



Dual N-Channel 30-V (D-S) MOSFET with Schottky Diode

| PRODUCT SUMMARY | | | |
|-----------------|---------------------|----------------------------------|--------------------|
| | V _{DS} (V) | r _{DS(on)} (Ω) | I _D (A) |
| Channel-1 | 30 | 0.011 @ V _{GS} = 10 V | 10 |
| | | 0.016 @ V _{GS} = 4.5 V | 8.2 |
| Channel-2 | | 0.0085 @ V _{GS} = 10 V | 14 |
| | | 0.0095 @ V _{GS} = 4.5 V | 13 |

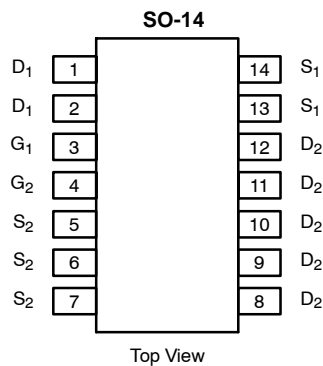
| SCHOTTKY PRODUCT SUMMARY | | |
|--------------------------|--|--------------------|
| V _{DS} (V) | V _{SD} (V) Diode Forward Voltage | I _F (A) |
| 30 | 0.53 V @ 3 A | 2.0 |

FEATURES

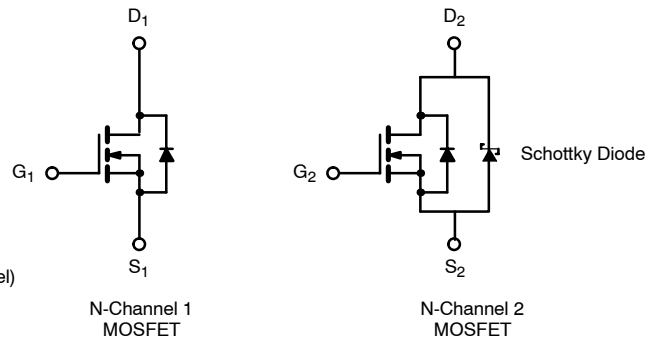
- TrenchFET® Power MOSFET
- 100% R_g Tested

APPLICATIONS

- DC/DC Converters
 - Game Stations
 - Video Equipment



Ordering Information:
Si4310BDY—E3
Si4310BDY-T1—E3 (with Tape and Reel)



| ABSOLUTE MAXIMUM RATINGS (T _A = 25 °C UNLESS OTHERWISE NOTED) | | | | | | | |
|--|-----------------------------------|------------------------|--------------|-----------|--------------|------|---|
| Parameter | Symbol | Channel-1 | | Channel-2 | | Unit | |
| | | 10 secs | Steady State | 10 secs | Steady State | | |
| Drain-Source Voltage | V _{DS} | 30 | | | | V | |
| Gate-Source Voltage | V _{GS} | ± 20 | | ± 20 | | | |
| Continuous Drain Current (T _J = 150 °C) ^a | I _D | T _A = 25 °C | 10 | 7.5 | 14 | 9.8 | A |
| | | T _A = 70 °C | 8 | 6 | 11 | 7.8 | |
| Pulsed Drain Current | I _{DM} | 40 | | 50 | | A | |
| Continuous Source Current (Diode Conduction) ^a | I _S | 1.8 | 1.04 | 2.73 | 1.33 | | |
| Maximum Power Dissipation ^a | P _D | T _A = 25 °C | 2 | 1.14 | 3.0 | 1.47 | W |
| | | T _A = 70 °C | 1.28 | 0.73 | 1.9 | 0.94 | |
| Operating Junction and Storage Temperature Range | T _J , T _{stg} | –55 to 150 | | | | °C | |

| THERMAL RESISTANCE RATINGS | | | | | | | | | |
|--|--------------|-------------------|-----|-----------|-----|----------|-----|------|------|
| Parameter | Symbol | Channel-1 | | Channel-2 | | Schottky | | Unit | |
| | | Typ | Max | Typ | Max | Typ | Max | | |
| Maximum Junction-to-Ambient ^a | t ≤ 10 sec | R _{thJA} | 53 | 62.5 | 34 | 35 | 40 | 48 | °C/W |
| | Steady-State | | 92 | 110 | 70 | 72 | 76 | 93 | |
| Maximum Junction-to-Foot (Drain) | Steady-State | R _{thJF} | 35 | 42 | 17 | 24 | 21 | 26 | |

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

| MOSFET SPECIFICATIONS ($T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED). | | | | | | | | | |
|---|--------------|--|--|------|------------------|--------|---------------|----|----|
| Parameter | Symbol | Test Condition | | Min | Typ ^a | Max | Unit | | |
| Static | | | | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$ | Ch-1 | 1.0 | | 3.0 | V | | |
| | | | Ch-2 | 1.0 | | 3.0 | | | |
| Gate-Body Leakage | I_{GSS} | $V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$ | Ch-1 | | | 100 | nA | | |
| | | | Ch-2 | | | 100 | | | |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 30 \text{ V}, V_{GS} = 0 \text{ V}$ | Ch-1 | | | 1 | μA | | |
| | | | Ch-2 | | | 100 | | | |
| | | $V_{DS} = 30 \text{ V}, V_{GS} = 0 \text{ V}, T_J = 85^\circ\text{C}$ | Ch-1 | | | 15 | | | |
| | | | Ch-2 | | | 4000 | | | |
| On-State Drain Current ^b | $I_{D(on)}$ | $V_{DS} = 5 \text{ V}, V_{GS} = 10 \text{ V}$ | Ch-1 | 20 | | | A | | |
| | | | Ch-2 | 30 | | | | | |
| Drain-Source On-State Resistance ^b | $r_{DS(on)}$ | $V_{GS} = 10 \text{ V}, I_D = 10 \text{ A}$ | Ch-1 | | 0.009 | 0.011 | Ω | | |
| | | $V_{GS} = 10 \text{ V}, I_D = 14 \text{ A}$ | Ch-2 | | 0.0065 | 0.0085 | | | |
| | | $V_{GS} = 4.5 \text{ V}, I_D = 8.2 \text{ A}$ | Ch-1 | | 0.013 | 0.016 | | | |
| | | $V_{GS} = 4.5 \text{ V}, I_D = 13 \text{ A}$ | Ch-2 | | 0.0075 | 0.0095 | | | |
| Forward Transconductance ^b | g_{fs} | $V_{DS} = 15 \text{ V}, I_D = 10 \text{ A}$ | Ch-1 | | 30 | | S | | |
| | | $V_{DS} = 15 \text{ V}, I_D = 14 \text{ A}$ | Ch-2 | | 60 | | | | |
| Diode Forward Voltage ^b | V_{SD} | $I_S = 1.8 \text{ A}, V_{GS} = 0 \text{ V}$ | Ch-1 | | 0.76 | 1.1 | V | | |
| | | $I_S = 2.73 \text{ A}, V_{GS} = 0 \text{ V}$ | Ch-2 | | 0.485 | 0.53 | | | |
| Dynamic^a | | | | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS} = 15 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$ | Ch-1 | 790 | 1580 | 2370 | pF | | |
| | | | Ch-2 | 1530 | 3060 | 4590 | | | |
| Output Capacitance | C_{oss} | | Ch-1 | 145 | 290 | 435 | | | |
| | | | Ch-2 | 300 | 600 | 900 | | | |
| Reverse Transfer Capacitance | C_{rss} | | Ch-1 | 70 | 140 | 210 | | | |
| | | | Ch-2 | 115 | 225 | 340 | | | |
| Total Gate Charge | Q_g | | Channel-1 $V_{DS} = 15 \text{ V}, V_{GS} = 4.5 \text{ V}, I_D = 10 \text{ A}$ Channel-2 $V_{DS} = 15 \text{ V}, V_{GS} = 4.5 \text{ V}, I_D = 14 \text{ A}$ | Ch-1 | | 12 | | 18 | nC |
| Gate-Source Charge | Q_{gs} | | | Ch-2 | | 19 | | 30 | |
| | | Ch-1 | | | 5.3 | | | | |
| Gate-Drain Charge | Q_{gd} | Ch-2 | | | 10 | | | | |
| | | Ch-1 | | | 4.3 | | | | |
| Ch-2 | | 5 | | | | | | | |
| Gate Resistance | R_g | $f = 1 \text{ MHz}$ | Ch-1 | 0.90 | 1.8 | 2.7 | Ω | | |
| | | | Ch-2 | 0.3 | 0.95 | 1.4 | | | |
| Turn-On Delay Time | $t_{d(on)}$ | Channel-1 $V_{DD} = 15 \text{ V}, R_L = 15 \Omega$ $I_D \approx 1 \text{ A}, V_{GEN} = 10 \text{ V}, R_G = 6 \Omega$ Channel-2 $V_{DD} = 15 \text{ V}, R_L = 15 \Omega$ $I_D \approx 1 \text{ A}, V_{GEN} = 10 \text{ V}, R_G = 6 \Omega$ | Ch-1 | | 13 | 20 | ns | | |
| | | | Ch-2 | | 17 | 26 | | | |
| Rise Time | t_r | | Ch-1 | | 10 | 15 | | | |
| | | | Ch-2 | | 12 | 20 | | | |
| Turn-Off Delay Time | $t_{d(off)}$ | | Ch-1 | | 33 | 50 | | | |
| | | | Ch-2 | | 53 | 80 | | | |
| Fall Time | t_f | | Ch-1 | | 10 | 15 | | | |
| | | | Ch-2 | | 17 | 26 | | | |
| Source-Drain Reverse Recovery Time | t_{rr} | $I_F = 1.8 \text{ A}, di/dt = 100 \text{ A}/\mu\text{s}$ | Ch-1 | | 25 | 40 | | | |
| | | $I_F = 2.73 \text{ A}, di/dt = 100 \mu\text{A}/\mu\text{s}$ | Ch-2 | | 31 | 50 | | | |

Notes

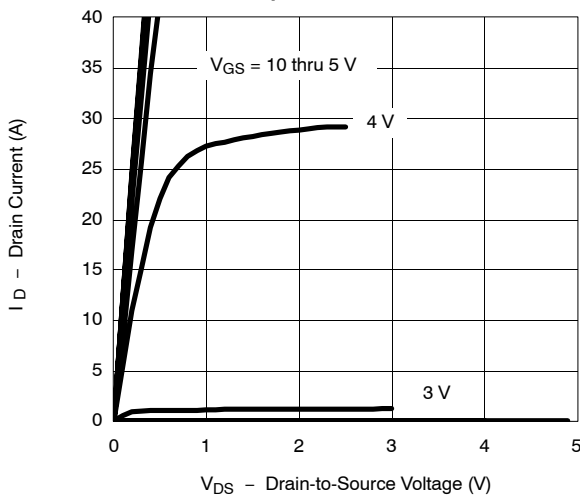
- a. Guaranteed by design, not subject to production testing.
 b. Pulse test; pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$.



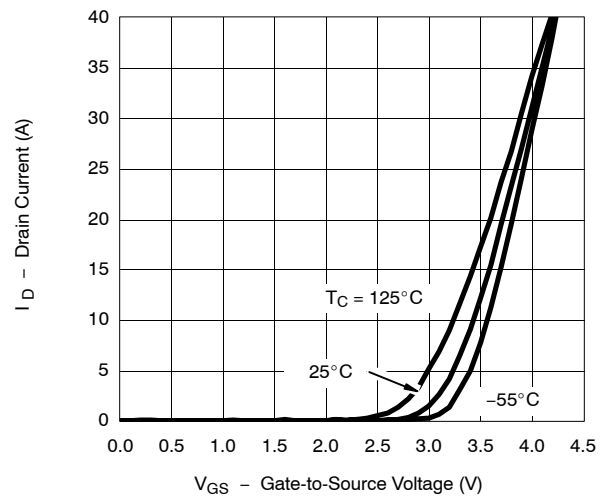
| SCHOTTKY SPECIFICATIONS (T _J = 25°C UNLESS OTHERWISE NOTED) | | | | | | |
|--|-----------------|--|-----|-------|-------|------|
| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit |
| Forward Voltage Drop | V _F | I _F = 3 A | | 0.485 | 0.53 | V |
| | | I _F = 3 A, T _J = 125°C | | 0.42 | 0.42 | |
| Maximum Reverse Leakage Current | I _{rm} | V _r = 30 V | | 0.008 | 0.100 | mA |
| | | V _r = 30 V, T _J = 75°C | | 0.4 | 5 | |
| | | V _r = -30 V, T _J = 125°C | | 6.5 | 20 | |
| Junction Capacitance | C _T | V _r = 15 V | | 102 | | pF |

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) CHANNEL-1

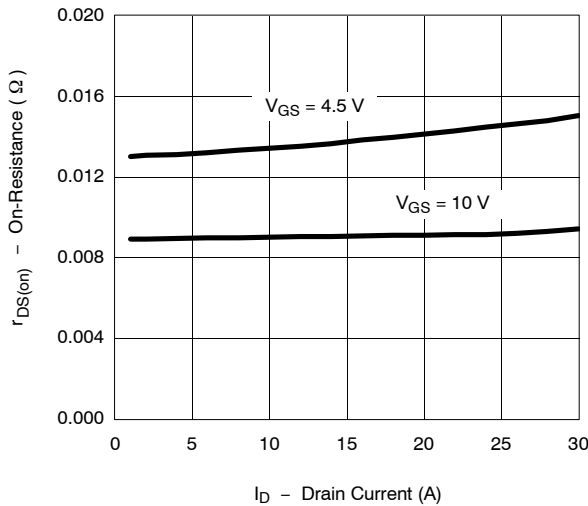
Output Characteristics



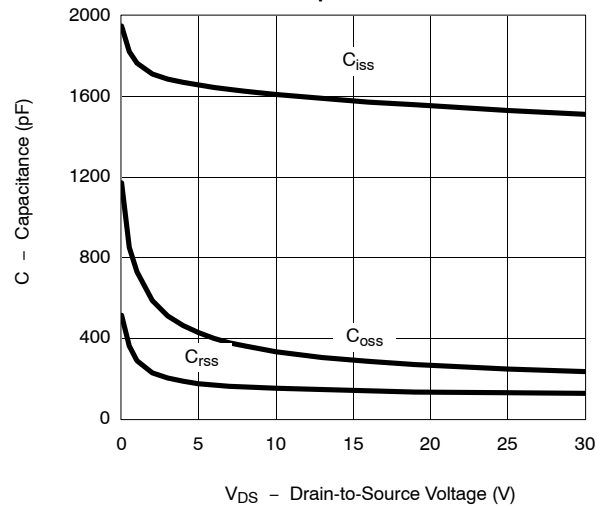
Transfer Characteristics



On-Resistance vs. Drain Current

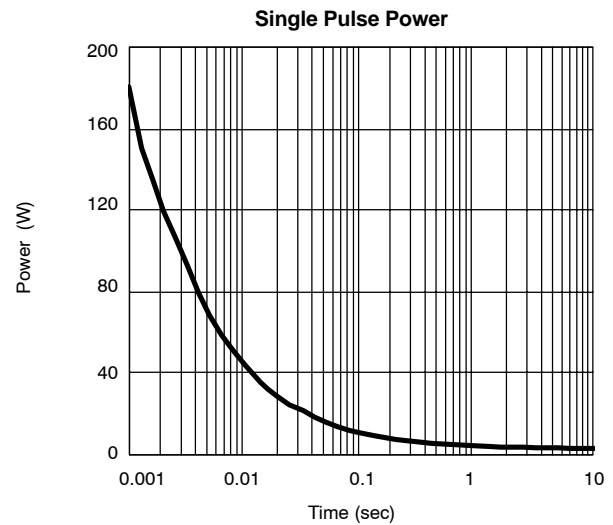
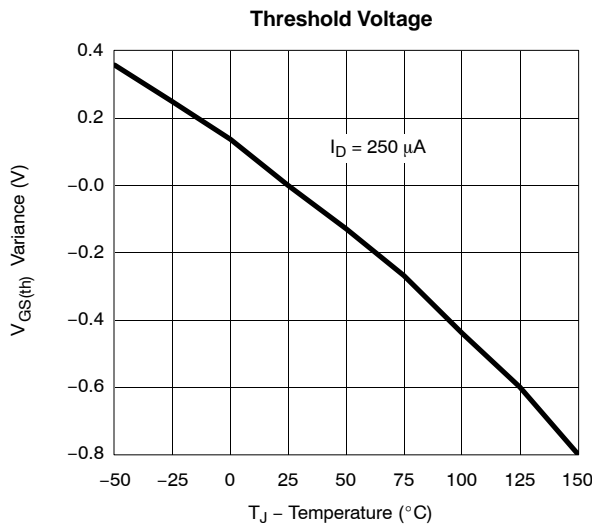
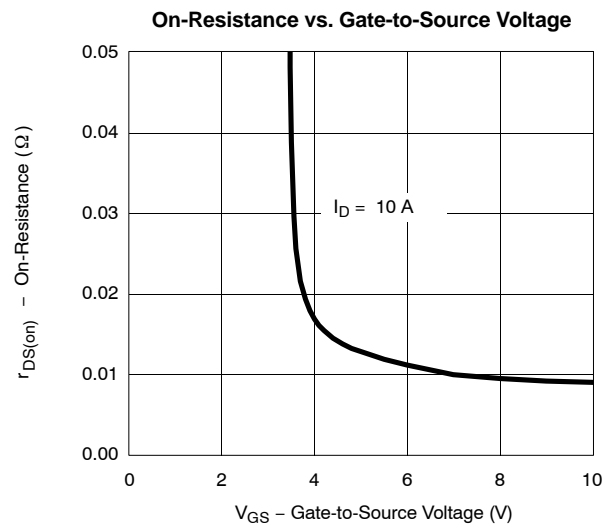
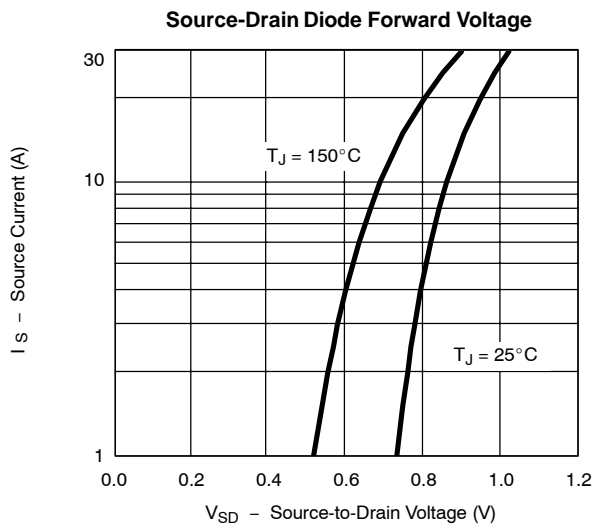
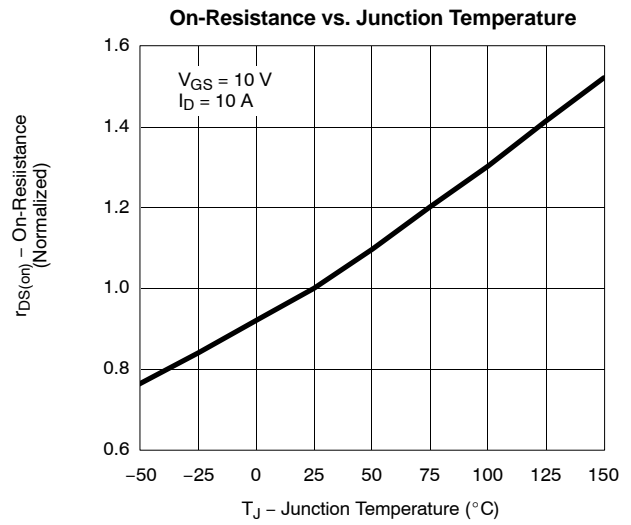
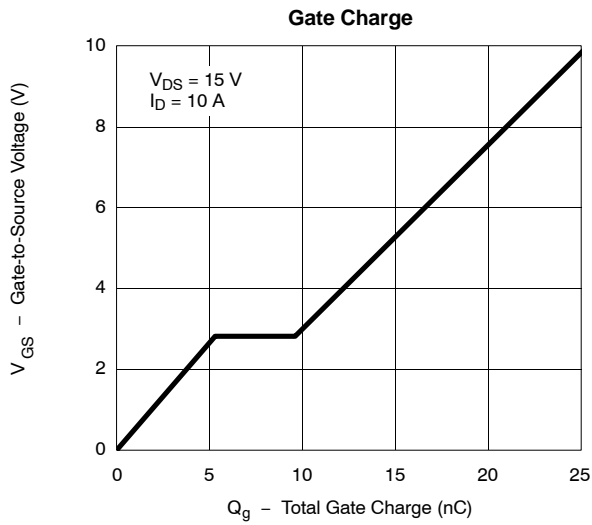


Capacitance



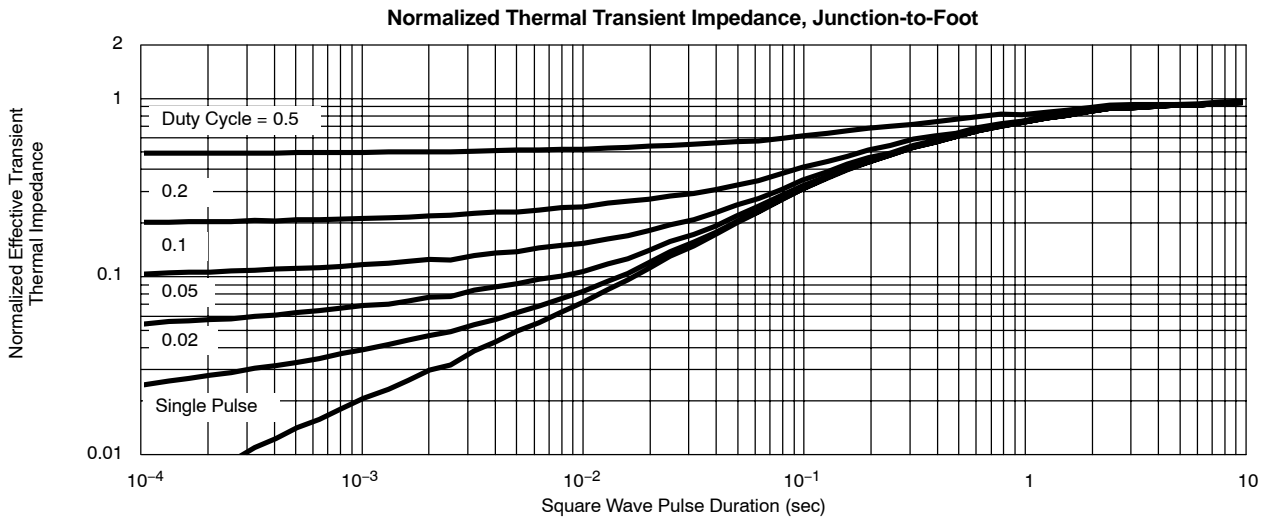
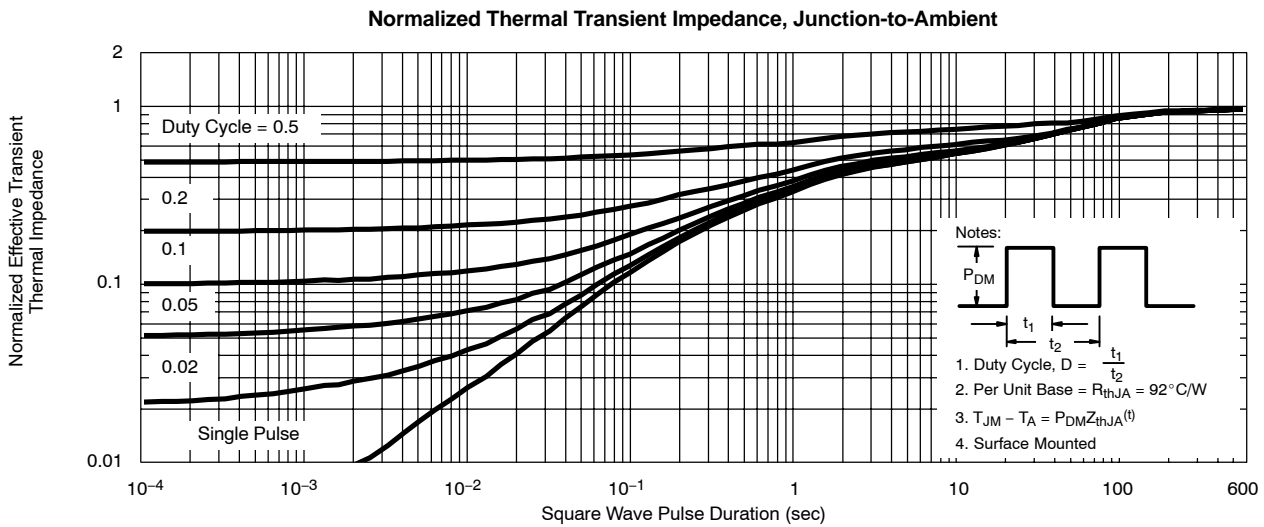
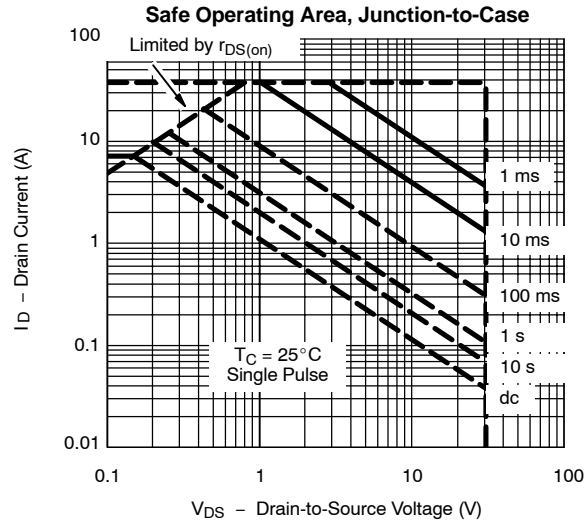
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

CHANNEL-1





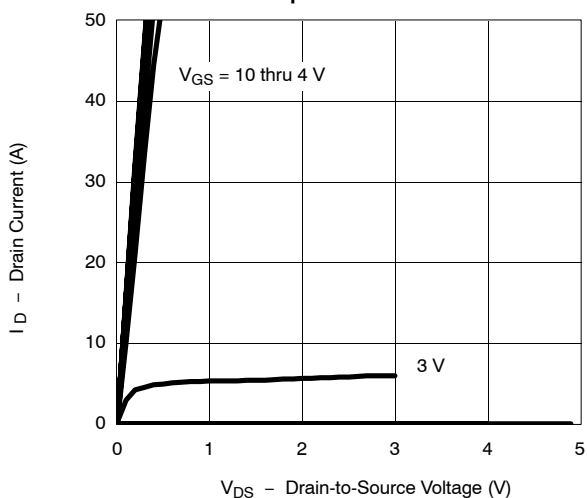
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) CHANNEL-1



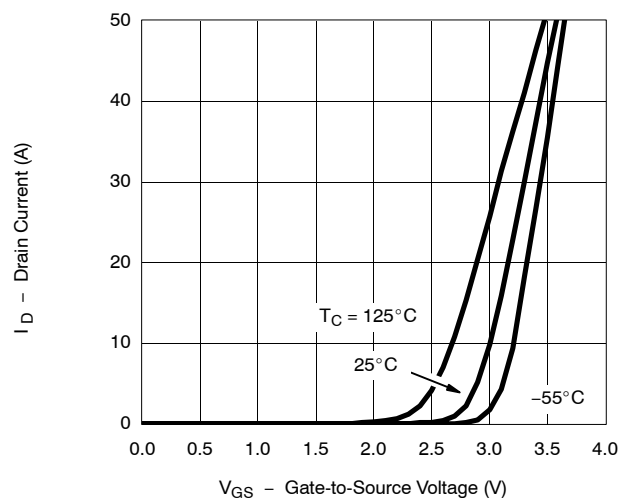
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

CHANNEL-2

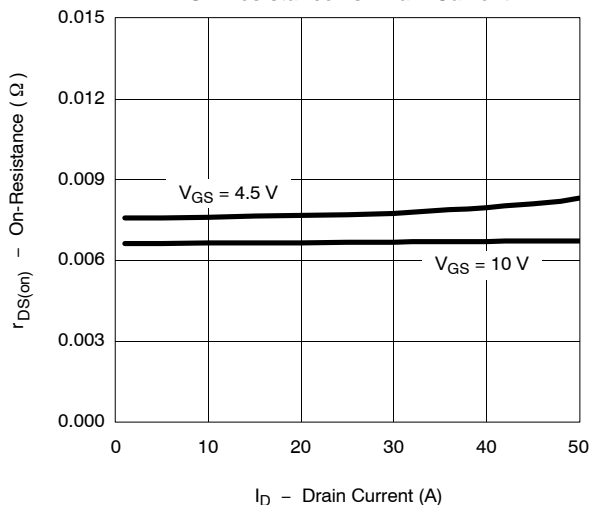
Output Characteristics



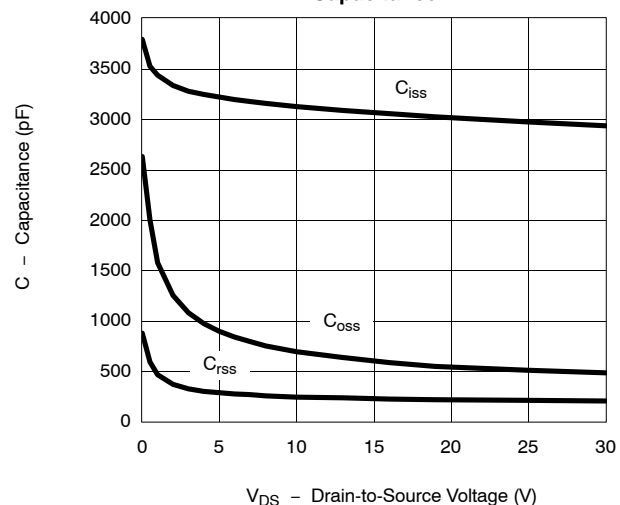
Transfer Characteristics



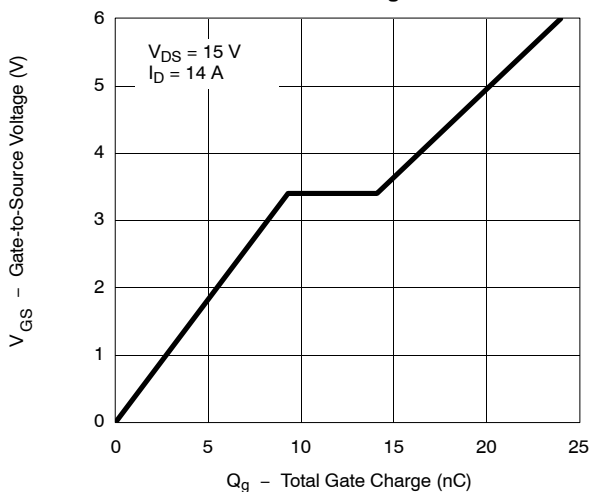
On-Resistance vs. Drain Current



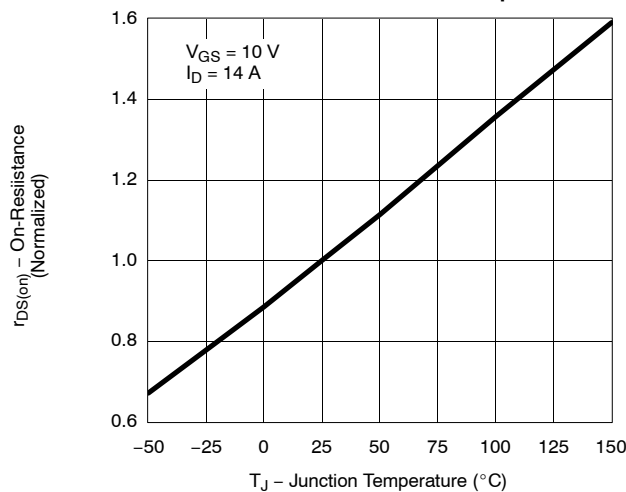
Capacitance



Gate Charge



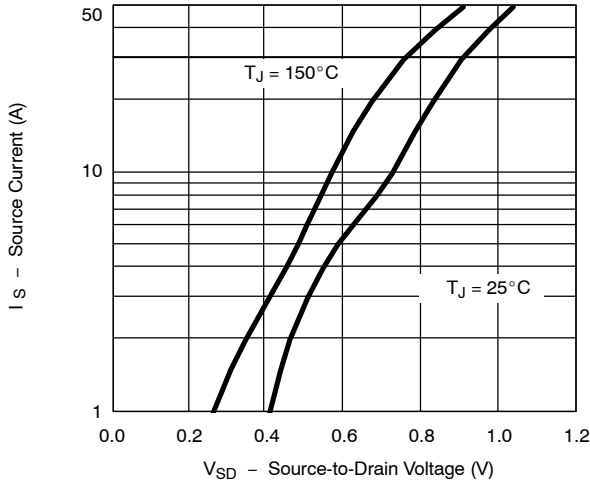
On-Resistance vs. Junction Temperature



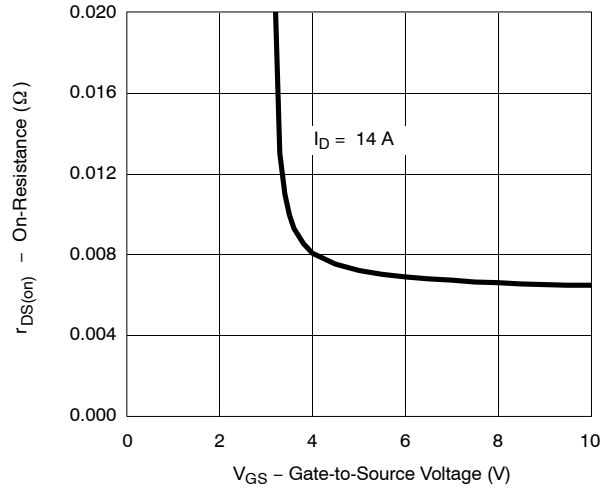


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) CHANNEL-2

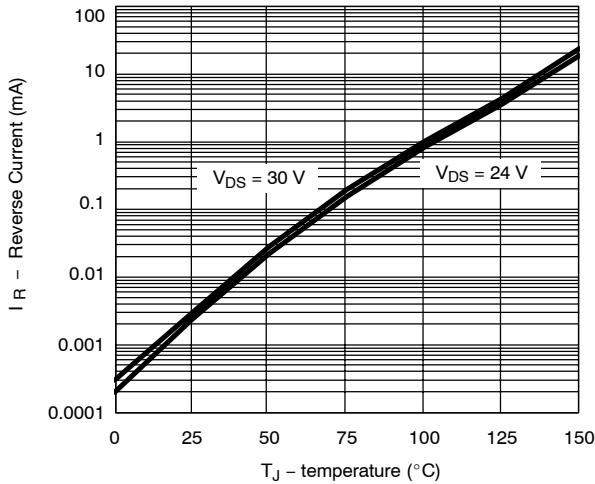
Source-Drain Diode Forward Voltage



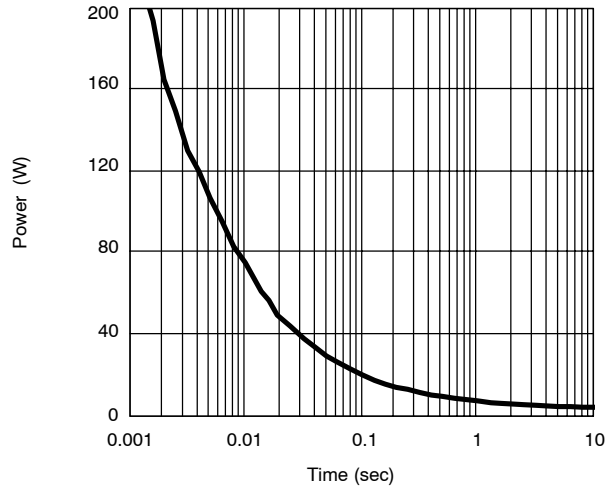
On-Resistance vs. Gate-to-Source Voltage



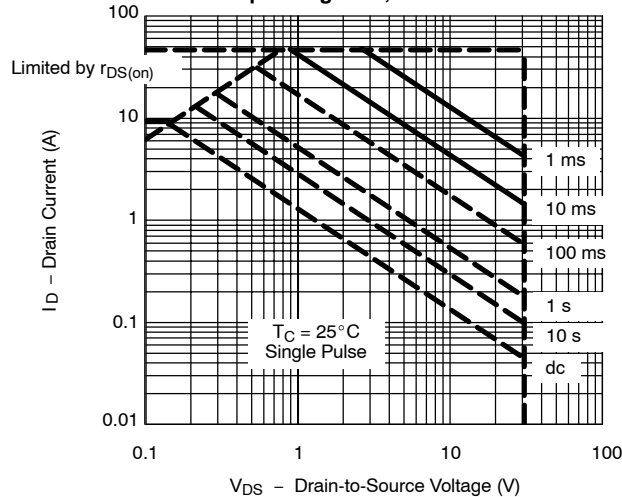
Reverse Current vs. Junction Temperature



Single Pulse Power



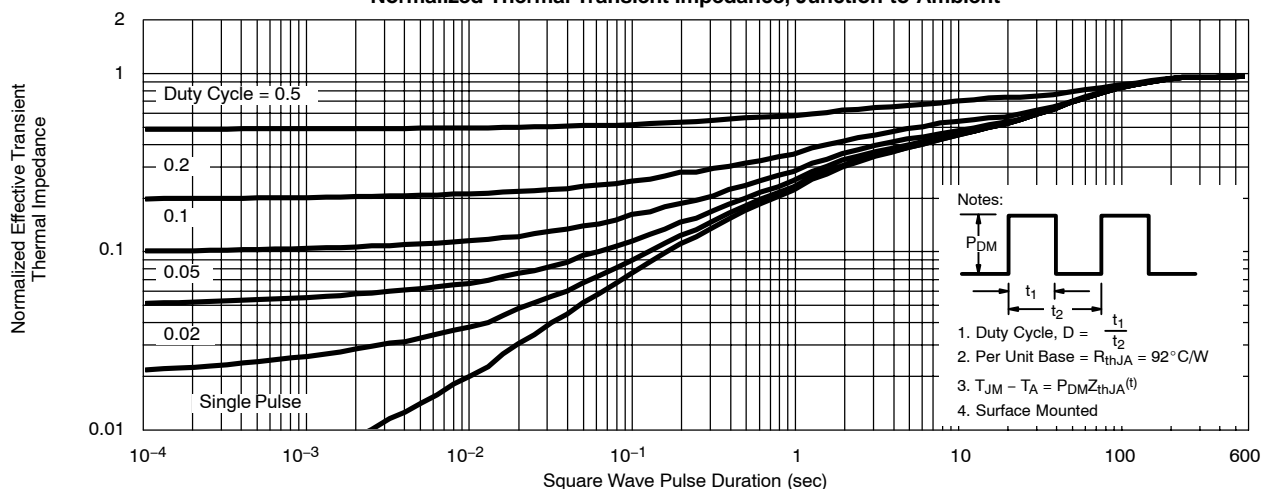
Safe Operating Area, Junction-to-Case



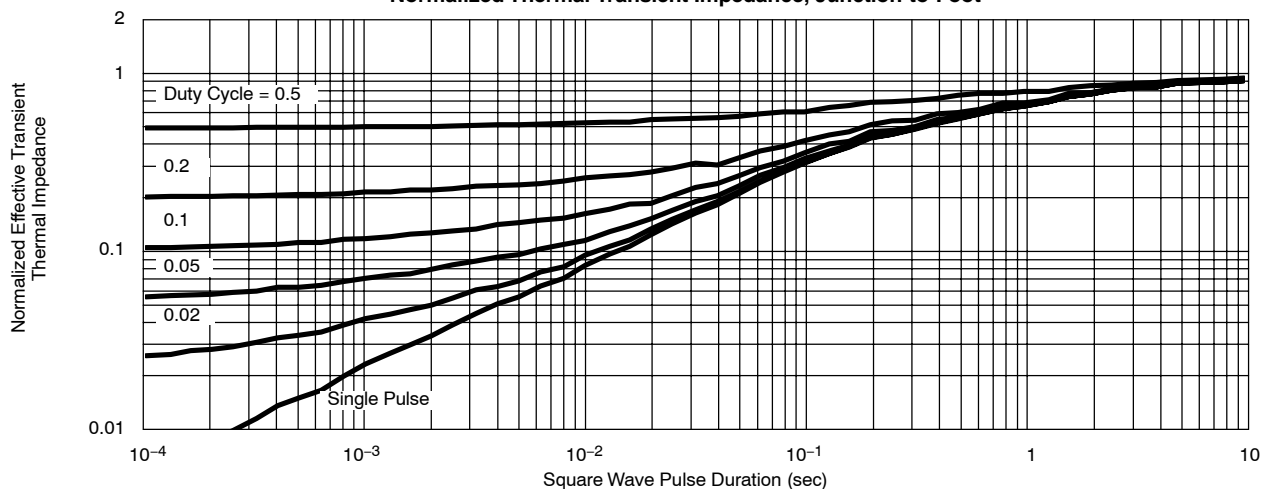
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

CHANNEL-2

Normalized Thermal Transient Impedance, Junction-to-Ambient



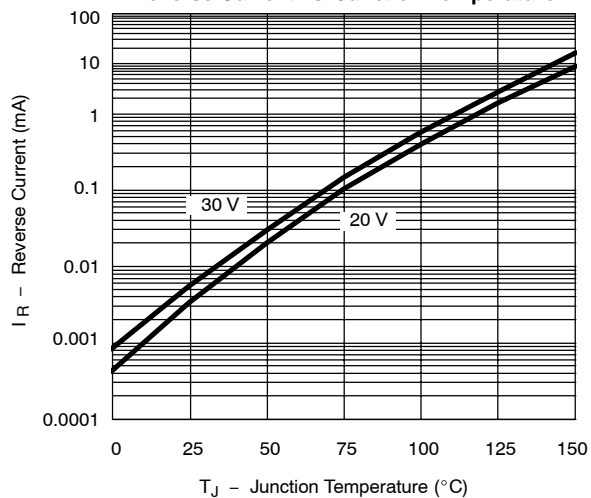
Normalized Thermal Transient Impedance, Junction-to-Foot



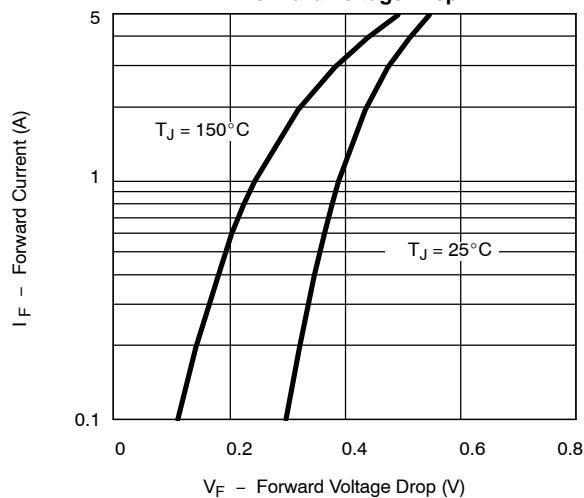
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

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Reverse Current vs. Junction Temperature



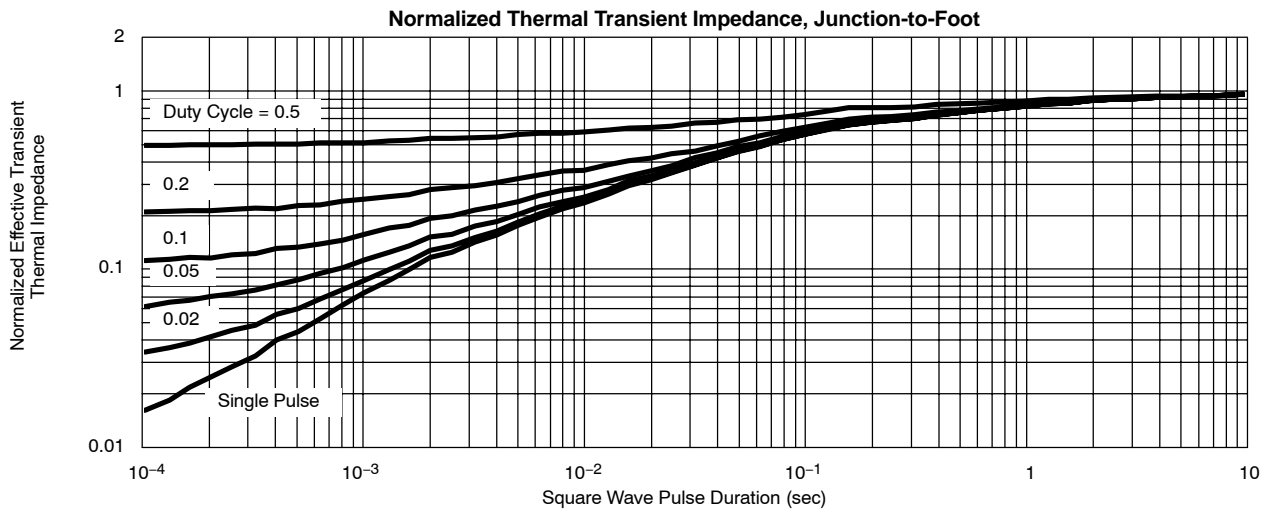
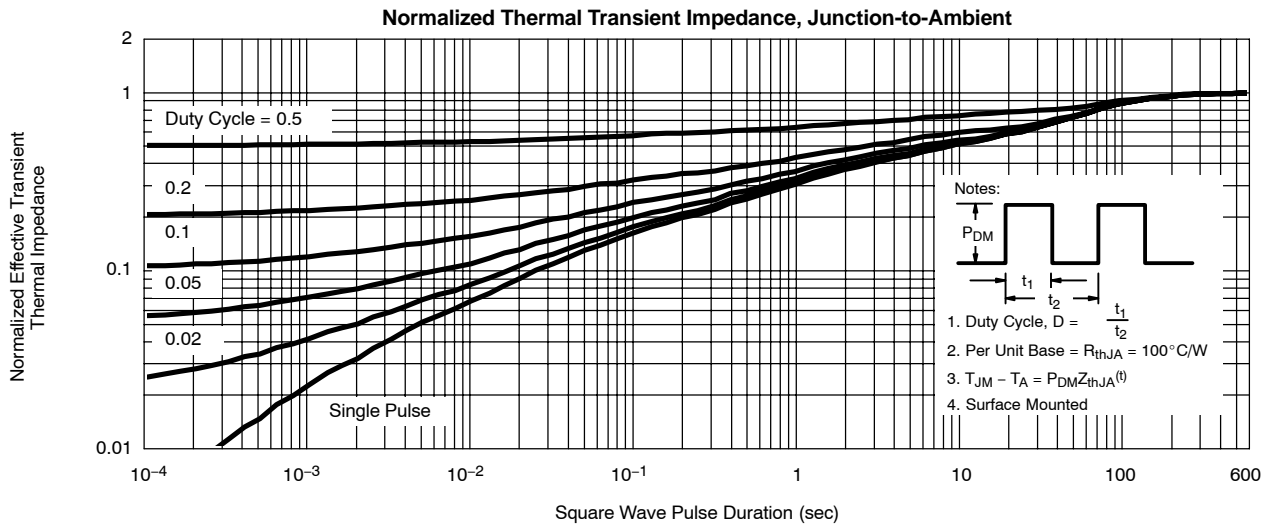
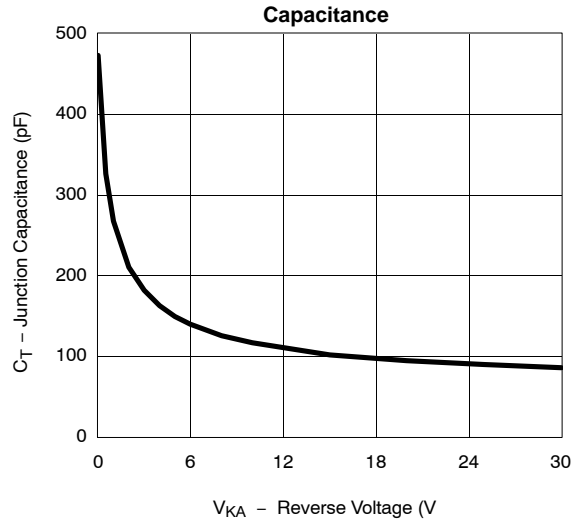
Forward Voltage Drop





TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

SCHOTTKY





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All product specifications and data are subject to change without notice.

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