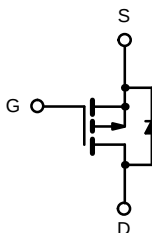
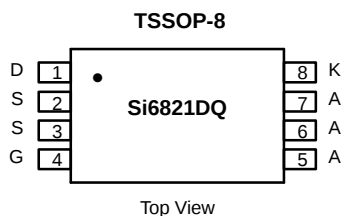


P-Channel, Reduced  $Q_g$ , MOSFET with Schottky Diode

| MOSFET PRODUCT SUMMARY |                           |           |
|------------------------|---------------------------|-----------|
| $V_{DS}$ (V)           | $r_{DS(on)}$ ( $\Omega$ ) | $I_D$ (A) |
| -20                    | 0.190 @ $V_{GS} = -4.5$ V | $\pm 1.7$ |
|                        | 0.280 @ $V_{GS} = -3.0$ V | $\pm 1.3$ |

| SCHOTTKY PRODUCT SUMMARY |                                    |           |
|--------------------------|------------------------------------|-----------|
| $V_{KA}$ (V)             | $V_F$ (V)<br>Diode Forward Voltage | $I_F$ (A) |
| 20                       | 0.5 V @ 1 A                        | 1.5       |

LITTLE FOOT Plus™



| ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)     |                          |                |            |                  |
|---------------------------------------------------------------------------------|--------------------------|----------------|------------|------------------|
| Parameter                                                                       |                          | Symbol         | Limit      | Unit             |
| Drain-Source Voltage (MOSFET)                                                   |                          | $V_{DS}$       | -20        | V                |
| Reverse Voltage (Schottky)                                                      |                          | $V_{KA}$       | 20         |                  |
| Gate-Source Voltage (MOSFET)                                                    |                          | $V_{GS}$       | $\pm 12$   |                  |
| Continuous Drain Current ( $T_J = 150^\circ\text{C}$ ) (MOSFET) <sup>a, b</sup> | $T_A = 25^\circ\text{C}$ | $I_D$          | $\pm 1.7$  | A                |
|                                                                                 | $T_A = 70^\circ\text{C}$ |                | $\pm 1.3$  |                  |
| Pulsed Drain Current (MOSFET)                                                   |                          | $I_{DM}$       | $\pm 8$    |                  |
| Continuous Source Current (MOSFET Diode Conduction) <sup>a, b</sup>             |                          | $I_S$          | -1.0       |                  |
| Average Forward Current (Schottky)                                              |                          | $I_F$          | 1.5        |                  |
| Pulsed Forward Current (Schottky)                                               |                          | $I_{FM}$       | 30         |                  |
| Maximum Power Dissipation (MOSFET) <sup>a, b</sup>                              | $T_A = 25^\circ\text{C}$ | $P_D$          | 1.2        | W                |
|                                                                                 | $T_A = 70^\circ\text{C}$ |                | 0.76       |                  |
| Maximum Power Dissipation (Schottky) <sup>a, b</sup>                            | $T_A = 25^\circ\text{C}$ |                | 1.0        |                  |
|                                                                                 | $T_A = 70^\circ\text{C}$ |                | 0.64       |                  |
| Operating Junction and Storage Temperature Range                                |                          | $T_J, T_{stg}$ | -55 to 150 | $^\circ\text{C}$ |

| THERMAL RESISTANCE RATINGS                                             |          |            |         |         |                    |
|------------------------------------------------------------------------|----------|------------|---------|---------|--------------------|
| Parameter                                                              | Device   | Symbol     | Typical | Maximum | Unit               |
| Maximum Junction-to-Ambient ( $t \leq 10$ sec) <sup>a</sup>            | MOSFET   | $R_{thJA}$ |         | 105     | $^\circ\text{C/W}$ |
|                                                                        | Schottky |            |         | 125     |                    |
| Maximum Junction-to-Ambient ( $t = \text{steady state}$ ) <sup>a</sup> | MOSFET   |            | 115     |         |                    |
|                                                                        | Schottky |            | 130     |         |                    |

## Notes

- a. Surface Mounted on FR4 Board.  
b.  $t \leq 10$  sec.



| <b>MOSFET SPECIFICATIONS (<math>T_J = 25^\circ\text{C}</math> UNLESS OTHERWISE NOTED)</b> |              |                                                                                                                                 |      |       |           |               |
|-------------------------------------------------------------------------------------------|--------------|---------------------------------------------------------------------------------------------------------------------------------|------|-------|-----------|---------------|
| Parameter                                                                                 | Symbol       | Test Condition                                                                                                                  | Min  | Typ   | Max       | Unit          |
| <b>Static</b>                                                                             |              |                                                                                                                                 |      |       |           |               |
| Gate Threshold Voltage                                                                    | $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = -250\ \mu\text{A}$                                                                                   | -0.6 |       |           | V             |
| Gate-Body Leakage                                                                         | $I_{GSS}$    | $V_{DS} = 0\ \text{V}$ , $V_{GS} = \pm 12\ \text{V}$                                                                            |      |       | $\pm 100$ | nA            |
| Zero Gate Voltage Drain Current                                                           | $I_{DSS}$    | $V_{DS} = -20\ \text{V}$ , $V_{GS} = 0\ \text{V}$                                                                               |      |       | -1        | $\mu\text{A}$ |
|                                                                                           |              | $V_{DS} = -20\ \text{V}$ , $V_{GS} = 0\ \text{V}$ , $T_J = 55^\circ\text{C}$                                                    |      |       | -25       |               |
| On-State Drain Current <sup>a</sup>                                                       | $I_{D(on)}$  | $V_{DS} \geq -5\ \text{V}$ , $V_{GS} = -4.5\ \text{V}$                                                                          | -6   |       |           | A             |
| Drain-Source On-State Resistance <sup>a</sup>                                             | $r_{DS(on)}$ | $V_{GS} = -4.5\ \text{V}$ , $I_D = -1.7\ \text{A}$                                                                              |      | 0.135 | 0.190     | $\Omega$      |
|                                                                                           |              | $V_{GS} = -3.0\ \text{V}$ , $I_D = -1.3\ \text{A}$                                                                              |      | 0.200 | 0.280     |               |
| Forward Transconductance <sup>a</sup>                                                     | $g_{fs}$     | $V_{DS} = -10\ \text{V}$ , $I_D = -1.7\ \text{A}$                                                                               |      | 4.0   |           | S             |
| Diode Forward Voltage <sup>a</sup>                                                        | $V_{SD}$     | $I_S = -1\ \text{A}$ , $V_{GS} = 0\ \text{V}$                                                                                   |      | -0.77 | -1.2      | V             |
| <b>Dynamic<sup>b</sup></b>                                                                |              |                                                                                                                                 |      |       |           |               |
| Total Gate Charge                                                                         | $Q_g$        | $V_{DS} = -3.5\ \text{V}$ , $V_{GS} = -4.5\ \text{V}$ , $I_D = -0.3\ \text{A}$                                                  |      | 3.5   | 7.0       | nC            |
| Gate-Source Charge                                                                        | $Q_{gs}$     |                                                                                                                                 |      | 0.85  |           |               |
| Gate-Drain Charge                                                                         | $Q_{gd}$     |                                                                                                                                 |      | 0.60  |           |               |
| Turn-On Delay Time                                                                        | $t_{d(on)}$  | $V_{DD} = -3.5\ \text{V}$ , $R_L = 11.5\ \Omega$<br>$I_D \approx -1\ \text{A}$ , $V_{GEN} = -4.5\ \text{V}$ , $R_G = 6\ \Omega$ |      | 7     | 15        | ns            |
| Rise Time                                                                                 | $t_r$        |                                                                                                                                 |      | 10    | 20        |               |
| Turn-Off Delay Time                                                                       | $t_{d(off)}$ |                                                                                                                                 |      | 11    | 20        |               |
| Fall Time                                                                                 | $t_f$        |                                                                                                                                 |      | 7     | 15        |               |
| Source-Drain Reverse Recovery Time                                                        | $t_{rr}$     | $I_F = -1\ \text{A}$ , $di/dt = 100\ \text{A}/\mu\text{s}$                                                                      |      | 35    | 60        |               |

Notes

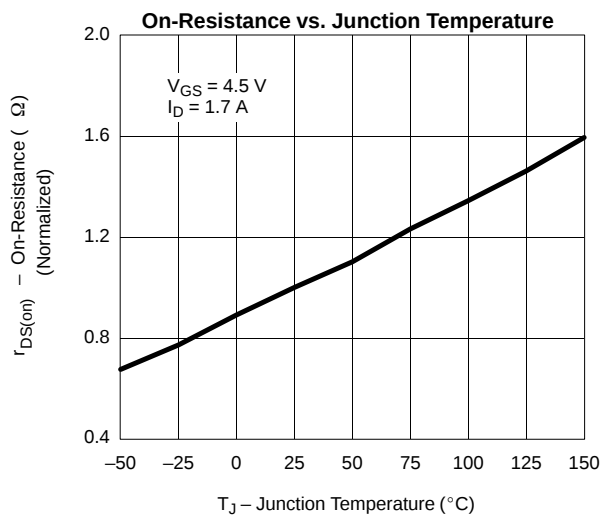
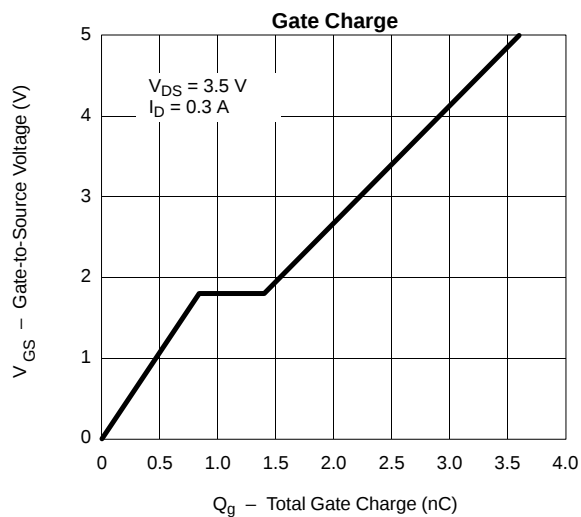
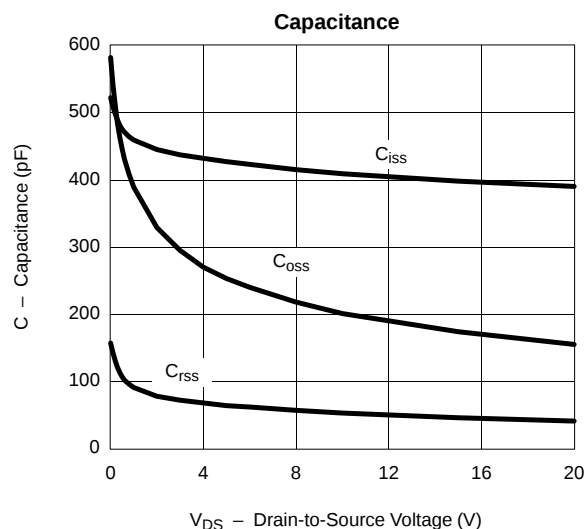
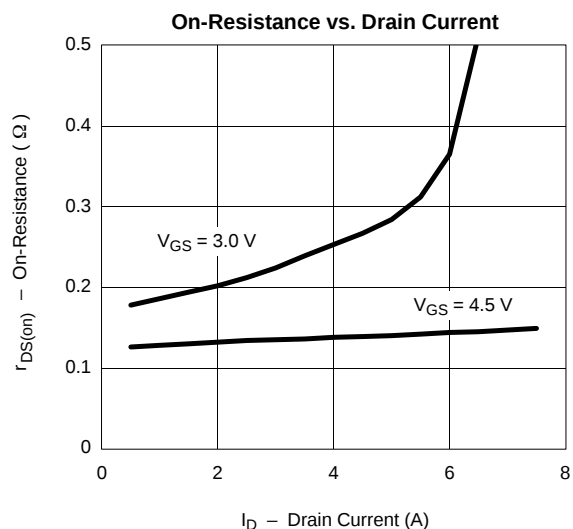
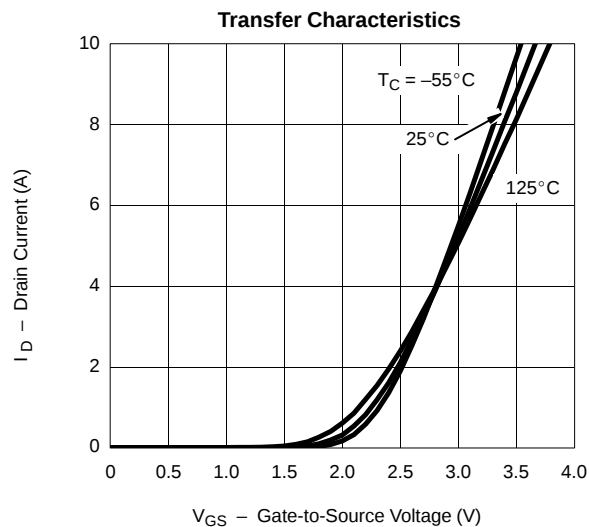
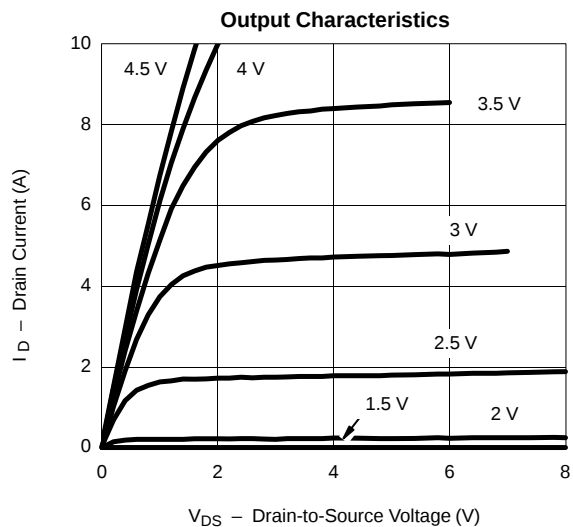
- a. Pulse test; pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$ .  
b. Guaranteed by design, not subject to production testing.

| <b>SCHOTTKY SPECIFICATIONS (<math>T_J = 25^\circ\text{C}</math> UNLESS OTHERWISE NOTED)</b> |          |                                                  |     |       |       |      |
|---------------------------------------------------------------------------------------------|----------|--------------------------------------------------|-----|-------|-------|------|
| Parameter                                                                                   | Symbol   | Test Condition                                   | Min | Typ   | Max   | Unit |
| Forward Voltage Drop                                                                        | $V_F$    | $I_F = 1\ \text{A}$                              |     | 0.45  | 0.5   | V    |
|                                                                                             |          | $I_F = 1\ \text{A}$ , $T_J = 125^\circ\text{C}$  |     | 0.36  | 0.42  |      |
| Maximum Reverse Leakage Current                                                             | $I_{rm}$ | $V_r = 20\ \text{V}$                             |     | 0.003 | 0.100 | mA   |
|                                                                                             |          | $V_r = 20\ \text{V}$ , $T_J = 75^\circ\text{C}$  |     | 0.1   | 1     |      |
|                                                                                             |          | $V_r = 20\ \text{V}$ , $T_J = 125^\circ\text{C}$ |     | 2     | 10    |      |
| Junction Capacitance                                                                        | $C_T$    | $V_r = 10\ \text{V}$                             |     | 62    |       | pF   |



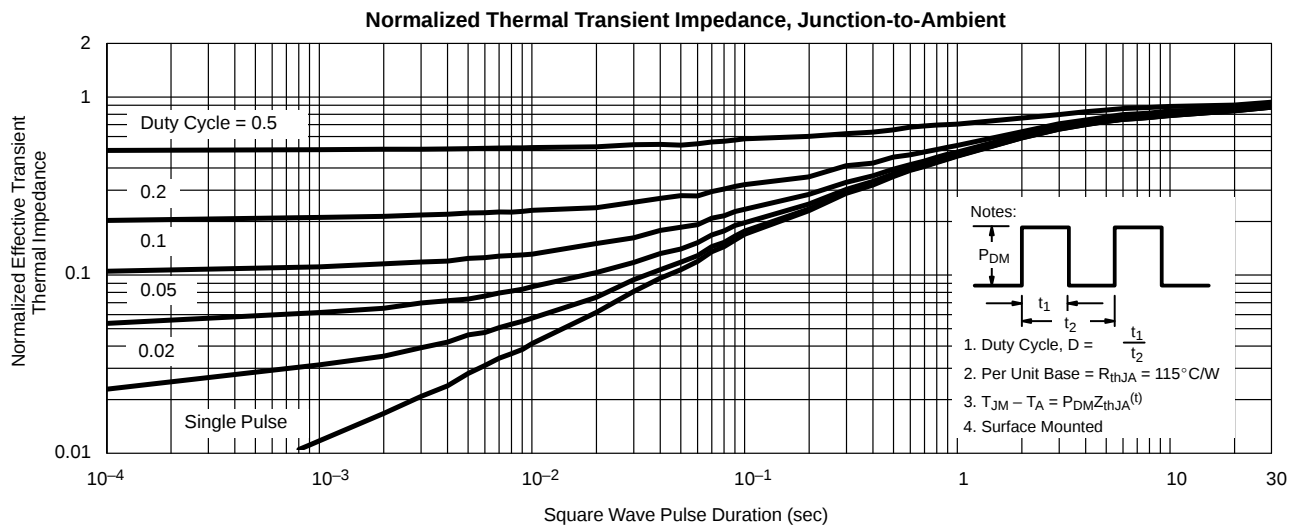
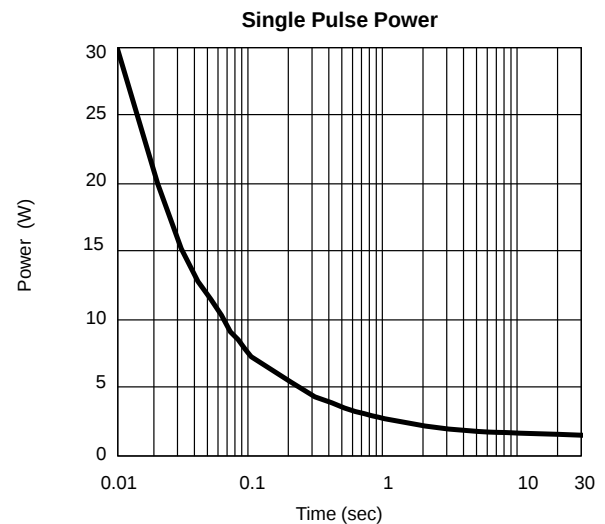
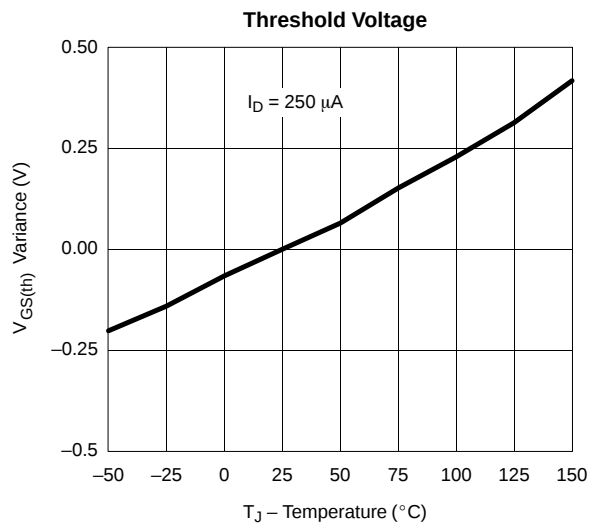
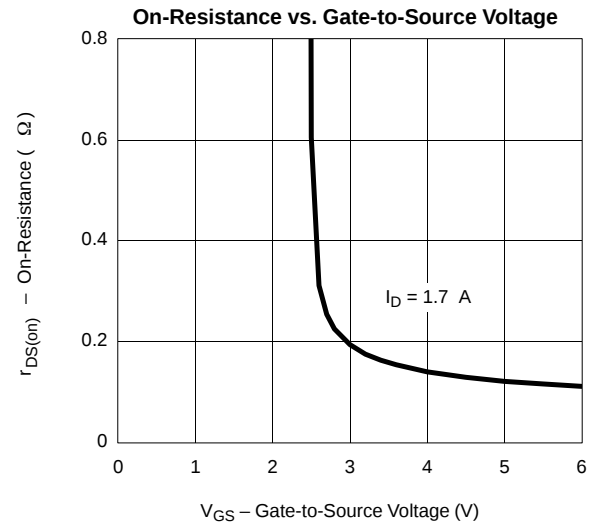
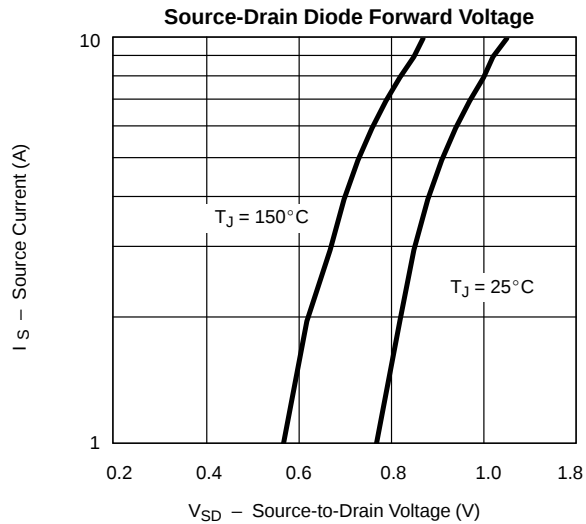
## TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

## MOSFET



## TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

## MOSFET



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