## Features

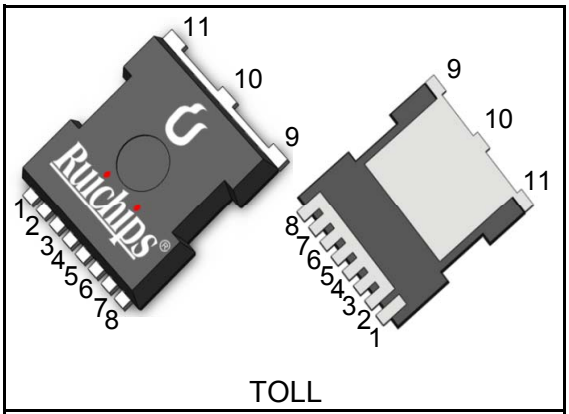
- 85V/350A,
$R_{DS\ (ON)}$ =1.3mΩ(Typ.)@$V_{GS}$=10V
- Using Ruichips Advanced RUISGT™ Technology
- Ultra Low On-Resistance
- Excellent $Q_g$&$R_{DS(on)}$ Performance
- Low Gate Charge Minimizing Switching Loss
- 100% Avalanche Tested
- Lead Free and Green Devices (RoHS Compliant)

Pb-Free RoHS Halogen-Free

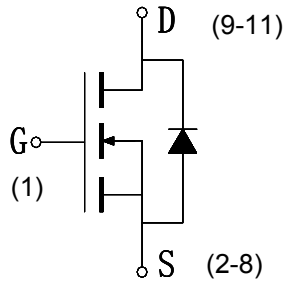
## Applications

- BMS
- Motor Drives
- Uninterruptible Power Supplies
- Synchronous Rectification
- Switching Applications

## Pin Description




TOLL




N-Channel MOSFET

## Absolute Maximum Ratings

| Symbol | Parameter | | Rating | Unit |
|---|---|---|---|---|
| **Common Ratings** ($T_C$=25°C Unless Otherwise Noted) | | | | |
| $V_{DSS}$ | Drain-Source Voltage | | 85 | V |
| $V_{GSS}$ | Gate-Source Voltage | | ±25 | |
| $T_J$ | Maximum Junction Temperature | | 175 | °C |
| $T_{STG}$ | Storage Temperature Range | | -55 to 175 | °C |
| $I_S$ | Diode Continuous Forward Current | $T_C$=25°C | 350 | A |
| **Mounted on Large Heat Sink** | | | | |
| $I_{DP}$ ① | 300μs Pulse Drain Current Tested | $T_C$=25°C | 1400 | A |
| $I_D$ ② | Continuous Drain Current($V_{GS}$=10V) | $T_C$=25°C | 350 | A |
| | | $T_C$=100°C | 247 | |
| $P_D$ | Maximum Power Dissipation | $T_C$=25°C | 555 | W |
| | | $T_C$=100°C | 278 | |
| $R_{\theta JC}$ | Thermal Resistance-Junction to Case | | 0.27 | °C/W |
| $R_{\theta JA}$ | Thermal Resistance-Junction to Ambient | | 30 | °C/W |
| **Drain-Source Avalanche Ratings** | | | | |
| $E_{AS}$ ③ | Avalanche Energy, Single Pulsed | | 2916 | mJ |

## Electrical Characteristics ($T_C$=25°C Unless Otherwise Noted)

| Symbol | Parameter | Test Condition | RUH85350T | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| **Static Characteristics** | | | | | | |
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V, $I_{DS}$=250μA | 85 | | | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=85V, $V_{GS}$=0V | | | 1 | μA |
| | | $T_J$=125°C | | | 30 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$, $I_{DS}$=250μA | 2 | | 4 | V |
| $I_{GSS}$ | Gate Leakage Current | $V_{GS}$=±25V, $V_{DS}$=0V | | | ±100 | nA |
| $R_{DS(ON)}$④ | Drain-Source On-state Resistance | $V_{GS}$=10V, $I_{DS}$=75A | | 1.3 | 1.6 | mΩ |
| | | $T_J$=125°C | | 2.4 | 3 | mΩ |
| **Diode Characteristics** | | | | | | |
| $V_{SD}$④ | Diode Forward Voltage | $I_{SD}$=75A, $V_{GS}$=0V | | 0.8 | 1.2 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_{SD}$=75A, $dI_{SD}/dt$=100A/μs | | 97 | 130 | ns |
| $Q_{rr}$ | Reverse Recovery Charge | | | 203 | 260 | nC |
| **Dynamic Characteristics**⑤ | | | | | | |
| $R_G$ | Gate Resistance | $V_{GS}$=0V,$V_{DS}$=0V,F=1MHz | | 0.35 | 1 | Ω |
| $C_{iss}$ | Input Capacitance | $V_{GS}$=0V, $V_{DS}$=40V, Frequency=1.0MHz | | 12450 | 15000 | pF |
| $C_{oss}$ | Output Capacitance | | | 3950 | 5000 | |
| $C_{rss}$ | Reverse Transfer Capacitance | | | 245 | 320 | |
| $t_{d(ON)}$ | Turn-on Delay Time | $V_{DD}$=40V, $I_{DS}$=75A, $V_{GEN}$=10V,$R_G$=1.6Ω | | 55 | 80 | ns |
| $t_r$ | Turn-on Rise Time | | | 73 | 100 | |
| $t_{d(OFF)}$ | Turn-off Delay Time | | | 110 | 150 | |
| $t_f$ | Turn-off Fall Time | | | 75 | 100 | |
| **Gate Charge Characteristics**⑤ | | | | | | |
| $Q_g$ | Total Gate Charge | $V_{DS}$=68V, $V_{GS}$=10V, $I_{DS}$=75A | | 198 | 260 | nC |
| $Q_{gs}$ | Gate-Source Charge | | | 61 | 85 | |
| $Q_{gd}$ | Gate-Drain Charge | | | 49 | 75 | |

Notes:

①Pulse width limited by safe operating area.

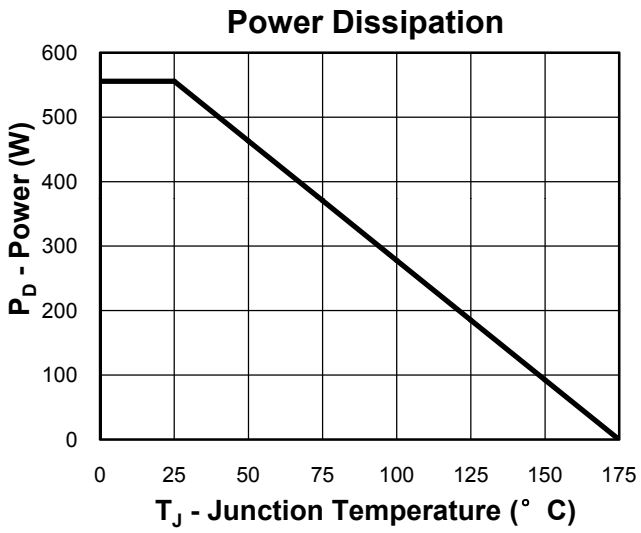
②Calculated continuous current based on maximum allowable junction temperature. The package limitation current is 75A.

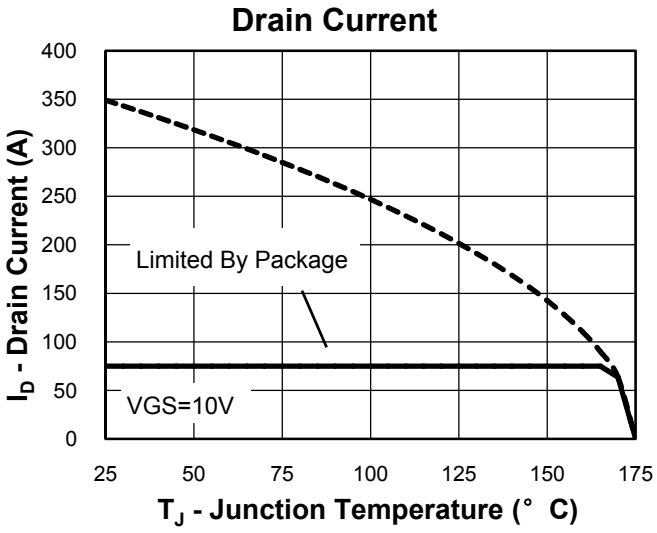
③This value is based on starting $T_J$ = 25°C, L = 0.5mH, $R_G$ = 25Ω, $I_{AS}$ = 108A, $V_{DD}$ =48V; 100% FT tested at L = 0.5mH, $I_{AS}$ = 75A.

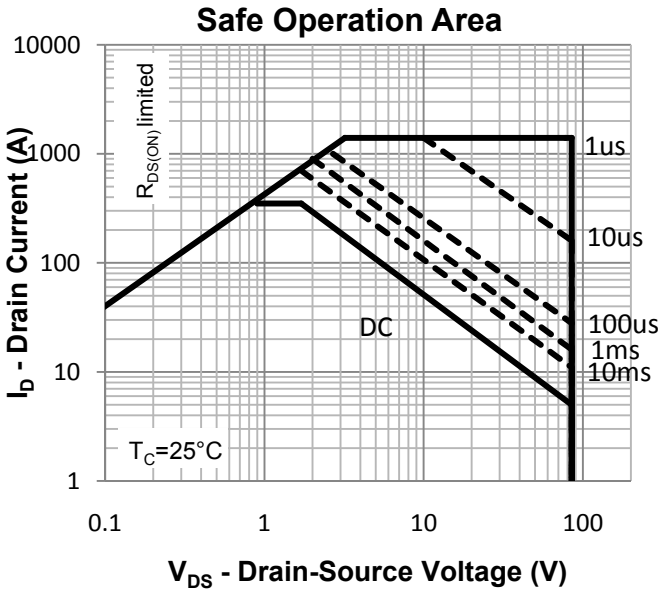
④Pulse test;Pulse width≤300μs, duty cycle≤2%.

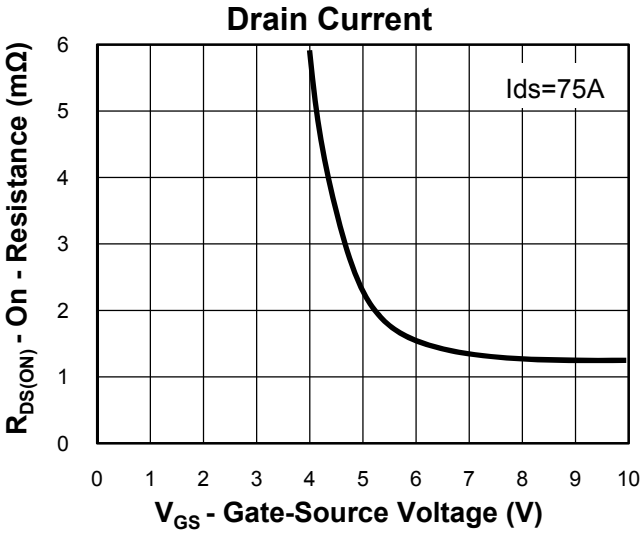
⑤Guaranteed by design, not subject to production testing.

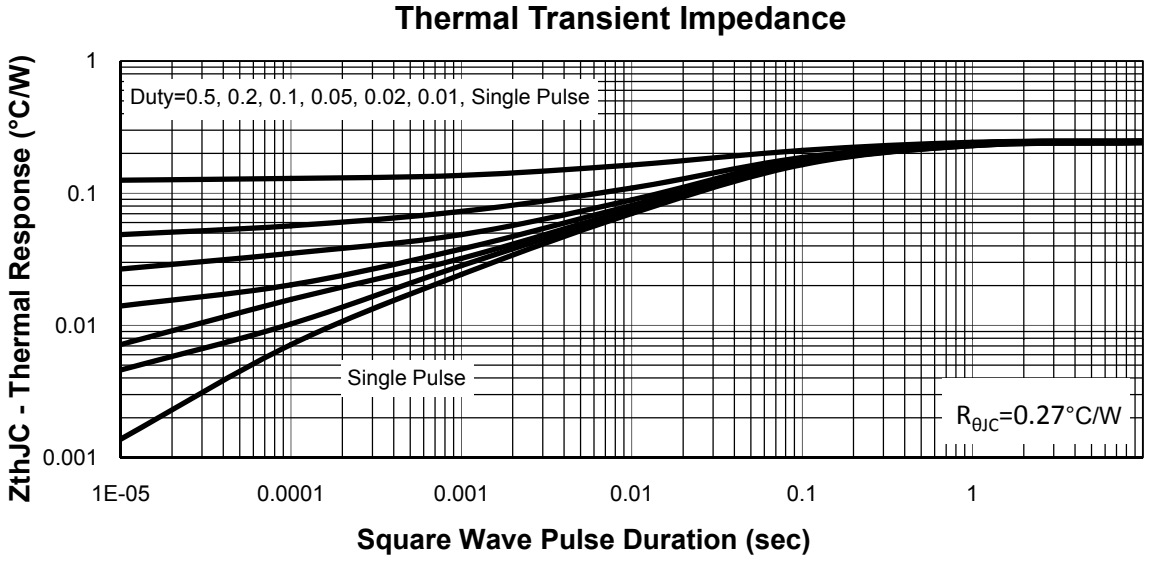
## Typical Characteristics



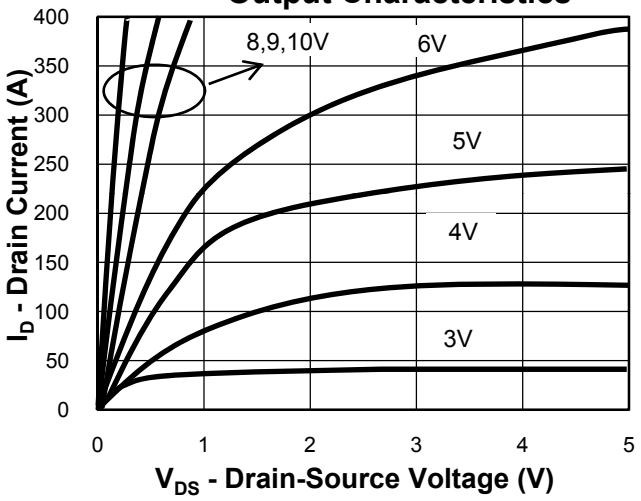



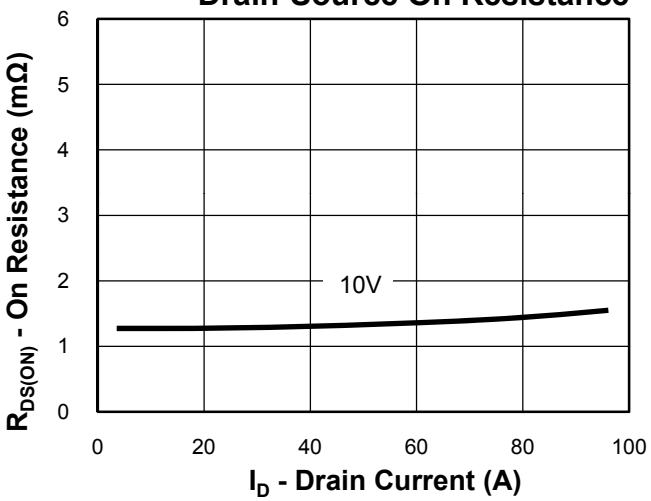



## Typical Characteristics

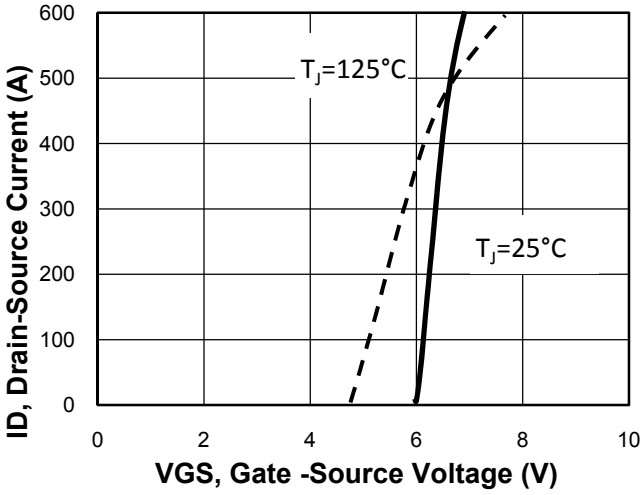
Output Characteristics



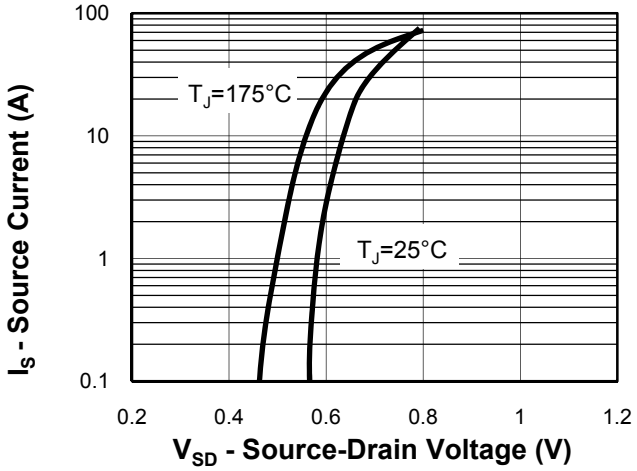

Drain-Source On Resistance



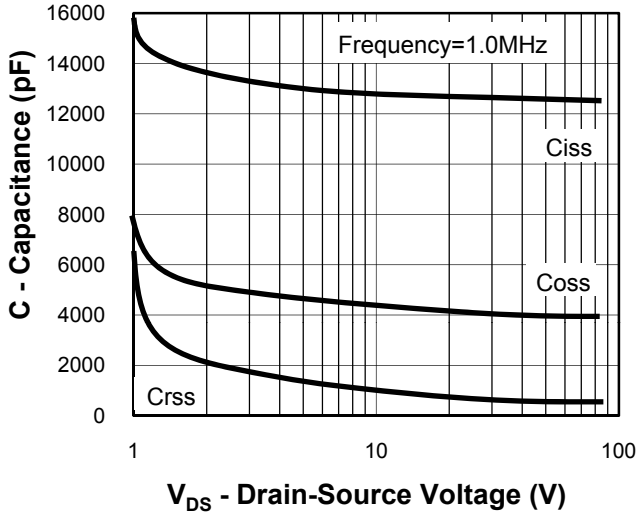

Transfer Characteristics



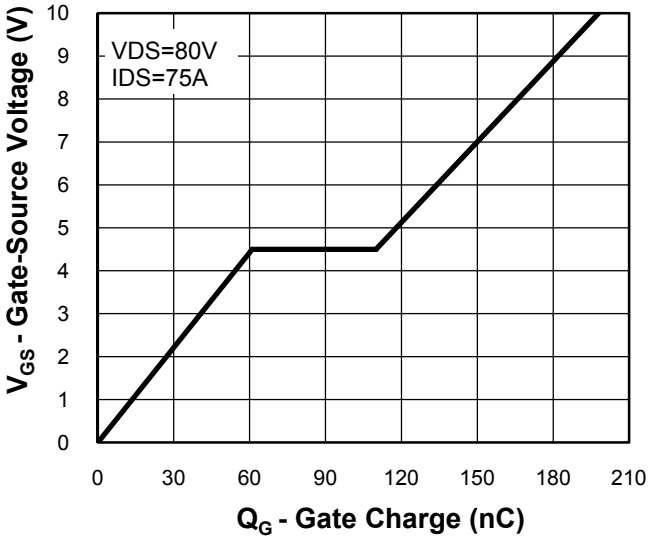

Source-Drain Diode Forward



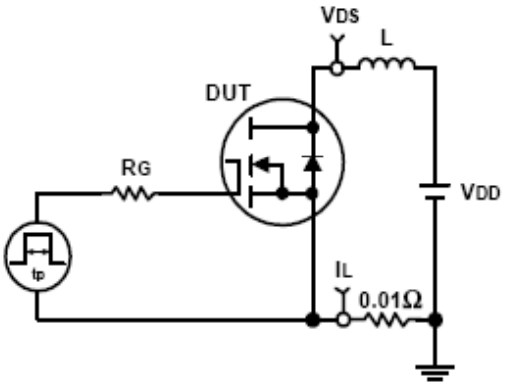

Capacitance

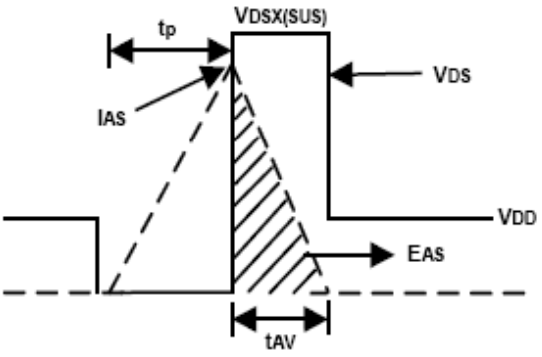



Gate Charge

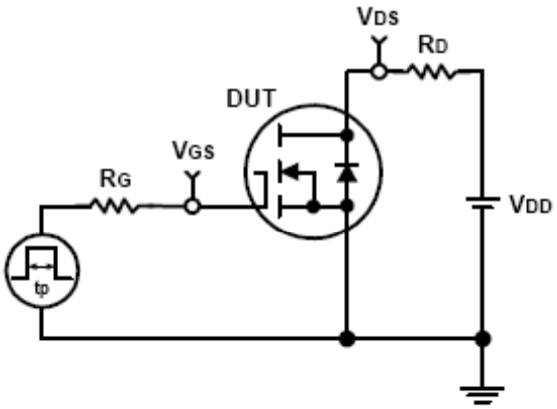


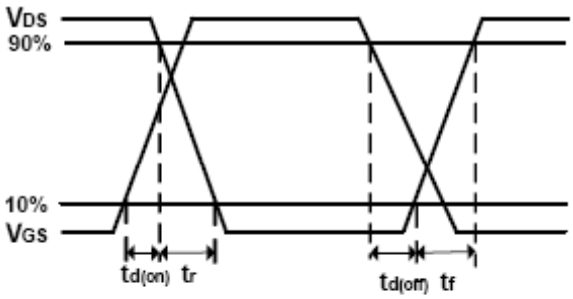
## Avalanche Test Circuit and Waveforms




## Switching Time Test Circuit and Waveforms



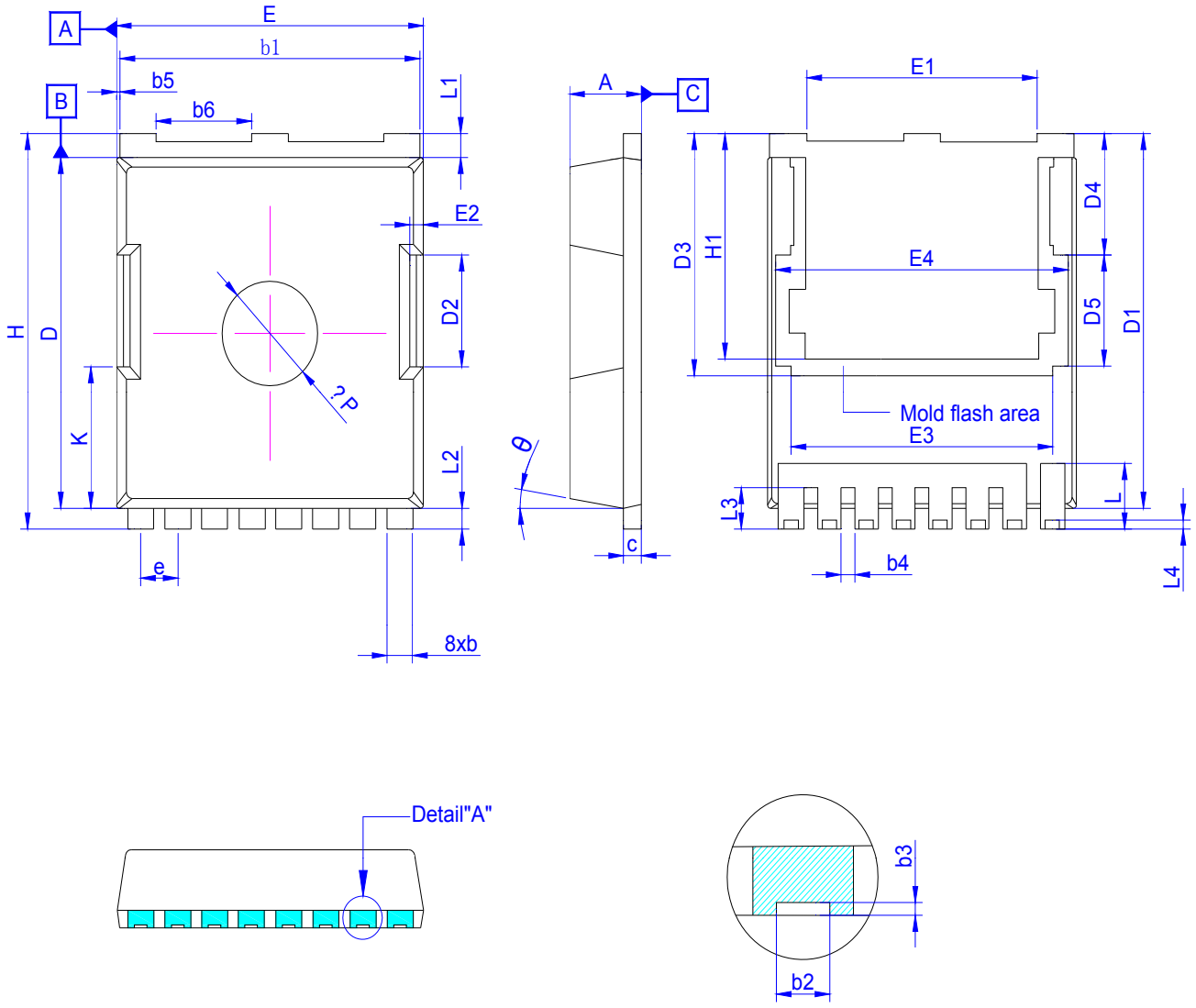




## Ordering and Marking Information

| Device | Marking | Package | Packaging | Quantity | Reel Size | Tape width |
|---|---|---|---|---|---|---|
| RUH85350T | RUH85350T | TOLL | Tape&Reel | 2000 | 13” | 24mm |

## Package Information

# TOLL










| SYMBOL | MM | | | INCH | | | SYMBOL | MM | | | INCH | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MIN | NOM | MAX | MIN | NOM | MAX | | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 2.200 | 2.300 | 2.400 | 0.087 | 0.179 | 0.094 | E | 9.800 | 9.800 | 10.000 | 0.386 | 0.386 | 0.394 |
| b | 0.700 | 0.800 | 0.900 | 0.028 | 0.005 | 0.035 | E1 | 7.400 | 7.500 | 7.600 | 0.291 | 0.295 | 0.299 |
| b1 | 9.700 | 9.800 | 9.900 | 0.382 | 0.386 | 0.390 | E2 | 0.300 | 0.400 | 0.500 | 0.012 | 0.016 | 0.020 |
| b2 | 0.360 | 0.450 | 0.550 | 0.014 | 0.018 | 0.022 | E3 | | 8.500 | | | 0.335 | |
| b3 | 0.050 | 0.100 | | 0.002 | 0.004 | 0.000 | E4 | | 9.460 | | | 0.372 | |
| b4 | 0.300 | 0.400 | 0.500 | 0.012 | 0.02 | 0.020 | H | 11.500 | 11.680 | 11.850 | 0.453 | 0.460 | 0.467 |
| b5 | 1.100 | 1.200 | 1.300 | 0.043 | 0.05 | 0.051 | H1 | 6.550 | 6.650 | 6.750 | 0.258 | 0.262 | 0.266 |
| b6 | 3.000 | 3.100 | 3.200 | 0.118 | 0.12 | 0.126 | K | 4.080 | 4.180 | 4.280 | 0.161 | 0.165 | 0.169 |
| c | 0.400 | 0.500 | 0.600 | 0.016 | 0.020 | 0.024 | L | 1.600 | 1.900 | 2.100 | 0.063 | 0.075 | 0.083 |
| D | 10.280 | 10.380 | 10.550 | 0.405 | 0.41 | 0.415 | L1 | 0.500 | 0.700 | 0.900 | 0.02 | 0.028 | 0.035 |
| D1 | 10.980 | 11.080 | 11.180 | 0.432 | 0.44 | 0.440 | L2 | 0.500 | 0.600 | 0.700 | 0.02 | 0.024 | 0.028 |
| D2 | 3.200 | 3.300 | 3.400 | 0.126 | 0.129921 | 0.134 | L3 | 1.000 | 1.200 | 1.300 | 0.04 | 0.047 | 0.051 |
| D3 | | 7.150 | | | 0.281 | | L4 | 0.130 | 0.230 | 0.330 | 0.01 | 0.009 | 0.013 |
| D4 | | 3.590 | | | 0.141 | | P | 2.850 | 3.000 | 3.150 | 0.11 | 0.118 | 0.124 |
| D5 | | 3.260 | | | 0.128 | | Φ | | 10° REF | | | | |
| e | 1.100 | 1.200 | 1.300 | 0.043 | 0.047 | 0.051 | | | | | | | |