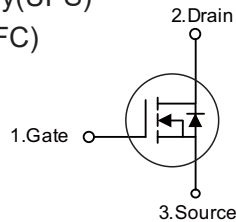


Features

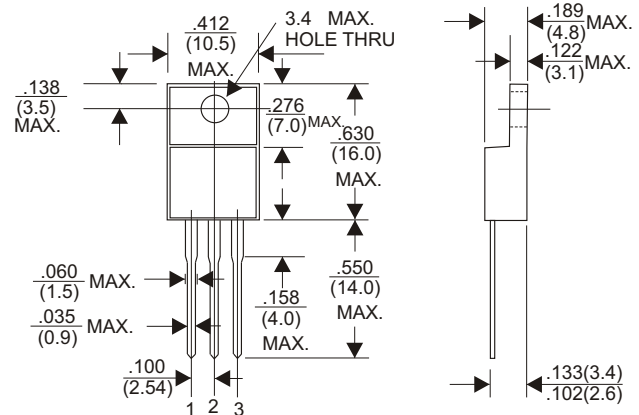
- 650V,10A
- $R_{DS(ON)} = 0.72\Omega$ (Typ.) @ $V_{GS} = 10V, I_D = 5A$
- Fast Switching
- Improved dv/dt Capability
- 100% Avalanche Tested

Application

- Switch Mode Power Supply(SMPS)
- Uninterruptible Power Supply(UPS)
- Power Factor Correction (PFC)



ITO-220F (FULLY INSULATED)



ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ C$ unless otherwise specified)

| PARAMETER | SYMBOL | RATINGS | UNIT | |
|------------------------------------|------------------------|------------|------------|----|
| Drain-Source Voltage | V_{DSS} | 650 | V | |
| Gate-Source Voltage | V_{GSS} | ± 30 | V | |
| Avalanche Current (Note 2) | I_{AR} | 10 | A | |
| Drain Current | Continuous | I_D | 10 | A |
| | Pulsed (Note 2) | I_{DM} | 38 | A |
| Avalanche Energy | Single Pulsed (Note 3) | E_{AS} | 700 | mJ |
| | Repetitive (Note 2) | E_{AR} | 15.6 | mJ |
| Peak Diode Recovery dv/dt (Note 4) | dv/dt | 4.5 | V/ns | |
| Power Dissipation | P_D | 50 | W | |
| Junction Temperature | T_J | +150 | $^\circ C$ | |
| Operating Temperature | T_{OPR} | -55 ~ +150 | $^\circ C$ | |
| Storage Temperature | T_{STG} | -55 ~ +150 | $^\circ C$ | |

Notes: 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 maximum junction temperature

3. $L = 14.2mH, I_{AS} = 10A, V_{DD} = 50V, R_G = 25 \Omega$ Starting $T_J = 25^\circ C$

4. $I_{SD} \leq 9.5A, di/dt \leq 200A/\mu s, V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ C$

10N65F

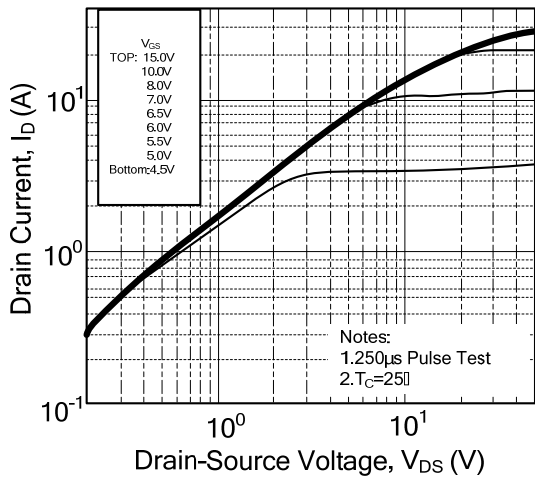
Electrical Characteristics (T_c=25°C unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT | |
|---|-------------------------------------|--|--|------|------|------|----|
| OFF CHARACTERISTICS | | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} = 0V, I _D = 250μA | 650 | | | V | |
| Drain-Source Leakage Current | I _{DSS} | V _{DS} = 650V, V _{GS} = 0V | | | 1 | μA | |
| Gate-Source Leakage Current | Forward | I _{GSS} V _{GS} = 30 V, V _{DS} = 0 V | | | 100 | nA | |
| | Reverse | | V _{GS} = -30 V, V _{DS} = 0 V | | | -100 | nA |
| Breakdown Voltage Temperature Coefficient | ΔBV _{DSS} /ΔT _J | I _D = 250 μA, Referenced to 25°C | | 0.7 | | V/°C | |
| ON CHARACTERISTICS | | | | | | | |
| Gate Threshold Voltage | V _{GS(TH)} | V _{DS} = V _{GS} , I _D = 250μA | 2.0 | | 4.0 | V | |
| Static Drain-Source On-State Resistance | R _{DS(ON)} | V _{GS} = 10V, I _D = 5.0A | | 0.72 | 0.86 | Ω | |
| DYNAMIC CHARACTERISTICS | | | | | | | |
| Input Capacitance | C _{ISS} | V _{DS} =25V, V _{GS} =0V, f=1.0 MHz | | 1570 | 2040 | pF | |
| Output Capacitance | C _{OSS} | | | | 166 | 215 | pF |
| Reverse Transfer Capacitance | C _{RSS} | | | | 18 | 24 | pF |
| SWITCHING CHARACTERISTICS | | | | | | | |
| Turn-On Delay Time | t _{D(ON)} | V _{DD} =325V, I _D =10A, R _G =25Ω (Note 1, 2) | | 23 | 55 | ns | |
| Turn-On Rise Time | t _R | | | | 69 | 150 | ns |
| Turn-Off Delay Time | t _{D(OFF)} | | | | 144 | 300 | ns |
| Turn-Off Fall Time | t _F | | | | 77 | 165 | ns |
| Total Gate Charge | Q _G | V _{DS} =520V, I _D =10A, V _{GS} =10 V (Note 1, 2) | | 44 | 57 | nC | |
| Gate-Source Charge | Q _{GS} | | | | 6.7 | | nC |
| Gate-Drain Charge | Q _{GD} | | | | 18.5 | | nC |
| DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS | | | | | | | |
| Drain-Source Diode Forward Voltage | V _{SD} | V _{GS} = 0 V, I _S =10A | | | 1.4 | V | |
| Maximum Continuous Drain-Source Diode Forward Current | I _S | | | | 10 | A | |
| Maximum Pulsed Drain-Source Diode Forward Current | I _{SM} | | | | 38 | A | |
| Reverse Recovery Time | t _{rr} | V _{GS} = 0 V, I _S = 10A, | | 420 | | ns | |
| Reverse Recovery Charge | Q _{RR} | dI _F / dt = 100 A/μs (Note 1) | | 4.2 | | μC | |

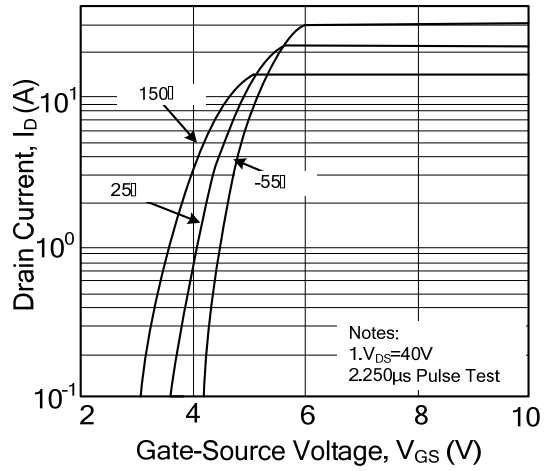
- Notes: 1. Pulse Test : Pulse width ≤300μs, Duty cycle ≤2%
 2. Essentially independent of operating temperature

RATING AND CHARACTERISTIC CURVES (10N65F)

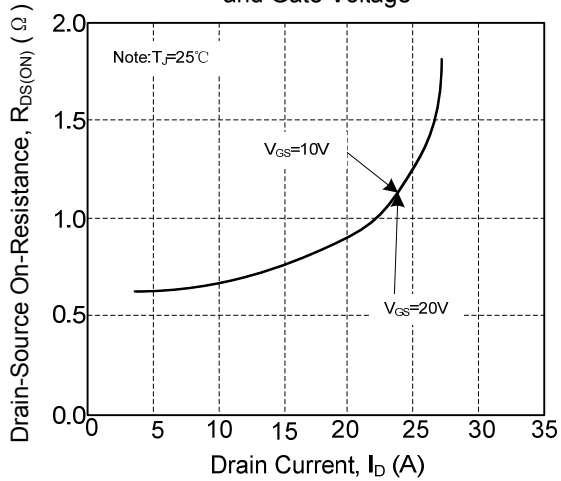
On-Region Characteristics



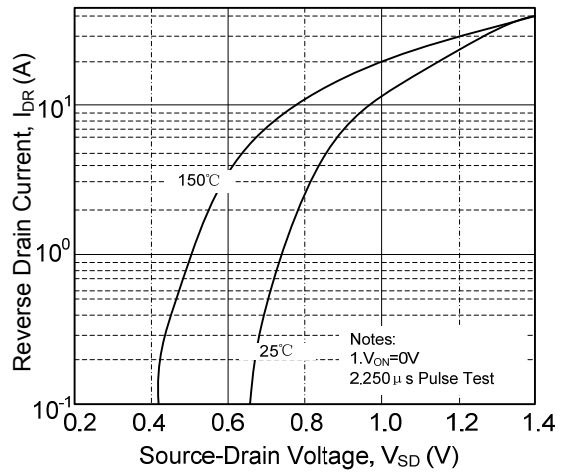
Transfer Characteristics



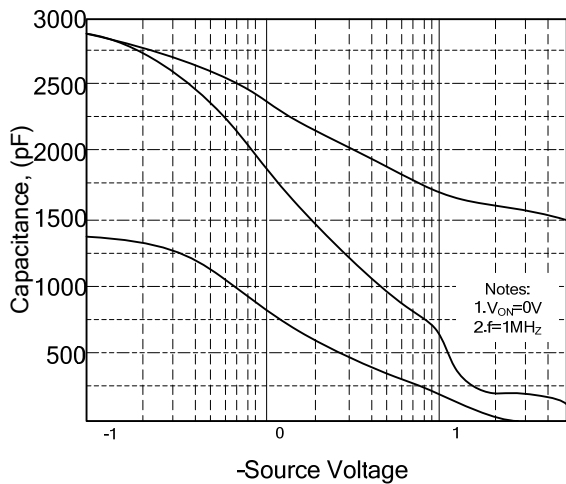
On-Resistance Variation vs. Drain Current and Gate Voltage



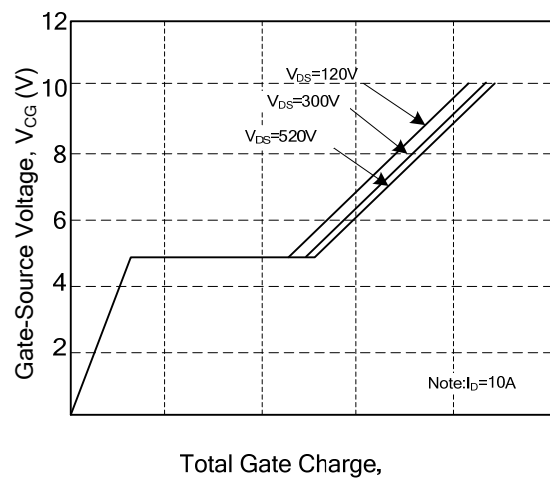
Body Diode Forward Voltage Variation with Source Current and Temperature



Capacitance Characteristics

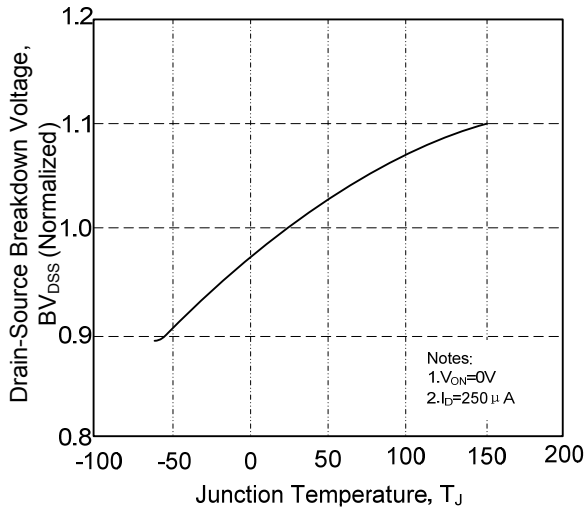


Gate Charge Characteristics

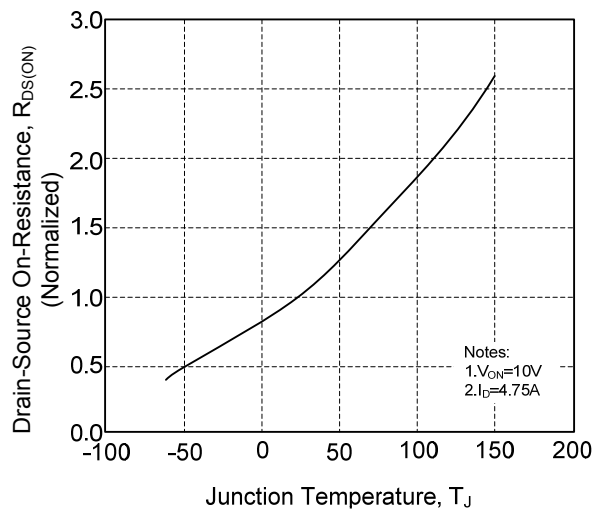


RATING AND CHARACTERISTIC CURVES (10N65F)

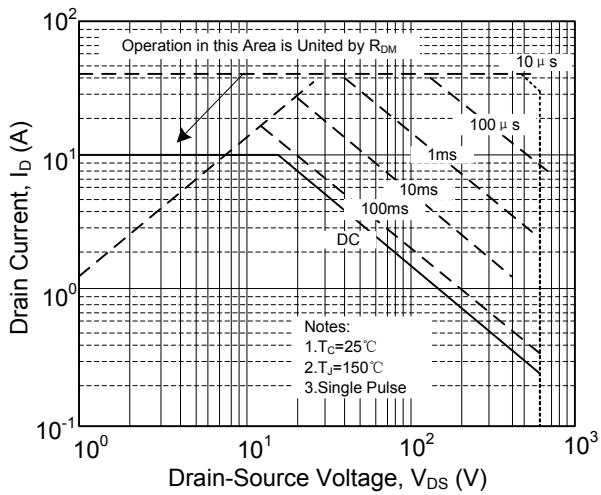
Breakdown Voltage Variation vs. Temperature



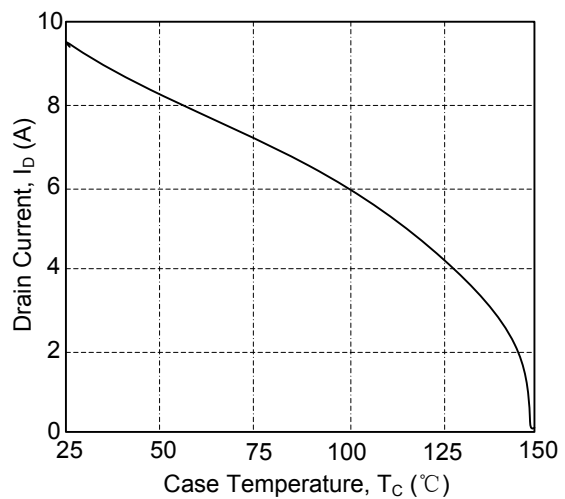
On-Resistance Variation vs. Temperature



Maximum Safe Operating Area



Maximum Drain Current vs. Case Temperature



Transient Thermal Response Curve

