



60V N-Channel MOSFETs

General Description

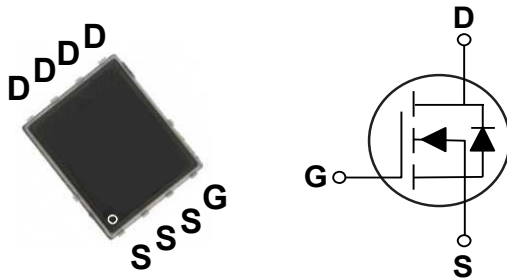
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

| | | |
|-------------------------|---------------------------|----------------------|
| BV_{DSS} | R_{DS(ON)} | I_D |
| 60 V | 10 mΩ | 65 A |

Features

- $R_{DS(ON)} \leq 10m\Omega @ V_{GS}=10V$
- Fast Switching
- Improved dv/dt Capability
- Green Device Available

PPAK5X6 Pin Configuration



Applications

- Battery Protection
- Load Switch
- Uninterruptible Power Supply

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

| Symbol | Parameter | Rating | Units |
|--------------|--|------------|------------|
| V_{DS} | Drain-Source Voltage | 60 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | V |
| I_D | Drain Current - Continuous (NOTE 1) | 65 | A |
| I_{DM} | Drain Current - Pulsed (NOTE 2) | 138 | A |
| EAS | Single Pulse Avalanche Energy (NOTE 3) | 30 | mJ |
| P_D | Power Dissipation ($T_C=25^\circ C$) | 59.5 | W |
| T_J | Operating Junction Temperature Range | -55 to 150 | $^\circ C$ |
| T_{STG} | Storage Temperature Range | -55 to 150 | $^\circ C$ |
| Marking Code | | NG010 | |

Thermal Characteristics

| Symbol | Parameter | Rating | Unit |
|-----------------|--|--------|--------------|
| $R_{\theta JA}$ | Thermal Resistance Junction to Ambient | 62 | $^\circ C/W$ |
| $R_{\theta JC}$ | Thermal Resistance Junction to Case | 2.1 | $^\circ C/W$ |



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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 | 60 | --- | --- | V |
| I _{DSS} | Drain-Source Leakage Current | V _{DS} =60V, V _{GS} =0V | --- | --- | 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 | --- | --- | 10 | mΩ |
| | | V _{GS} =4.5V, I _D =10A | --- | --- | 13 | |
| V _{GS(th)} | Gate Threshold Voltage | V _{GS} =V _{DS} , I _D =250uA | 1.2 | --- | 2.5 | V |

Dynamic and switching Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---------------------|------------------------------|---|------|--------|------|------|
| Q _g | Total Gate Charge | V _{DS} =50V, V _{GS} =10V, I _D =10A | --- | 18.4 | --- | nC |
| Q _{gs} | Gate-Source Charge | | --- | 3.3 | --- | |
| Q _{gd} | Gate-Drain Charge | | --- | 3.1 | --- | |
| T _{d(on)} | Turn-On Delay Time | V _{DS} =50V, V _{GS} =10V, R _G =2Ω, I _D =10A | --- | 17.9 | --- | nS |
| T _r | Rise Time | | --- | 4 | --- | |
| T _{d(off)} | Turn-Off Delay Time | | --- | 34.9 | --- | |
| T _f | Fall Time | | --- | 5.5 | --- | |
| C _{iss} | Input Capacitance | V _{DS} =50V, V _{GS} =0V, F=100kHz | --- | 1182.1 | --- | pF |
| C _{oss} | Output Capacitance | | --- | 199.5 | --- | |
| C _{rss} | Reverse Transfer Capacitance | | --- | 4.1 | --- | |

Drain-Source Diode Characteristics and Ratings

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-----------------|---------------------------|--|------|------|------|------|
| I _S | Continuous Source Current | | --- | --- | 60 | A |
| V _{SD} | Diode Forward Voltage | V _{GS} =0V, I _S =20A | --- | --- | 1.3 | V |
| t _{rr} | Reverse Recovery Time | I _F =10A, dI _F /dt=100A/us | --- | 41.8 | --- | nS |
| Q _{rr} | Reverse Recovery Charge | | --- | 36.1 | --- | nC |

NOTES :

1. Calculated continuous current based on maximum allowable junction temperature.
2. Repetitive Rating : Pulsed width limited by maximum junction temperature.
3. The EAS data shows Max. rating . The test condition is V_{DD}=50V, R_G=50ΩV, L=0.3mH.
4. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.



Characteristics Curves

FIG. 1 - Transfer Characteristics

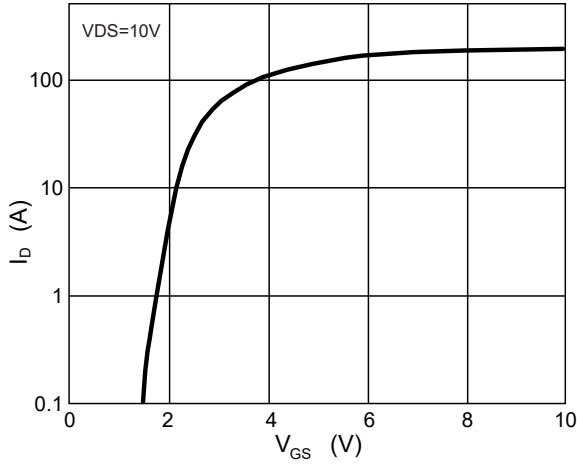


FIG. 2 - $R_{DS(ON)}$ vs. T_J

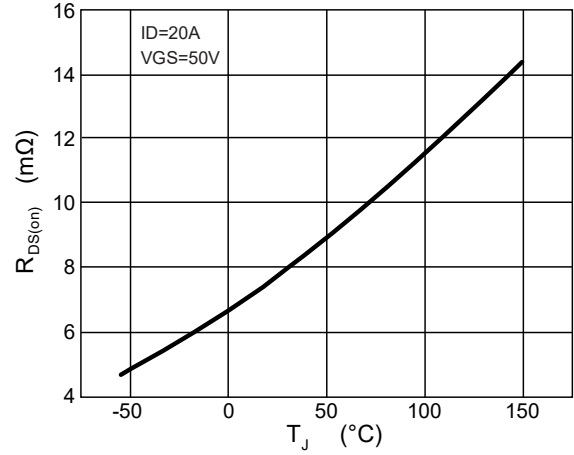


FIG. 3 - I_S vs. V_{SD}

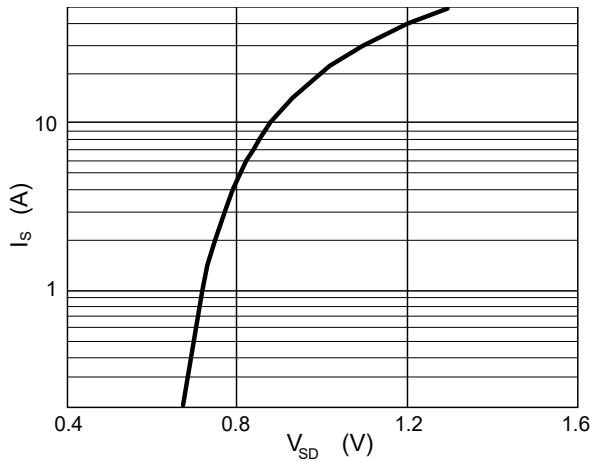


FIG. 4 - Gate Charge Characteristics

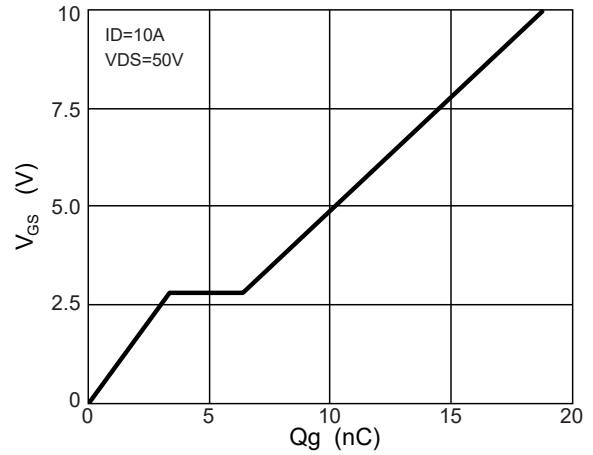


FIG. 5 - $R_{DS(ON)}$ vs. I_D

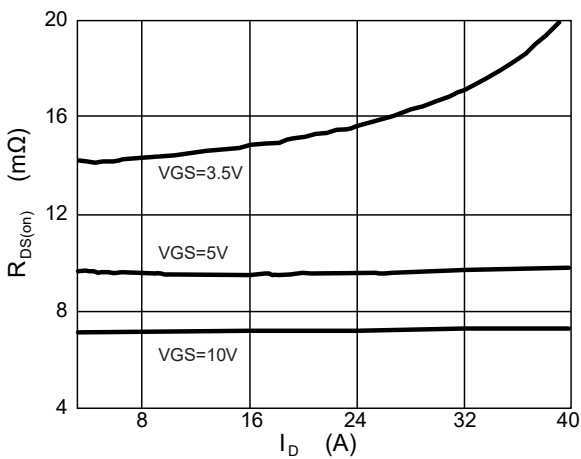
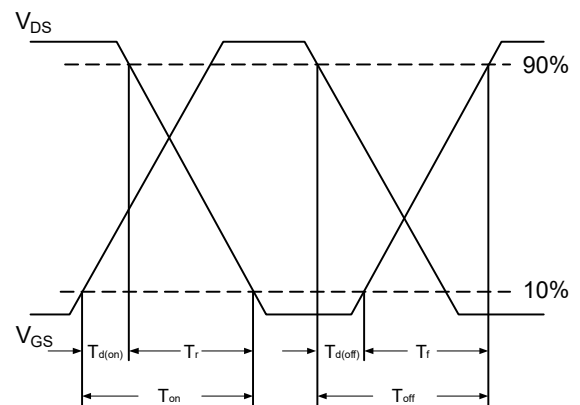
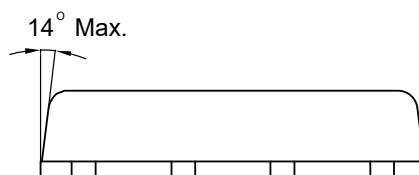
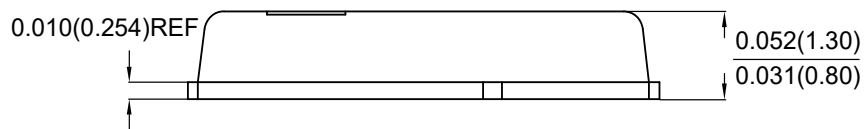
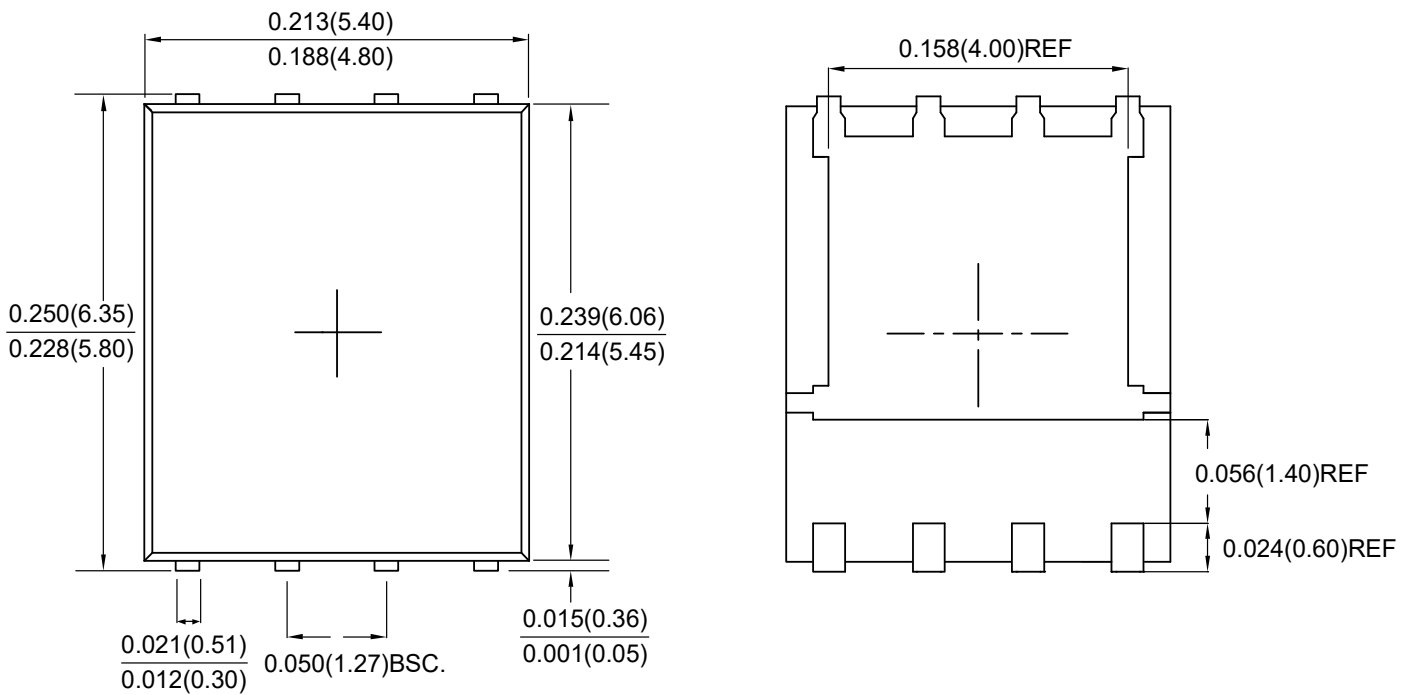


FIG. 6 - Switching Time Waveform





Package Outline Dimensions



PPAK5X6

Dimensions in inches and (millimeters)



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