

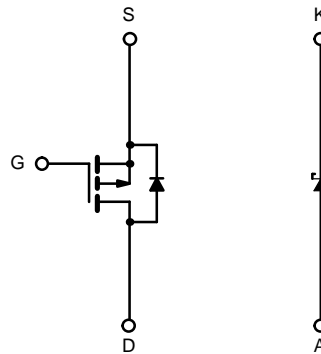
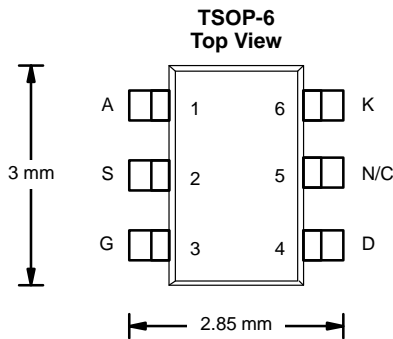


## P-Channel 20-V (D-S) MOSFET With Schottky Diode

| MOSFET PRODUCT SUMMARY |                           |           |
|------------------------|---------------------------|-----------|
| $V_{DS}$ (V)           | $r_{DS(on)}$ ( $\Omega$ ) | $I_D$ (A) |
| -20                    | 0.200 @ $V_{GS} = -4.5$ V | $\pm 1.8$ |
|                        | 0.340 @ $V_{GS} = -2.5$ V | $\pm 1.3$ |

| SCHOTTKY PRODUCT SUMMARY |                                    |           |
|--------------------------|------------------------------------|-----------|
| $V_{KA}$ (V)             | $V_f$ (V)<br>Diode Forward Voltage | $I_F$ (A) |
| 20                       | 0.48 V @ 0.5 A                     | 0.5       |

LITTLE FOOT Plus™



P-Channel MOSFET

| ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)  |                          |            |              |                  |
|--|--------------------------|------------|--------------|------------------|
| Parameter  | Symbol                   | 5 sec      | Steady State | Unit             |
| Drain-Source Voltage (MOSFET and Schottky)                                   | $V_{DS}$                 | -20        |              | V                |
| Reverse Voltage (Schottky)   | $V_{KA}$                 | 20         |              |                  |
| Gate-Source Voltage (MOSFET)   | $V_{GS}$                 | $\pm 12$   | $\pm 12$     | A                |
| Continuous Drain Current ( $T_J = 150^\circ\text{C}$ ) (MOSFET) <sup>a</sup> | $T_A = 25^\circ\text{C}$ | $\pm 1.8$  | $\pm 1.6$    |                  |
|  | $T_A = 70^\circ\text{C}$ | $\pm 1.5$  | $\pm 1.2$    |                  |
| Pulsed Drain Current (MOSFET)  | $I_{DM}$                 | $\pm 7$    |              |                  |
| Continuous Source Current (MOSFET Diode Conduction) <sup>a</sup>             | $I_S$                    | -1.05      | -0.75        |                  |
| Average Forward Current (Schottky)   | $I_F$                    | 0.5        |              |                  |
| Pulsed Forward Current (Schottky)  | $I_{FM}$                 | 7          |              |                  |
| Maximum Power Dissipation (MOSFET) <sup>a</sup>                              | $T_A = 25^\circ\text{C}$ | 1.15       | 0.83         | W                |
|  | $T_A = 70^\circ\text{C}$ | 0.73       | 0.53         |                  |
| Maximum Power Dissipation (Schottky) <sup>a</sup>                            | $T_A = 25^\circ\text{C}$ | 1.0        | 0.76         |                  |
|  | $T_A = 70^\circ\text{C}$ | 0.64       | 0.48         |                  |
| Operating Junction and Storage Temperature Range                             | $T_J, T_{stg}$           | -55 to 150 |              | $^\circ\text{C}$ |

Notes

a. Surface Mounted on 1" x 1" FR4 Board.



| THERMAL RESISTANCE RATINGS       |              |          |                   |         |         |      |
|----------------------------------|--------------|----------|-------------------|---------|---------|------|
| Parameter                        |              | Device   | Symbol            | Typical | Maximum | Unit |
| Junction-to-Ambient <sup>a</sup> | t ≤ 5 sec    | MOSFET   | R <sub>thJA</sub> | 93      | 110     | °C/W |
|                                  |              | Schottky |                   | 103     | 125     |      |
|                                  | Steady State | MOSFET   |                   | 130     | 150     |      |
|                                  |              | Schottky |                   | 140     | 165     |      |
| Junction-to-Foot                 | Steady State | MOSFET   | R <sub>thJF</sub> | 75      | 90      |      |
|                                  |              | Schottky | 80                | 95      |         |      |

## Notes

a. Surface Mounted on 1" x 1" FR4 Board.

| MOSFET SPECIFICATIONS (T <sub>J</sub> = 25°C UNLESS OTHERWISE NOTED) |                     |  |      |       |       |      |
|--|---------------------|--|------|-------|-------|------|
| Parameter  | Symbol              | Test Condition   | Min  | Typ   | Max   | Unit |
| <b>Static</b>  |                     |  |      |       |       |      |
| Gate Threshold Voltage   | V <sub>GS(th)</sub> | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250 μA   | -0.5 |       |       | V    |
| Gate-Body Leakage  | I <sub>GSS</sub>    | V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±12 V   |      |       | ±100  | nA   |
| Zero Gate Voltage Drain Current                                      | I <sub>DSS</sub>    | V <sub>DS</sub> = -16 V, V <sub>GS</sub> = 0 V   |      |       | -1    | μA   |
|  |                     | V <sub>DS</sub> = -16 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 75°C  |      |       | -10   |      |
| On-State Drain Current <sup>a</sup>                                  | I <sub>D(on)</sub>  | V <sub>DS</sub> ≥ -5 V, V <sub>GS</sub> = -4.5 V   | -5   |       |       | A    |
| Drain-Source On-State Resistance <sup>a</sup>                        | r <sub>DS(on)</sub> | V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -1.8 A  |      | 0.160 | 0.200 | Ω    |
|  |                     | V <sub>GS</sub> = -2.5 V, I <sub>D</sub> = -1.0 A  |      | 0.280 | 0.340 |      |
| Forward Transconductance <sup>a</sup>                                | g <sub>fs</sub>     | V <sub>DS</sub> = -5 V, I <sub>D</sub> = -1.8 A  |      | 3.6   |       | S    |
| Diode Forward Voltage <sup>a</sup>                                   | V <sub>SD</sub>     | I <sub>S</sub> = -1.05 A, V <sub>GS</sub> = 0 V  |      | -0.83 | -1.10 | V    |
| <b>Dynamic<sup>b</sup></b>   |                     |  |      |       |       |      |
| Total Gate Charge  | Q <sub>g</sub>      | V <sub>DS</sub> = -10 V, V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -1.8 A   |      | 2.7   | 4.0   | nC   |
| Gate-Source Charge   | Q <sub>gs</sub>     |  |      | 0.4   |       |      |
| Gate-Drain Charge  | Q <sub>gd</sub>     |  |      | 0.6   |       |      |
| Turn-On Delay Time   | t <sub>d(on)</sub>  | V <sub>DD</sub> = -10 V, R <sub>L</sub> = 10 Ω<br>I <sub>D</sub> ≅ -1 A, V <sub>GEN</sub> = -4.5 V, R <sub>G</sub> = 6 Ω |      | 11    | 17    | ns   |
| Rise Time  | t <sub>r</sub>      |  |      | 34    | 50    |      |
| Turn-Off Delay Time  | t <sub>d(off)</sub> |  |      | 19    | 30    |      |
| Fall Time  | t <sub>f</sub>      |  |      | 24    | 36    |      |
| Source-Drain Reverse Recovery Time                                   | t <sub>rr</sub>     | I <sub>F</sub> = -1.05 A, di/dt = 100 A/μs   |      | 20    | 40    |      |

## Notes

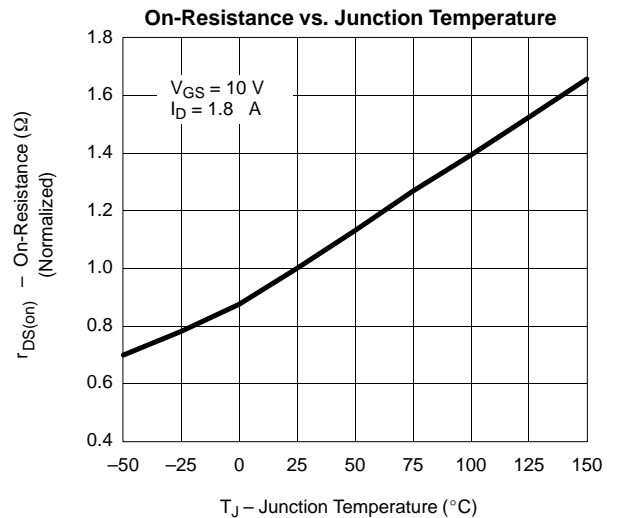
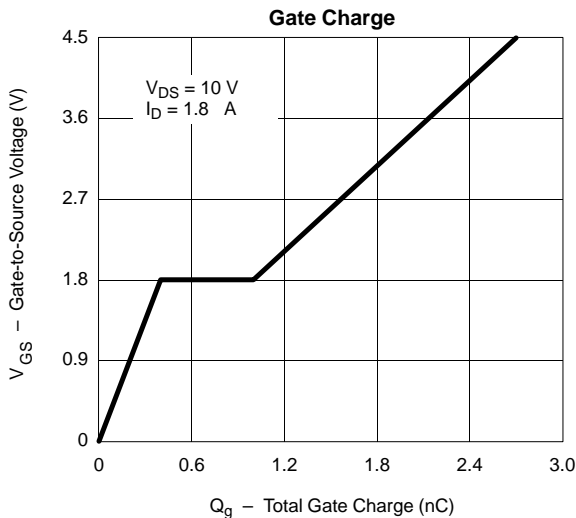
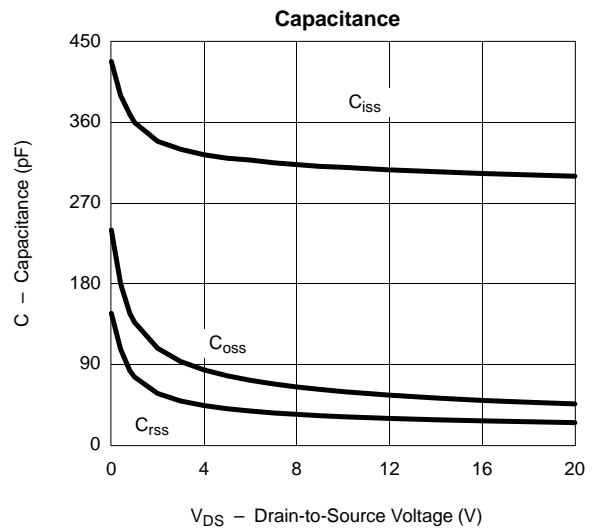
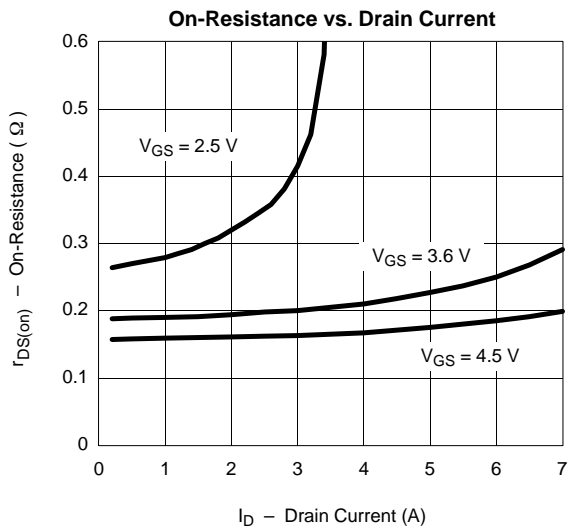
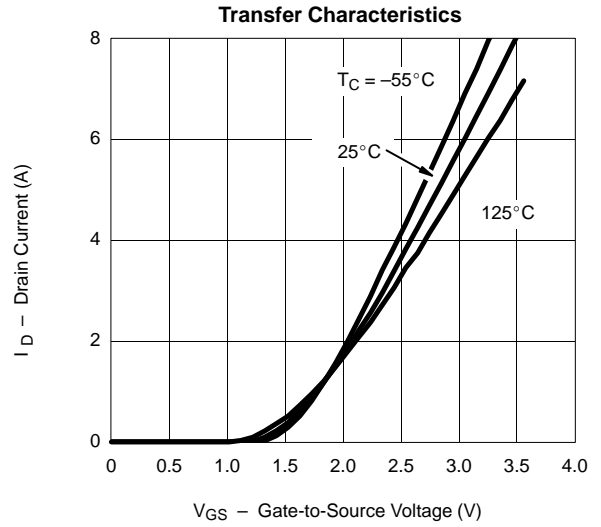
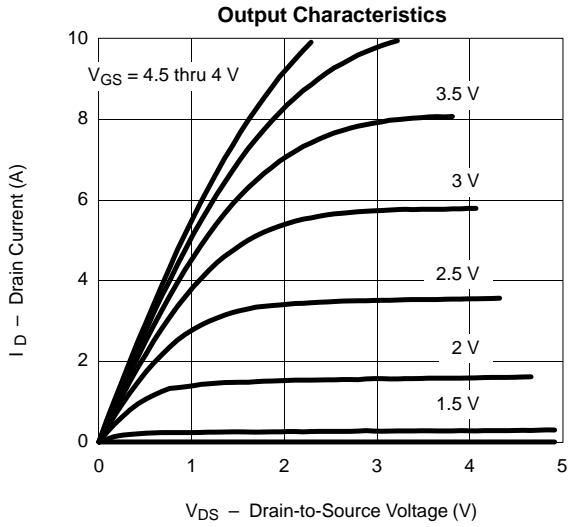
a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.

b. Guaranteed by design, not subject to production testing.

| SCHOTTKY SPECIFICATIONS (T <sub>J</sub> = 25°C UNLESS OTHERWISE NOTED) |                 |  |     |       |       |      |
|--|-----------------|--|-----|-------|-------|------|
| Parameter  | Symbol          | Test Condition                                 | Min | Typ   | Max   | Unit |
| Forward Voltage Drop   | V <sub>F</sub>  | I <sub>F</sub> = 0.5 A                         |     | 0.42  | 0.48  | V    |
|  |                 | I <sub>F</sub> = 0.5 A, T <sub>J</sub> = 125°C |     | 0.33  | 0.4   |      |
| Maximum Reverse Leakage Current  | I <sub>rm</sub> | V <sub>r</sub> = 20 V                          |     | 0.002 | 0.100 | mA   |
|  |                 | V <sub>r</sub> = 20 V, T <sub>J</sub> = 75°C   |     | 0.06  | 1     |      |
|  |                 | V <sub>r</sub> = 20 V, T <sub>J</sub> = 125°C  |     | 1.5   | 10    |      |
| Junction Capacitance   | C <sub>T</sub>  | V <sub>r</sub> = 10 V                          |     | 31    |       | pF   |

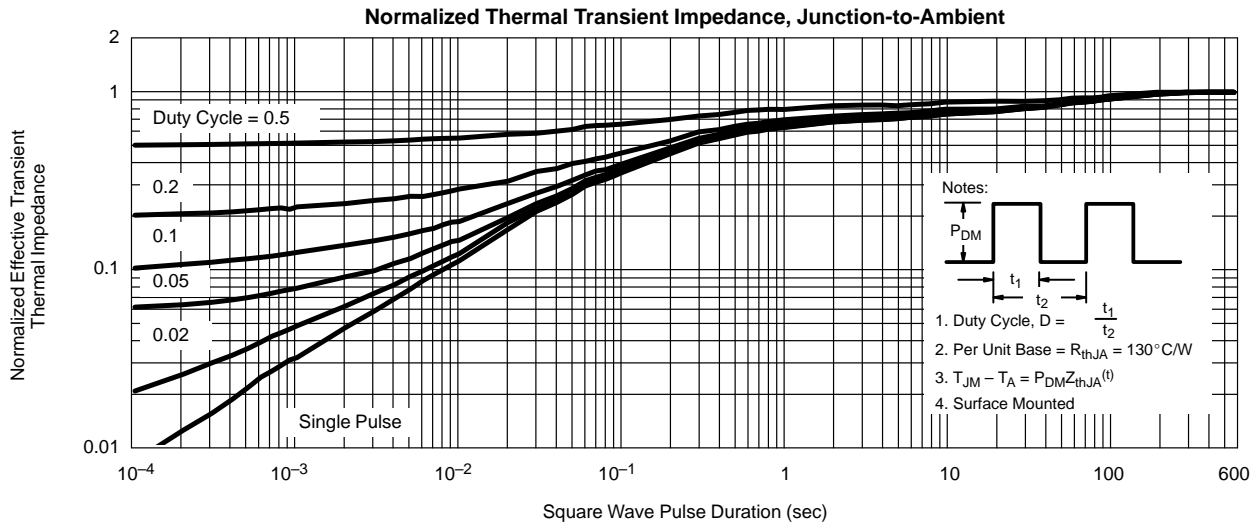
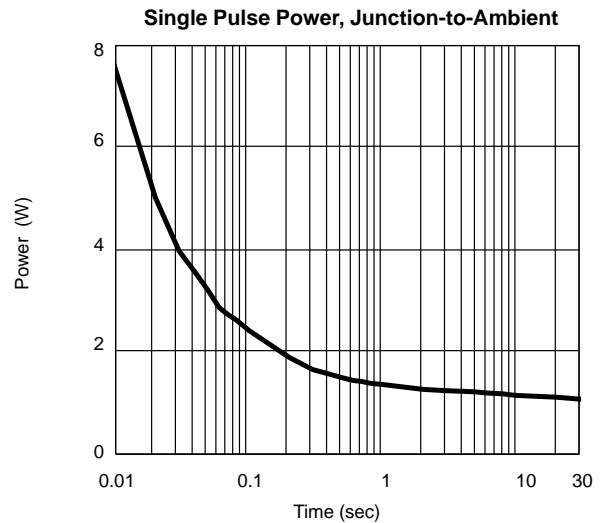
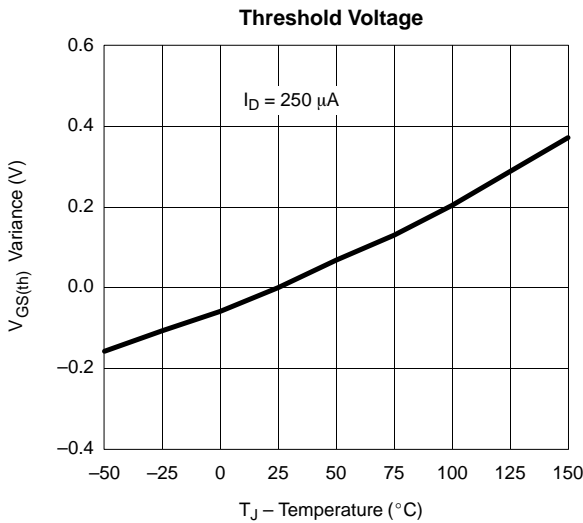
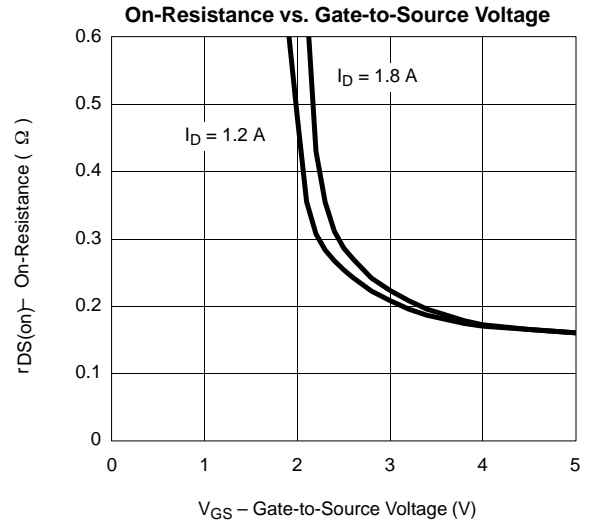
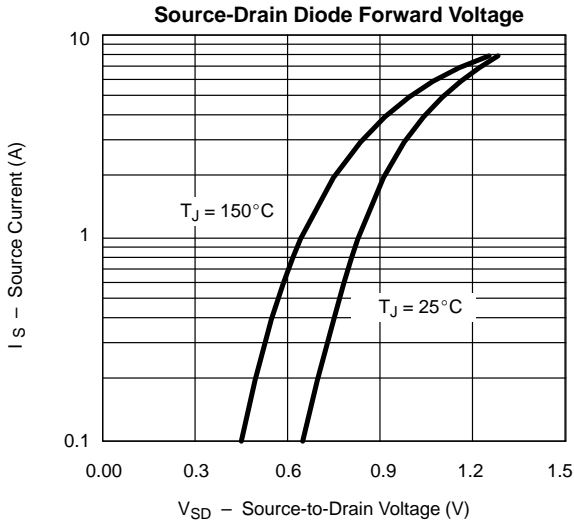


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)** **MOSFET**



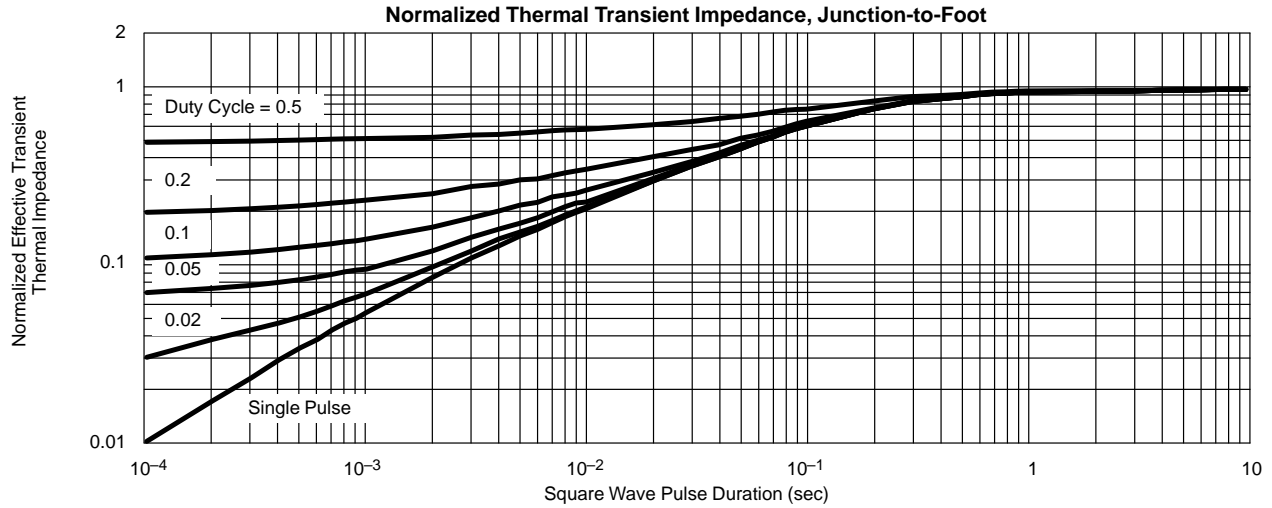


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) MOSFET**

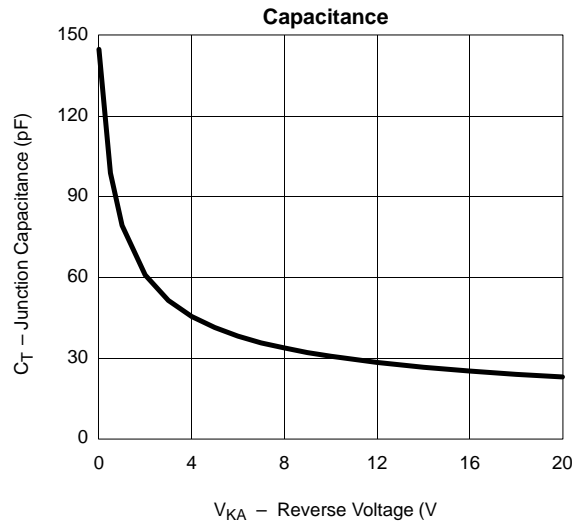
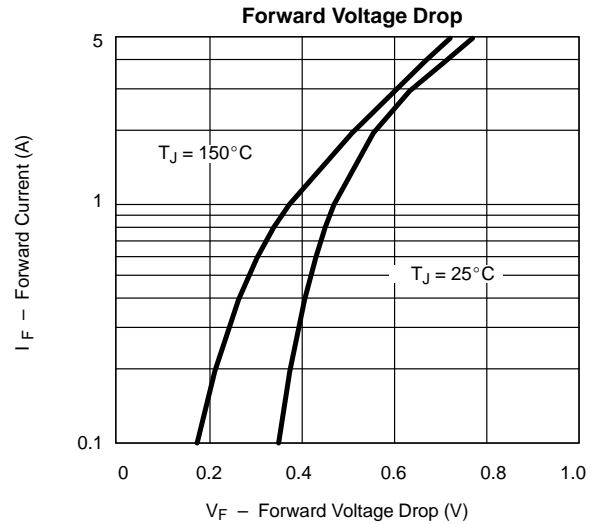
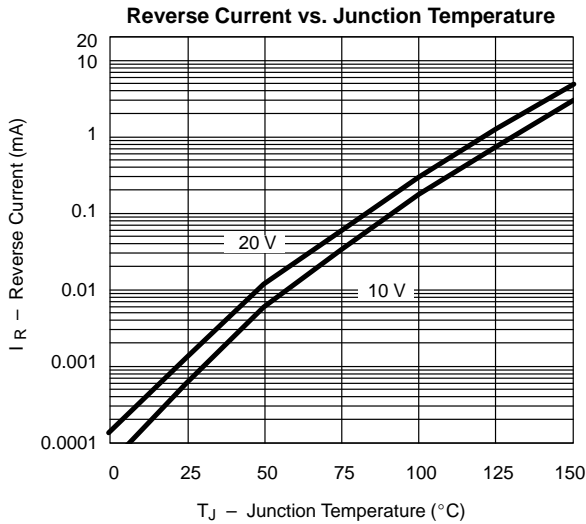




**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) MOSFET**



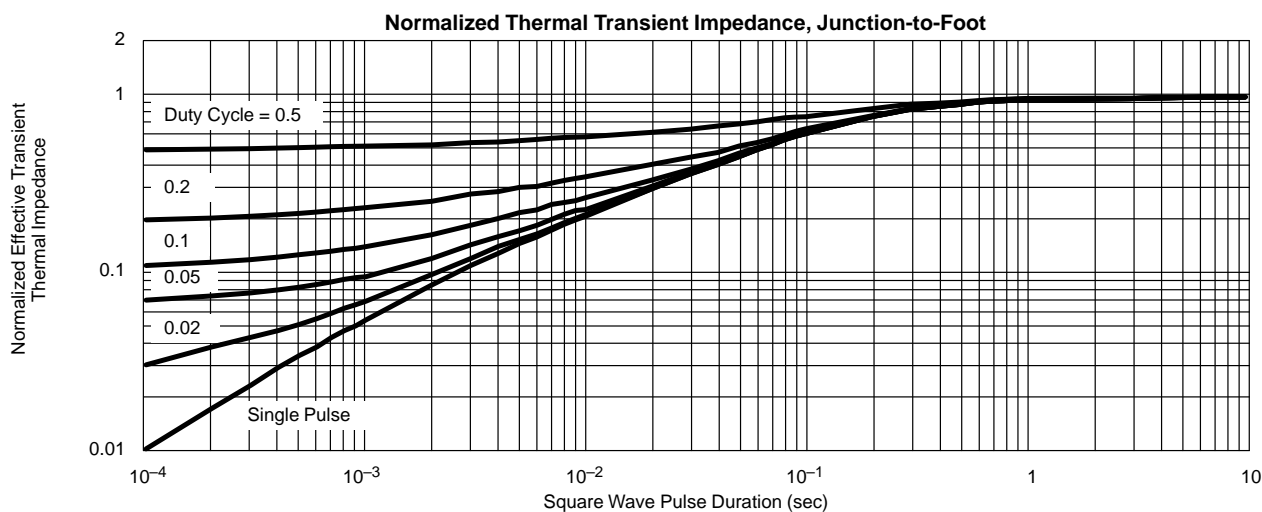
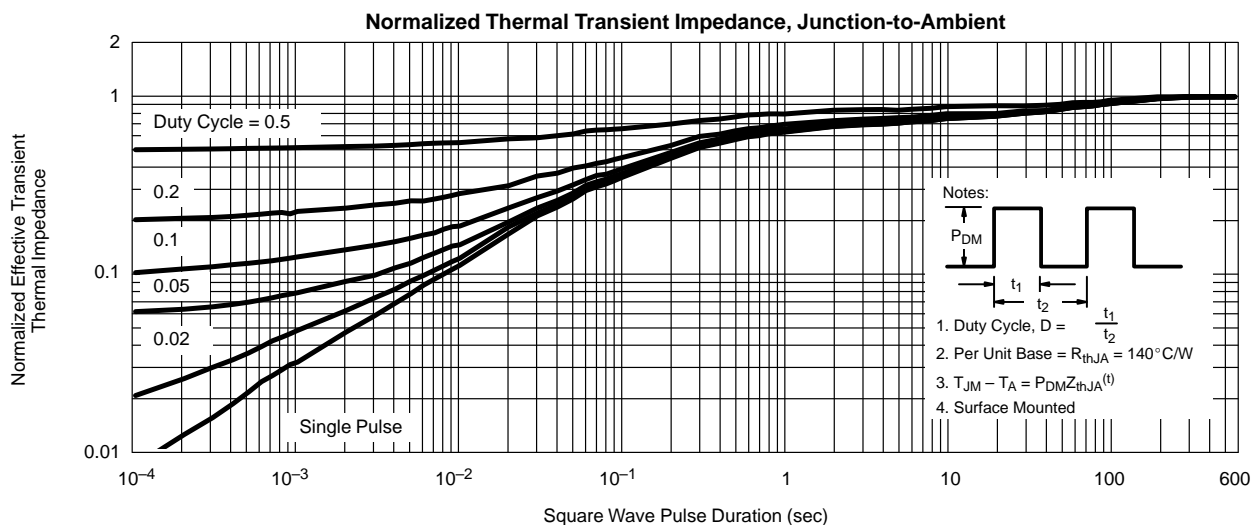
**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) SCHOTTKY**





**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**

**SCHOTTKY**





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