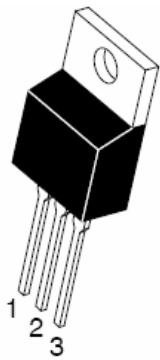
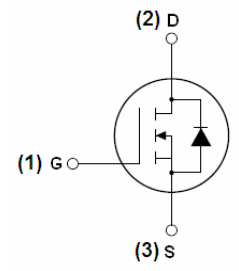


N-Channel Enhancement Mode Power MOSFET

| | | | | | | | | | | | | |
|--|---|-----------------|----|---|-------------------|-----|------------|-----|------------|-------|----|---|
| <p>General Description</p> <p>The HM75N80 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in PWM, load switching and general purpose applications.</p> <p>Features</p> <ul style="list-style-type: none"> ● $V_{DS}=75V$; $I_D=80A@V_{GS}=10V$; $R_{DS(ON)}<8m\Omega @V_{GS}=10V$ ● Special process technology for high ESD capability ● Special designed for Convertors and power controls ● High density cell design for ultra low R_{dson} ● Fully characterized Avalanche voltage and current ● Good stability and uniformity with high E_{AS} ● Excellent package for good heat dissipation <p>Application</p> <ul style="list-style-type: none"> ● Power switching application ● Hard Switched and High Frequency Circuits ● Uninterruptible Power Supply | <p>Product Summary</p> <table border="1"> <tr> <td>BV_{DSS} typ.</td> <td>84</td> <td>V</td> </tr> <tr> <td rowspan="2">$R_{DS(ON)}$ typ.</td> <td>6.5</td> <td>mΩ</td> </tr> <tr> <td>8.0</td> <td>mΩ</td> </tr> <tr> <td>I_D</td> <td>80</td> <td>A</td> </tr> </table> <p style="text-align: right; color: red;">100% UIS TESTED!</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>TO-220-3L top view</p> </div> <div style="text-align: center;">  <p>Schematic diagram</p> </div> </div> | BV_{DSS} typ. | 84 | V | $R_{DS(ON)}$ typ. | 6.5 | m Ω | 8.0 | m Ω | I_D | 80 | A |
| BV_{DSS} typ. | 84 | V | | | | | | | | | | |
| $R_{DS(ON)}$ typ. | 6.5 | m Ω | | | | | | | | | | |
| | 8.0 | m Ω | | | | | | | | | | |
| I_D | 80 | A | | | | | | | | | | |

Package Marking And Ordering Information

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity |
|----------------|---------|----------------|-----------|------------|----------|
| HM75N80 | HM75N80 | TO-220-3L | | - | - |

Table 1. Absolute Maximum Ratings (TA=25°C)

| Parameter | Symbol | Value | Unit |
|---|-----------------|------------|------|
| Drain-Source Voltage ($V_{GS}=0V$) | V_{DS} | 75 | V |
| Gate-Source Voltage ($V_{DS}=0V$) | V_{GS} | ± 25 | V |
| Drain Current (DC) at $T_c=25^\circ C$ | $I_{D(DC)}$ | 80 | A |
| Drain Current (DC) at $T_c=100^\circ C$ | $I_{D(DC)}$ | 60 | A |
| Drain Current-Continuous@ Current-Pulsed (Note 1) | $I_{DM(pluse)}$ | 320 | A |
| Peak diode recovery voltage | dv/dt | 30 | V/ns |
| Maximum Power Dissipation($T_c=25^\circ C$) | P_D | 170 | W |
| Derating factor | | 1.13 | W/°C |
| Single pulse avalanche energy (Note 2) | E_{AS} | 580 | mJ |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55 To 175 | °C |

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature

2.EAS condition: $T_J=25^\circ C, V_{DD}=50V, V_G=10V, L=0.3mH, I_D=62A$;

Table 2. Thermal Characteristic

| Parameter | Symbol | Value | Unit |
|---|------------|-------|---------------|
| Thermal Resistance, Junction-to-Case (Maximum) | R_{thJC} | 0.88 | $^{\circ}C/W$ |
| Thermal Resistance, Junction-to-Ambient (Maximum) | R_{thJA} | 63 | $^{\circ}C/W$ |

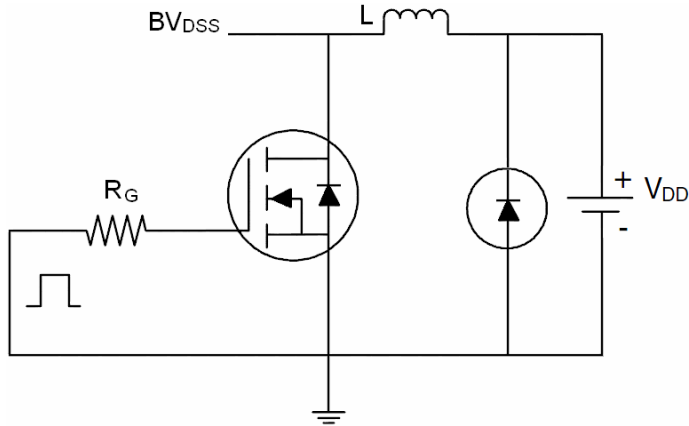
Table 3. Electrical Characteristics (TA=25 $^{\circ}C$ unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|--|--------------|--|-----|------|-----------|------------|
| On/off states | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=250\mu A$ | 75 | 84 | | V |
| Zero Gate Voltage Drain Current(Tc=25 $^{\circ}C$) | I_{DSS} | $V_{DS}=75V, V_{GS}=0V$ | | | 1 | μA |
| Zero Gate Voltage Drain Current(Tc=125 $^{\circ}C$) | I_{DSS} | $V_{DS}=75V, V_{GS}=0V$ | | | 10 | μA |
| Gate-Body Leakage Current | I_{GSS} | $V_{GS}=\pm 20V, V_{DS}=0V$ | | | ± 100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 2 | 2.85 | 4 | V |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}=10V, I_D=40A$ | | 6.5 | 8 | m Ω |
| Dynamic Characteristics | | | | | | |
| Forward Transconductance | g_{FS} | $V_{DS}=5V, I_D=30A$ | | 66 | | S |
| Input Capacitance | C_{iss} | $V_{DS}=25V, V_{GS}=0V,$ $F=1.0MHz$ | | 4400 | | PF |
| Output Capacitance | C_{oss} | | | 340 | | PF |
| Reverse Transfer Capacitance | C_{rss} | | | 260 | | PF |
| Total Gate Charge | Q_g | $V_{DS}=30V, I_D=30A,$ $V_{GS}=10V$ | | 100 | | nC |
| Gate-Source Charge | Q_{gs} | | | 20 | | nC |
| Gate-Drain Charge | Q_{gd} | | | 30 | | nC |
| Switching times | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}=30V, I_D=2A, R_L=15\Omega$ $V_{GS}=10V, R_G=2.5\Omega$ | | 17.8 | | nS |
| Turn-on Rise Time | t_r | | | 11.8 | | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 56 | | nS |
| Turn-Off Fall Time | t_f | | | 14.6 | | nS |
| Source- Drain Diode Characteristics | | | | | | |
| Source-drain current(Body Diode) | I_{SD} | | | | 80 | A |
| Pulsed Source-drain current(Body Diode) | I_{SDM} | | | | 320 | A |
| Forward on voltage ^(Note 1) | V_{SD} | $T_j=25^{\circ}C, I_{SD}=40A, V_{GS}=0V$ | | | 1.2 | V |
| Reverse Recovery Time ^(Note 1) | t_{rr} | $T_j=25^{\circ}C, I_F=75A, di/dt=100A/\mu s$ | | | 36 | nS |
| Reverse Recovery Charge ^(Note 1) | Q_{rr} | | | | 56 | nC |
| Forward Turn-on Time | t_{on} | Intrinsic turn-on time is negligible(turn-on is dominated by L_S+L_D) | | | | |

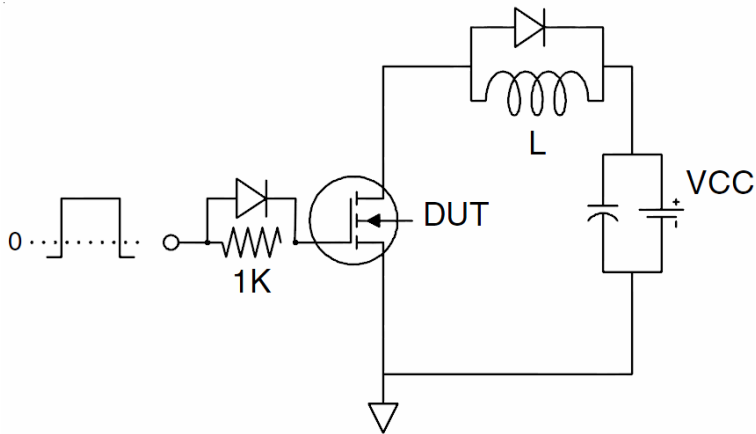
Notes 1. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 1.5\%$, $R_G=25\Omega$, Starting $T_j=25^{\circ}C$

Test circuit

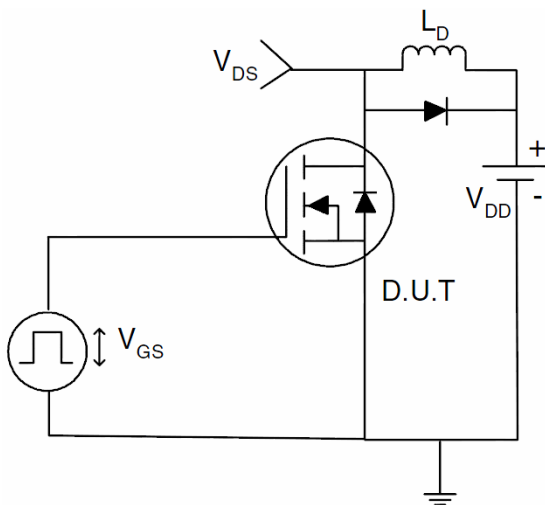
1) E_{AS} test circuits



2) Gate charge test circuit:



3) Switch Time Test Circuit:



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (curves)

Figure1. Safe operating area

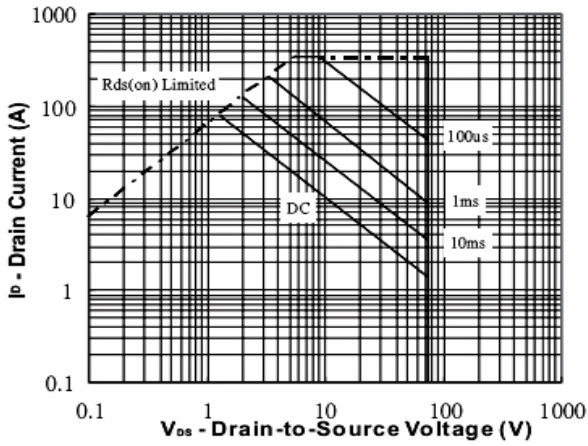


Figure2. Source-Drain Diode Forward Voltage

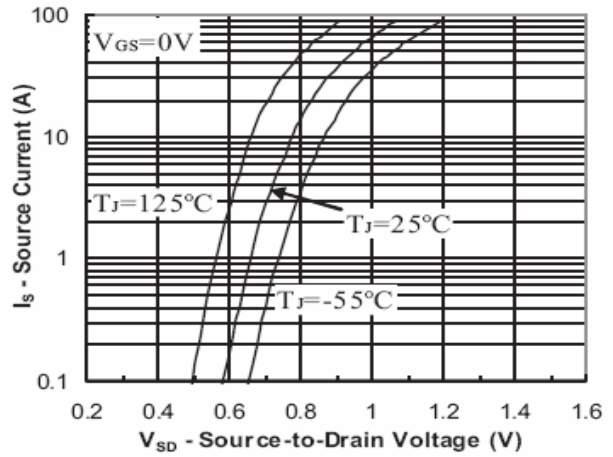


Figure3. Output characteristics

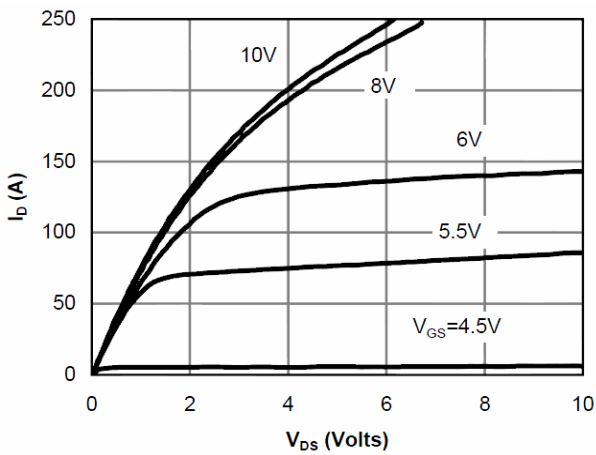


Figure4. Transfer characteristics

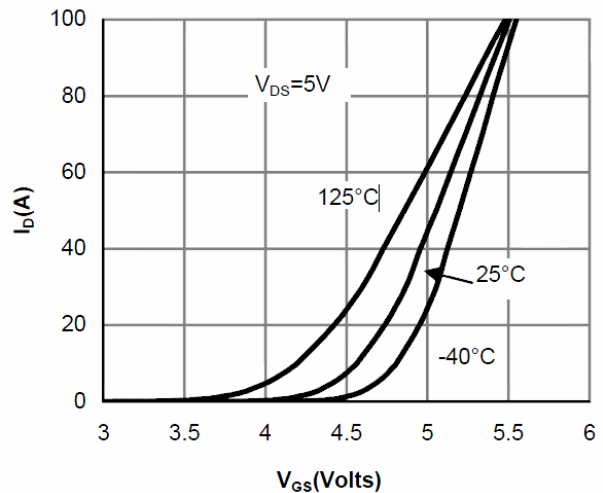


Figure5. Static drain-source on resistance

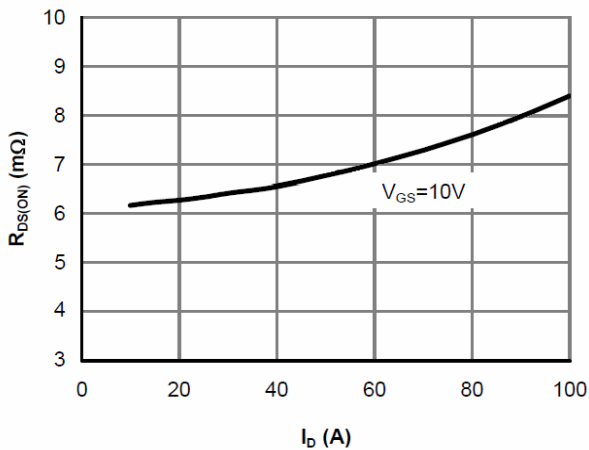


Figure6. $R_{DS(ON)}$ vs Junction Temperature

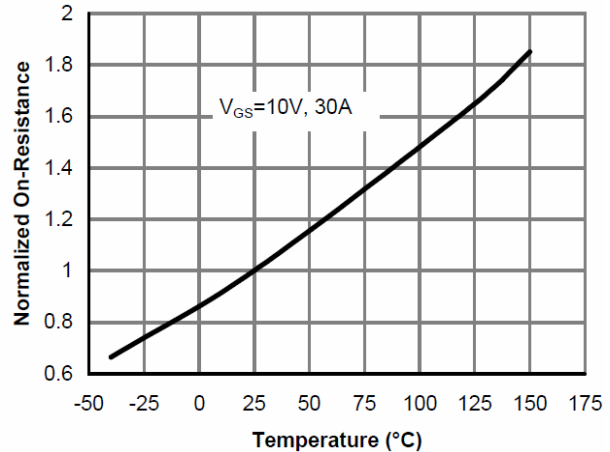


Figure7. BV_{DSS} vs Junction Temperature

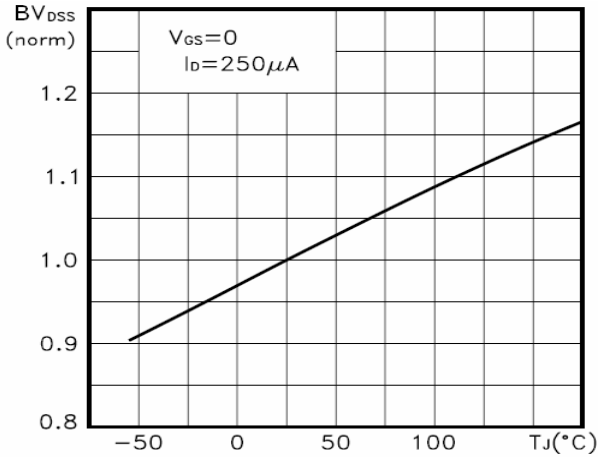


Figure8. $V_{GS(th)}$ vs Junction Temperature

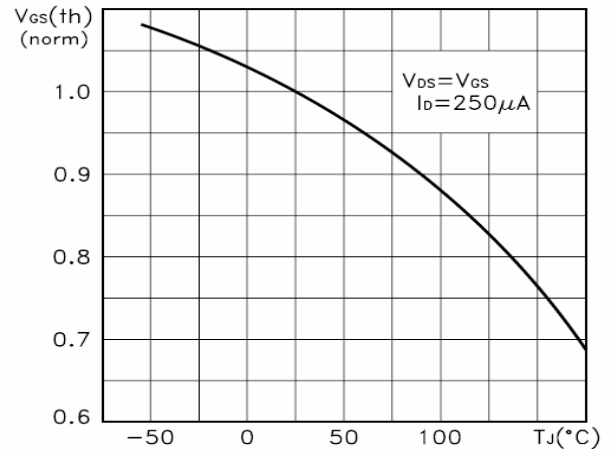


Figure9. Gate charge waveforms

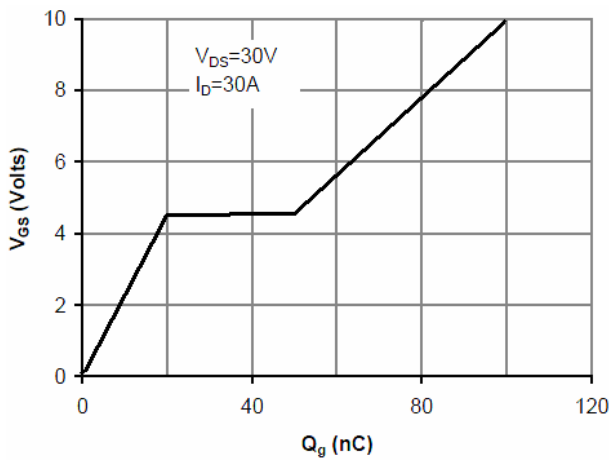
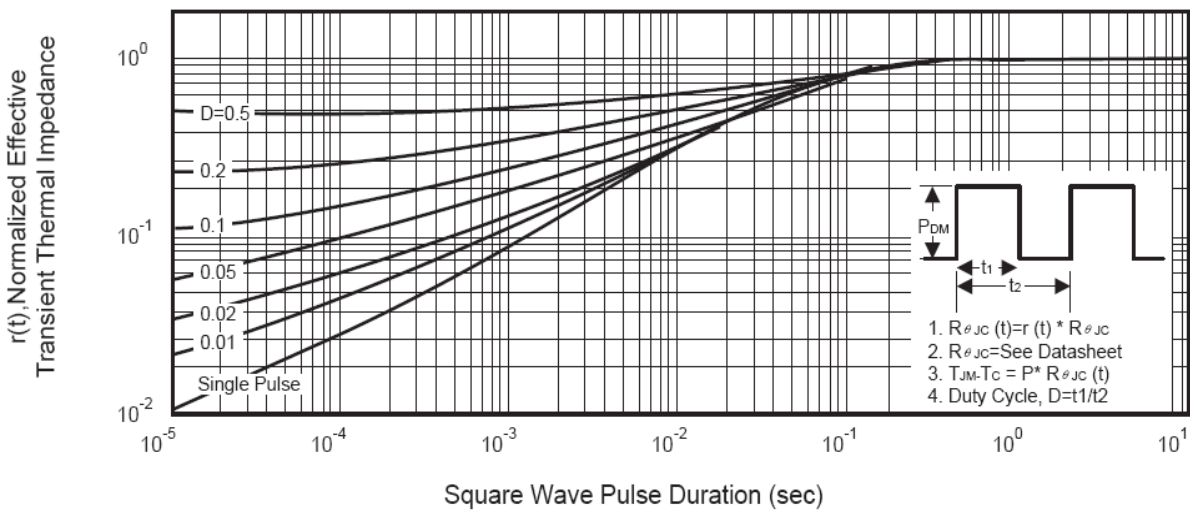
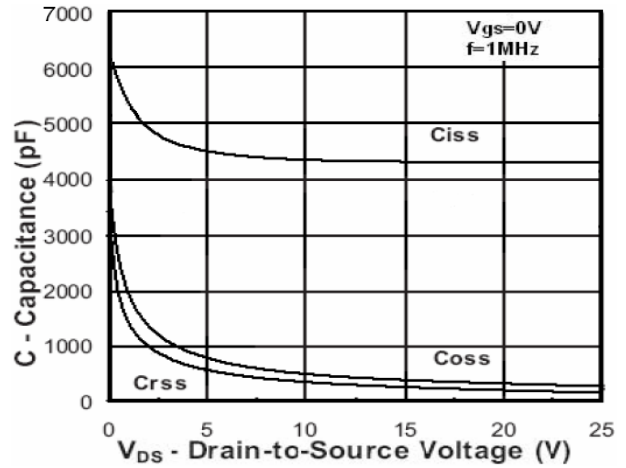
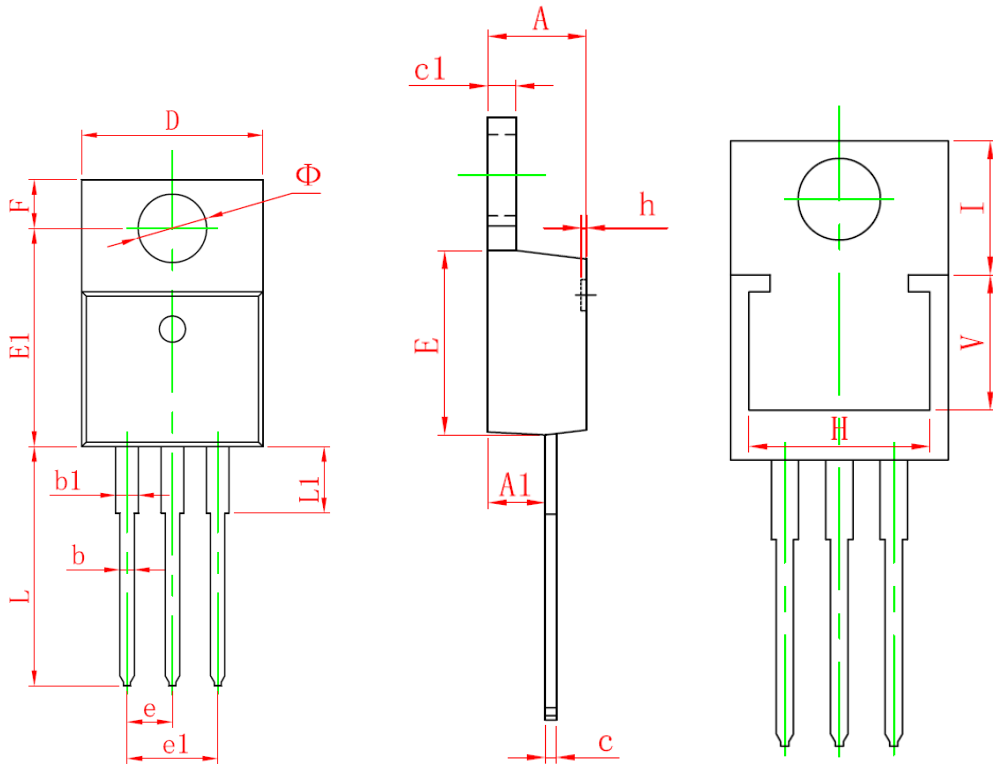


Figure10. Capacitance



TO-220-3L Package Information



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|--------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 4.470 | 4.670 | 0.176 | 0.184 |
| A1 | 2.520 | 2.820 | 0.099 | 0.111 |
| b | 0.710 | 0.910 | 0.028 | 0.036 |
| b1 | 1.170 | 1.370 | 0.046 | 0.054 |
| c | 0.330 | 0.650 | 0.013 | 0.026 |
| c1 | 1.200 | 1.400 | 0.047 | 0.055 |
| D | 10.010 | 10.350 | 0.394 | 0.407 |
| E | 8.500 | 8.900 | 0.335 | 0.350 |
| E1 | 12.060 | 12.460 | 0.475 | 0.491 |
| e | 2.540 (TYP.) | | 0.100 (TYP.) | |
| e1 | 4.980 | 5.180 | 0.196 | 0.204 |
| F | 2.590 | 2.890 | 0.102 | 0.114 |
| H | 8.440 REF. | | 0.332 REF. | |
| h | 0.000 | 0.300 | 0.000 | 0.012 |
| L | 13.400 | 13.800 | 0.528 | 0.543 |
| L1 | 3.560 | 3.960 | 0.140 | 0.156 |
| V | 6.360 REF. | | 0.250 REF. | |
| I | 6.300 REF. | | 0.248 REF. | |
| Φ | 3.735 | 3.935 | 0.147 | 0.155 |