

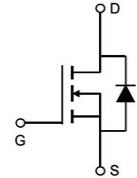
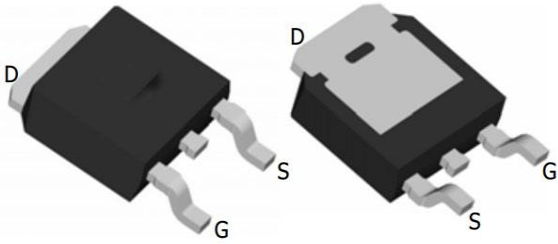
30V /36A Single N Power MOSFET
General Description

30V /36A Single N Power MOSFET

 Very low on-resistance $R_{DS(on)}$ @ $V_{GS}=4.5\text{ V}$

Pb-free lead plating; RoHS compliant

| | | |
|---|------|------------|
| V_{DS} | 30 | V |
| $R_{DS(on),TYP@V_{GS}=10V}$ | 7.7 | m Ω |
| $R_{DS(on),TYP@V_{GS}=4.5}$ | 12.1 | m Ω |
| I_D | 36 | A |



| | | | |
|-----------|--------------|---------|---------------------------|
| Part ID | Package Type | Marking | Tape and reel information |
| SM418T9RL | TO-252 | 36N03 | 2500 |


 100% UIS Tested
 100% Kg Tested

| Parameter | Symbol | Maximum | Units |
|---|----------------|------------------------|------------------|
| Drain-Source Voltage | V_{DS} | 30 | V |
| Gate-Source Voltage | V_{GS} | 20 | $\pm V$ |
| Continuous Drain Current ^A | I_D | $T_A=25^\circ\text{C}$ | A |
| | | $T_A=70^\circ\text{C}$ | |
| Pulsed Drain Current ^B | I_{DM} | 57.6 | |
| Avalanche Current ^C | I_{AR} | 11.5 | |
| Repetitive avalanche energy $L=0.1\text{mH}$ ^C | E_{AR} | 26.5 | mJ |
| Power Dissipation ^A | P_D | $T_A=25^\circ\text{C}$ | W |
| | | $T_A=70^\circ\text{C}$ | |
| Junction and Storage Temperature Range | T_J, T_{STG} | -55 to 150 | $^\circ\text{C}$ |

Thermal Characteristics

| Parameter | Symbol | Typ | Max | Units |
|--|-----------------|--------------|-----|--------------------|
| Maximum Junction-to-Ambient ^A | $R_{\theta JA}$ | 27 | 41 | $^\circ\text{C/W}$ |
| Maximum Junction-to-Ambient ^A | | Steady State | 55 | 66 |
| Maximum Junction-to-Lead ^C | $R_{\theta JL}$ | 16 | 26 | $^\circ\text{C/W}$ |



STATIC PARAMETERS

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|---------------------|---------------------------------------|---|-----|-------------|--------------|-------|
| BV _{DSS} | Drain-Source Breakdown Voltage | I _D = -250uA, V _{GS} = 0V | 30 | | | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =30V, V _{GS} =0V | | | 1 5 | uA |
| I _{GSS} | Gate-Body leakage current | V _{DS} = 0V, V _{GS} = ±20V | | | ±100 | nA |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} = V _{GS} I _D = 250µA | 1.3 | 1.9 | 2.5 | V |
| R _{DS(ON)} | Static Drain-Source On-Resistance | V _{GS} =10V, I _D =20A V _{GS} =4.5V, I _D =20A | | 7.7 12.1 | 11.0 15.7 | mΩ |
| g _{FS} | Forward Transconductance | V _{DS} =5V, I _D =20A | | 81 | | S |
| V _{SD} | Diode Forward Voltage | I _S =1A, V _{GS} =136V | | 0.72 | 1 | V |
| I _S | Maximum Body-Diode Continuous Current | | | | 36 | A |

DYNAMIC PARAMETERS

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|------------------|------------------------------|---|-----|------|------|-------|
| C _{iss} | Input Capacitance | V _{GS} =0V, V _{DS} =15V, f=1MHz | | 1150 | 1403 | pF |
| C _{oss} | Output Capacitance | | | 180 | 221 | pF |
| C _{rss} | Reverse Transfer Capacitance | | | 105 | 124 | pF |
| R _g | Gate resistance | V _{GS} =0V, V _{DS} =0V, f=1MHz | | | 2.5 | Ω |

SWITCHING PARAMETERS

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|----------------------|------------------------------------|---|-----|-------|-----|-------|
| Q _g (10V) | Total Gate Charge | V _{GS} =10V, V _{DS} =15V, I _D =20A | | 9.5 | | nC |
| Q _g 4.5V) | Total Gate Charge | | | 4.75 | | |
| Q _{gs} | Gate Source Charge | | | 3.5 | | |
| Q _{gd} | Gate Drain Charge | | | 5 | | |
| t _{D(on)} | Turn-On DelayTime | V _{GS} =10V, V _{DS} =15V, R _L =0.75Ω, R _{GEN} =3Ω | | 4.35 | | ns |
| t _r | Turn-On Rise Time | | | 3.48 | | |
| t _{D(off)} | Turn-Off DelayTime | | | 12.18 | | |
| t _f | Turn-Off Fall Time | | | 3.915 | | |
| t _{rr} | Body Diode Reverse Recovery Time | I _F =-8A, dI/dt=500A/µs | | 8.7 | | ns |
| Q _{rr} | Body Diode Reverse Recovery Charge | I _F =18A, dI/dt=500A/µs | | 13.5 | | nC |

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

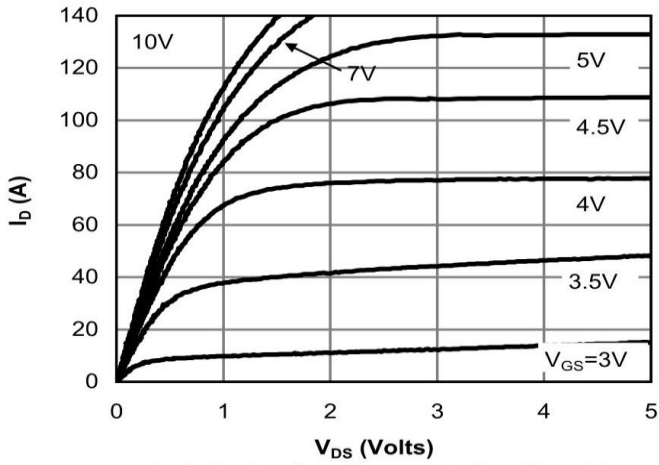


Fig 1: On-Region Characteristics (Note E)

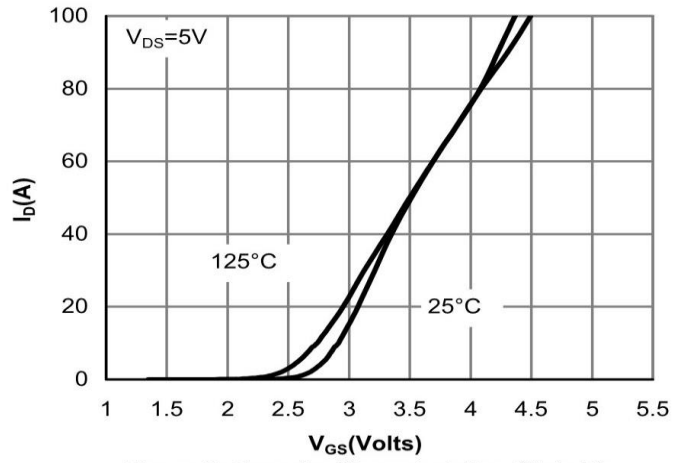


Figure 2: Transfer Characteristics (Note E)

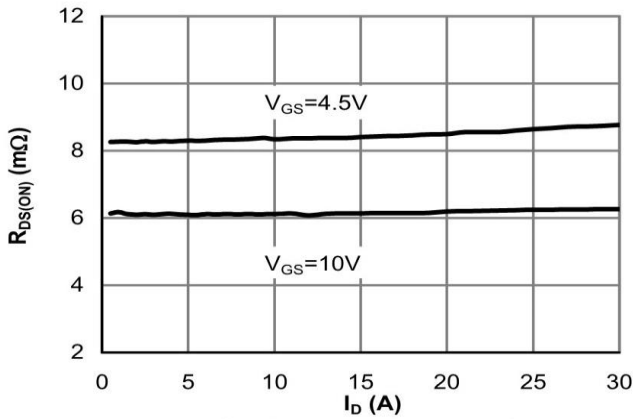


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

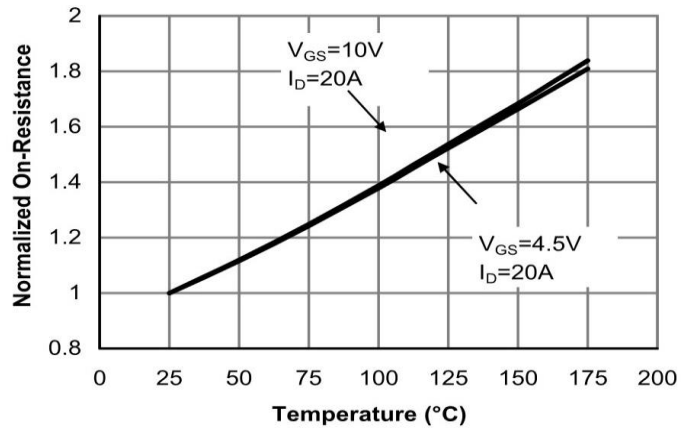
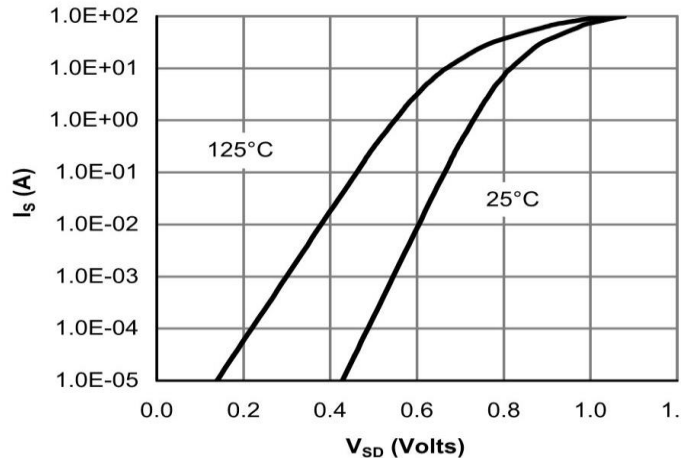
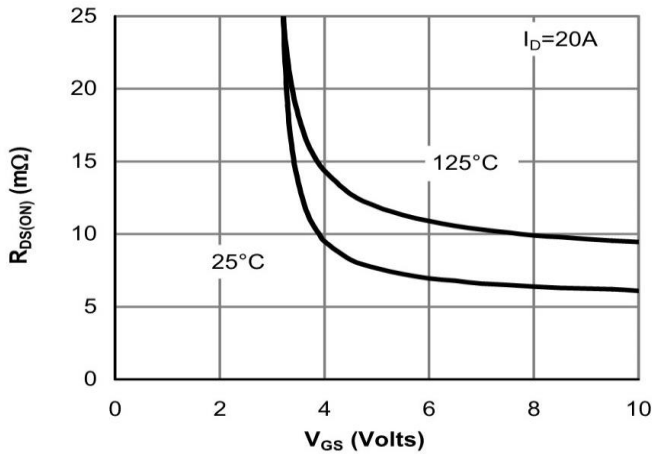


Figure 4: On-Resistance vs. Junction Temperature (Note E)



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

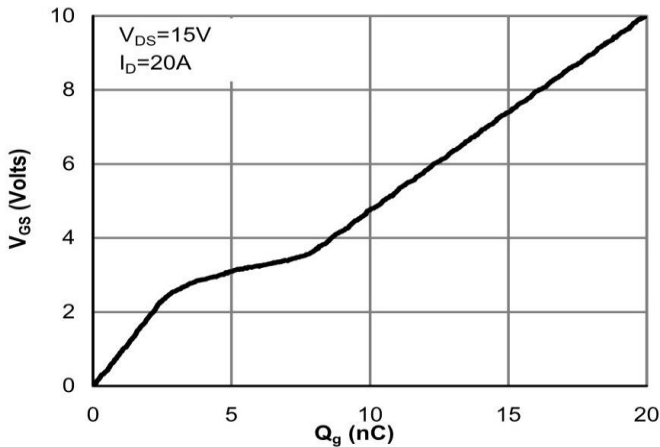


Figure 7: Gate-Charge Characteristics

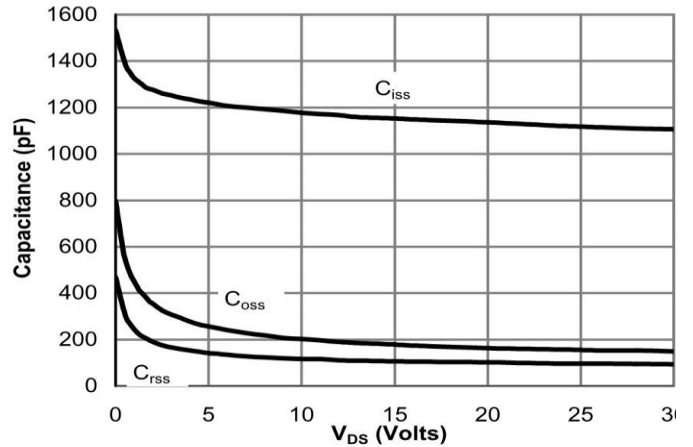


Figure 8: Capacitance Characteristics

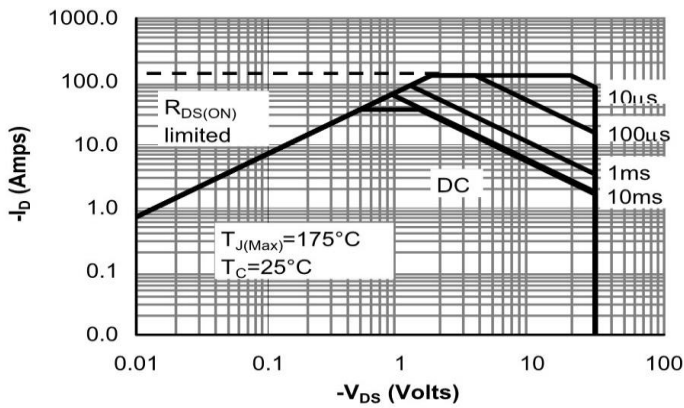


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

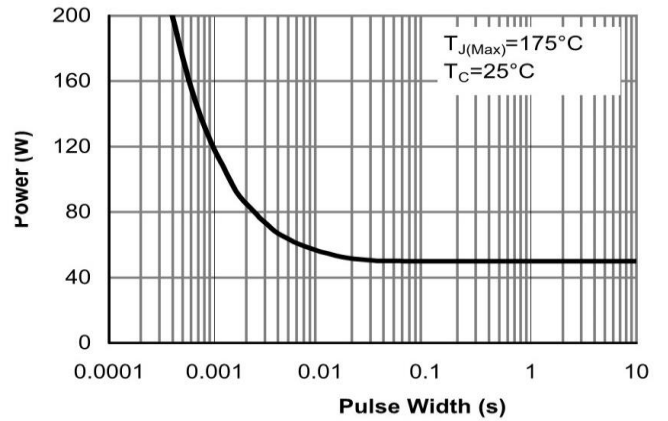


Figure 10: Single Pulse Power Rating Junction-t-Case (Note F)

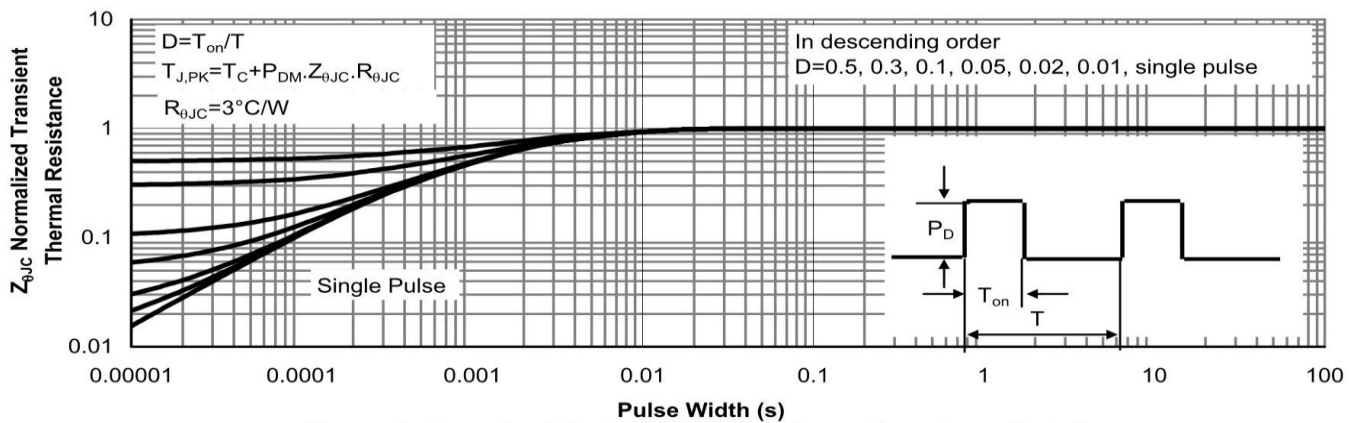


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)