|---|---|---|---|
| 2023.06.14 | 23.06 | Original | |