



P5MNC6P3



30V N-Channel MOSFETs

General Description

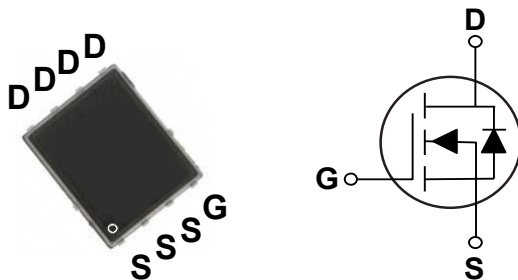
The P5MNC6P3 is the high cell density trenched N-ch MOSFETs, which provide excellent $R_{DS(ON)}$ and gate charge for DC/DC converters application.

| BV_{DSS} | $R_{DS(ON)}$ | I_D |
|------------|----------------|-------|
| 30 V | 6.3 m Ω | 52 A |

Features

- $R_{DS(ON)} \leq 6.3m\Omega @ V_{GS}=10V$
- Super Low Gate Charge
- Low $R_{DS(ON)}$
- Green Device Available

PPAK5X6 Pin Configuration



Applications

- Motor Control
- DC/DC Converter

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

| Symbol | Parameter | Rating | Units |
|--------------|--|------------|------------|
| V_{DS} | Drain-Source Voltage | 30 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | V |
| I_D | Drain Current – Continuous ($T_C=25^\circ C$) | 52 | A |
| | Drain Current – Continuous ($T_C=100^\circ C$) | 33 | A |
| I_{DM} | Drain Current – Pulsed (NOTE 1) | 125 | A |
| EAS | Single Pulse Avalanche Energy (NOTE 2) | 28.8 | mJ |
| IAS | Avalanche Current | 24 | A |
| P_D | Power Dissipation ($T_C=25^\circ C$) (NOTE 3) | 27 | W |
| T_J | Operating Junction Temperature Range | -55 to 150 | $^\circ C$ |
| T_{STG} | Storage Temperature Range | -55 to 150 | $^\circ C$ |
| Marking Code | | NC6P3 | |

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 | --- | 4.6 | $^\circ C/W$ |



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 | 30 | --- | --- | V |
| I _{DSS} | Drain-Source Leakage Current | V _{DS} =24V, V _{GS} =0V, T _J =25°C | --- | --- | 1 | uA |
| | | V _{DS} =24V, V _{GS} =0V, T _J =55°C | --- | --- | 5 | 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 | --- | 5.0 | 6.3 | mΩ |
| | | V _{GS} =4.5V, I _D =15A | --- | 6.9 | 9 | |
| V _{GS(th)} | Gate Threshold Voltage | V _{GS} =V _{DS} , I _D =250uA | 1.2 | --- | 2.5 | V |
| g _{fs} | Forward Transconductance | V _{DS} =5V, I _D =20A | --- | 67 | --- | S |

Dynamic and switching Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---------------------|------------------------------|---|------|------|------|------|
| Q _g | Total Gate Charge | V _{DS} =15V, V _{GS} =4.5V, I _D =15A | --- | 8 | --- | nC |
| Q _{gs} | Gate-Source Charge | | --- | 2.4 | --- | |
| Q _{gd} | Gate-Drain Charge | | --- | 3.2 | --- | |
| T _{d(on)} | Turn-On Delay Time | V _{DD} =15V, V _{GS} =10V, R _G =3.3Ω, I _D =15A | --- | 7.1 | --- | nS |
| T _r | Rise Time | | --- | 40 | --- | |
| T _{d(off)} | Turn-Off Delay Time | | --- | 15 | --- | |
| T _f | Fall Time | | --- | 6 | --- | |
| C _{iss} | Input Capacitance | V _{DS} =15V, V _{GS} =0V, F=1MHz | --- | 814 | --- | pF |
| C _{OSS} | Output Capacitance | | --- | 498 | --- | |
| C _{rss} | Reverse Transfer Capacitance | | --- | 41 | --- | |
| R _g | Gate resistance | V _{GS} =0V, V _{DS} =0V, F=1MHz | --- | 1.7 | --- | 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 | --- | --- | 30 | A |
| V _{SD} | Diode Forward Voltage (NOTE 1) | V _{GS} =0V, I _S =1A, T _J =25°C | --- | --- | 1 | V |
| t _{rr} | Reverse Recovery Time | I _F =20A, di/dt=100A/us, T _J =25°C | --- | 15 | --- | nS |
| Q _{rr} | Reverse Recovery Charge | T _J =25°C | --- | 25 | --- | nC |

NOTES :

1. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
2. The EAS data shows Max. rating. The test condition is V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=24A.
3. The power dissipation is limited by 150°C junction temperature.
4. The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.



Characteristics Curves

FIG.1-Typical Output Characteristics

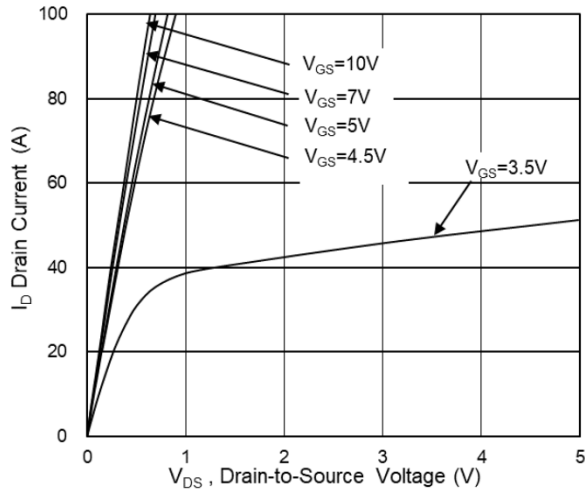


FIG.2-On-Resistance vs. G-S Voltage

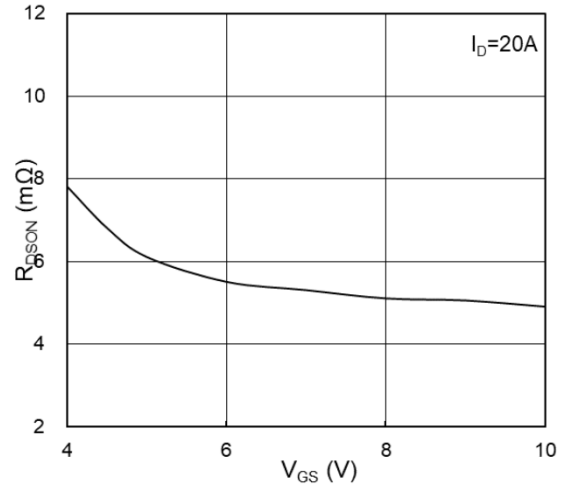


FIG.3-Source Drain Forward Characteristics

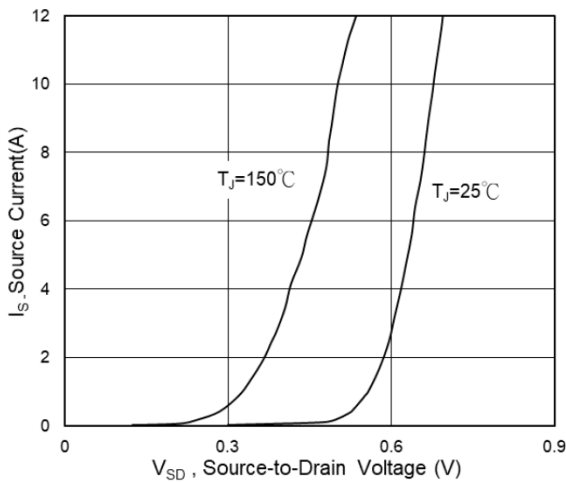


FIG.4-Gate Charge Characteristics

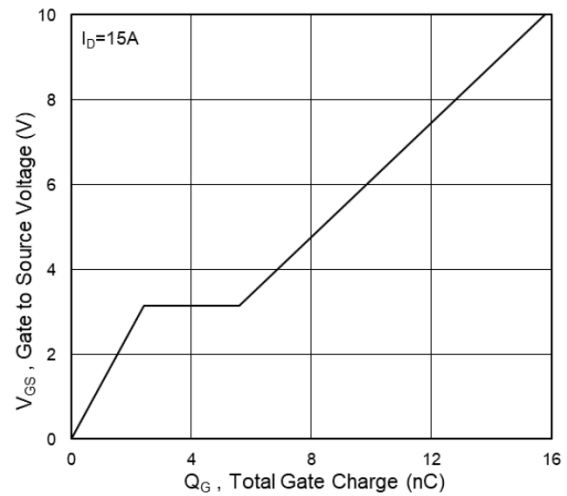


FIG.5-Normalized $V_{GS(th)}$ vs. T_J

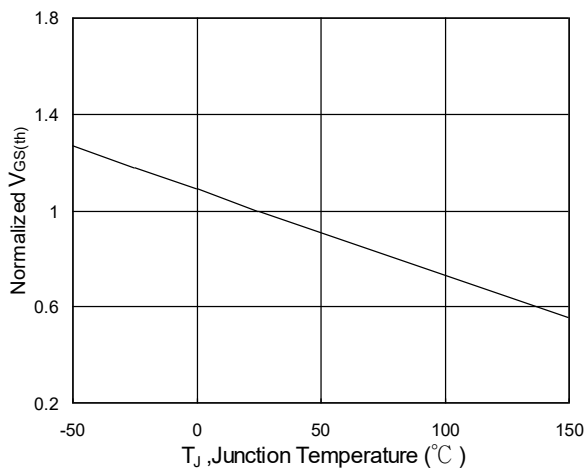
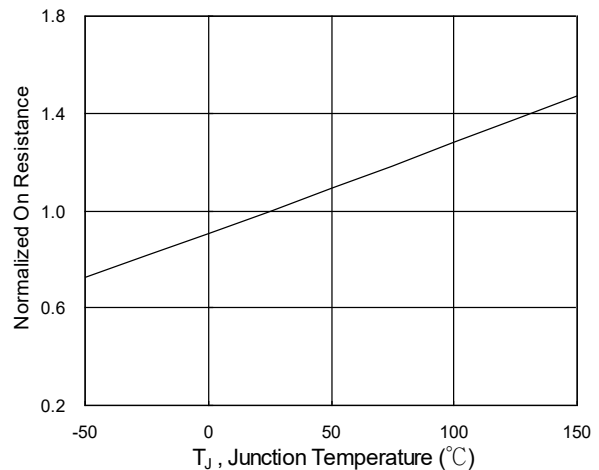


FIG.6-Normalized $R_{DS(on)}$ vs. T_J





Characteristics Curves

FIG.7-Switching Time Waveform

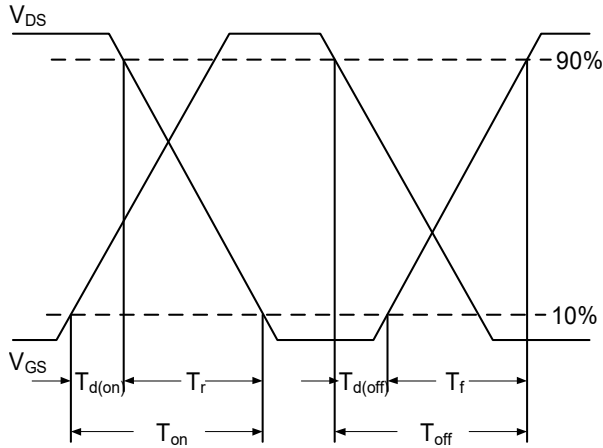
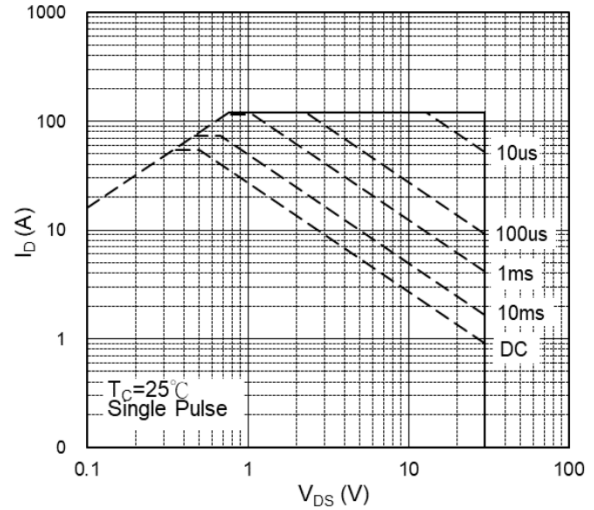
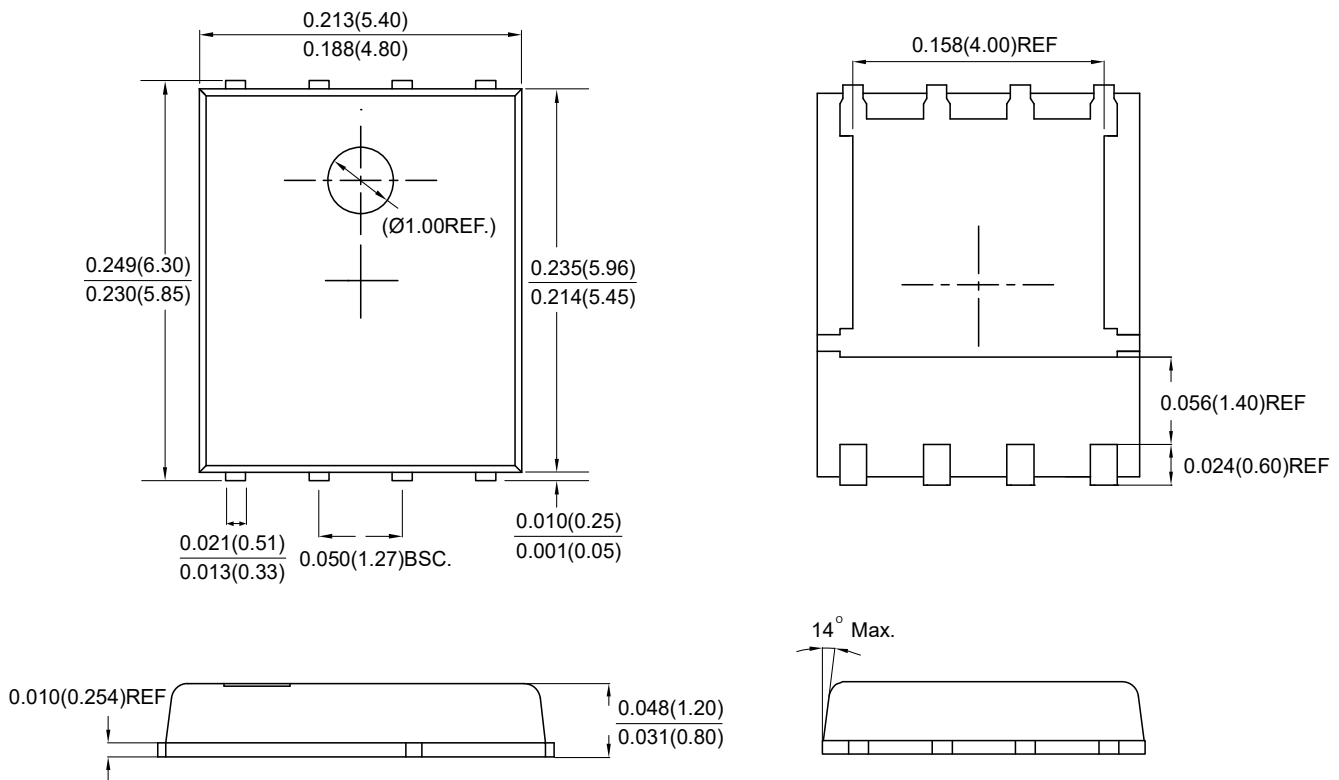


FIG.8-Safe Operating Area



Package Outline Dimensions



PPAK5X6

Dimensions in inches and (millimeters)



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