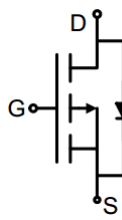
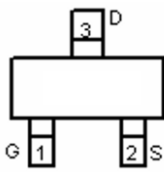
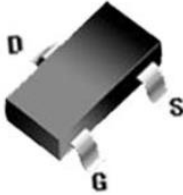


P-Channel Enhancement Mode Power MOSFET

| | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <p>Description</p> <p>The 5P40 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.</p> <p>General Features</p> <ul style="list-style-type: none"> • V_{DS} -40V • I_D (at $V_{GS} = -10V$) -5A • $R_{DS(ON)}$ (at $V_{GS} = -10V$) < 85mΩ • $R_{DS(ON)}$ (at $V_{GS} = -4.5V$) < 150mΩ • 100% Avalanche Tested • RoHS Compliant <p>Application</p> <ul style="list-style-type: none"> • Power switch • DC/DC converters | |  <p>Schematic diagram</p>  <p>Marking and pin assignment</p>  <p>SOT-23-3L</p> | |
| Device | Package | Marking | Packaging |
| 5P40 | SOT-23-3 | 5P40 | 3000pcs/Reel |

| Absolute Maximum Ratings $T_C = 25^{\circ}C$, unless otherwise noted | | | |
|-----------------------------------------------------------------------|----------------|------------|-------------|
| Parameter | Symbol | Value | Unit |
| Drain-Source Voltage | V_{DS} | -40 | V |
| Continuous Drain Current | I_D | -5 | A |
| Pulsed Drain Current (note1) | I_{DM} | -20 | A |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Power Dissipation | P_D | 2 | W |
| Operating Junction and Storage Temperature Range | T_J, T_{stg} | -55 To 150 | $^{\circ}C$ |

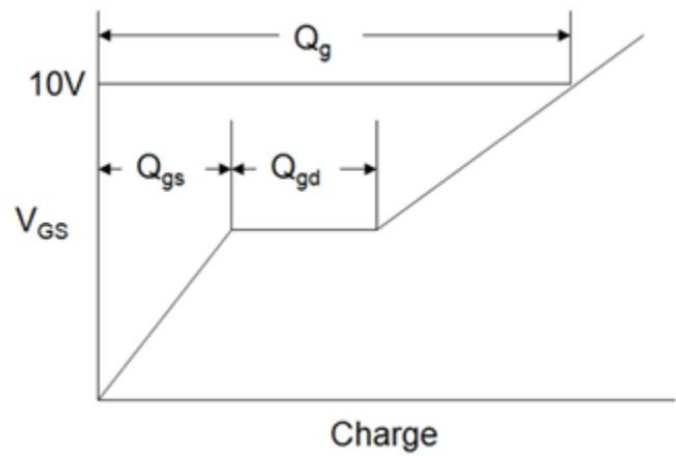
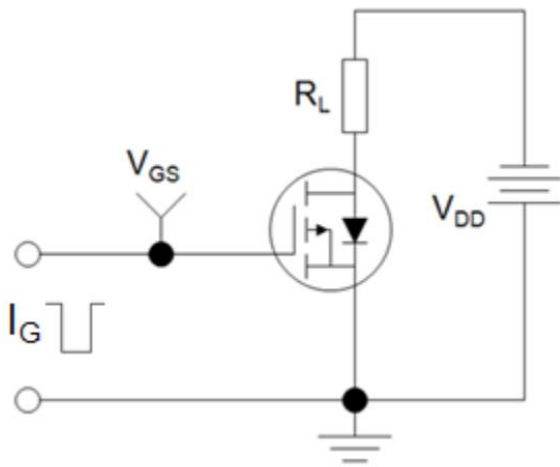
| Thermal Resistance | | | |
|-----------------------------------------|------------|-------|---------------|
| Parameter | Symbol | Value | Unit |
| Thermal Resistance, Junction-to-Ambient | R_{thJA} | 62.5 | $^{\circ}C/W$ |

| Specifications $T_J = 25^\circ\text{C}$, unless otherwise noted | | | | | | |
|------------------------------------------------------------------|---------------|-----------------------------------------------------|-------|------|-----------|------------|
| Parameter | Symbol | Test Conditions | Value | | | Unit |
| | | | Min. | Typ. | Max. | |
| Static Parameters | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = -250\mu A$ | -40 | -- | -- | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = -40V, V_{GS} = 0V$ | -- | -- | -1 | μA |
| Gate-Source Leakage | I_{GSS} | $V_{GS} = \pm 20V$ | -- | -- | ± 100 | nA |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = -250\mu A$ | -1 | -1.7 | -3 | V |
| Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS} = -10V, I_D = -3A$ | -- | 57 | 85 | m Ω |
| | | $V_{GS} = -4.5V, I_D = -2A$ | -- | 77 | 150 | |
| Dynamic Parameters | | | | | | |
| Input Capacitance | C_{iss} | $V_{GS} = 0V,$ $V_{DS} = -20V,$ $f = 1.0MHz$ | -- | 600 | -- | pF |
| Output Capacitance | C_{oss} | | -- | 90 | -- | |
| Reverse Transfer Capacitance | C_{rss} | | -- | 70 | -- | |
| Total Gate Charge | Q_g | $V_{DD} = -20V,$ $I_D = -3A,$ $V_{GS} = -10V$ | -- | 14 | -- | nC |
| Gate-Source Charge | Q_{gs} | | -- | 3 | -- | |
| Gate-Drain Charge | Q_{gd} | | -- | 3.8 | -- | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD} = -20V,$ $I_D = -3A,$ $R_G = 3\Omega$ | -- | 9 | -- | ns |
| Turn-on Rise Time | t_r | | -- | 8 | -- | |
| Turn-off Delay Time | $t_{d(off)}$ | | -- | 28 | -- | |
| Turn-off Fall Time | t_f | | -- | 10 | -- | |
| Drain-Source Body Diode Characteristics | | | | | | |
| Continuous Body Diode Current | I_S | $T_C = 25^\circ\text{C}$ | -- | -- | -5 | A |
| Body Diode Voltage | V_{SD} | $T_J = 25^\circ\text{C}, I_{SD} = -2A, V_{GS} = 0V$ | -- | -- | -1.2 | V |
| Reverse Recovery Charge | Q_{rr} | $I_S = -3A, V_{GS} = 0V$ $di/dt = 500A/\mu s$ | -- | 4 | -- | nc |
| Reverse Recovery Time | t_{rr} | | -- | 10 | -- | ns |

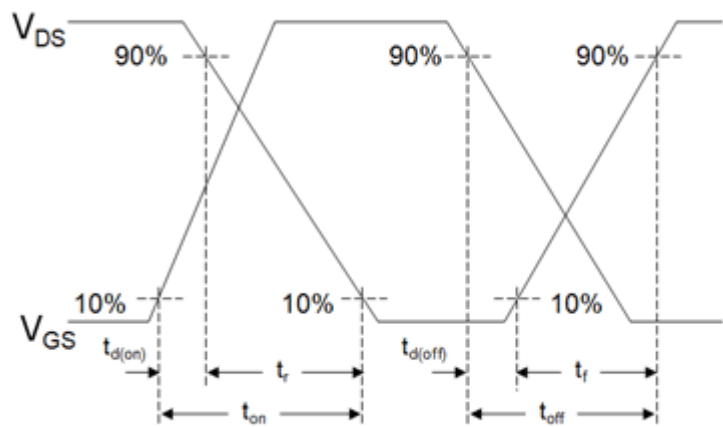
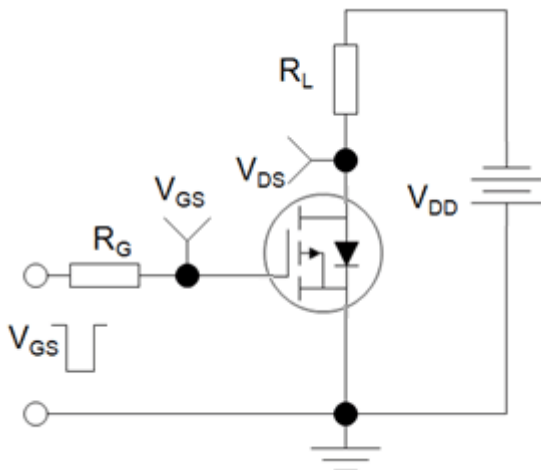
Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. Identical low side and high side switch with identical R_G

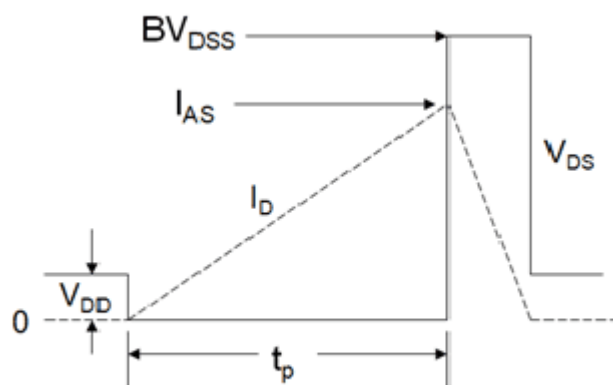
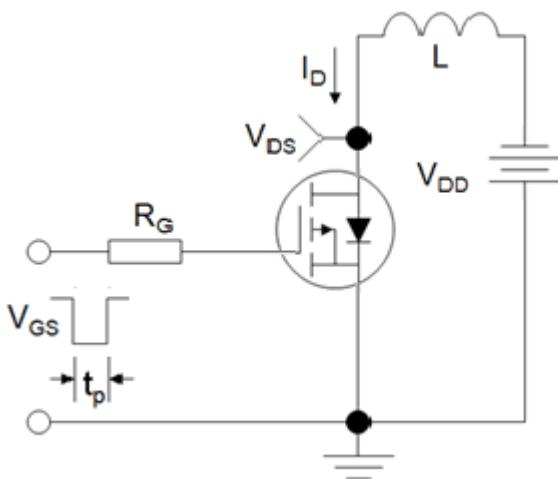
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 1. Output Characteristics

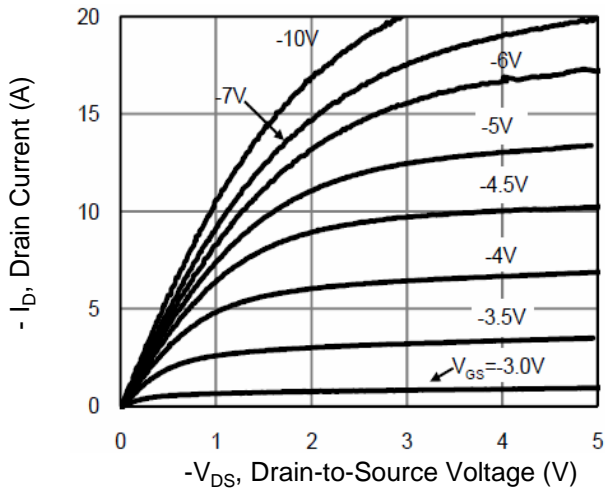


Figure 2. Transfer Characteristics

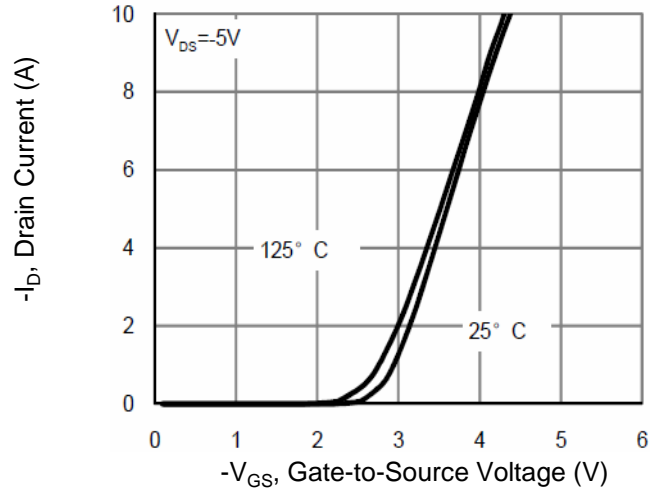


Figure 3. Gate Charge

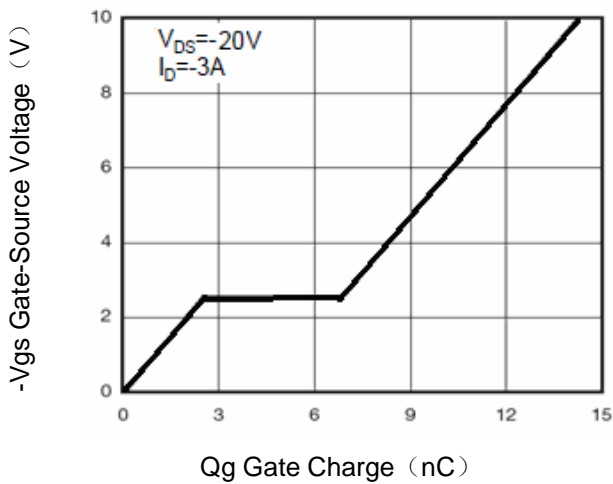


Figure 4. Drain Source On Resistance

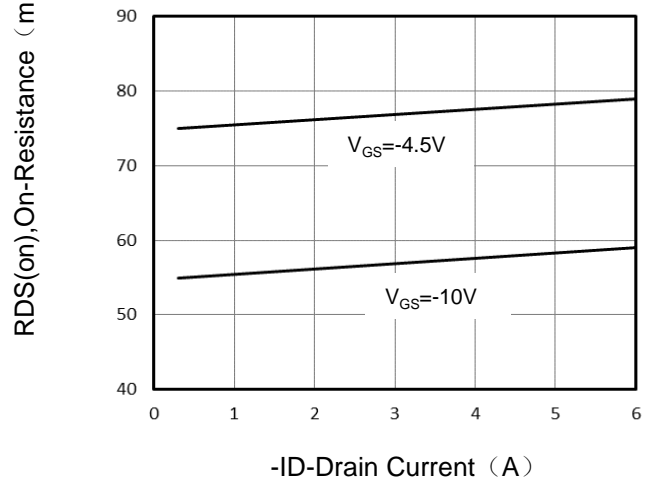


Figure 5. Capacitance

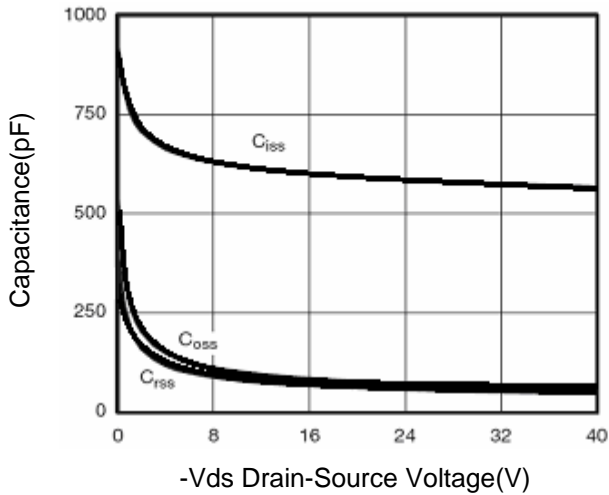
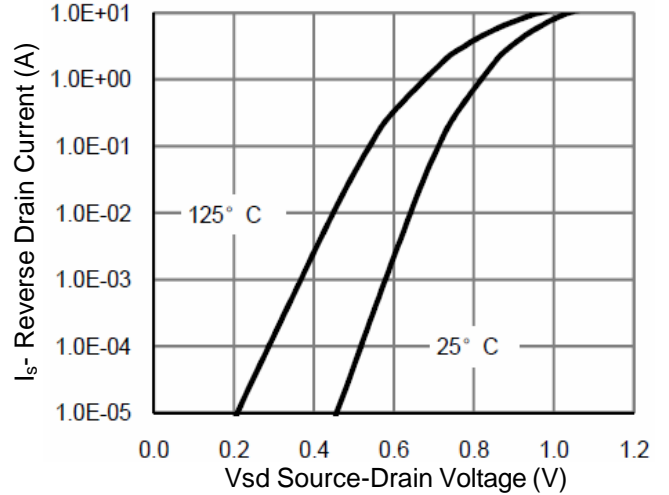


Figure 6. Source-Drain Diode Forward



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 7. Drain-Source On-Resistance

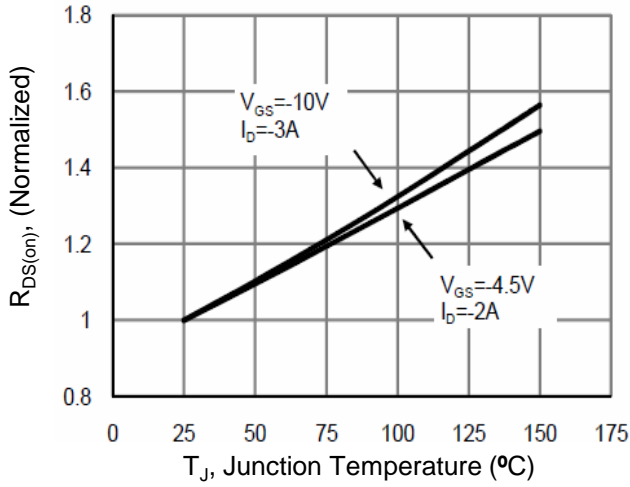


Figure 8. Safe Operation Area

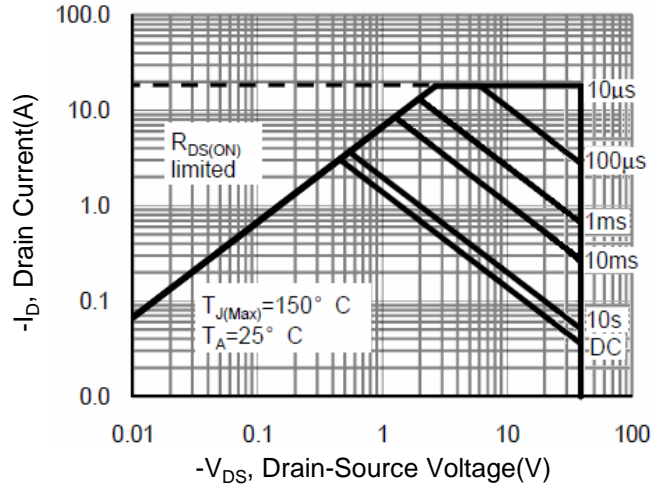
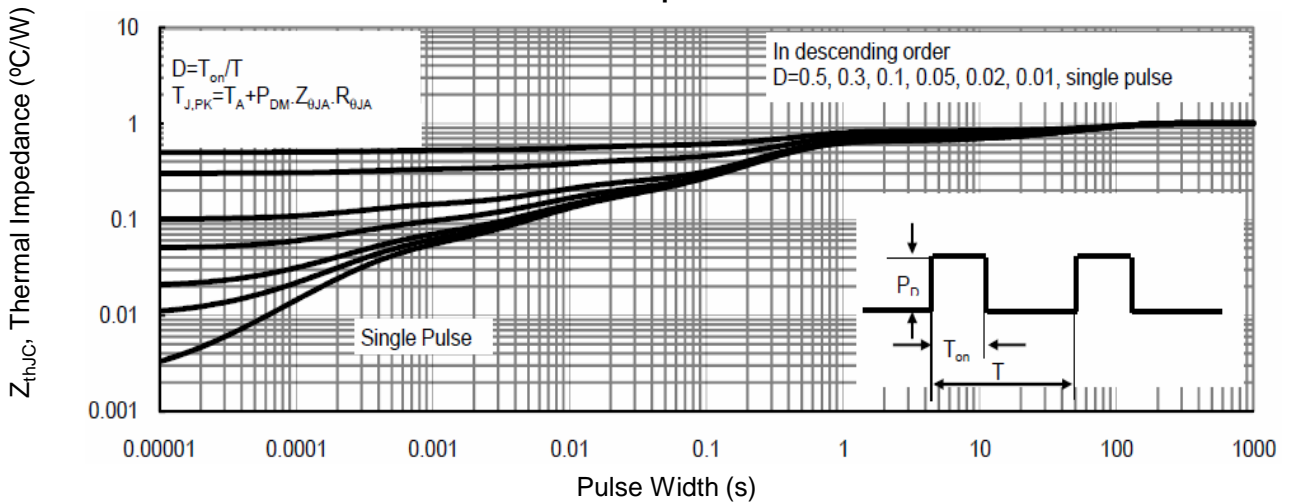
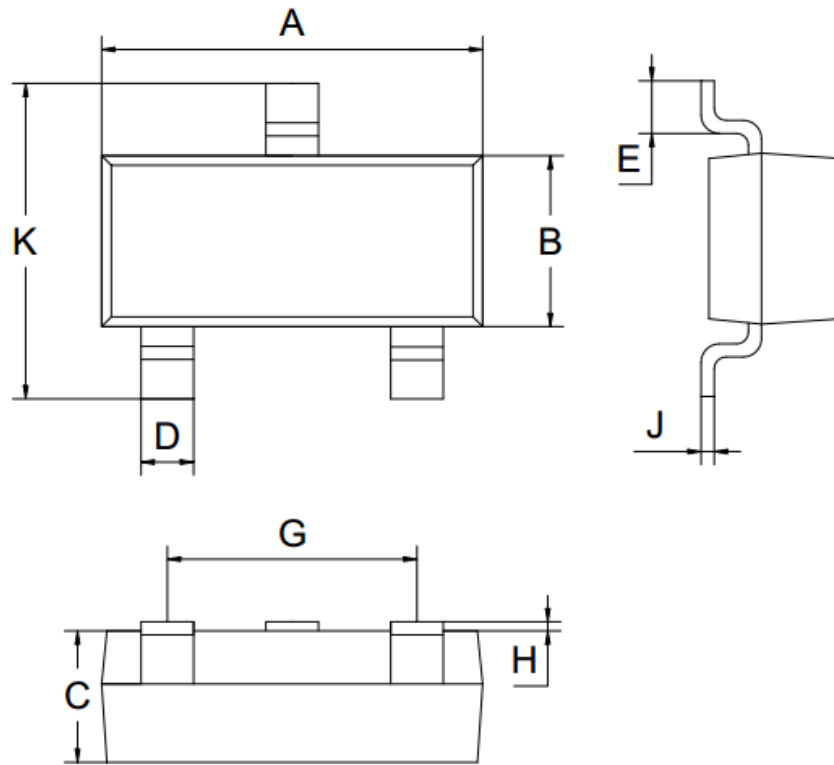


Figure 9. Normalized Maximum Transient Thermal Impedance



SOT-23-3L Package Information



| Symbol | Dimensions in Millimeters | | |
|----------------------|---------------------------|-------|-------|
| | MIN. | NOM. | MAX. |
| A | 2.80 | 2.90 | 3.00 |
| B | 1.50 | 1.60 | 1.70 |
| C | 1.00 | 1.10 | 1.20 |
| D | 0.30 | 0.40 | 0.50 |
| E | 0.25 | 0.40 | 0.55 |
| G | 1.90 | | |
| H | 0.00 | - | 0.10 |
| J | 0.047 | 0.127 | 0.207 |
| K | 2.60 | 2.80 | 3.00 |
| All Dimensions in mm | | | |