

## -30V<sub>DS</sub>/±20V<sub>GS</sub> P-Channel Enhancement Mode MOSFET

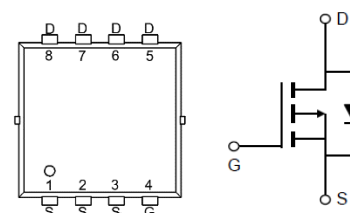
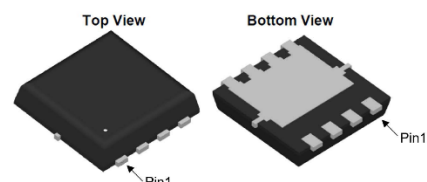
### Features

- V<sub>DS</sub>=-30V, I<sub>D</sub>=-80A
- R<sub>DS(ON)</sub>=9mΩ (TYP.) V<sub>GS</sub>=-10V
- R<sub>DS(ON)</sub>=14mΩ (TYP.) V<sub>GS</sub>=-4.5V
- Fast Switching
- Low On-Resistance

### Applications

- Switch switching
- Power management in portable/desktop PCs

### PDFN5060



### Ordering Information

| Device   | package  | Device Marking | Package Qty. |
|----------|----------|----------------|--------------|
| HAN80P03 | PDFN5060 | N80P03         | 5000/PCS     |

### Absolute Maximum Ratings (T<sub>C</sub>=25°C, unless otherwise noted)

| Parameter                                         | Symbol                            | Value   | Unit |
|---------------------------------------------------|-----------------------------------|---------|------|
| Drain-Source Voltage (V <sub>GS</sub> =0V)        | V <sub>DS</sub>                   | -30     | V    |
| Gate-Source Voltage (V <sub>GS</sub> =0V, static) | V <sub>GS</sub>                   | ±20     | V    |
| Continuous Drain Current (T <sub>C</sub> =25°C)   | I <sub>D</sub>                    | -80     | A    |
| Continuous Drain Current (T <sub>C</sub> =100°C)  |                                   | -48     | A    |
| Pulsed Drain Current                              | I <sub>DM</sub>                   | -180    | A    |
| Avalanche Energy, Single Pulsed                   | E <sub>AS</sub>                   | 102     | mJ   |
| Maximum Power Dissipation (T <sub>C</sub> =25°C)  | P <sub>D</sub>                    | 45      | W    |
| Maximum Power Dissipation (T <sub>C</sub> =100°C) |                                   | 23      | W    |
| Operating, Storage Temperature Range              | T <sub>J</sub> , T <sub>STG</sub> | -55~150 | °C   |

### Thermal Characteristics

| Parameter                               | Symbol           | Min. | Typ. | Max. | Unit |
|-----------------------------------------|------------------|------|------|------|------|
| Thermal Resistance, Junction-to-Case    | R <sub>θJC</sub> | -    | 3.8  | -    | °C/W |
| Thermal Resistance, Junction-to-Ambient | R <sub>θJA</sub> | -    | 59   | -    | °C/W |

## Electrical Characteristics

| Parameter                        | Symbol       | Test Conditions                | Min. | Typ. | Max.      | Unit       |
|----------------------------------|--------------|--------------------------------|------|------|-----------|------------|
| Drain-Source Breakdown Voltage   | $BV_{DSS}$   | $V_{GS}=0V, I_D=-250\mu A$     | -30  | -    | -         | V          |
| Zero Gate Voltage Drain Current  | $I_{DSS}$    | $V_{DS}=-30V, V_{GS}=0V$       | -    | -    | -1        | $\mu A$    |
| Gate -Source Leakage Current     | $I_{GSS}$    | $V_{GS}=\pm 20V, V_{DS}=0V$    | -    | -    | $\pm 100$ | nA         |
| Gate Threshold Voltage           | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=-250\mu A$ | -1.0 | -1.3 | -2.4      | V          |
| Drain-Source On-stage Resistance | $R_{DS(on)}$ | $V_{GS}=-10V, I_D=-1A$         | -    | 4.5  | 7         | m $\Omega$ |
|                                  |              | $V_{GS}=-4.5V, I_D=-1A$        | -    | 6    | 10        |            |
|                                  |              | $V_{GS}=-2.5V, I_D=-1A$        | -    | 10   | 20        |            |

## Dynamic Characteristics

| Parameter                    | Symbol       | Test Conditions | Min. | Typ. | Max. | Unit     |
|------------------------------|--------------|-----------------|------|------|------|----------|
| Input capacitance            | $C_{iss}$    | $V_{DS}=-15V$   | -    | 1968 | -    | pF       |
| Output capacitance           | $C_{oss}$    | $V_{GS}=0V$     | -    | 723  | -    |          |
| Reverse transfer capacitance | $C_{rss}$    | $f=1MHz$        | -    | 165  | -    |          |
| Gate Resistance              | $R_g$        | $f=1MHz$        | -    | 6    | -    | $\Omega$ |
| Total Gate Charge            | $Q_g$        | $V_{DS}=-15V$   | -    | 36   | -    | nC       |
| Gate Source Charge           | $Q_{gs}$     | $V_{GS}=-10V$   | -    | 3    | -    |          |
| Gate Drain Charge            | $Q_{gd}$     | $I_D=-15A$      | -    | 9.5  | -    |          |
| Turn-on delay Time           | $t_{d(on)}$  | $V_{GS}=-10V$   | -    | 16   | -    | ns       |
| Rise time                    | $t_r$        | $V_{DS}=-15V$   | -    | 19   | -    |          |
| Turn-off delay Time          | $t_{d(off)}$ | $R_L=1\Omega$   | -    | 70   | -    |          |
| Fall time                    | $t_f$        | $R_G=3\Omega$   | -    | 41   | -    |          |

## Reverse Diode Characteristics

| Parameter                  | Symbol   | Test Conditions          | Min. | Typ.  | Max. | Unit |
|----------------------------|----------|--------------------------|------|-------|------|------|
| Body Diode Forward Voltage | $V_{SD}$ | $V_{GS}=0V, I_{SD}=-1A$  | -    | -0.75 | -1   | V    |
| Reverse Recovery Time      | $t_{rr}$ | $V_{GS}=0V, I_{SD}=-15A$ | -    | 39    | -    | ns   |
| Reverse Recovery Charge    | $Q_{rr}$ | $d_i/d_t=100A/\mu s$     | -    | 26    | -    | nC   |

# Electrical Characteristics Diagrames

Figure 1. On-Regin Characteristics

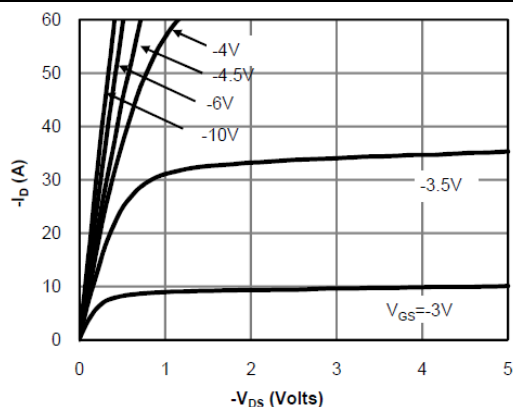


Figure 2. Transfer Characteristics

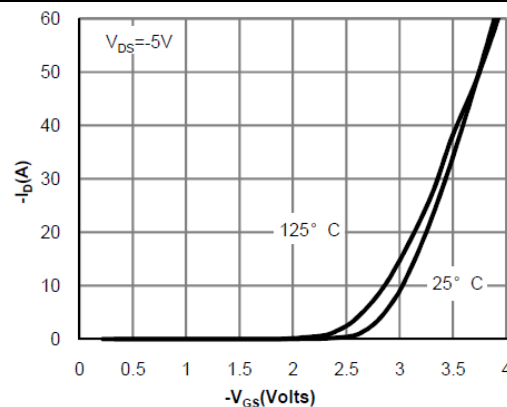


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

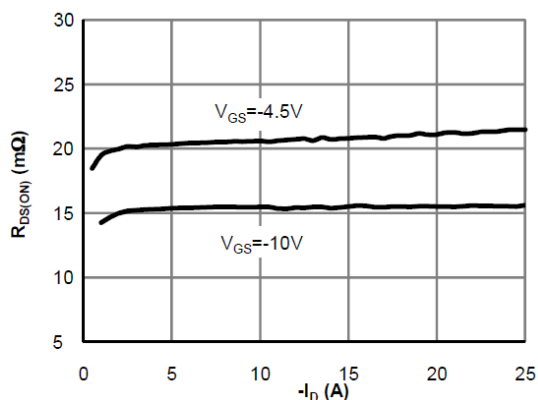


Figure 4. On-Resistance vs. Junction Temperature

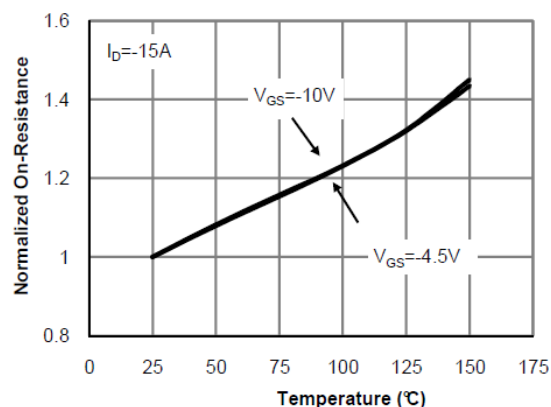


Figure 5. On-Resistance vs. Gate-Source Voltage

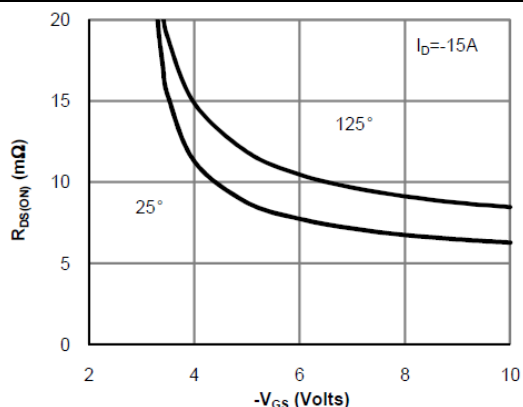
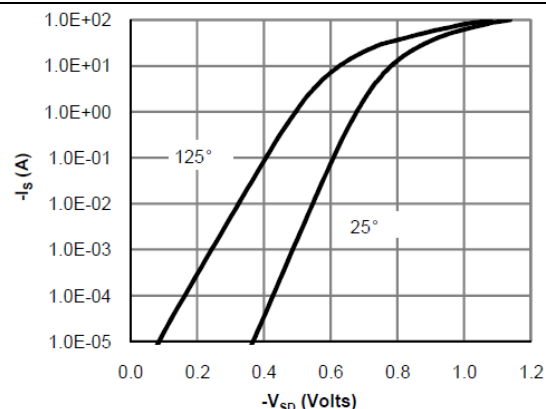
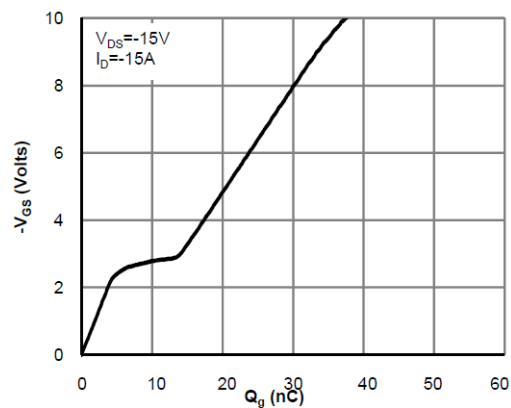


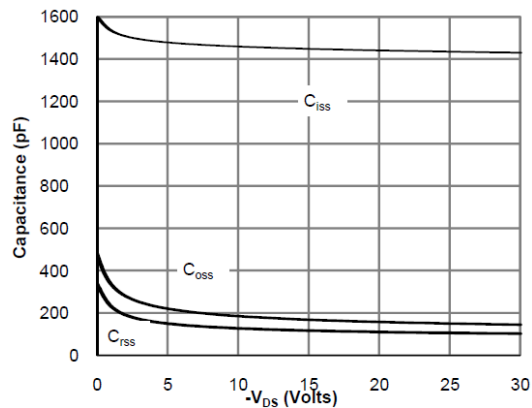
Figure 6. Body-Diode Characteristics



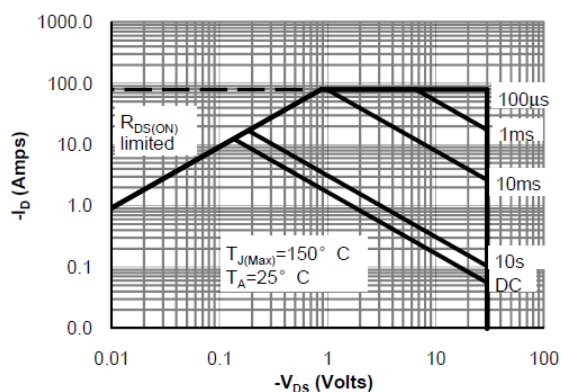
**Figure 7. Gate-Charge Characteristics**



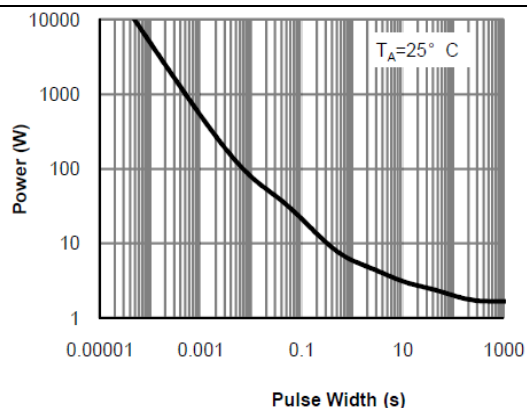
**Figure 8. Capacitance Characteristics**



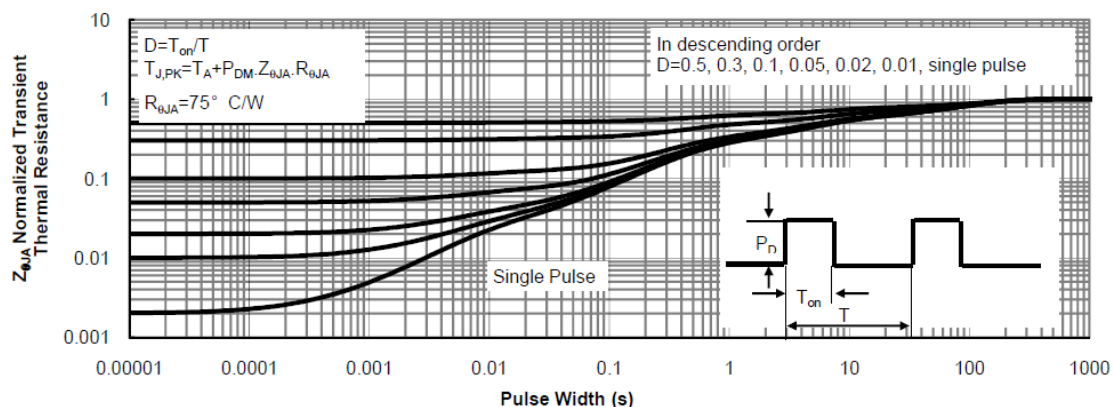
**Figure 9. Maximum Forward Biased Safe Operating Area**



**Figure 10. Single Pulse Power Rating Junction-to-Ambient**

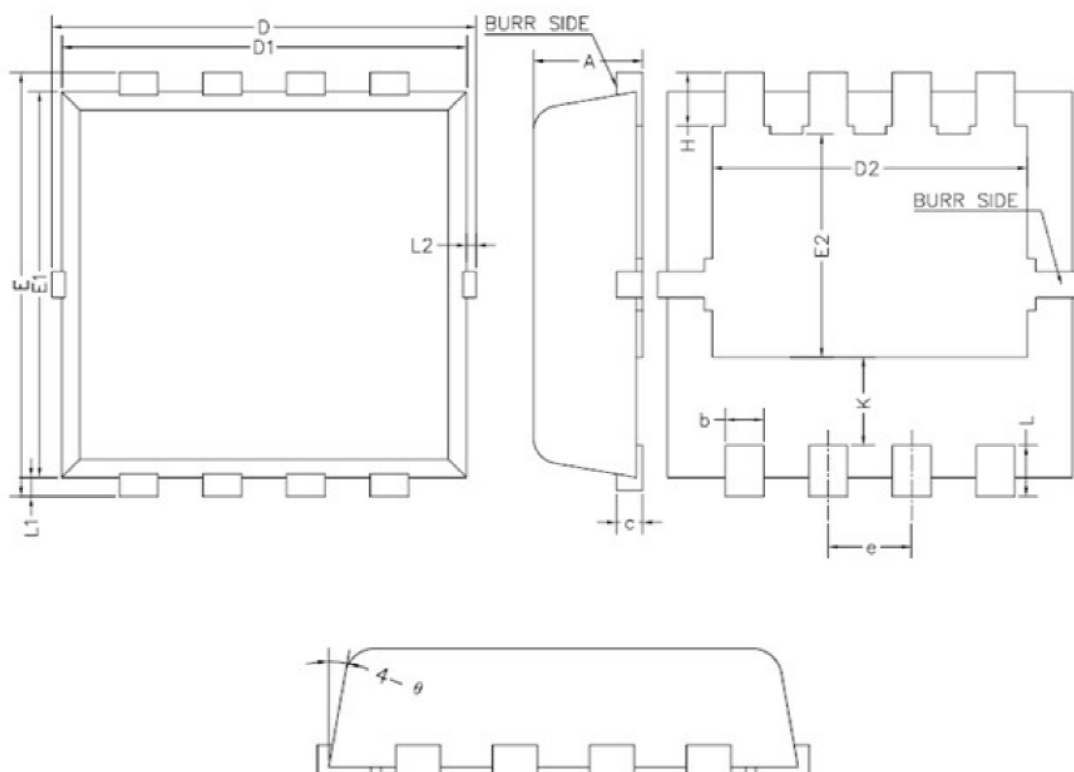


**Figure 11. Normalized Maximum Transient Thermal Impedance**



## Physical Dimensions

### PDFN5060



| 符号 | 尺寸 (mm) |      |      | 符号 | 尺寸 (mm) |      |      |
|----|---------|------|------|----|---------|------|------|
|    | 最小值     | 典型值  | 最大值  |    | 最小值     | 典型值  | 最大值  |
| A  | 0.90    | 1.00 | 1.10 | E1 | 5.70    | 5.75 | 5.80 |
| b  | 0.33    | 0.41 | 0.51 | E2 | 3.38    | 3.58 | 3.78 |
| c  | 0.20    | 0.25 | 0.30 | H  | 0.41    | 0.51 | 0.61 |
| D  | 4.80    | 4.90 | 5.00 | K  | 1.10    | -    | -    |
| D1 | 3.61    | 3.81 | 3.96 | L  | 0.51    | 0.61 | 0.71 |
| e  | 1.27BSC |      |      | L1 | 0.06    | 0.13 | 0.20 |
| E  | 5.90    | 6.00 | 6.10 | θ  | 0°      | -    | 12°  |

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