# 20V P-Ch Power MOSFET

## Feature

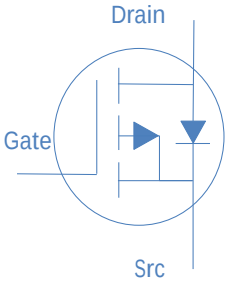
- High Speed Power Switching, Logic Level
- Enhanced Avalanche Ruggedness
- 100% UIS Tested, 100% Rg Tested
- Lead Free, Halogen Free

| | | | |
|---|---|---|---|
| $V_{DS}$ | | -20 | V |
| $R_{DS(on),typ}$ | $V_{GS}$=-10V | 2.4 | mΩ |
| $R_{DS(on),typ}$ | $V_{GS}$=-4.5V | 2.7 | mΩ |
| $R_{DS(on),typ}$ | $V_{GS}$=-2.5V | 3.4 | mΩ |
| $I_{D\ (Sillicon\ Limited)}$ | | -100 | A |

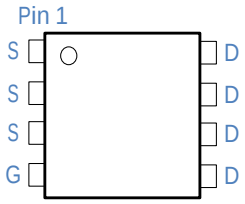
## Application

- Hard Switching and High Speed Circuit
- DC/DC in Telecoms and Inductrial

DFN5*6




| Part Number | Package | Marking |
|---|---|---|
| HTN027P02 | DFN5*6 | TN027P02 |




## Absolute Maximum Ratings at $T_j$=25 (unless otherwise specified)

| Parameter | Symbol | Conditions | Value | Unit |
|---|---|---|---|---|
| Continuous Drain Current (Silicon Limited) | $I_D$ | $T_C$=25 | -100 | A |
| | | $T_C$=100 | -73 | |
| Drain to Source Voltage | $V_{DS}$ | - | -20 | V |
| Gate to Source Voltage | $V_{GS}$ | - | ±12 | V |
| Pulsed Drain Current | $I_{DM}$ | - | -400 | A |
| Avalanche Energy, Single Pulse | $E_{AS}$ | L=0.1mH, $T_C$=25 | 500 | mJ |
| Power Dissipation | $P_D$ | $T_A$=25 | 69 | W |
| Operating and Storage Temperature | $T_J$, $T_{stg}$ | - | -55 to150 | |

## Absolute Maximum Ratings

| Parameter | Symbol | Max | Unit |
|---|---|---|---|
| Thermal Resistance Junction-Ambient | $R_{\theta JA}$ | 50 | /W |
| Thermal Resistance Junction-Case | $R_{\theta JC}$ | 1.8 | /W |

## Electrical Characteristics at $T_j$=25 (unless otherwise specified)

### Static Characteristics

| Parameter | Symbol | Conditions | Value min | Value typ | Value max | Unit |
|---|---|---|---|---|---|---|
| Drain to Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$=0V, $I_D$=-250μA | -20 | - | - | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{GS}$=$V_{DS}$, $I_D$=-250μA | -0.4 | -0.60 | -1.2 | |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{GS}$=0V, $V_{DS}$=-16V, $T_j$=25 | - | - | -1 | μA |
| | | $V_{GS}$=0V, $V_{DS}$=-12V, $T_j$=125 | - | - | -10 | |
| Gate to Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±12V, $V_{DS}$=0V | - | - | ±100 | nA |
| Drain to Source on Resistance | $R_{DS(on)}$ | $V_{GS}$=-10V, $I_D$=-20A | - | 2.4 | 2.7 | mΩ |
| | | $V_{GS}$=-4.5V, $I_D$=-20A | - | 2.7 | 3.2 | |
| | | $V_{GS}$=-2.5V, $I_D$=-20A | - | 3.4 | 4.1 | |
| Transconductance | $g_{fs}$ | $V_{DS}$=-5V, $I_D$=-20A | - | 65 | - | S |
| Gate Resistance | $R_G$ | $V_{GS}$=15mV, $V_{DS}$ =0V, f=1MHz | - | 3.0 | - | Ω |

### Dynamic Characteristics

| | | | | | | |
|---|---|---|---|---|---|---|
| Input Capacitance | $C_{iss}$ | $V_{GS}$=0V, $V_{DS}$=-10V, f=1MHz | - | 11116 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 1303 | - | |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 592 | - | |
| Total Gate Charge | $Q_g$ (10V) | $V_{DD}$=-10V, $I_D$=-20A, $V_{GS}$=-10V | - | 202 | - | nC |
| | $Q_g$ (4.5V) | | - | 87 | - | |
| Gate to Source Charge | $Q_{gs}$ | | - | 18.0 | - | |
| Gate to Drain (Miller) Charge | $Q_{gd}$ | | - | 16 | - | |
| Turn on Delay Time | $t_{d(on)}$ | $V_{DD}$=-10V, $I_D$=-1A, $V_{GS}$=-10V, $R_G$=3Ω, | - | 20 | - | ns |
| Rise time | $t_r$ | | - | 55 | - | |
| Turn off Delay Time | $t_{d(off)}$ | | - | 270 | - | |
| Fall Time | $t_f$ | | - | 100 | - | |

### Reverse Diode Characteristics

| | | | | | | |
|---|---|---|---|---|---|---|
| Diode Forward Voltage | $V_{SD}$ | $V_{GS}$=0V, $I_F$=-200A | - | | -1.2 | V |
| Reverse Recovery Time | $t_{rr}$ | $I_F$=-20A,$dI_F$/dt = 100A /μS | - | 50 | - | nS |
| Reverse Recovery Charge | $Q_{RR}$ | | - | 180 | - | nC |

Fig 1. Typical Output Characteristics

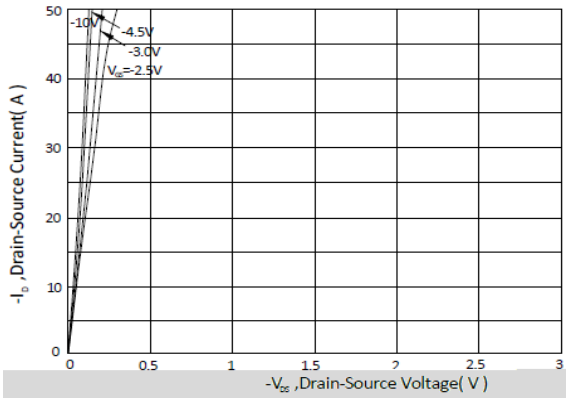



Figure 2. On-Resistance vs. Gate-Source Voltage

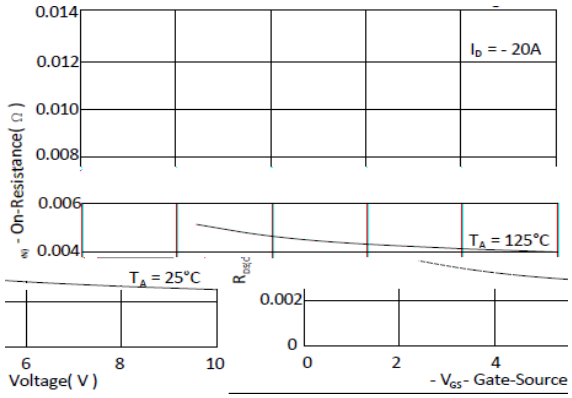



Figure 3. On-Resistance vs. Drain Current and Gate Voltage

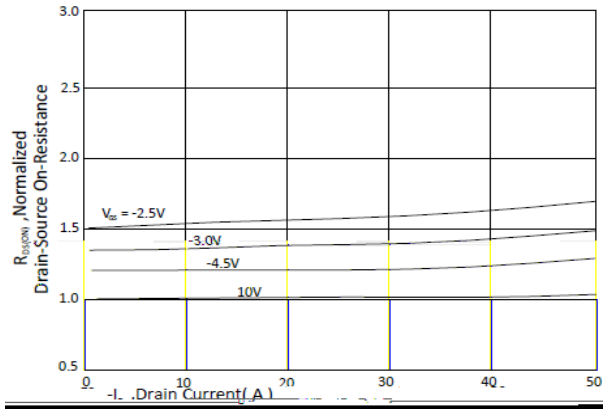



Figure 4. Normalized On-Resistance vs. Junction Temperature

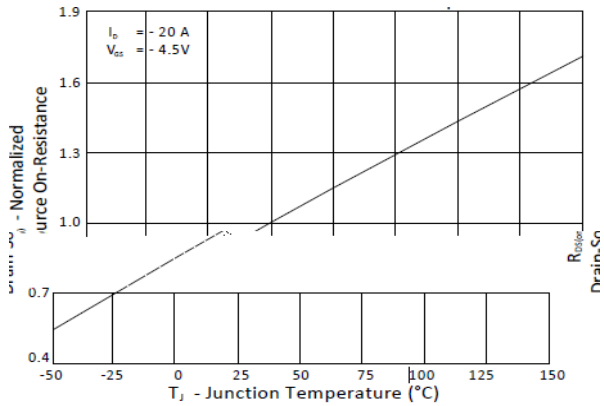



Figure 5. Typical Transfer Characteristics

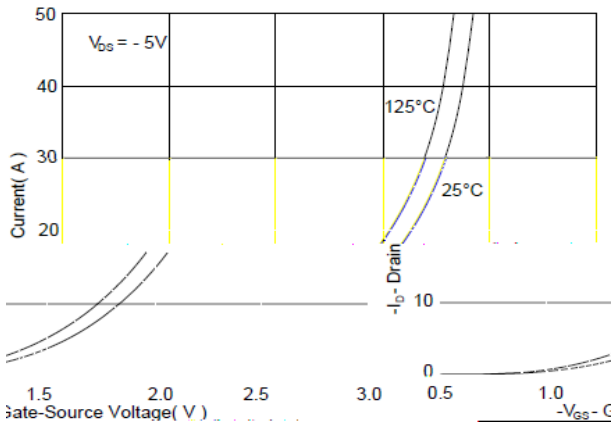
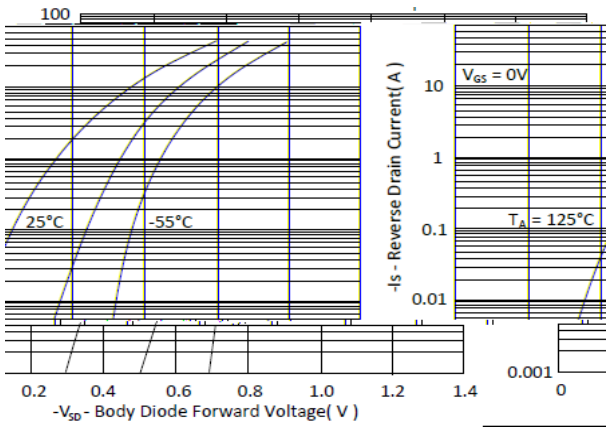
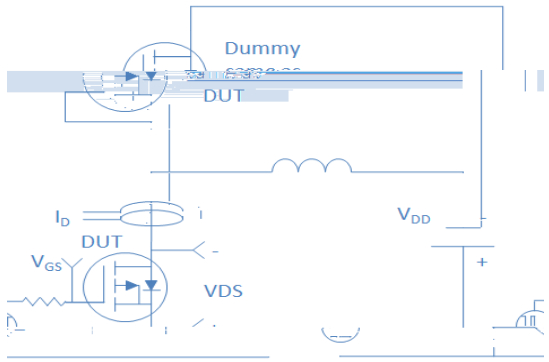
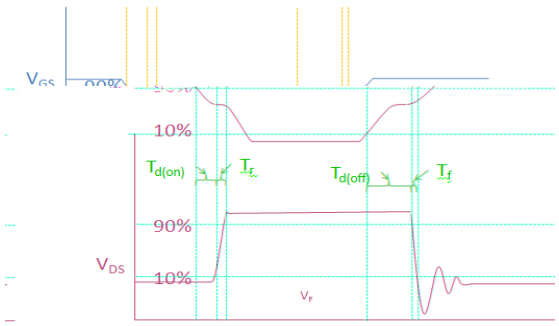



Figure 6. Typical Source-Drain Diode Forward Voltage

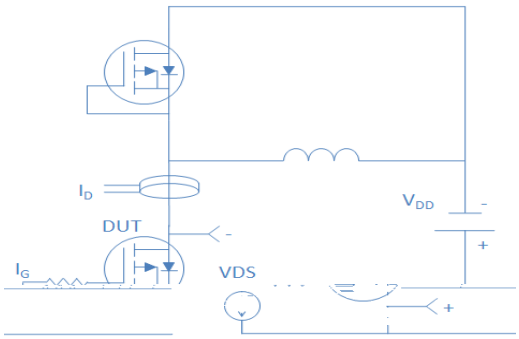


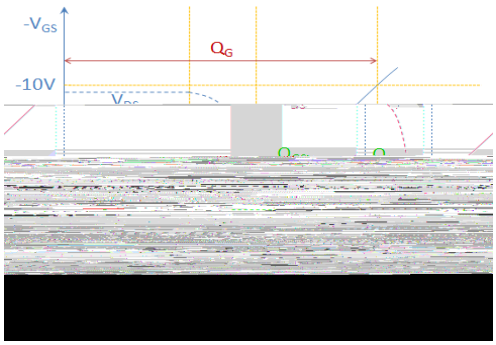
## Inductive switching Test



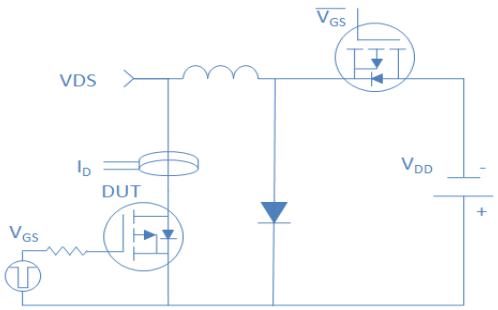



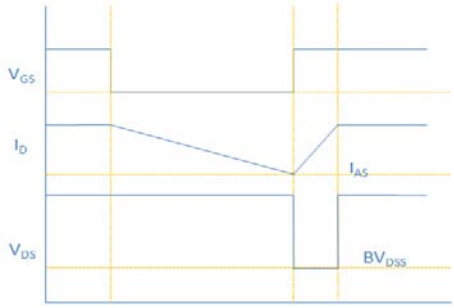

## Gate Charge Test



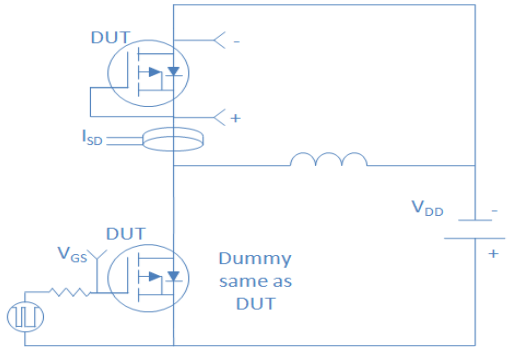



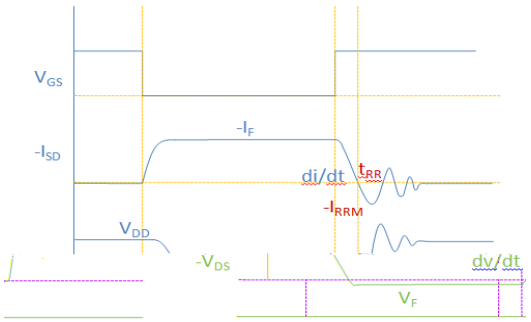

## Uclamped Inductive Switching (UIS) Test



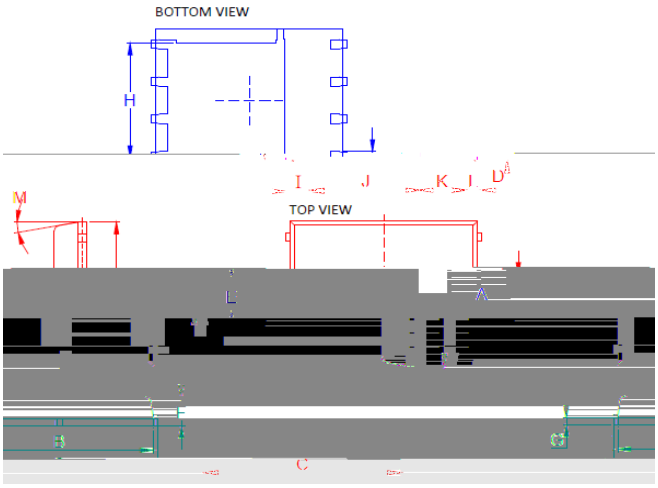

## Diode Recovery Test



Package Outline

## DFN5*6, 8leads




Dimension in mm

| Dimension | A | B | C | D | E | F | G | H | I | J | K | L | M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Min. | 4.80 | 5.50 | 5.90 | 0.3 | | 0.85 | 0.15 | 3.67 | 0.41 | 3.00 | 0.94 | 0.45 | 0° |
| Typ. | | | | | 1.27 | | | | | | | | |