



40V N-Channel Trench Power MOSFET

General Description

The SJP40N058 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a wide variety of applications.

Features

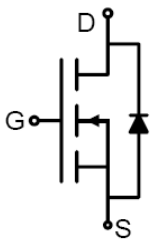
- Low Gate Charge
- 100% UIS Tested, 100% DVDS Tested
- High Power and current handing capability
- Lead free product is acquired

Application

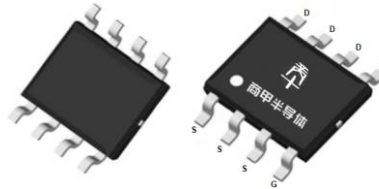
- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

Key Performance Parametes

| Parameter | Value | Unit |
|-------------------|-------|------------|
| V_{DS} | 40 | V |
| $R_{DS(ON_TYP)}$ | 7.4 | m Ω |
| I_D | 14 | A |
| Q_G | 41 | nC |



Schematic Diagram



SOP-8 top&bottom view



Package Marking and Ordering Information

| Device/Ordering Code | Marking | Package | Packing | Reel Size | Tape width | Quantity |
|----------------------|-----------|---------|---------|-----------|------------|----------|
| SJP40N058 | SJP40N058 | SOP-8 | Tape | \ | \ | 4000 Pcs |

Table 1. Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

| Symbol | Parameter | Limit | Unit |
|------------------|--|------------|------------------|
| V_{DS} | Drain-Source Voltage ($V_{GS}=0V$) | 40 | V |
| V_{GS} | Gate-Source Voltage ($V_{DS}=0V$) | ± 20 | V |
| I_D | Drain Current-Continuous($T_A=25^\circ\text{C}$) | 14 | A |
| | Drain Current-Continuous($T_A=100^\circ\text{C}$) | 8.7 | A |
| I_{DM} (pluse) | Drain Current-Continuous@ Current-Pulsed (Note 1) | 56 | A |
| P_D | Maximum Power Dissipation($T_A=25^\circ\text{C}$) | 3.3 | W |
| | Maximum Power Dissipation($T_A=100^\circ\text{C}$) | 1.3 | W |
| E_{AS} | Avalanche energy (Note 2) | 132 | mJ |
| T_J, T_{STG} | Operating Junction and Storage Temperature Range | -55 To 150 | $^\circ\text{C}$ |

Table 2. Thermal Characteristic

| Symbol | Parameter | Typ | Max | Unit |
|-----------------|---|-----|------|--------------------|
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient | | 37.4 | $^\circ\text{C/W}$ |



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Table 3. Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|------------------------------------|-----------------------------------|--|-----|------|------|------|
| On/Off States | | | | | | |
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V I _D =250μA | 40 | | | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =40V, V _{GS} =0V T _J =25°C | | | 1 | μA |
| | | V _{DS} =40V, V _{GS} =0V T _J =125°C | | | 100 | μA |
| I _{GSS} | Gate-Body Leakage Current | V _{GS} =±20V, V _{DS} =0V | | | ±100 | nA |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =250μA | 1 | | 2.5 | V |
| g _{FS} | Forward Transconductance | V _{DS} =10V, I _D =20A | | 38.8 | | S |
| R _{DS(ON)} | Drain-Source On-State Resistance | V _{GS} =10V, I _D =20A T _J =25°C | | 7.4 | 9.3 | mΩ |
| R _{DS(ON)} | Drain-Source On-State Resistance | V _{GS} =4.5V, I _D =15A T _J =25°C | | 8.7 | 11.6 | mΩ |
| Dynamic Characteristics | | | | | | |
| C _{iss} | Input Capacitance | V _{DS} =20V, V _{GS} =0V, f=1.0MHz | | 2181 | | pF |
| C _{oss} | Output Capacitance | | | 165 | | pF |
| C _{rss} | Reverse Transfer Capacitance | | | 134 | | pF |
| R _g | Gate resistance | V _{GS} =0V, V _{DS} =0V, f=1.0MHz | | 2.43 | | Ω |
| Switching Parameters | | | | | | |
| t _{d(on)} | Turn-on Delay Time | V _{GS} =10V, V _{DS} =20V, R _L =1Ω, R _{GEN} =3Ω | | 8.4 | | nS |
| t _r | Turn-on Rise Time | | | 6.2 | | nS |
| t _{d(off)} | Turn-Off Delay Time | | | 40.2 | | nS |
| t _f | Turn-Off Fall Time | | | 7.8 | | nS |
| Q _g | Total Gate Charge | V _{GS} =10V, V _{DS} =20V, I _D =20A | | 41 | | nC |
| Q _{gs} | Gate-Source Charge | | | 5.5 | | nC |
| Q _{gd} | Gate-Drain Charge | | | 8.0 | | nC |
| Source-Drain Diode Characteristics | | | | | | |
| I _{SD} | Source-Drain Current (Body Diode) | | | | 14 | A |
| V _{SD} | Forward on Voltage (Note 3) | V _{GS} =0V, I _S =20A | | | 1.2 | V |
| t _{rr} | Reverse Recovery Time | I _F =20A, dI/dt=100A/μs | | 18.3 | | ns |
| Q _{rr} | Reverse Recovery Charge | I _F =20A, dI/dt=100A/μs | | 12.8 | | nC |

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature.

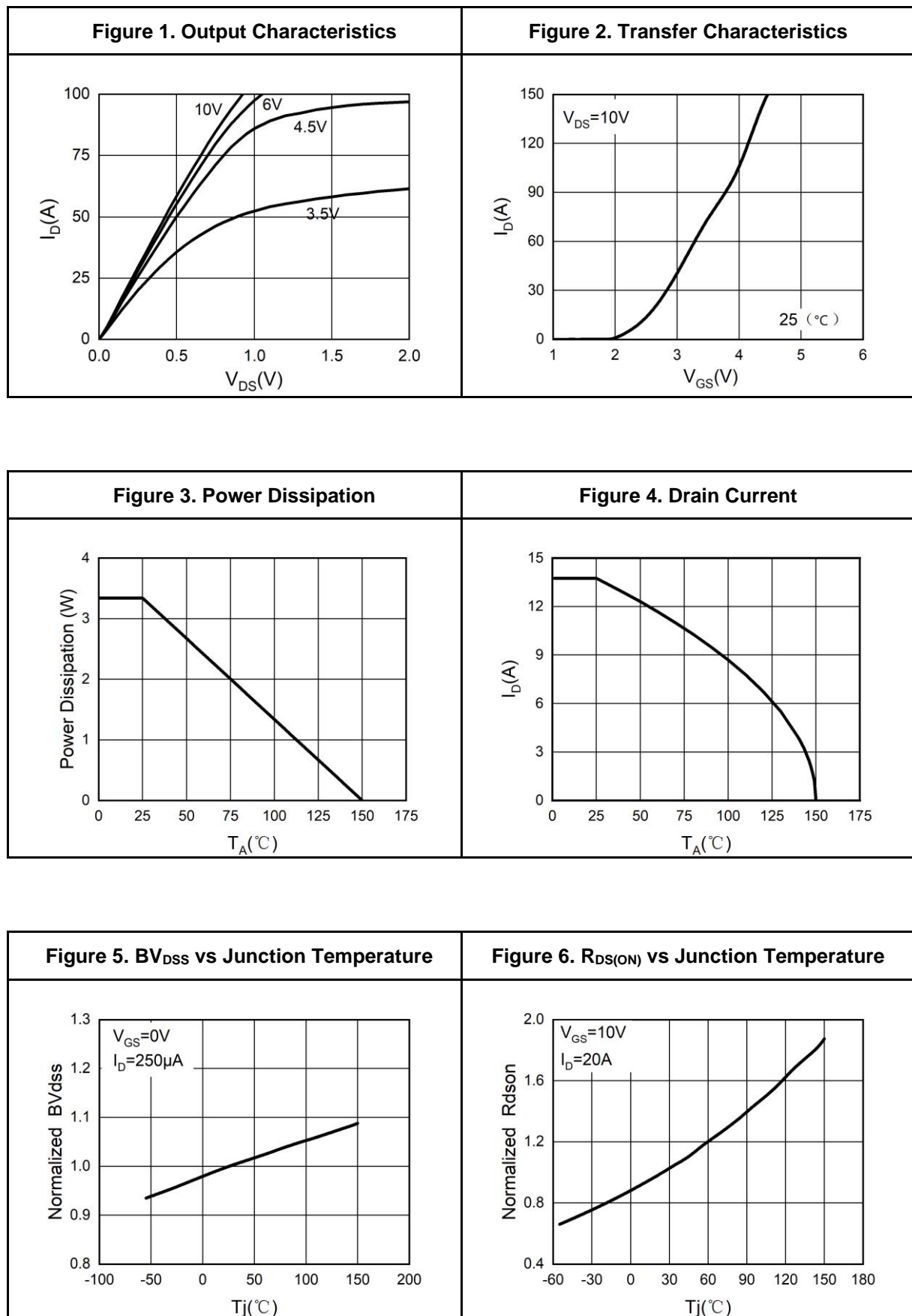
Notes 2.EAS condition: $T_J=25^{\circ}\text{C}, V_{DD}=40V, V_G=10V, R_g=25\Omega, L=0.5\text{mH}$.

Notes 3.Repetitive Rating: Pulse width limited by maximum junction temperature.



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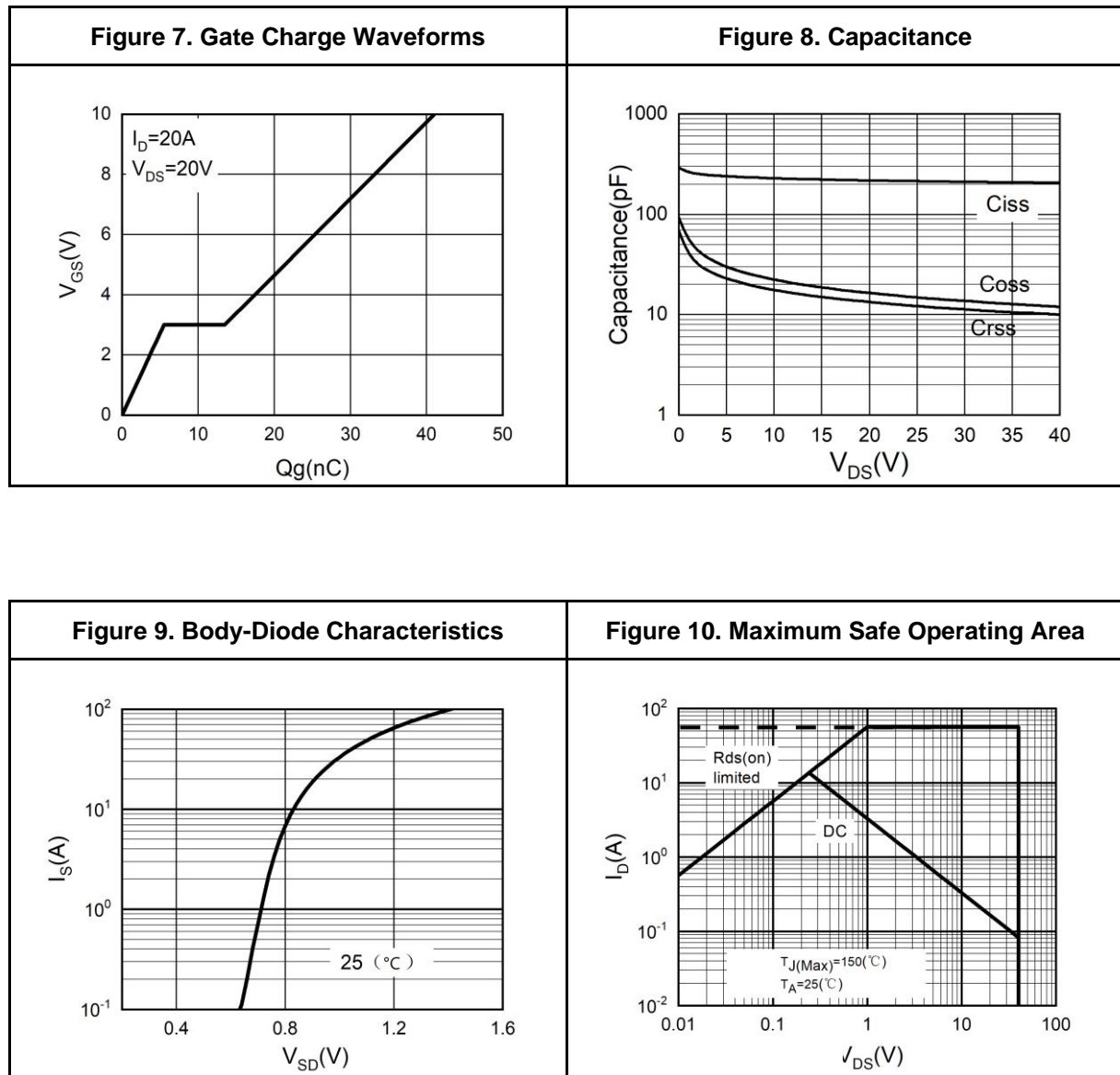
Typical Electrical And Thermal Characteristics (Curves)





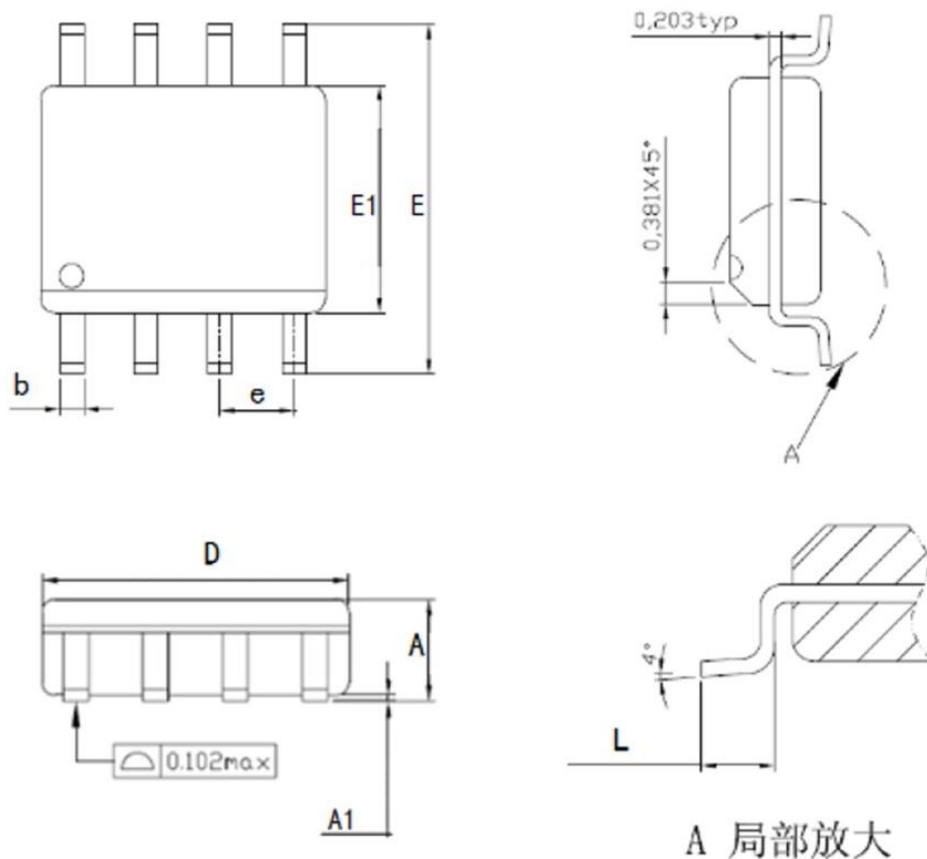
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Typical Electrical And Thermal Characteristics (Curves)





SOP-8 Package Information



| Symbol | Dimensions In Millimeters | | |
|--------|---------------------------|-------|-------|
| | Min. | Nom. | Max |
| A | 1.35 | 1.55 | 1.75* |
| A1 | 0.1 | 0.15 | 0.2 |
| b | 0.346 | 0.406 | 0.466 |
| D | 4.8 | 4.89 | 4.98 |
| E | 5.75 | 6.00 | 6.25 |
| E1 | 3.81 | 3.90 | 3.99 |
| e | 1.27TYP | | |
| L | 0.406 | 0.838 | 1.27 |



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