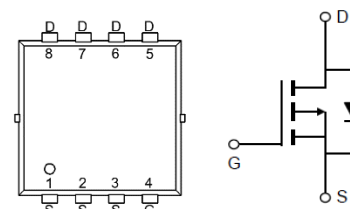
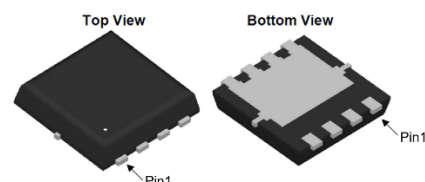


## -30V<sub>DS</sub>/±20V<sub>GS</sub> P-Channel Enhancement Mode MOSFET

### Features

- $V_{DS}=-30V, I_D=-45A$
- $R_{DS(ON)}=11m\Omega$  (TYP.)  $V_{GS}=-10V$
- $R_{DS(ON)}=22m\Omega$  (TYP.)  $V_{GS}=-4.5V$
- Fast Switching
- Low On-Resistance

### PDFN3333



### Applications

- Switch switching
- Power management in portable/desktop PCs

### Ordering Information

| Device    | package  | Device Marking | Package Qty. |
|-----------|----------|----------------|--------------|
| HTM200P03 | PDFN3333 | TM200P03       | 5000/PCS     |

### Absolute Maximum Ratings ( $T_C=25^{\circ}C$ , unless otherwise noted)

| Parameter                                        | Symbol         | Value   | Unit        |
|--------------------------------------------------|----------------|---------|-------------|
| Drain-Source Voltage ( $V_{GS}=0V$ )             | $V_{DS}$       | -30     | V           |
| Gate-Source Voltage ( $V_{GS}=0V$ , static)      | $V_{GS}$       | ±20     | V           |
| Continuous Drain Current ( $T_C=25^{\circ}C$ )   | $I_D$          | -35     | A           |
| Continuous Drain Current ( $T_C=100^{\circ}C$ )  |                | -20     | A           |
| Pulsed Drain Current                             | $I_{DM}$       | -120    | A           |
| Avalanche Energy, Single Pulsed                  | $E_{AS}$       | 102     | mJ          |
| Maximum Power Dissipation ( $T_C=25^{\circ}C$ )  | $P_D$          | 35      | W           |
| Maximum Power Dissipation ( $T_C=100^{\circ}C$ ) |                | 16      | W           |
| Operating, Storage Temperature Range             | $T_J, T_{STG}$ | -55~150 | $^{\circ}C$ |

### Thermal Characteristics

| Parameter                               | Symbol          | Min. | Typ. | Max. | Unit          |
|-----------------------------------------|-----------------|------|------|------|---------------|
| Thermal Resistance, Junction-to-Case    | $R_{\theta JC}$ | -    | 3.8  | -    | $^{\circ}C/W$ |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | -    | 59   | -    | $^{\circ}C/W$ |

## 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           | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=-250\mu A$ | -0.5 | -0.8 | -1.1      | V          |
| Drain-Source On-stage Resistance | $R_{DS(on)}$ | $V_{GS}=-10V, I_D=-1A$         | -    | 10   | 14        | m $\Omega$ |
|                                  |              | $V_{GS}=-4.5V, I_D=-1A$        | -    | 14   | 22        |            |
|                                  |              | $V_{GS}=-2.5V, I_D=-1A$        | -    | 22   | 36        |            |

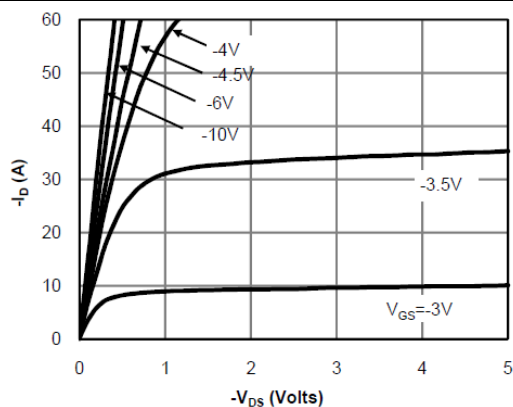
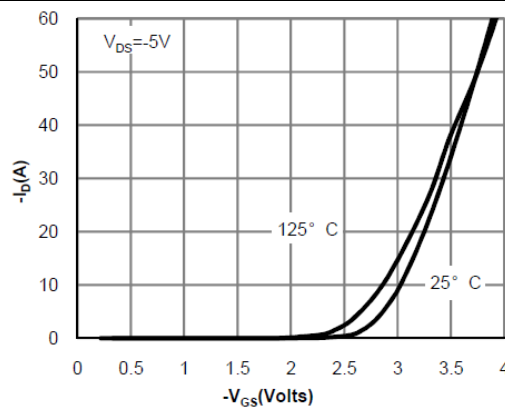
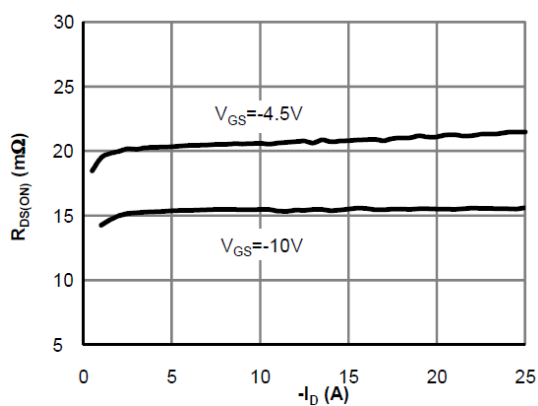
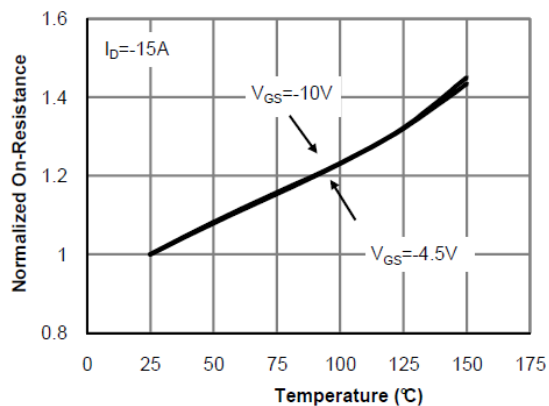
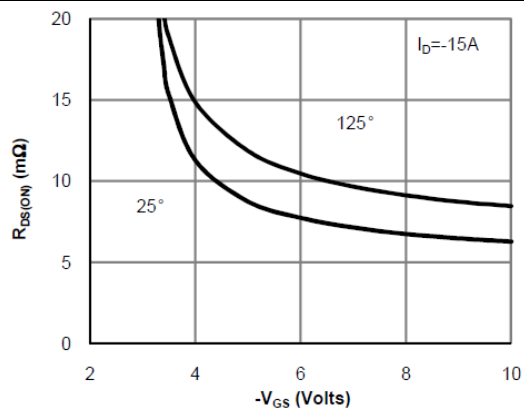
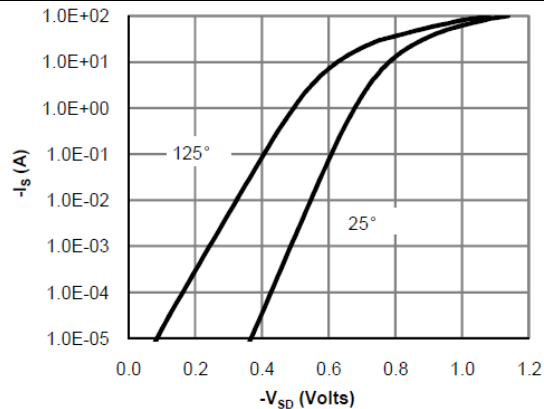
## Dynamic Characteristics

| Parameter                    | Symbol       | Test Conditions | Min. | Typ. | Max. | Unit     |
|------------------------------|--------------|-----------------|------|------|------|----------|
| Input capacitance            | $C_{iss}$    | $V_{DS}=-15V$   | -    | 5270 | -    | pF       |
| Output capacitance           | $C_{oss}$    | $V_{GS}=0V$     | -    | 945  | -    |          |
| Reverse transfer capacitance | $C_{rss}$    | $f=1MHz$        | -    | 745  | -    |          |
| 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   | -    |          |

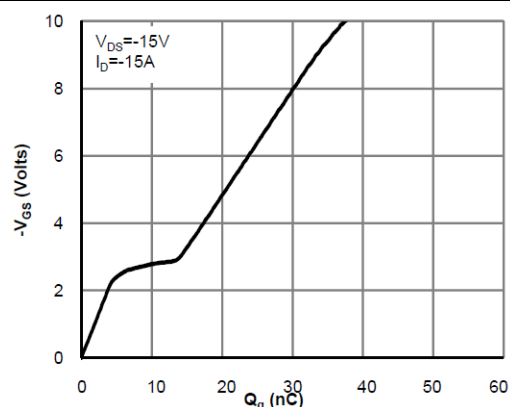
## Reverse Diode Characteristics

| 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   |

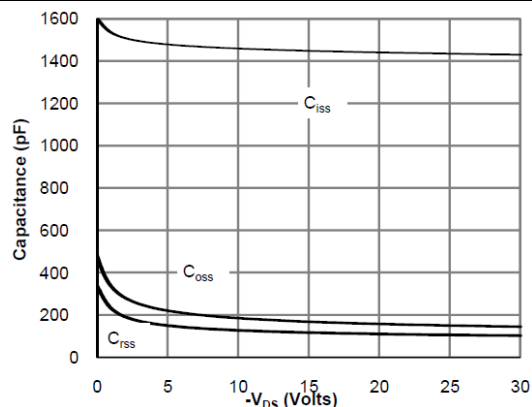
# Electrical Characteristics Diagrames

**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**


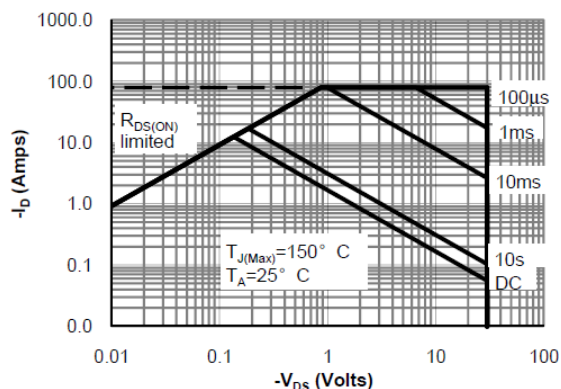
**Figure 7. Gate-Charge Characteristics**



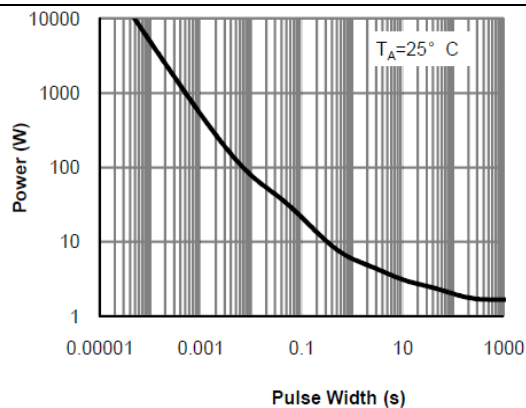
**Figure 8. Capacitance Characteristics**



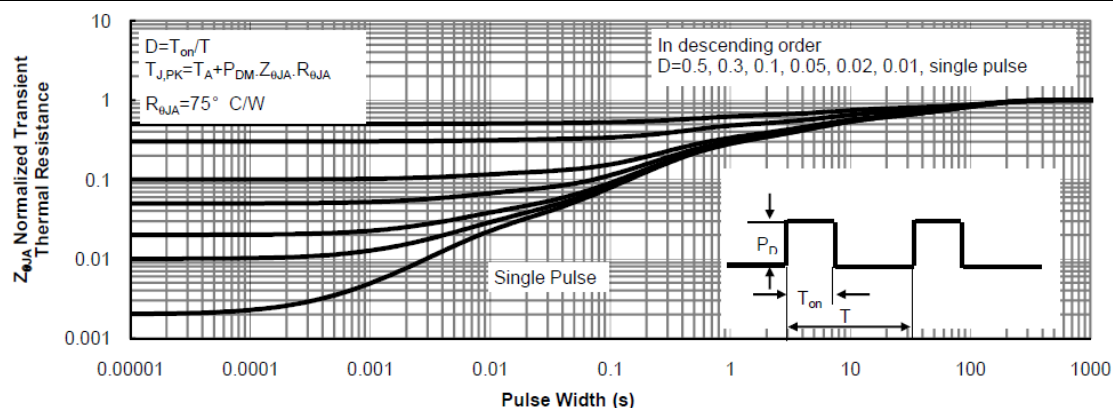
**Figure 9. Maximum Forward Biased Safe Operating Area**



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

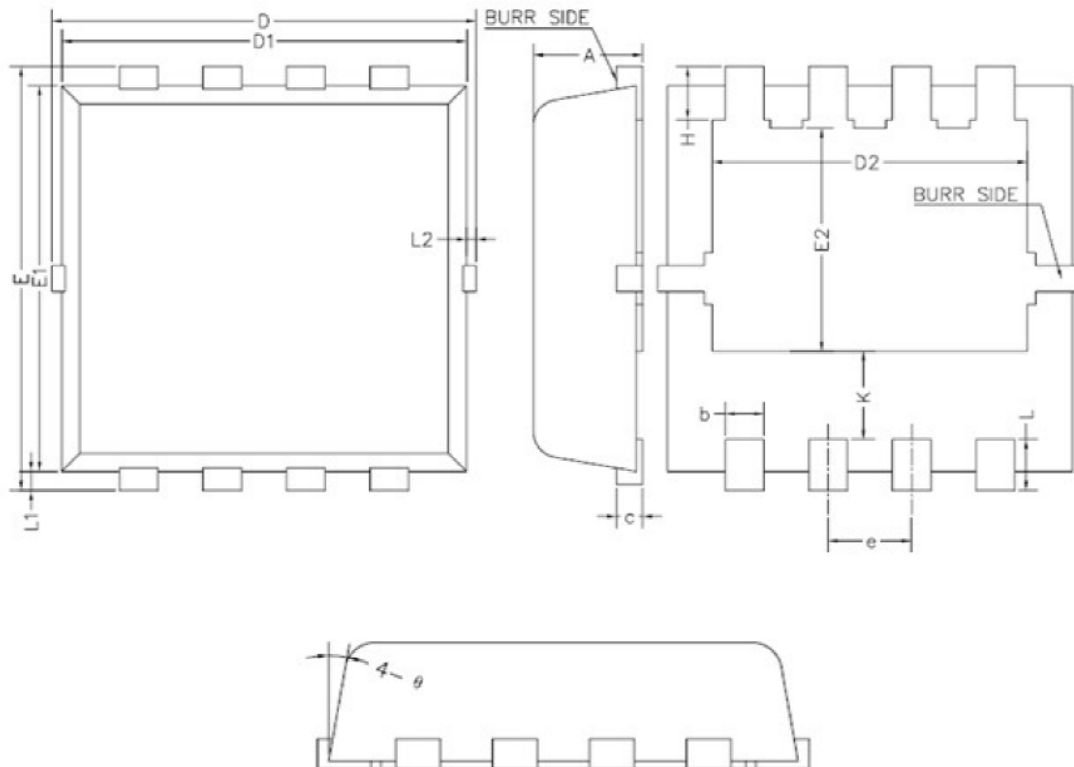


**Figure 11. Normalized Maximum Transient Thermal Impedance**



## Physical Dimensions

### PDFN3333



| 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  | 0.70    | 0.80 | 0.90 | E1 | 2.90    | 3.00 | 3.10 |
| b  | 0.25    | 0.30 | 0.35 | E2 | 1.64    | 1.74 | 1.84 |
| c  | 0.14    | 0.15 | 0.20 | H  | 0.32    | 0.42 | 0.52 |
| D  | 3.10    | 3.30 | 3.50 | K  | 0.59    | 0.69 | 0.79 |
| D1 | 3.05    | 3.15 | 3.25 | L  | 0.25    | 0.40 | 0.55 |
| D2 | 2.35    | 2.45 | 2.55 | L1 | 0.10    | 0.15 | 0.20 |
| e  | 0.55    | 0.65 | 0.75 | L2 | -       | -    | 0.15 |
| E  | 3.10    | 3.30 | 3.50 | θ  | 8°      | 10°  | 12°  |

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