

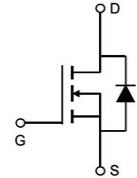
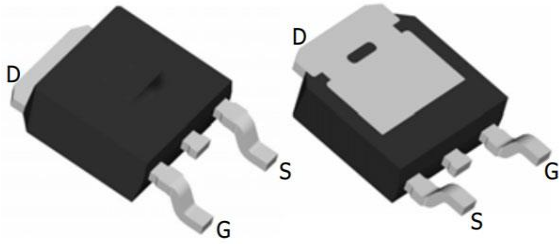
**100V /14A Single N Power MOSFET**
**General Description**

100V /14A Single N Power MOSFET

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

Pb-free lead plating; RoHS compliant

|   |       |            |
|---|-------|------------|
| <b><math>V_{DS}</math></b>                    | 100   | V          |
| <b><math>R_{DS(on),TYP@V_{GS}=10V}</math></b> | 90.0  | m $\Omega$ |
| <b><math>R_{DS(on),TYP@V_{GS}=4.5}</math></b> | 105.0 | m $\Omega$ |
| <b><math>I_D</math></b>                       | 14    | A          |



| Part ID    | Package Type | Marking | Tape and reel information |
|------------|--------------|---------|---------------------------|
| SM4286T9RL | TO-252       | 4286    | 2500                      |


 100% UIS Tested  
 100% Kg Tested

| Parameter  | Symbol         | Maximum          | Units      |
|--|----------------|------------------|------------|
| Drain-Source Voltage                               | $V_{DS}$       | 100              | V          |
| Gate-Source Voltage                                | $V_{GS}$       | 20               | $\pm V$    |
| Continuous Drain Current <sup>A</sup>              | $I_D$          | $T_A=25^\circ C$ | A          |
|  |                | $T_A=70^\circ C$ |            |
| Pulsed Drain Current <sup>B</sup>                  | $I_{DM}$       | 22.4             |            |
| Avalanche Current <sup>C</sup>                     | $I_{AR}$       | 4.5              |            |
| Repetitive avalanche energy $L=0.1mH$ <sup>C</sup> | $E_{AR}$       | 10.3             | mJ         |
| Power Dissipation <sup>A</sup>                     | $P_D$          | $T_A=25^\circ C$ | W          |
|  |                | $T_A=70^\circ C$ |            |
| Junction and Storage Temperature Range             | $T_J, T_{STG}$ | -55 to 150       | $^\circ C$ |

**Thermal Characteristics**

| Parameter                                | Symbol          | Typ          | Max | Units        |
|--|-----------------|--------------|-----|--------------|
| Maximum Junction-to-Ambient <sup>A</sup> | $R_{\theta JA}$ | 230          | 345 | $^\circ C/W$ |
| Maximum Junction-to-Ambient <sup>A</sup> |                 | Steady State | 460 | 552          |
| Maximum Junction-to-Lead <sup>C</sup>    | $R_{\theta JL}$ | 138          | 220 | $^\circ C/W$ |



**STATIC PARAMETERS**

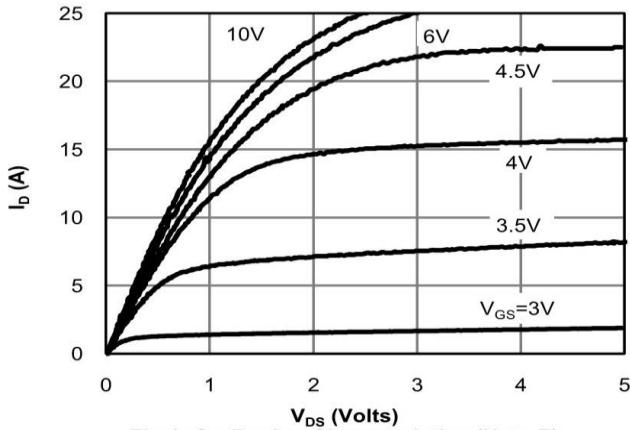
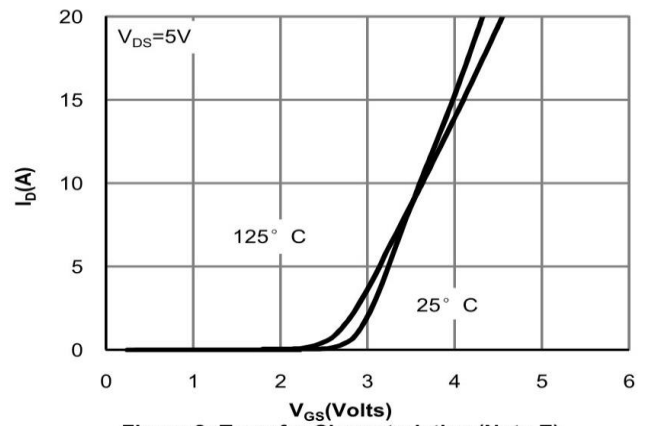
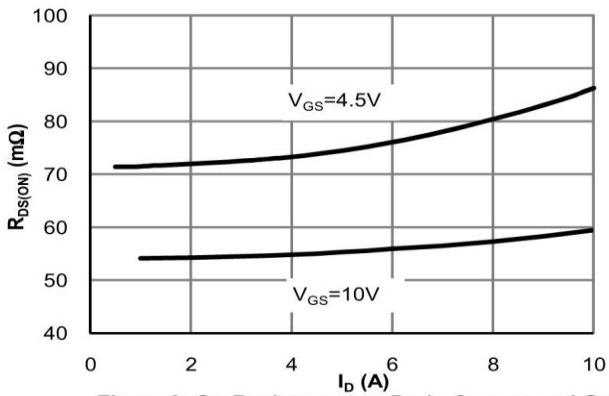
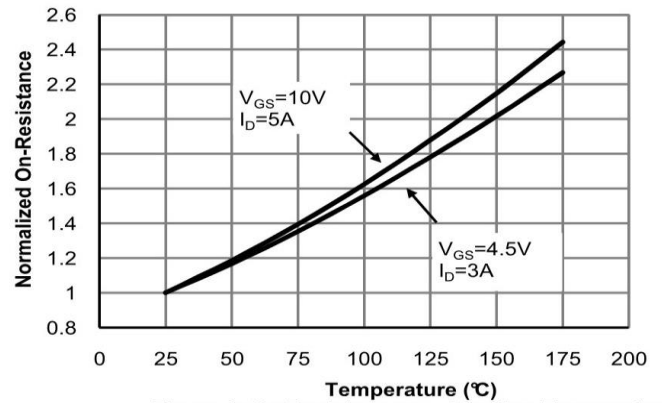
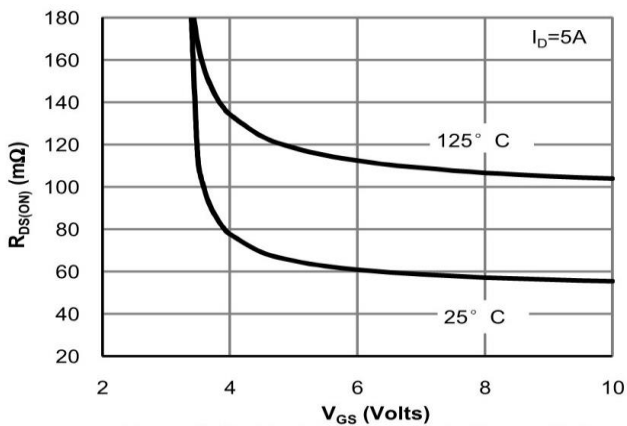
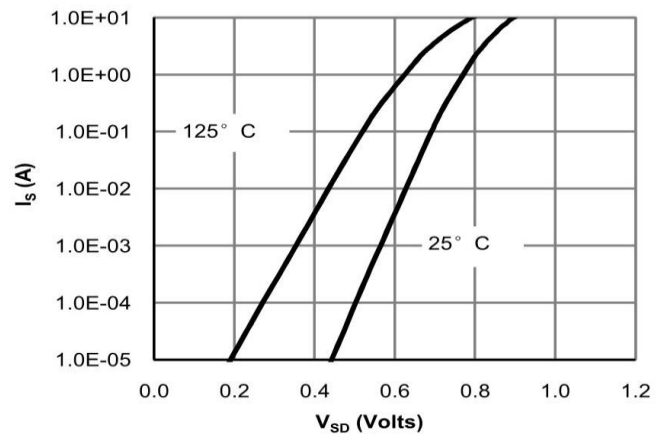
| Symbol              | Parameter                             | Conditions   | Min | Typ           | Max            | Units |
|---------------------|---------------------------------------|--|-----|---------------|----------------|-------|
| BV <sub>DSS</sub>   | Drain-Source Breakdown Voltage        | I <sub>D</sub> = -250uA, V <sub>GS</sub> = 0V  | 100 |               |                | V     |
| I <sub>DSS</sub>    | Zero Gate Voltage Drain Current       | V <sub>DS</sub> =100V, V <sub>GS</sub> =0V   |     |               | 1<br>5         | uA    |
| I <sub>GSS</sub>    | Gate-Body leakage current             | V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±20V   |     |               | ±100           | nA    |
| V <sub>GS(th)</sub> | Gate Threshold Voltage                | V <sub>DS</sub> = V <sub>GS</sub> I <sub>D</sub> = 250µA                                 | 1.5 | 2.2           | 2.9            | V     |
| R <sub>DS(ON)</sub> | Static Drain-Source On-Resistance     | V <sub>GS</sub> =-10V, I <sub>D</sub> =14A<br>V <sub>GS</sub> =4.5V, I <sub>D</sub> =14A |     | 90.0<br>105.0 | 115.0<br>125.0 | mΩ    |
| g <sub>FS</sub>     | Forward Transconductance              | V <sub>DS</sub> =5V, I <sub>D</sub> =14A   |     | 75            |                | S     |
| V <sub>SD</sub>     | Diode Forward Voltage                 | I <sub>S</sub> =1A, V <sub>GS</sub> =70V   |     | 0.72          | 1              | V     |
| I <sub>S</sub>      | Maximum Body-Diode Continuous Current |  |     |               | 14             | A     |

**DYNAMIC PARAMETERS**

| Symbol           | Parameter                    | Conditions  | Min | Typ | Max | Units |
|------------------|------------------------------|---|-----|-----|-----|-------|
| C <sub>iss</sub> | Input Capacitance            | V <sub>GS</sub> =0V, V <sub>DS</sub> =15V, f=1MHz |     | 390 | 475 | pF    |
| C <sub>oss</sub> | Output Capacitance           |   |     | 30  | 36  | pF    |
| C <sub>rss</sub> | Reverse Transfer Capacitance |   |     | 3   | 3   | pF    |
| R <sub>g</sub>   | Gate resistance              | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz  |     |     | 0.6 | Ω     |

**SWITCHING PARAMETERS**

| Symbol               | Parameter                          | Conditions  | Min | Typ  | Max | Units |
|----------------------|------------------------------------|---|-----|------|-----|-------|
| Q <sub>g</sub> (10V) | Total Gate Charge                  | V <sub>GS</sub> =10V, V <sub>DS</sub> =15V, I <sub>D</sub> =14A                         |     | 2.8  |     | nC    |
| Q <sub>g</sub> 4.5V) | Total Gate Charge                  |   |     | 1.4  |     |       |
| Q <sub>gs</sub>      | Gate Source Charge                 |   |     | 0.84 |     |       |
| Q <sub>gd</sub>      | Gate Drain Charge                  |   |     | 1.2  |     |       |
| t <sub>D(on)</sub>   | Turn-On DelayTime                  | V <sub>GS</sub> =10V, V <sub>DS</sub> =15V, R <sub>L</sub> =0.75Ω, R <sub>GEN</sub> =3Ω |     | 7.5  |     | ns    |
| t <sub>r</sub>       | Turn-On Rise Time                  |   |     | 6    |     |       |
| t <sub>D(off)</sub>  | Turn-Off DelayTime                 |   |     | 21   |     |       |
| t <sub>f</sub>       | Turn-Off Fall Time                 |   |     | 6.75 |     |       |
| t <sub>rr</sub>      | Body Diode Reverse Recovery Time   | I <sub>F</sub> =-8A, dI/dt=500A/µs  |     | 15   |     | ns    |
| Q <sub>rr</sub>      | Body Diode Reverse Recovery Charge | I <sub>F</sub> =18A, dI/dt=500A/µs  |     | 53   |     | 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)**

**Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)**

**Figure 6: Body-Diode Characteristics (Note E)**

## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

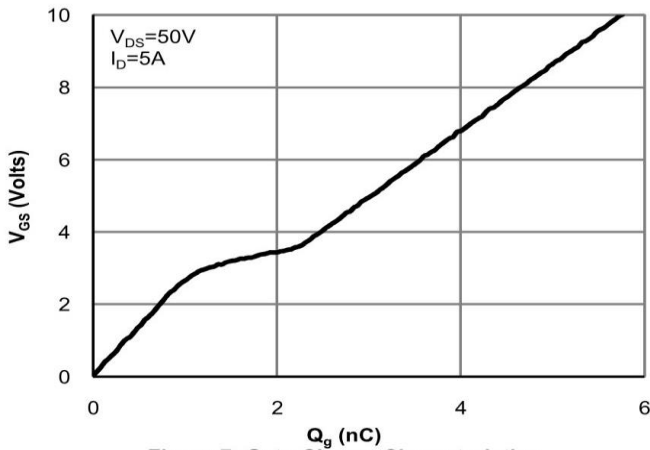


Figure 7: Gate-Charge Characteristics

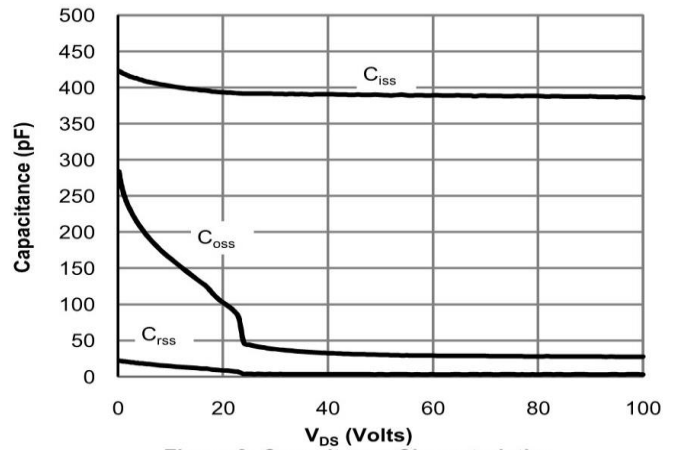


Figure 8: Capacitance Characteristics

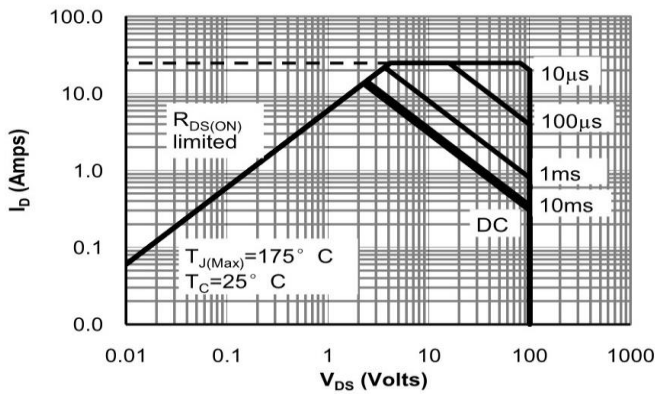


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

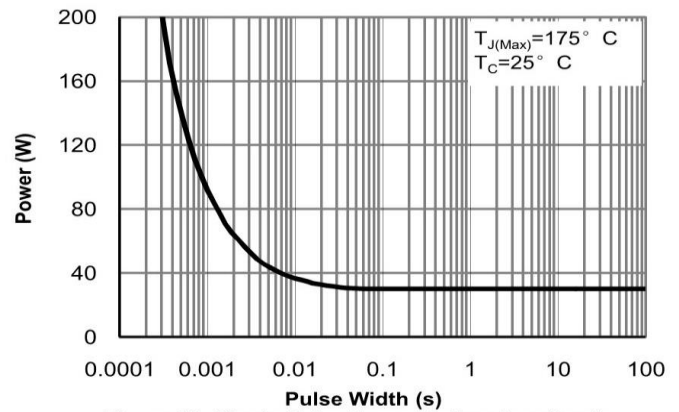


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

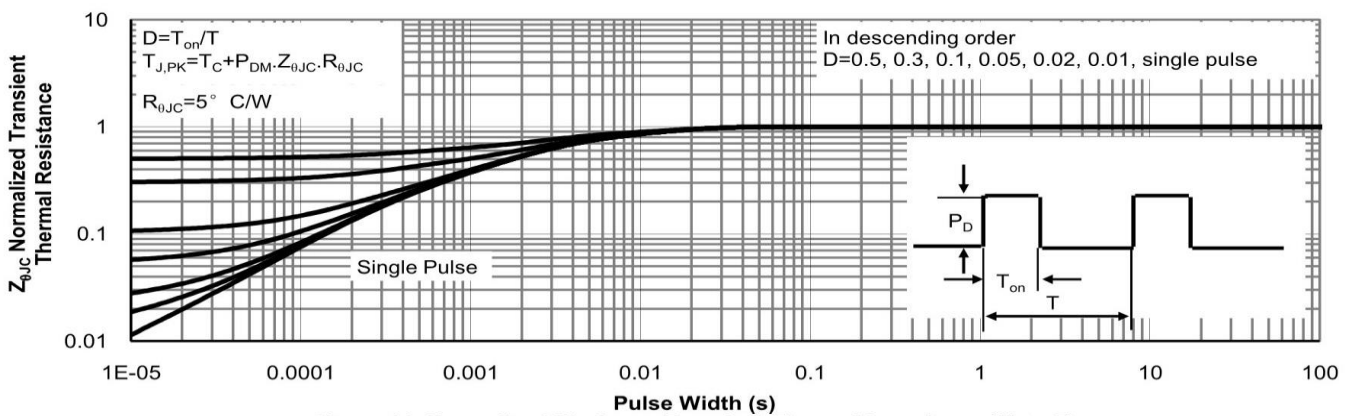


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)