

Electrical Characteristics

$T_A = 25^\circ\text{C}$ unless otherwise noted

| Symbol | Parameter | Test Conditions | Min | Typ | Max | Units |
|--------|-----------|-----------------|-----|-----|-----|-------|
|--------|-----------|-----------------|-----|-----|-----|-------|

Off Characteristics

| | | | | | | |
|--------------------------------------|---|---|----|----|-----------|---------------|
| BV_{DSS} | Drain–Source Breakdown Voltage | $V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$ | 30 | | | V |
| $\frac{\Delta BV_{DSS}}{\Delta T_J}$ | Breakdown Voltage Temperature Coefficient | $I_D = 250\ \mu\text{A}$, Referenced to 25°C | | 39 | | mV/°C |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS} = 24\text{ V}, V_{GS} = 0\text{ V}$ | | | 1 | μA |
| I_{GSS} | Gate–Body Leakage | $V_{GS} = \pm 16\text{ V}, V_{DS} = 0\text{ V}$ | | | ± 100 | nA |

On Characteristics (Note 2)

| | | | | | | |
|--|--|---|---|-------------------|-------------------|------------|
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$ | 1 | 1.4 | 3 | V |
| $\frac{\Delta V_{GS(th)}}{\Delta T_J}$ | Gate Threshold Voltage Temperature Coefficient | $I_D = 250\ \mu\text{A}$, Referenced to 25°C | | -5 | | mV/°C |
| $R_{DS(on)}$ | Static Drain–Source On–Resistance | $V_{GS} = 10\text{ V}, I_D = 21\text{ A}$ $V_{GS} = 4.5\text{ V}, I_D = 18\text{ A}$ $V_{GS} = 10\text{ V}, I_D = 21\text{ A}, T_J = 125^\circ\text{C}$ | | 3.3 4.2 4.4 | 3.7 5.0 5.5 | m Ω |
| g_{FS} | Forward Transconductance | $V_{DS} = 10\text{ V}, I_D = 21\text{ A}$ | | 118 | | S |

Dynamic Characteristics

| | | | | | | |
|------------|------------------------------|--|-----|------|-----|----------|
| C_{iss} | Input Capacitance | $V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$ | | 4040 | | pF |
| C_{oss} | Output Capacitance | | | 1730 | | pF |
| C_{riss} | Reverse Transfer Capacitance | | | 160 | | pF |
| R_G | Gate Resistance | $f = 1.0\text{ MHz}$ | 0.2 | 0.9 | 1.5 | Ω |

Switching Characteristics (Note 2)

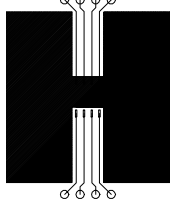
| | | | | | | |
|--------------|---|--|--|------|-----|----|
| $t_{d(on)}$ | Turn–On Delay Time | $V_{DD} = 15\text{ V}, I_D = 1\text{ A},$ $V_{GS} = 10\text{ V}, R_{GEN} = 6\ \Omega$ | | 12 | 21 | ns |
| t_r | Turn–On Rise Time | | | 11 | 20 | ns |
| $t_{d(off)}$ | Turn–Off Delay Time | | | 56 | 90 | ns |
| t_f | Turn–Off Fall Time | | | 68 | 108 | ns |
| $Q_{g(TOT)}$ | Total Gate Charge at $V_{GS} = 10\text{ V}$ | $V_{DD} = 15\text{ V}, I_D = 21\text{ A}$ | | 58.5 | 82 | nC |
| $Q_{g(TOT)}$ | Total Gate Charge at $V_{GS} = 5\text{ V}$ | | | 30 | 42 | nC |
| Q_{gs} | Gate–Source Charge | | | 9.5 | | nC |
| Q_{gd} | Gate–Drain Charge | | | 5.5 | | nC |

Drain–Source Diode Characteristics and Maximum Ratings

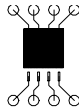
| | | | | | | |
|----------|------------------------------------|--|--|-----|-----|----|
| V_{SD} | Drain–Source Diode Forward Voltage | $V_{GS} = 0\text{ V}, I_S = 2.1\text{ A}$ (Note 2) | | 0.7 | 1.2 | V |
| t_{rr} | Diode Reverse Recovery Time | $I_F = 21\text{ A},$ $di_F/dt = 100\text{ A}/\mu\text{s}$ | | 51 | | ns |
| I_{RM} | Diode Reverse Recovery Current | | | 1.5 | | A |
| Q_{rr} | Diode Reverse Recovery Charge | | | 37 | | nC |

Notes:

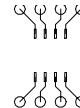
1. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design.



a) 50°/W when mounted on a 1 in² pad of 2 oz copper



b) 105°/W when mounted on a .04 in² pad of 2 oz copper



c) 125°/W when mounted on a minimum pad.

Scale 1 : 1 on letter size paper

2. Pulse Test: Pulse Width < 300 μs , Duty Cycle < 2.0%

Typical Characteristics

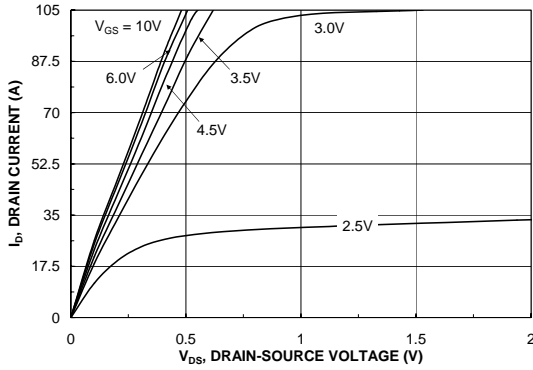


Figure 1. On-Region Characteristics.

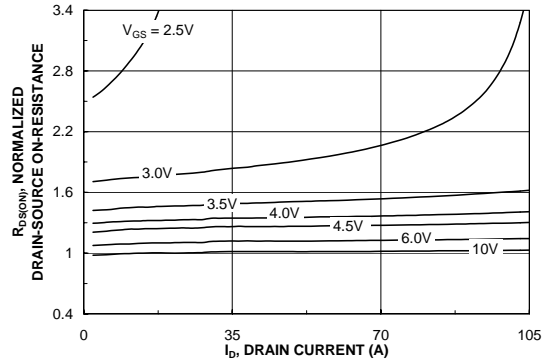


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.

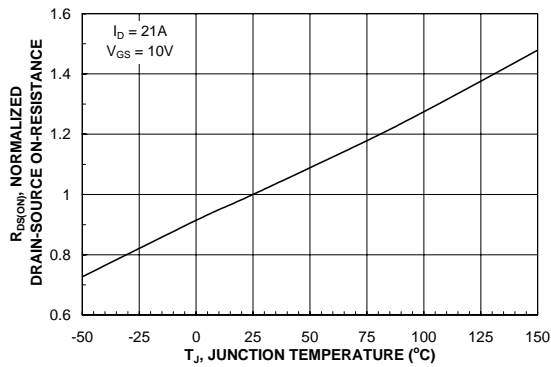


Figure 3. On-Resistance Variation with Temperature.

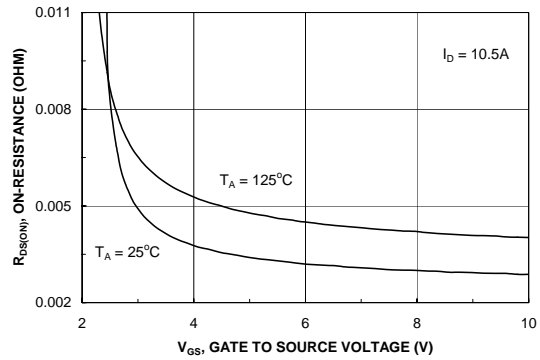


Figure 4. On-Resistance Variation with Gate-to-Source Voltage.

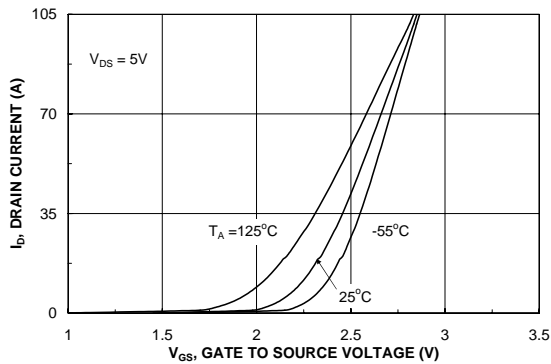


Figure 5. Transfer Characteristics.

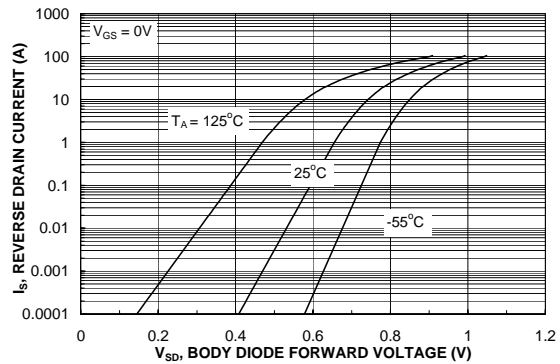


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature.

Typical Characteristics (continued)

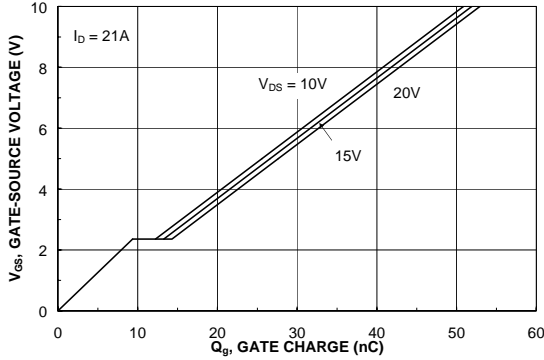


Figure 7. Gate Charge Characteristics.

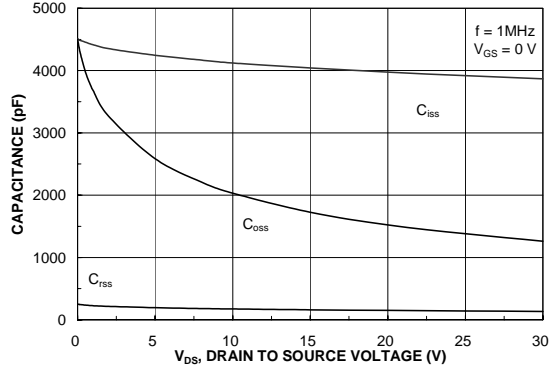


Figure 8. Capacitance Characteristics.

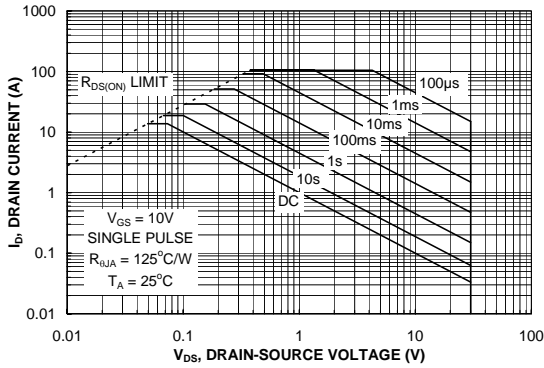


Figure 9. Maximum Safe Operating Area.

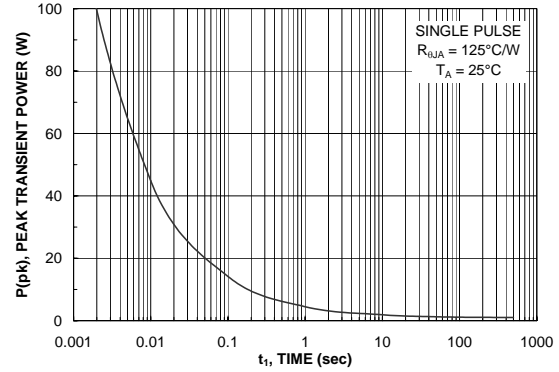


Figure 10. Single Pulse Maximum Power Dissipation.

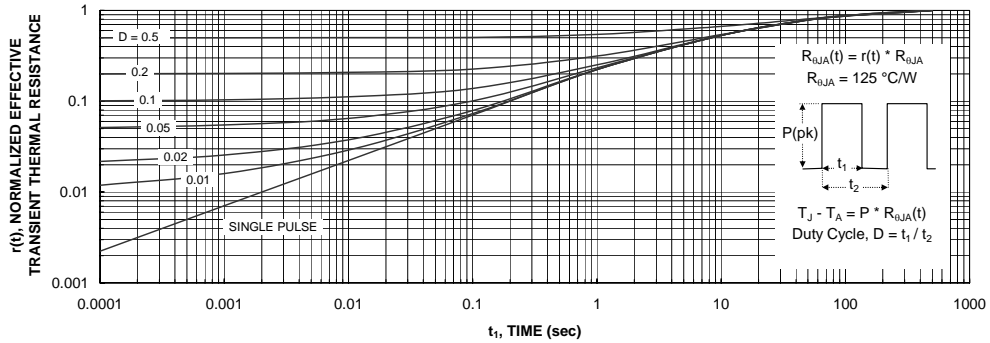


Figure 11. Transient Thermal Response Curve.

Thermal characterization performed using the conditions described in Note 1c.
 Transient thermal response will change depending on the circuit board design.

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