

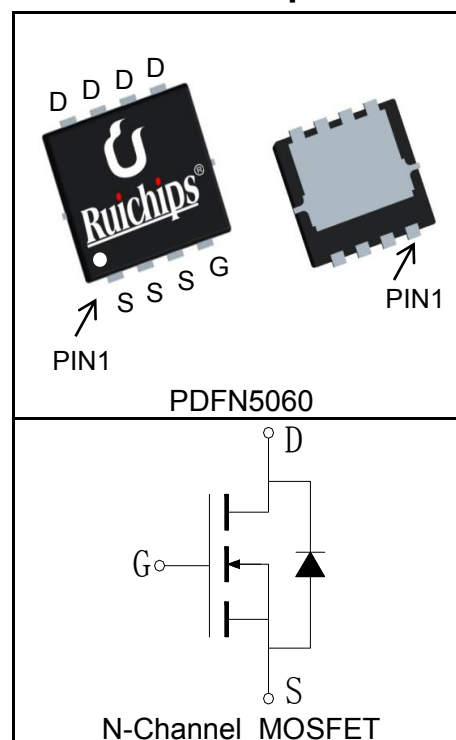
Features

- 100V/80A,
- $R_{DS(ON)} = 6m\Omega(Typ.)@V_{GS}=10V$
- $R_{DS(ON)} = 9m\Omega(Typ.)@V_{GS}=4.5V$
- Ultra Low On-Resistance
- Fast Switching Speed
- 100% avalanche tested
- Lead Free and Green Devices Available (RoHS Compliant)

Applications

- LED backlighting
- On board power for server
- Synchronous rectification

Pin Description



Absolute Maximum Ratings

| Symbol | Parameter | Rating | Unit |
|--|---|-------------------------------|------------------|
| Common Ratings ($T_C=25^\circ\text{C}$ Unless Otherwise Noted) | | | |
| V_{DSS} | Drain-Source Voltage | 100 | V |
| V_{GSS} | Gate-Source Voltage | ± 25 | |
| T_J | Maximum Junction Temperature | 150 | $^\circ\text{C}$ |
| T_{STG} | Storage Temperature Range | -55 to 150 | $^\circ\text{C}$ |
| I_S | Diode Continuous Forward Current | $T_C=25^\circ\text{C}$ 50 | A |
| Mounted on Large Heat Sink | | | |
| $I_{DP}^{①}$ | 300 μs Pulse Drain Current Tested | $T_C=25^\circ\text{C}$ 200 | A |
| $I_D^{②}$ | Continuous Drain Current@ $T_C(V_{GS}=10V)$ | $T_C=25^\circ\text{C}$ 80 | A |
| | | $T_C=100^\circ\text{C}$ 50 | |
| | Continuous Drain Current@ $T_A(V_{GS}=10V)^{③}$ | $T_A=25^\circ\text{C}$ 14 | |
| | | $T_A=70^\circ\text{C}$ 11 | |
| P_D | Maximum Power Dissipation@ T_C | $T_C=25^\circ\text{C}$ 105 | W |
| | | $T_C=100^\circ\text{C}$ 42 | |
| | Maximum Power Dissipation@ $T_A^{③}$ | $T_A=25^\circ\text{C}$ 4.2 | |
| | | $T_A=70^\circ\text{C}$ 2.7 | |

| Symbol | Parameter | Rating | Unit |
|---------------------------------------|--|--------|------|
| $R_{\theta JC}$ | Thermal Resistance-Junction to Case | 1.2 | °C/W |
| $R_{\theta JA}^{(3)}$ | Thermal Resistance-Junction to Ambient | 30 | °C/W |
| Drain-Source Avalanche Ratings | | | |
| $E_{AS}^{(4)}$ | Avalanche Energy, Single Pulsed | 200 | mJ |

Electrical Characteristics ($T_C=25^\circ\text{C}$ Unless Otherwise Noted)

| Symbol | Parameter | Test Condition | RUH1H80M | | | Unit |
|--|----------------------------------|---|----------|------|-----------|-----------|
| | | | Min. | Typ. | Max. | |
| Static Characteristics | | | | | | |
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_{DS}=250\mu A$ | 100 | | | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS}=100V, V_{GS}=0V$ | | | 1 | μA |
| | | $T_J=125^\circ\text{C}$ | | | 30 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}, I_{DS}=250\mu A$ | 1 | | 3 | V |
| I_{GSS} | Gate Leakage Current | $V_{GS}=\pm 25V, V_{DS}=0V$ | | | ± 100 | nA |
| $R_{DS(ON)}^{(5)}$ | Drain-Source On-state Resistance | $V_{GS}=4.5V, I_{DS}=35A$ | | 9 | 11 | $m\Omega$ |
| | | $V_{GS}=10V, I_{DS}=50A$ | | 6 | 8 | $m\Omega$ |
| Diode Characteristics | | | | | | |
| $V_{SD}^{(5)}$ | Diode Forward Voltage | $I_{SD}=50A, V_{GS}=0V$ | | | 1.2 | V |
| t_{rr} | Reverse Recovery Time | $I_{SD}=50A, di_{SD}/dt=100A/\mu s$ | | 17 | | ns |
| Q_{rr} | Reverse Recovery Charge | | | 129 | | nC |
| Dynamic Characteristics⁽⁶⁾ | | | | | | |
| R_G | Gate Resistance | $V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$ | | 1.2 | | Ω |
| C_{iss} | Input Capacitance | $V_{GS}=0V,$ $V_{DS}=50V,$ Frequency=1.0MHz | | 1850 | | pF |
| C_{oss} | Output Capacitance | | | 390 | | |
| C_{rss} | Reverse Transfer Capacitance | | | 11 | | |
| $t_{d(ON)}$ | Turn-on Delay Time | $V_{DD}=50V, I_{DS}=50A,$ $V_{GEN}=10V, R_G=1.2\Omega$ | | 14 | | ns |
| t_r | Turn-on Rise Time | | | 9 | | |
| $t_{d(OFF)}$ | Turn-off Delay Time | | | 37 | | |
| t_f | Turn-off Fall Time | | | 6 | | |
| Gate Charge Characteristics⁽⁶⁾ | | | | | | |
| Q_g | Total Gate Charge | $V_{DS}=80V, V_{GS}=10V,$ $I_{DS}=50A$ | | 64 | | nC |
| Q_{gs} | Gate-Source Charge | | | 11 | | |
| Q_{gd} | Gate-Drain Charge | | | 18 | | |

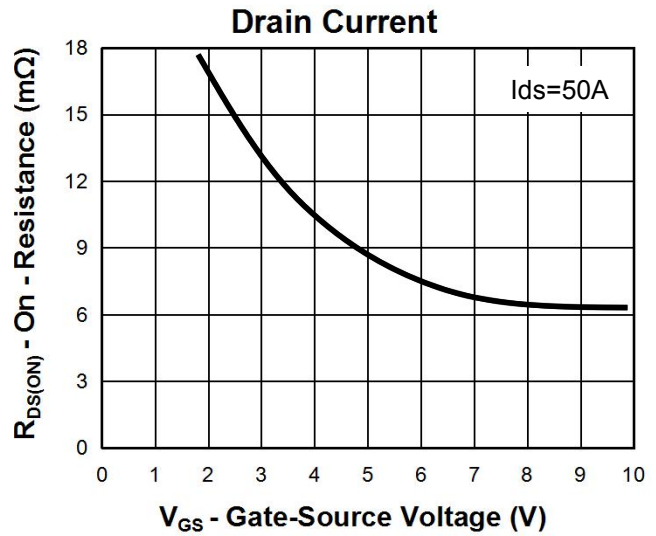
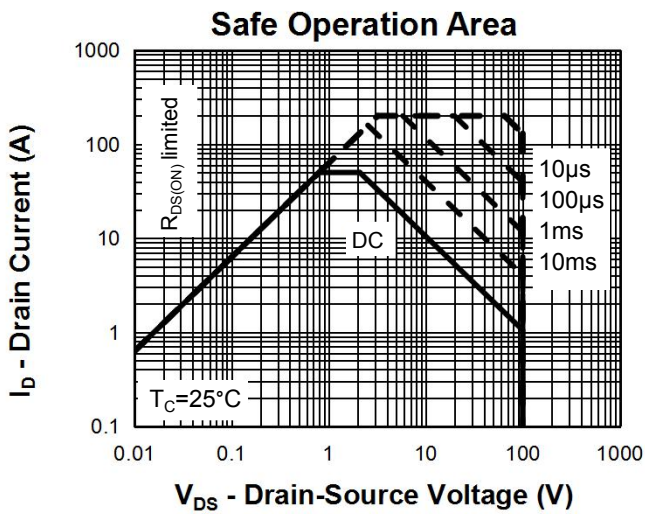
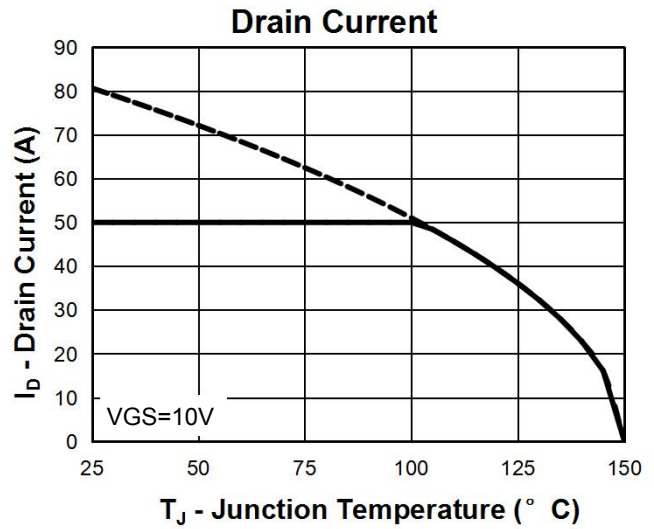
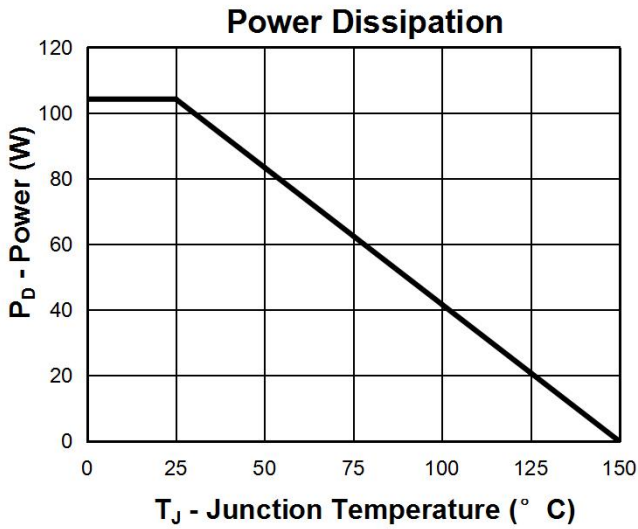
Notes:

- ①Pulse width limited by safe operating area.
- ②Calculated continuous current based on maximum allowable junction temperature. The package limitation current is 50A.
- ③When mounted on 1 inch square copper board, $t \leq 10\text{sec}$.
- ④Limited by $T_{J\text{max}}$, $I_{AS} = 40\text{A}$, $V_{DD} = 60\text{V}$, $R_G = 50\ \Omega$, Starting $T_J = 25^\circ\text{C}$.
- ⑤Pulse test; Pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.
- ⑥Guaranteed by design, not subject to production testing.

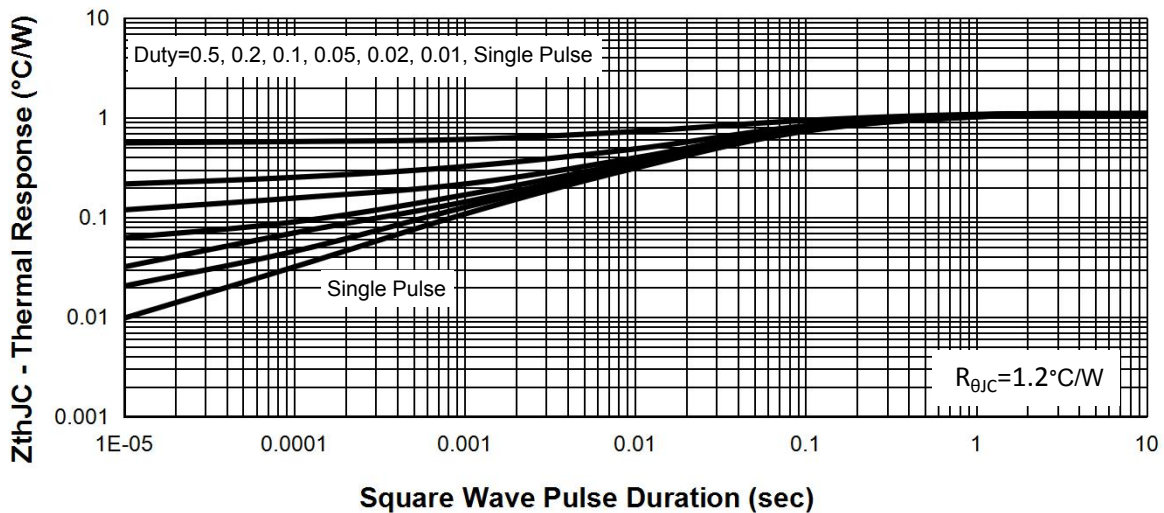
Ordering and Marking Information

| Device | Marking | Package | Packaging | Quantity | Reel Size | Tape width |
|----------|----------|----------|-----------|----------|-----------|------------|
| RUH1H80M | RUH1H80M | PDFN5060 | Tape&Reel | 3000 | 13" | 12mm |

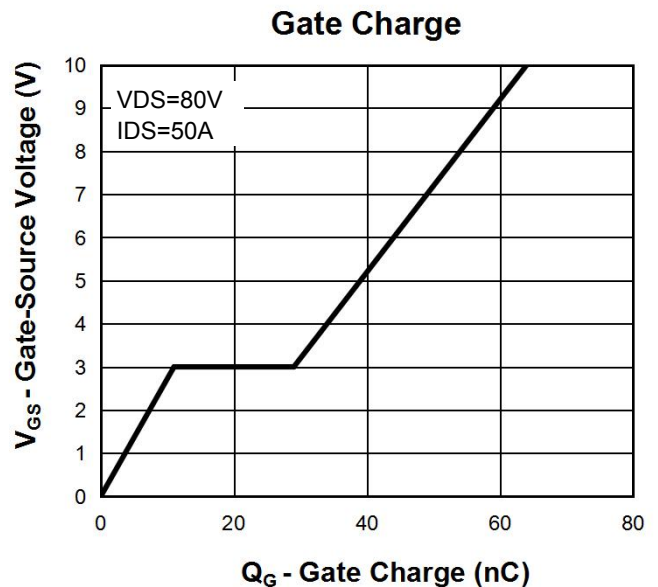
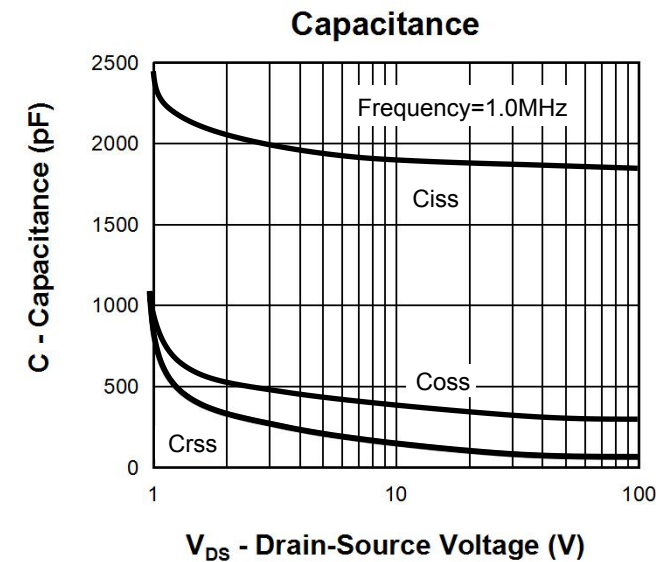
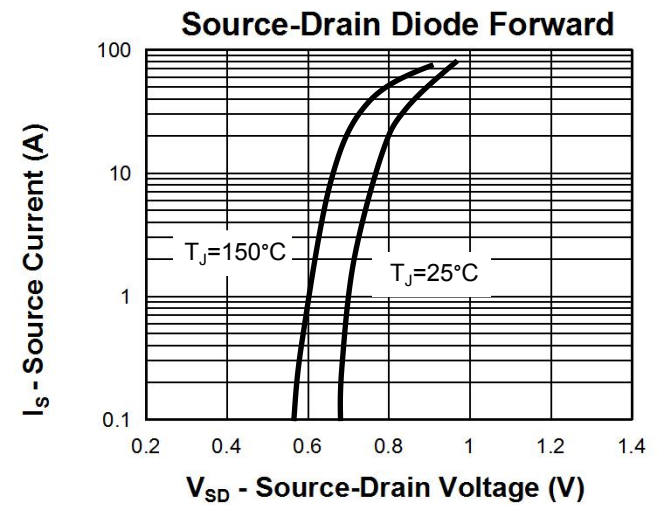
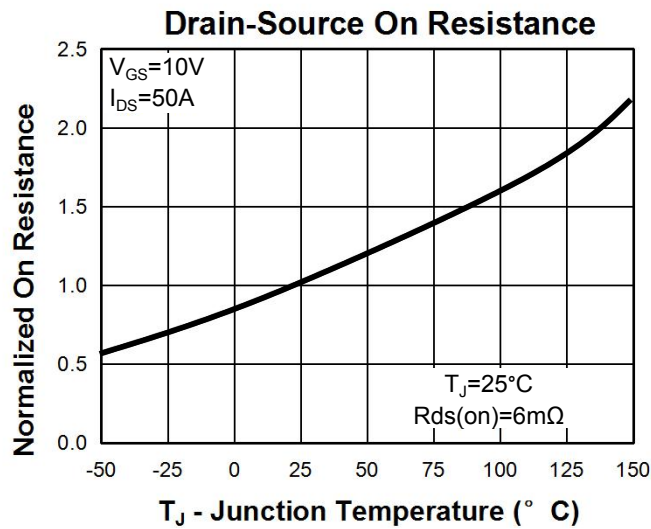
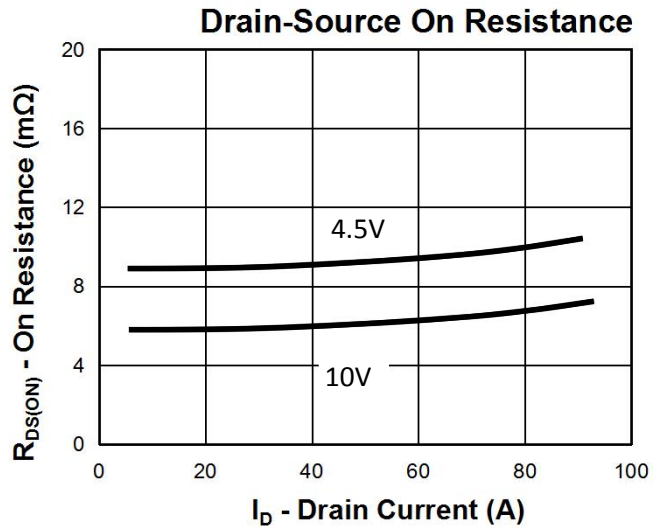
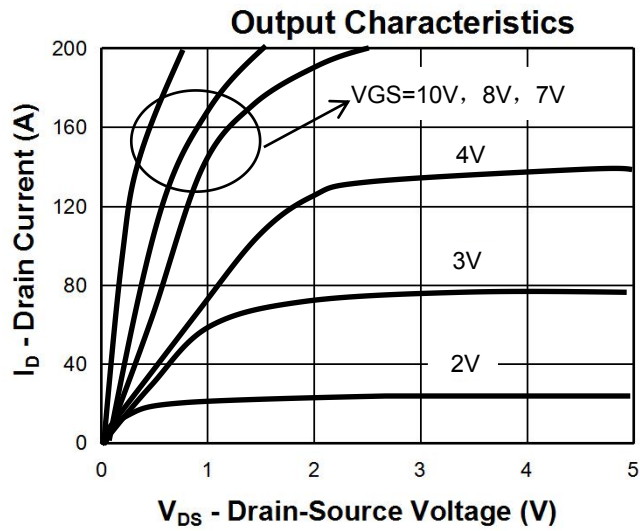
Typical Characteristics



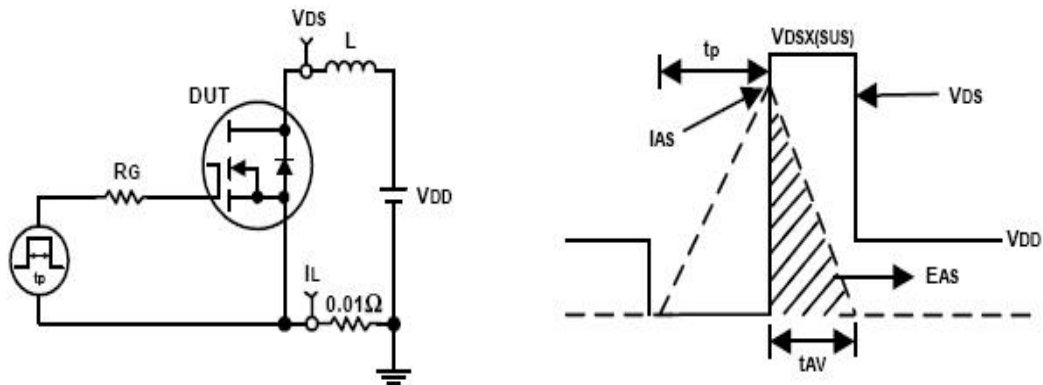
Thermal Transient Impedance



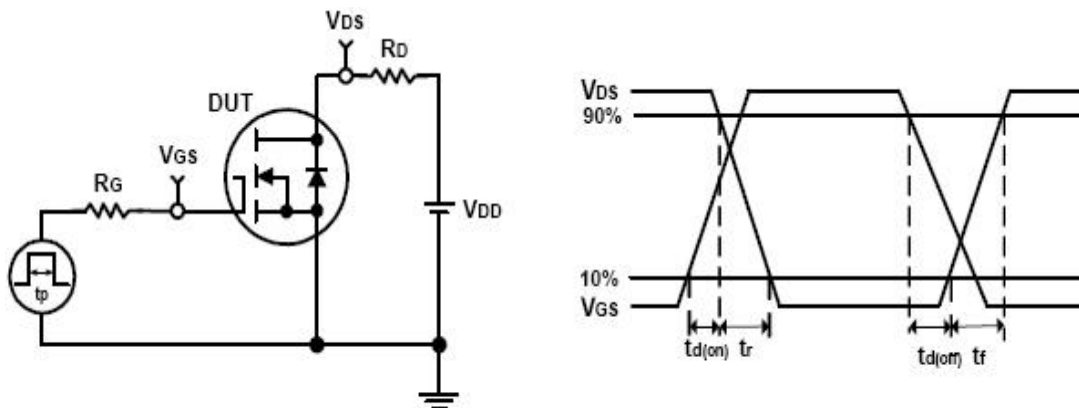
Typical Characteristics



Avalanche Test Circuit and Waveforms

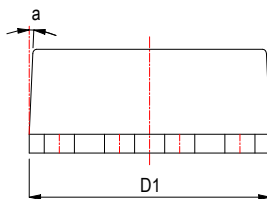
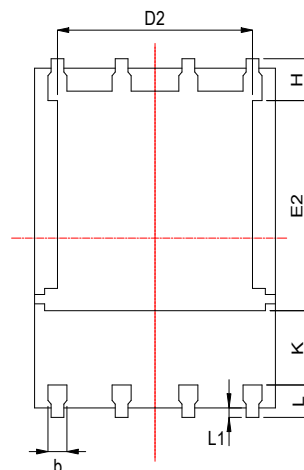
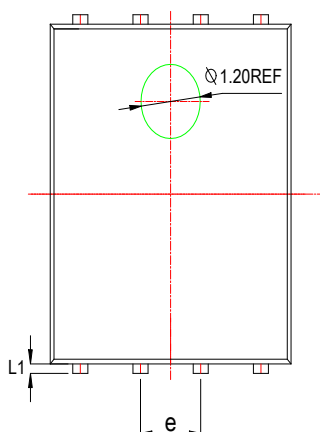
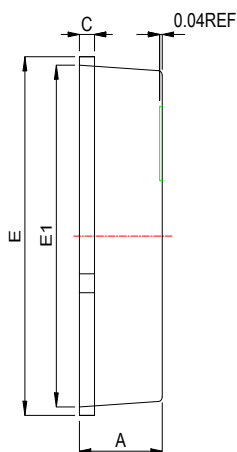


Switching Time Test Circuit and Waveforms

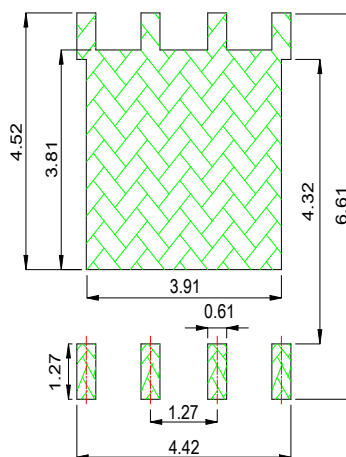


Package Information

PDFN5060



Land Pattern
(Only for Reference)



| SYMBOL | MM | | | INCH | | |
|--------|----------|------|------|-----------|-------|-------|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.90 | 1.00 | 1.10 | 0.035 | 0.039 | 0.043 |
| b | 0.33 | 0.42 | 0.51 | 0.013 | 0.017 | 0.020 |
| c | 0.20 | 0.25 | 0.30 | 0.008 | 0.010 | 0.012 |
| D1 | 4.80 | 4.90 | 5.00 | 0.189 | 0.193 | 0.197 |
| D2 | 3.61 | 3.79 | 3.96 | 0.142 | 0.149 | 0.156 |
| E | 5.90 | 6.00 | 6.10 | 0.232 | 0.236 | 0.240 |
| E1 | 5.65 | 5.75 | 5.85 | 0.222 | 0.226 | 0.230 |
| E2 | 3.38 | 3.58 | 3.78 | 0.133 | 0.141 | 0.149 |
| e | 1.27 BSC | | | 0.005 BSC | | |
| H | 0.41 | 0.51 | 0.61 | 0.016 | 0.020 | 0.024 |
| k | 1.10 | | | 0.043 | | |
| L | 0.51 | 0.61 | 0.71 | 0.020 | 0.024 | 0.028 |
| L1 | 0.06 | 0.13 | 0.20 | 0.002 | 0.005 | 0.008 |
| a | 0° | | 12° | 0° | | 12° |