



40V N-Channel MOSFETs

General Description

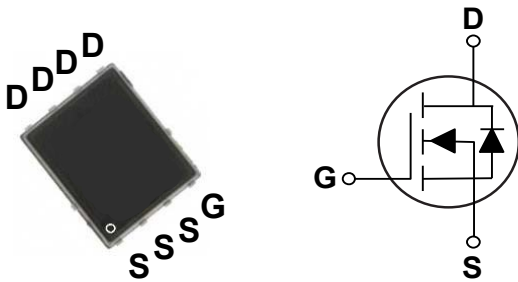
The advanced SGT MOSFET technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and converter applications.

| BV_{DSS} | $R_{DS(ON)}$ | I_D |
|------------|--------------|-------|
| 40 V | 1.8 mΩ | 195 A |

Features

- $R_{DS(ON)} \leq 1.8m\Omega @ V_{GS}=10V$
- Low Gate Charge
- Low $R_{DS(ON)}$
- Green Device Available

PPAK5X6 Pin Configuration



Applications

- SMPS Synchronous Rectification
- DC/DC Converters

Absolute Maximum Ratings $T_J=25^\circ C$ unless otherwise noted

| Symbol | Parameter | Rating | Units |
|--------------|---|---------------|------------|
| V_{DS} | Drain-Source Voltage | 40 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | V |
| I_D | Drain Current – Continuous ($T_C=25^\circ C$) | 195 | A |
| I_{DM} | Drain Current – Pulsed (NOTE 1) | 780 | A |
| EAS | Single Pulse Avalanche Energy (NOTE 2) | 288 | mJ |
| P_D | Power Dissipation ($T_C=25^\circ C$) | 113.6 | W |
| T_J | Operating Junction Temperature Range | -55 to 150 | $^\circ C$ |
| T_{STG} | Storage Temperature Range | -55 to 150 | $^\circ C$ |
| Marking Code | | A4048 , ND1P8 | |

Thermal Characteristics

| Symbol | Parameter | Typ. | Max. | Unit |
|-----------------|--|------|------|--------------|
| $R_{\theta JA}$ | Thermal Resistance Junction to Ambient | --- | 50 | $^\circ C/W$ |
| $R_{\theta JC}$ | Thermal Resistance Junction to Case | --- | 1.1 | $^\circ C/W$ |



Electrical Characteristics (T_J=25°C, unless otherwise noted)

Off Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-------------------|--------------------------------|---|------|------|------|------|
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =250uA | 40 | --- | --- | V |
| I _{DSS} | Drain-Source Leakage Current | V _{DS} =32V, V _{GS} =0V, T _J =25°C | --- | --- | 1 | uA |
| I _{GSS} | Gate-Source Leakage Current | V _{GS} =±20V, V _{DS} =0V | --- | --- | ±100 | nA |

On Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---------------------|-----------------------------------|--|------|------|------|------|
| R _{DS(ON)} | Static Drain-Source On-Resistance | V _{GS} =10V, I _D =20A | --- | --- | 1.8 | mΩ |
| V _{GS(th)} | Gate Threshold Voltage | V _{GS} =V _{DS} , I _D =250uA | 1.0 | --- | 2.5 | V |

Dynamic and switching Characteristics (NOTE 4)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---------------------|------------------------------|---|------|------|------|------|
| Q _g | Total Gate Charge | V _{DS} =32V, V _{GS} =10V, I _D =40A | --- | 166 | --- | nC |
| Q _{gs} | Gate-Source Charge | | --- | 30 | --- | |
| Q _{gd} | Gate-Drain Charge | | --- | 68 | --- | |
| T _{d(on)} | Turn-On Delay Time | V _{DS} =20V, V _{GS} =10V, R _G =1Ω, I _D =40A | --- | 22 | --- | nS |
| T _r | Rise Time | | --- | 75 | --- | |
| T _{d(off)} | Turn-Off Delay Time | | --- | 60 | --- | |
| T _f | Fall Time | | --- | 36 | --- | |
| C _{iss} | Input Capacitance | V _{DS} =25V, V _{GS} =0V, F=1MHz | --- | 7850 | --- | pF |
| C _{oss} | Output Capacitance | | --- | 1730 | --- | |
| C _{rss} | Reverse Transfer Capacitance | | --- | 500 | --- | |
| R _g | Gate resistance | V _{GS} =0V, V _{DS} =0V, F=1MHz | --- | 2.4 | --- | Ω |

Drain-Source Diode Characteristics and Ratings

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-----------------|---------------------------|---|------|------|------|------|
| I _S | Continuous Source Current | V _G =V _D =0V, Force Current | --- | --- | 195 | A |
| V _{SD} | Diode Forward Voltage | V _{GS} =0V, I _S =1A, T _J =25°C | --- | --- | 1.2 | V |

NOTES :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The EAS data shows Max. rating. The test condition is V_{DD}=25V, L=1mH, R_G=25Ω.
3. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing.



Characteristics Curves

FIG.1-Typical Output Characteristics

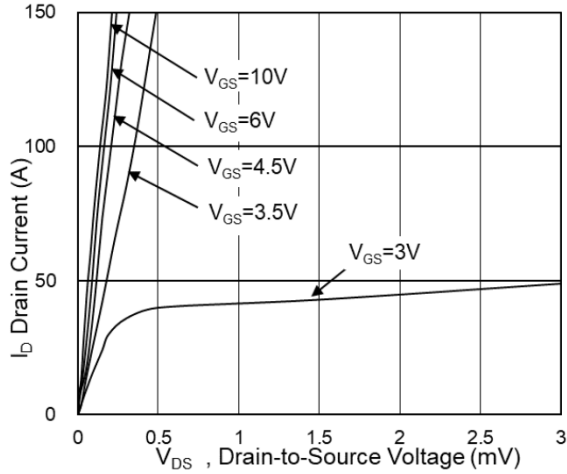


FIG.2-On-Resistance vs. G-S Voltage

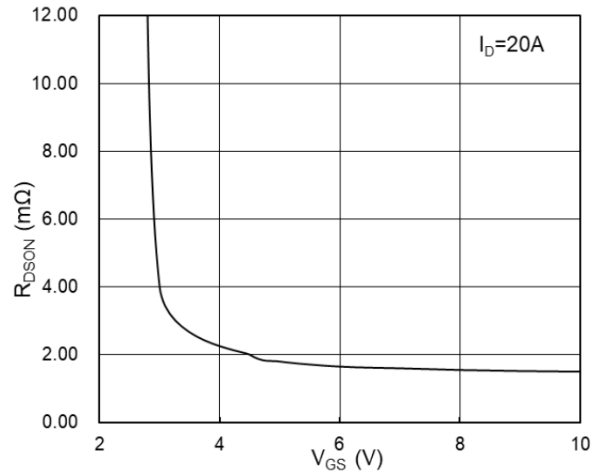


FIG.3-Source Drain Forward Characteristics

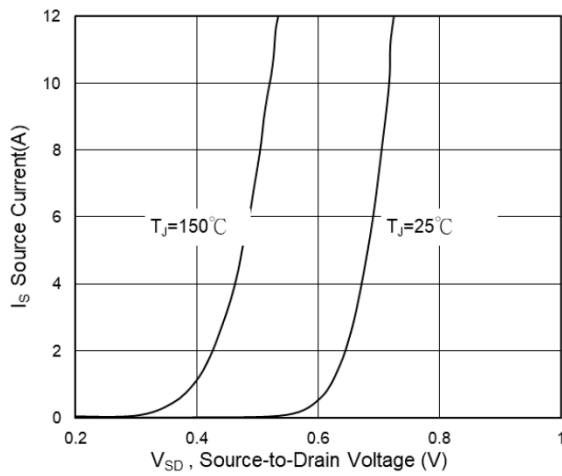


FIG.4-Gate Charge Characteristics

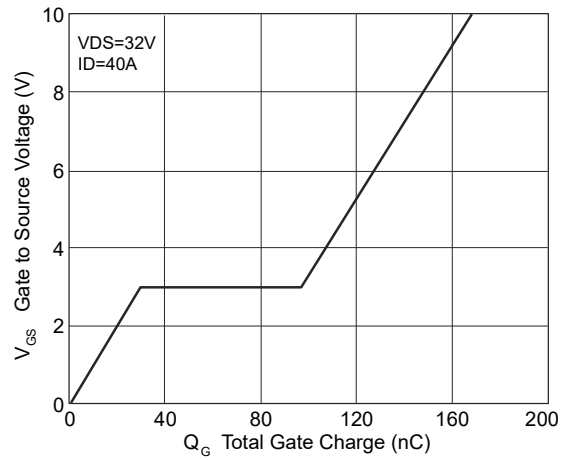


FIG.5-Normalized VGS(th) vs. TJ

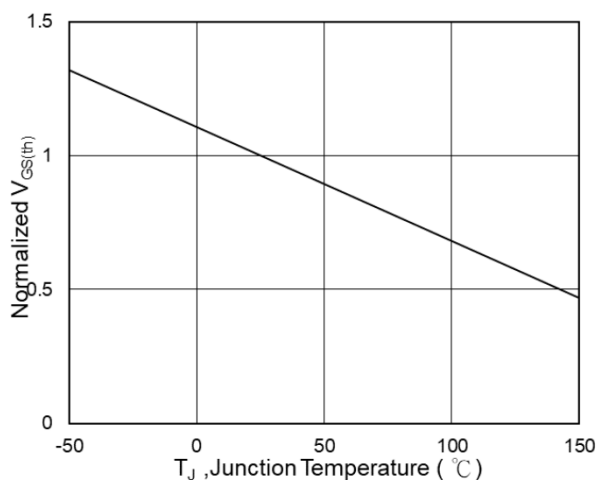
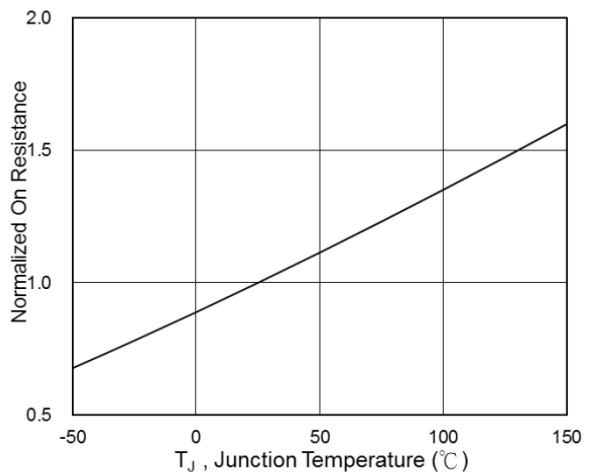


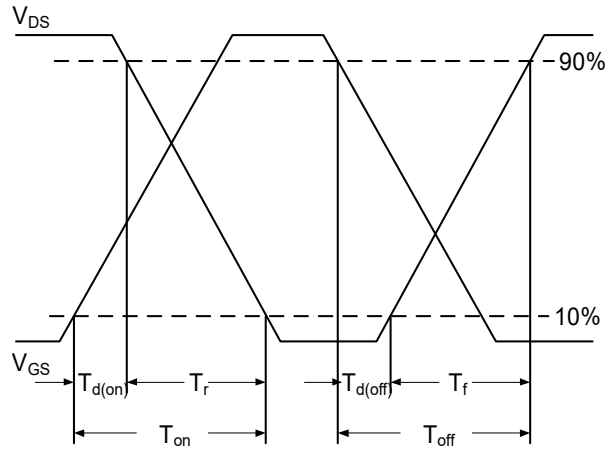
FIG.6-Normalized RDS(on) vs. TJ



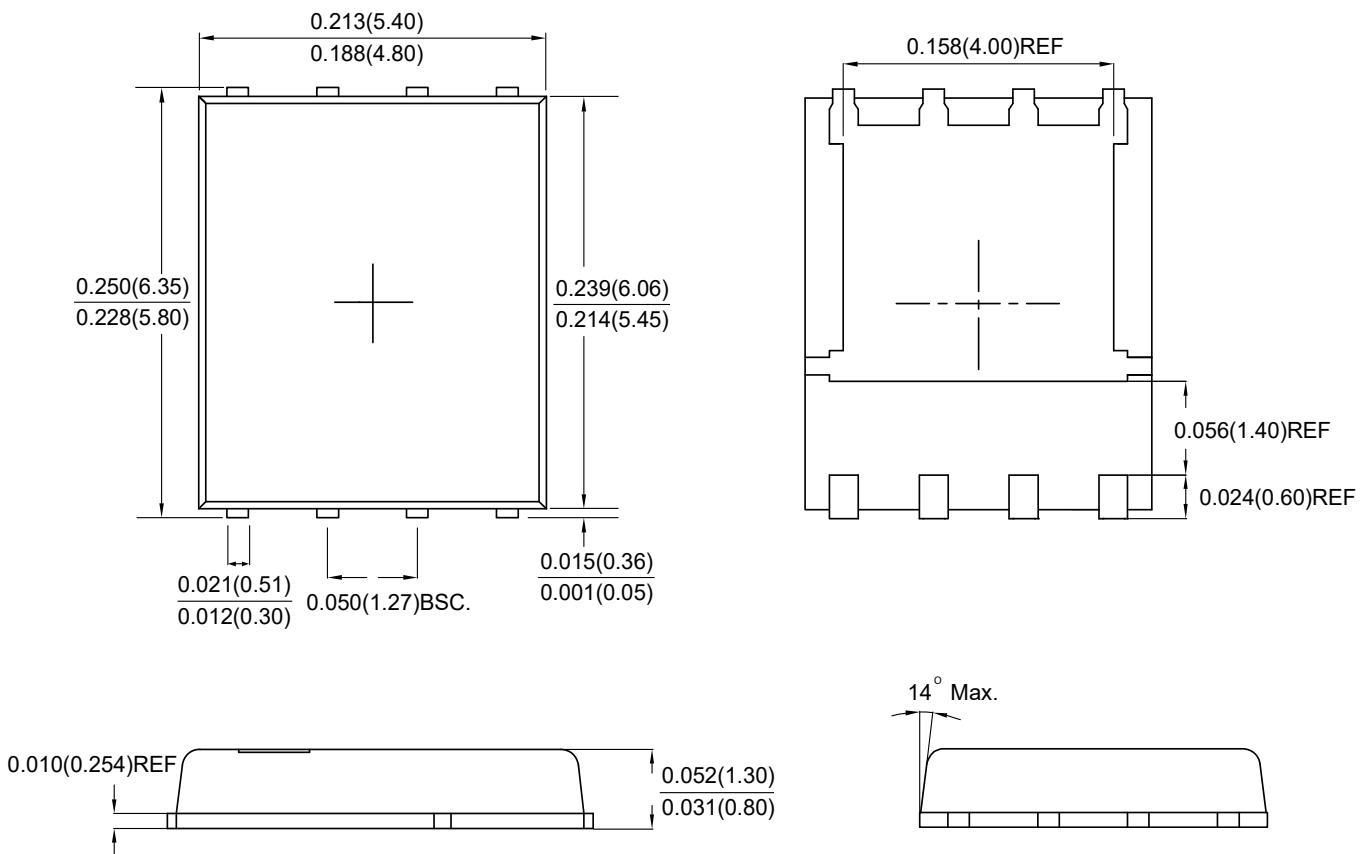


Characteristics Curves

FIG.7-Switching Time Waveform



Package Outline Dimensions



PPAK5X6

Dimensions in inches and (millimeters)



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