



UF5305

Preliminary

POWER MOSFET

-31A, -55V P-CHANNEL POWER MOSFET

DESCRIPTION

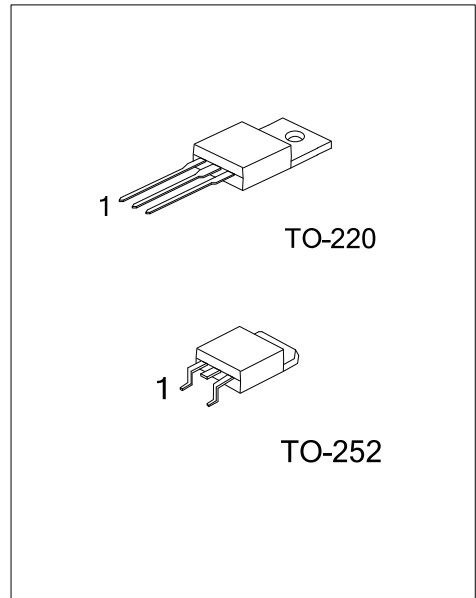
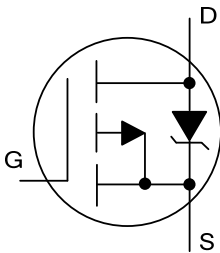
The UTC **UF5305** is a P-channel Power MOSFET, it uses UTC's advanced technology to provide the customers with high switching speed and a minimum on-state resistance.

The UTC **UF5305** is suitable for all commercial-industrial applications, etc.

FEATURES

- * $R_{DS(ON)} < 0.06\Omega$ @ $V_{GS} = -10V, I_D = -16A$
- * High Switching Speed
- * Dynamic dv/dt Rating

SYMBOL



ORDERING INFORMATION

| Ordering Number | | Package | Pin Assignment | | | Packing |
|-----------------|---------------|---------|----------------|---|---|-----------|
| Lead Free | Halogen Free | | 1 | 2 | 3 | |
| UF5305L-TA3-T | UF5305G-TA3-T | TO-220 | G | D | S | Tube |
| UF5305L-TN3-T | UF5305G-TN3-T | TO-252 | G | D | S | Tube |
| UF5305L-TN3-R | UF5305G-TN3-R | TO-252 | G | D | S | Tape Reel |

Note: Pin Assignment: G: Gate D: Drain S: Source

| | |
|--|--|
| <p>UF5305L-TA3-T</p> <ul style="list-style-type: none"> (1) Packing Type (2) Package Type (3) Lead Free | <ul style="list-style-type: none"> (1) T: Tube, R: Tape Reel (2) TA3: TO-220, TN3: TO-252 (3) L: Lead Free, G: Halogen Free |
|--|--|

■ ABSOLUTE MAXIMUM RATING

| PARAMETER | | SYMBOL | RATINGS | UNIT | |
|--|-----------------------|-----------|--------------------------------|---------------|---|
| Drain-Source Voltage | | V_{DSS} | -55 | V | |
| Gate-Source Voltage | | V_{GSS} | ± 20 | V | |
| Drain Current | Continuous | I_D | $V_{GS}=-10V, T_C=25^\circ C$ | -31 | A |
| | | | $V_{GS}=-10V, T_C=100^\circ C$ | -22 | A |
| | Pulsed (Note 2) | | I_{DM} | -110 | A |
| Avalanche Current (Note 2) | | I_{AR} | -16 | A | |
| Avalanche Energy | Single Pulse (Note 3) | E_{AS} | 280 | mJ | |
| | Repetitive (Note 2) | E_{AR} | 11 | mJ | |
| Peak Diode Recovery dv/dt (Note 4) | | dv/dt | -5.0 | V/ns | |
| Power Dissipation ($T_C=25^\circ C$) | | P_D | 110 | W | |
| Linear Derating Factor | | | 0.71 | W/ $^\circ C$ | |
| Junction Temperature | | T_J | -55~+150 | $^\circ C$ | |
| Storage Temperature Range | | T_{STG} | -55~+150 | $^\circ C$ | |

Note: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Repetitive rating; pulse width limited by max. junction temperature.

3. $V_{DD}=-25V$, Starting $T_J=25^\circ C$, $L=2.1mH$, $R_G=25\Omega$, $I_{AS}=-16A$.

4. $I_{SD}\leq -16A$, $di/dt\leq 280A/\mu s$, $V_{DD}\leq BV_{DSS}$, $T_J\leq 150^\circ C$

■ THERMAL RESISTANCE

| PARAMETER | SYMBOL | RATINGS | UNIT |
|---------------------|---------------|---------|--------------|
| Junction to Ambient | θ_{JA} | 62 | $^\circ C/W$ |
| Junction to Case | θ_{JC} | 1.4 | $^\circ C/W$ |

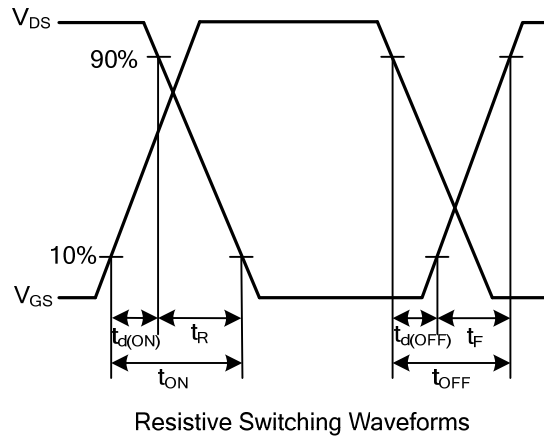
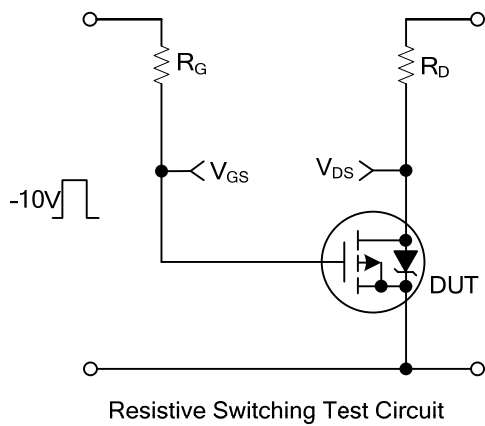
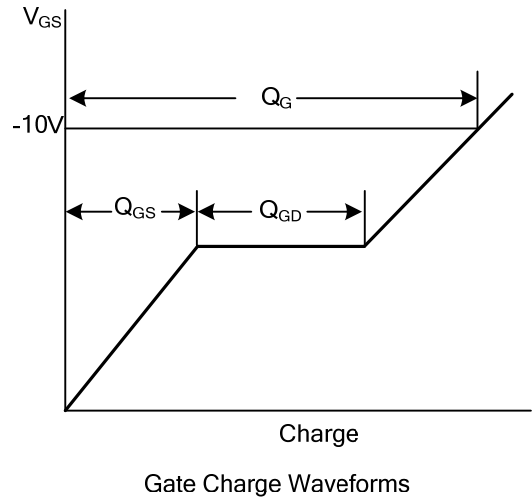
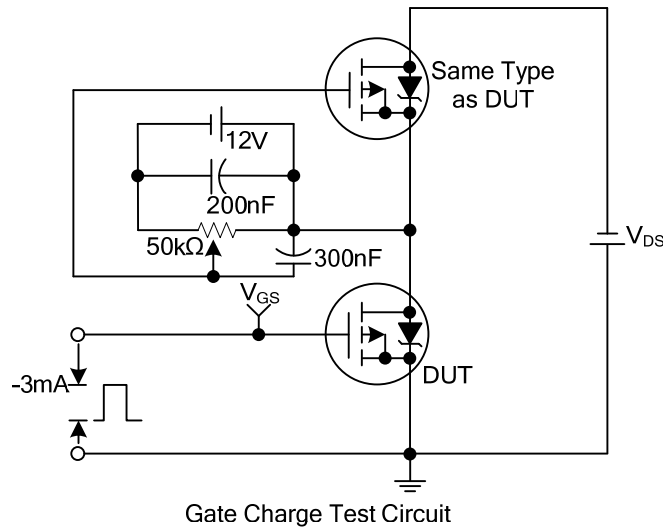
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--|-------------------------------------|--|------|--------|------|------|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} =0V, I _D =-250μA | -55 | | | V |
| Breakdown Voltage Temperature Coefficient | ΔBV _{DSS} /ΔT _J | Reference to 25°C, I _D =-1mA | | -0.034 | | V/°C |
| Drain-Source Leakage Current | I _{DSS} | V _{DS} =-55V, V _{GS} =0V | | | -25 | μA |
| | | V _{DS} =-44V, V _{GS} =0V, T _J =150°C | | | -250 | μA |
| Gate-Source Leakage Current | Forward | V _{GS} =20V, V _{DS} =0V | | | 100 | nA |
| | Reverse | V _{GS} =-20V, V _{DS} =0V | | | -100 | nA |
| ON CHARACTERISTICS | | | | | | |
| Static Drain-Source On-Resistance | R _{DS(ON)} | V _{GS} =-10V, I _D =-16A (Note 2) | | | 0.06 | Ω |
| Gate Threshold Voltage | V _{GS(TH)} | V _{DS} =V _{GS} , I _D =-250μA | -2.0 | | -4.0 | V |
| DYNAMIC PARAMETERS | | | | | | |
| Input Capacitance | C _{ISS} | V _{GS} =0V, V _{DS} =-25V, f=1.0MHz | | 1200 | | pF |
| Output Capacitance | C _{OSS} | | | 520 | | pF |
| Reverse Transfer Capacitance | C _{RSS} | | | 250 | | pF |
| SWITCHING PARAMETERS | | | | | | |
| Total Gate Charge | Q _G | I _D =-16A, V _{DS} =-44V, V _{GS} =-10V (Note 2) | | | 63 | nC |
| Gate-to-Source Charge | Q _{GS} | | | | 13 | nC |
| Gate-to-Drain ("Miller") Charge | Q _{GD} | | | | 29 | nC |
| Turn-ON Delay Time | t _{D(ON)} | V _{DD} =-28V, I _D =-16A, R _G =6.8Ω R _D =1.6Ω (Note 2) | | 14 | | ns |
| Rise Time | t _R | | | 66 | | ns |
| Turn-OFF Delay Time | t _{D(OFF)} | | | 39 | | ns |
| Fall Time | t _F | | | 63 | | ns |
| SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS | | | | | | |
| Maximum Body Diode Continuous Source Current | I _S | | | | -31 | A |
| Maximum Body-Diode Pulsed Current (Note 1) | I _{SM} | | | | -110 | A |
| Drain-Source Diode Forward Voltage | V _{SD} | T _J =25°C, I _S =-16A, V _{GS} =0V (Note 2) | | | -1.4 | V |
| Body Diode Reverse Recovery Time | t _{RR} | T _J =25°C, I _F =-16A, | | 71 | 110 | ns |
| Body Diode Reverse Recovery Charge | Q _{RR} | di/dt=-100A/μs (Note 2) | | 170 | 250 | nC |

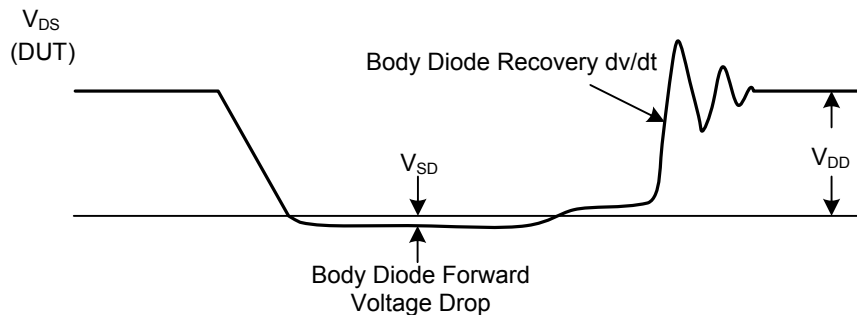
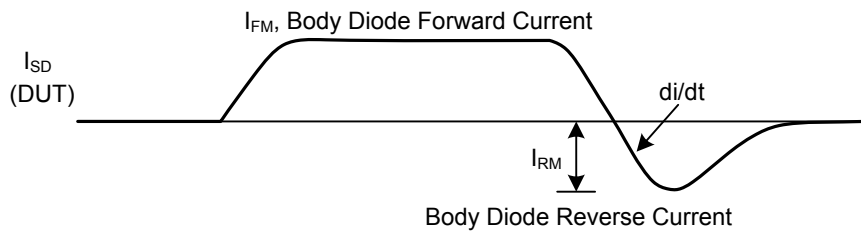
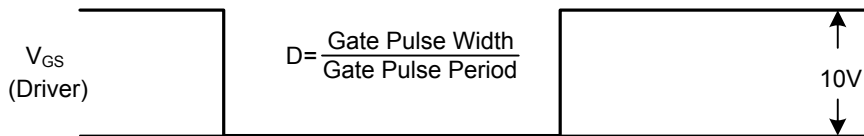
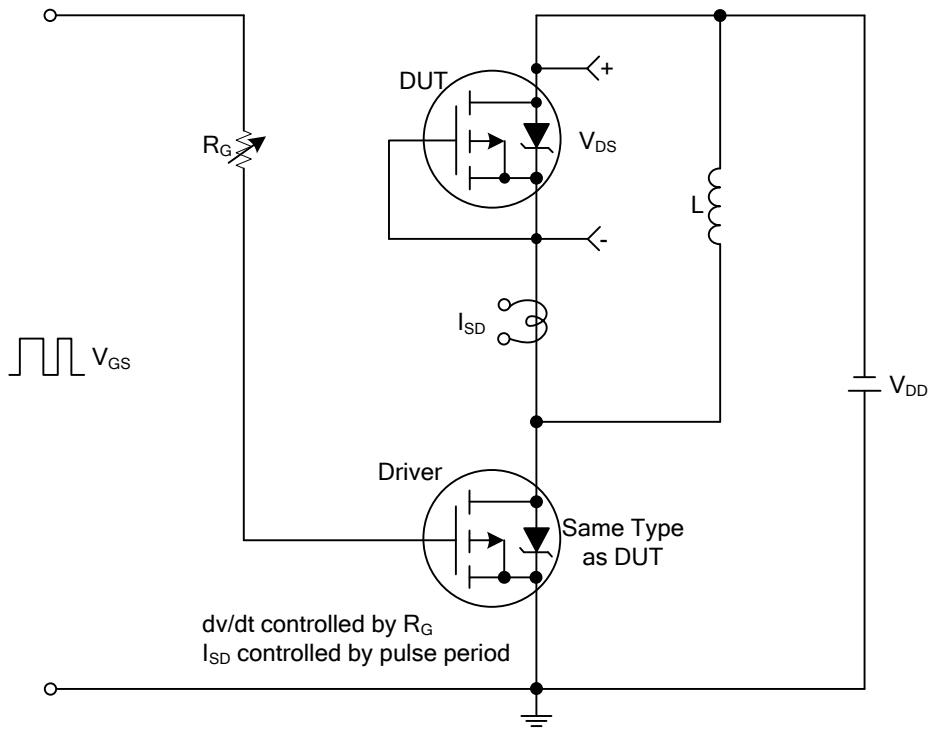
Note: 1. Repetitive rating; pulse width limited by max. junction temperature.

2. Pulse width≤300μs; duty cycle≤2%.

■ TEST CIRCUITS AND WAVEFORMS



■ TEST CIRCUITS AND WAVEFORMS(Cont.)



Peak Diode Recovery dv/dt Test Circuit and Waveforms

UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice.