

6N90Z

Power MOSFET

6.2A, 900V N-CHANNEL POWER MOSFET

DESCRIPTION

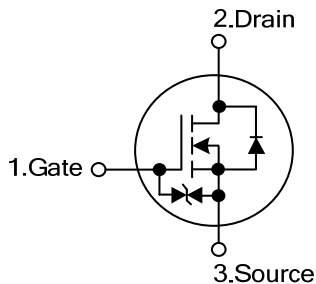
The UTC **6N90Z** is an N-channel enhancement mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology allows a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC **6N90Z** is generally applied in high efficiency switch mode power supplies.

FEATURES

- * $R_{DS(ON)} \leq 2.3 \Omega @ V_{GS}=10V, I_D=3.1A$
- * Fast switching
- * 100% avalanche tested
- * Improved dv/dt capability

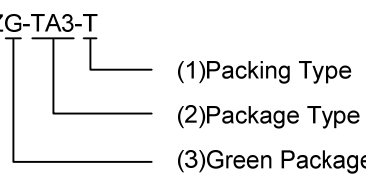
SYMBOL

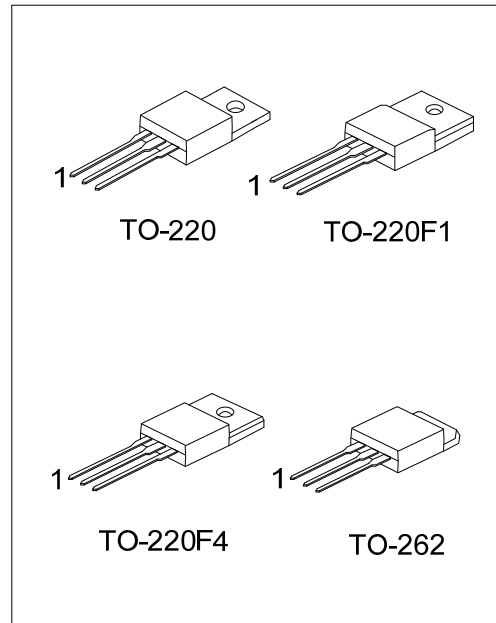


ORDERING INFORMATION

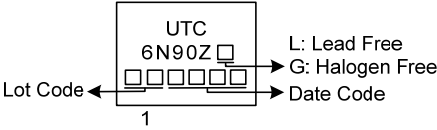
| Ordering Number | | Package | Pin Assignment | | | Packing |
|-----------------|---------------|----------|----------------|---|---|---------|
| Lead Free | Halogen Free | | 1 | 2 | 3 | |
| 6N90ZL-TA3-T | 6N90ZG-TA3-T | TO-220 | G | D | S | Tube |
| 6N90ZL-TF1-T | 6N90ZG-TF1-T | TO-220F1 | G | D | S | Tube |
| 6N90ZL-TF34-T | 6N90ZG-TF34-T | TO-220F4 | G | D | S | Tube |
| 6N90ZL-TQ2-T | 6N90ZG-TQ2-T | TO-262 | G | D | S | Tube |

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

| | |
|---|--|
| <p>6N90ZG-TA3-T</p>  | <p>(1) T: Tube (2) TA3: TO-220, TF1: TO-220F1, TF34: TO-220F4 TQ2: TO-262 (3) G: Halogen Free and Lead Free, L: Lead Free</p> |
|---|--|



MARKING



■ ABSOLUTE MAXIMUM RATINGS ($T_C=25^\circ\text{C}$, unless otherwise specified)

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|------------------------------------|---------------------------------------|-----------|----------|------------------|
| Drain-Source Voltage | | V_{DSS} | 900 | V |
| Gate-Source Voltage | | V_{GSS} | ± 20 | V |
| Drain Current | Continuous ($T_C=25^\circ\text{C}$) | I_D | 6.2 | A |
| | Pulsed (Note 2) | I_{DM} | 18.6 | A |
| Avalanche Energy | Single Pulsed (Note 3) | E_{AS} | 345 | mJ |
| Peak Diode Recovery dv/dt (Note 4) | | dv/dt | 2.2 | V/ns |
| Power Dissipation | TO-220/TO-262 | P_D | 140 | W |
| | TO-220F1/TO-220F4 | | 36 | W |
| Junction Temperature | | T_J | +150 | $^\circ\text{C}$ |
| Storage Temperature | | T_{STG} | -55~+150 | $^\circ\text{C}$ |

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. $L = 30\text{mH}$, $I_{AS} = 4.8\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 6.0\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL DATA

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|---------------------|-------------------|---------------|---------|---------------------------|
| Junction to Ambient | | θ_{JA} | 62.5 | $^\circ\text{C}/\text{W}$ |
| Junction to Case | TO-220/TO-262 | θ_{JC} | 0.89 | $^\circ\text{C}/\text{W}$ |
| | TO-220F1/TO-220F4 | | 3.47 | $^\circ\text{C}/\text{W}$ |

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

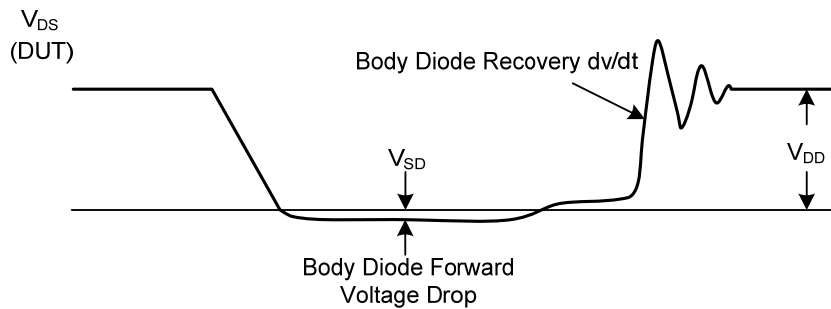
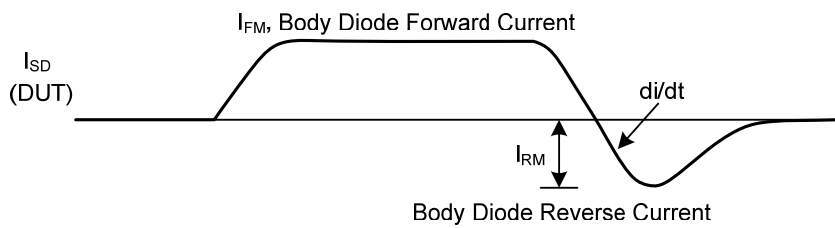
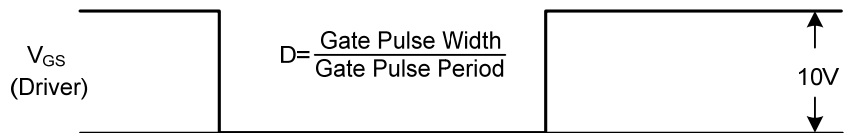
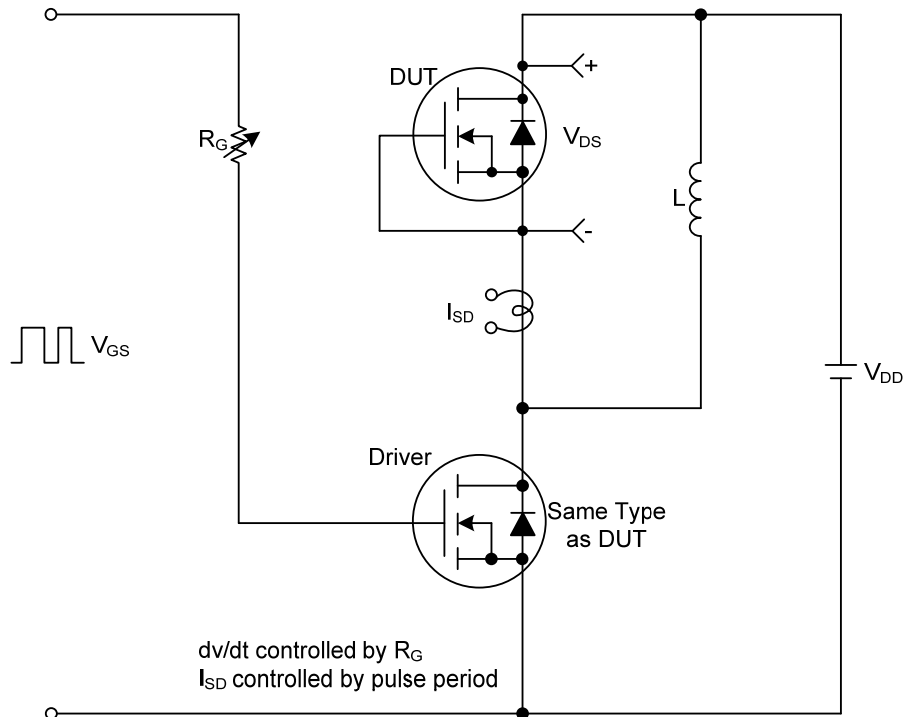
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--|---------------------|---|-----|------|------|------|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | I _D =250μA, V _{GS} =0V | 900 | | | V |
| Drain-Source Leakage Current | I _{DSS} | V _{DS} =900V, V _{GS} =0V | | | 10 | μA |
| Gate- Source Leakage Current | Forward | V _{GS} =+20V, V _{DS} =0V | | | +5 | μA |
| | Reverse | V _{GS} =-20V, V _{DS} =0V | | | -5 | μA |
| ON CHARACTERISTICS | | | | | | |
| Gate Threshold Voltage | V _{GS(TH)} | V _{DS} =V _{GS} , I _D =250μA | 3.0 | | 5.0 | V |
| Static Drain-Source On-State Resistance | R _{DS(ON)} | V _{GS} =10V, I _D =3.1A | | 1.72 | 2.3 | Ω |
| DYNAMIC PARAMETERS | | | | | | |
| Input Capacitance | C _{ISS} | V _{GS} =0V, V _{DS} =25V, f=1.0MHz | | 1450 | | pF |
| Output Capacitance | C _{OSS} | | | 118 | | pF |
| Reverse Transfer Capacitance | C _{RSS} | | | 14 | | pF |
| SWITCHING PARAMETERS | | | | | | |
| Total Gate Charge | Q _G | V _{GS} =10V, V _{DS} =720V, I _D =6.2A (Note 1, 2) | | 50 | | nC |
| Gate to Source Charge | Q _{GS} | | | 15.5 | | nC |
| Gate to Drain Charge | Q _{GD} | | | 15 | | nC |
| Turn-ON Delay Time | t _{D(ON)} | V _{DS} =100V, V _{GS} =10V, I _D =6.2A, R _G =25Ω (Note 1, 2) | | 18 | | ns |
| Rise Time | t _R | | | 20 | | ns |
| Turn-OFF Delay Time | t _{D(OFF)} | | | 96 | | ns |
| Fall-Time | t _F | | | 40 | | ns |
| SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS | | | | | | |
| Maximum Body-Diode Continuous Current | I _S | | | | 6.2 | A |
| Maximum Body-Diode Pulsed Current | I _{SM} | | | | 18.6 | A |
| Drain-Source Diode Forward Voltage | V _{SD} | I _S =6.2A, V _{GS} =0V | | | 1.4 | V |
| Body Diode Reverse Recovery Time | t _{RR} | I _S =6.2A, V _{GS} =0V, dI _F /dt=100A/μs (Note 1) | | 472 | | ns |
| Body Diode Reverse Recovery Charge | Q _{RR} | | | | 6.1 | |

Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

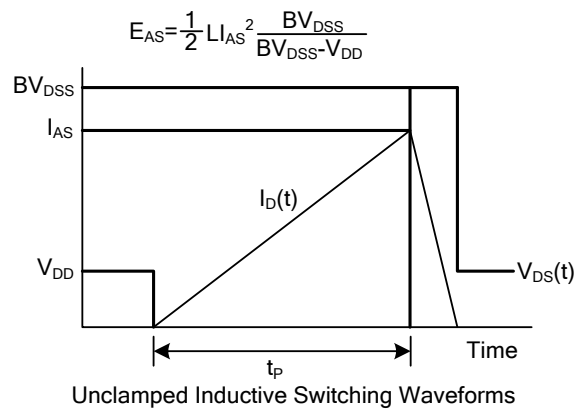
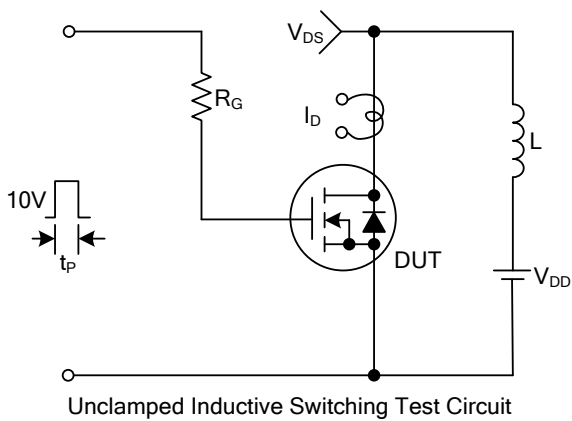
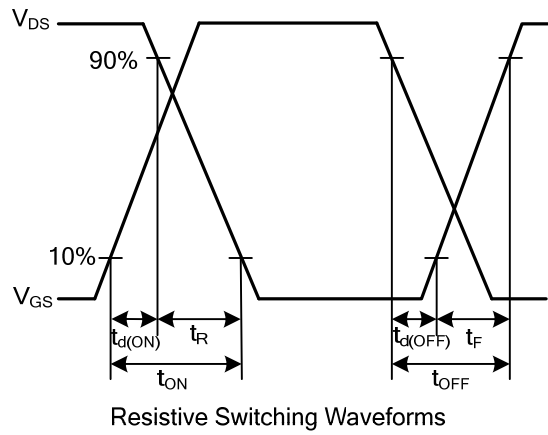
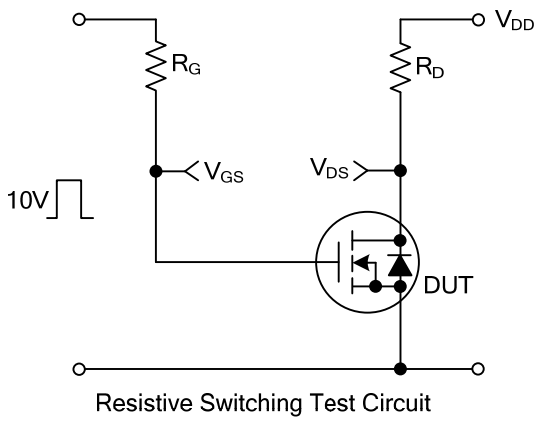
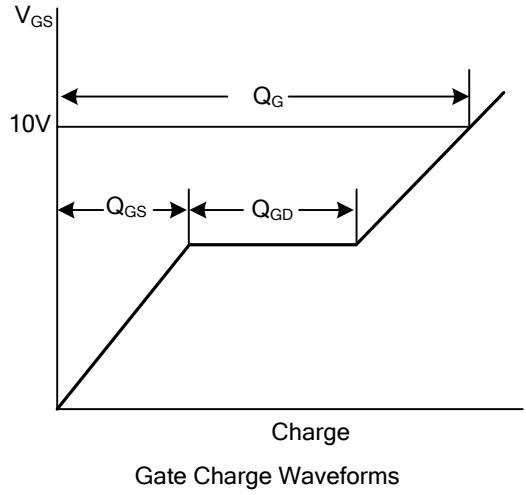
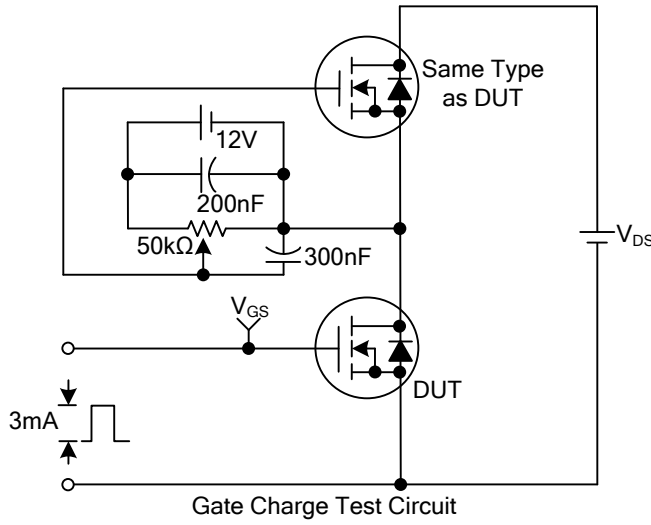
2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

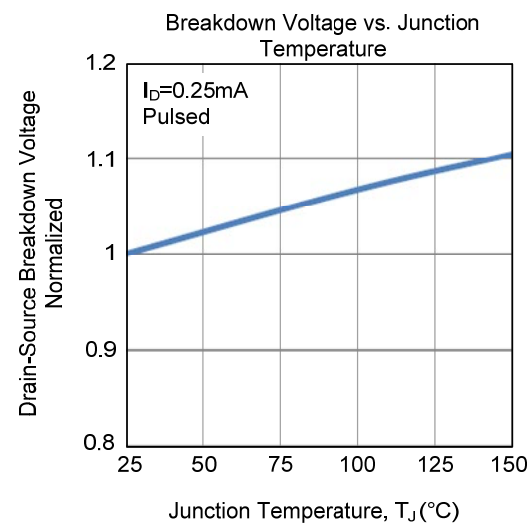
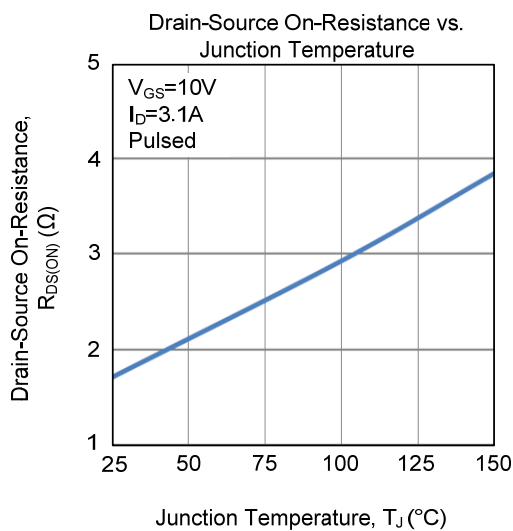
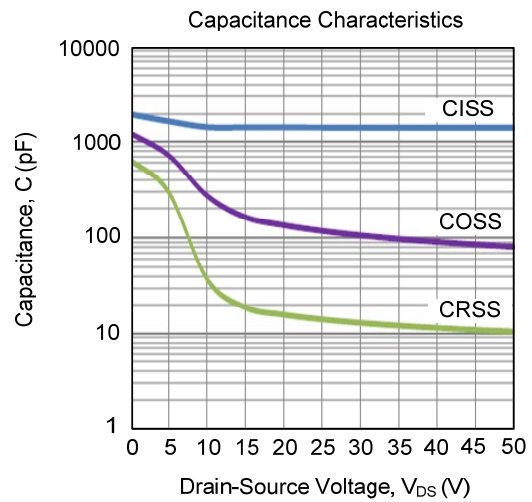
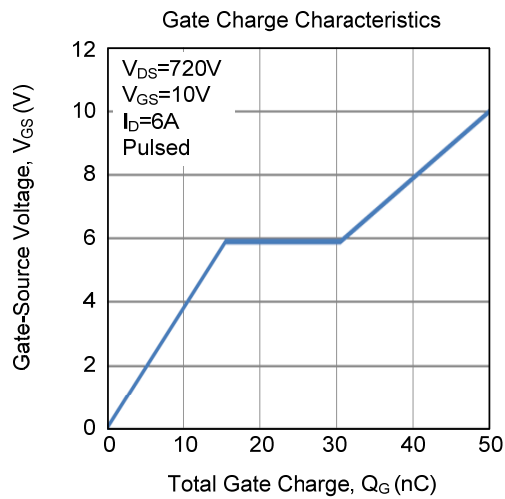
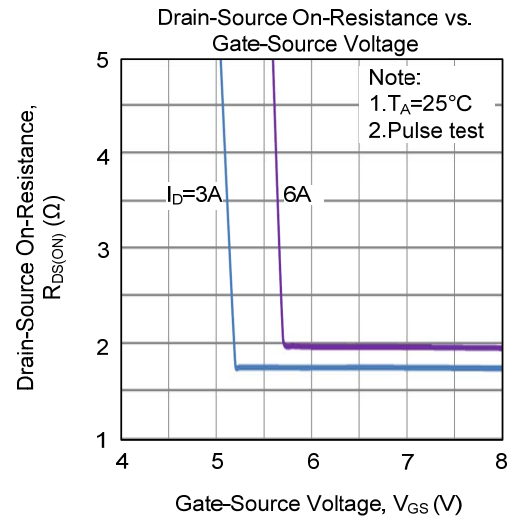
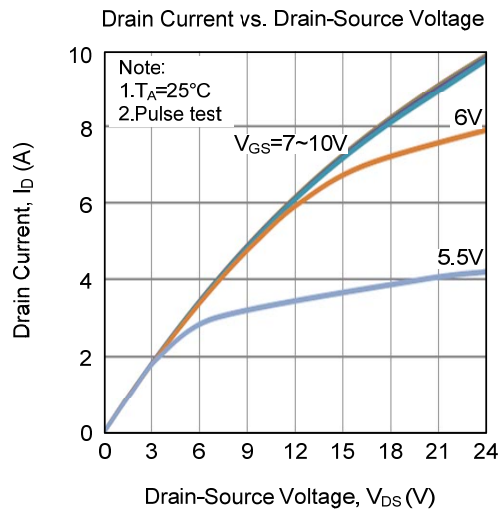
Peak Diode Recovery dv/dt Test Circuit & Waveforms



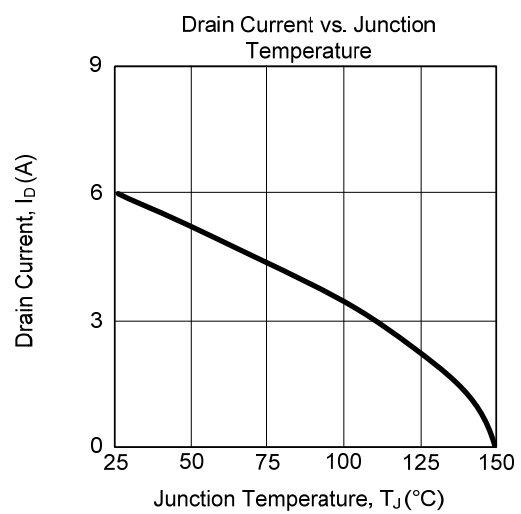
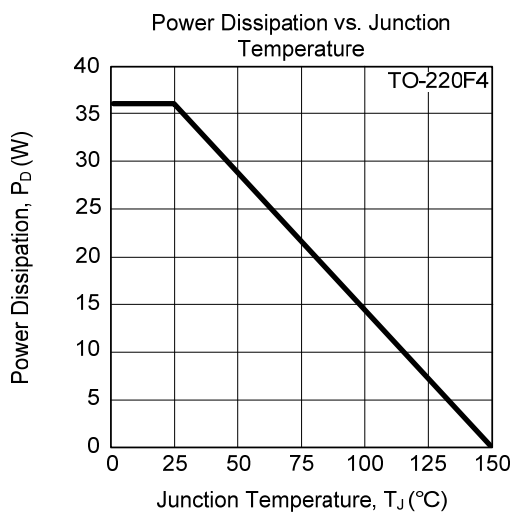
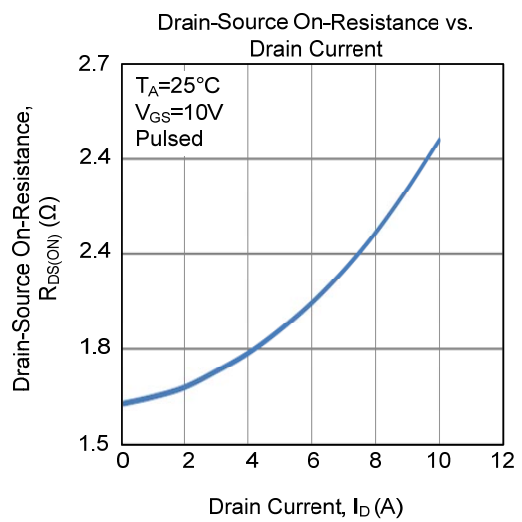
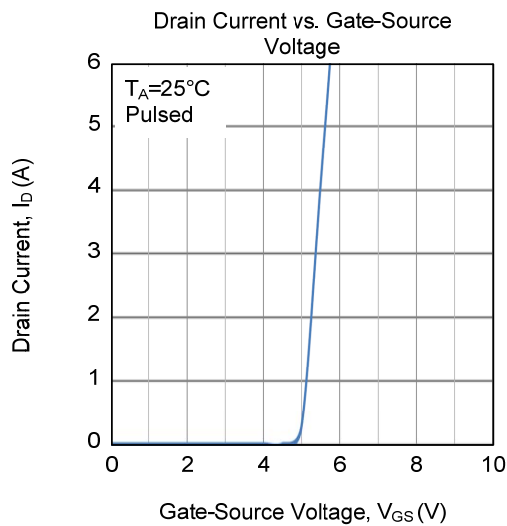
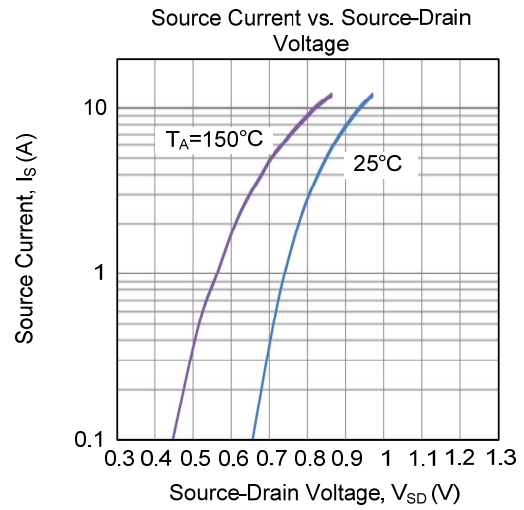
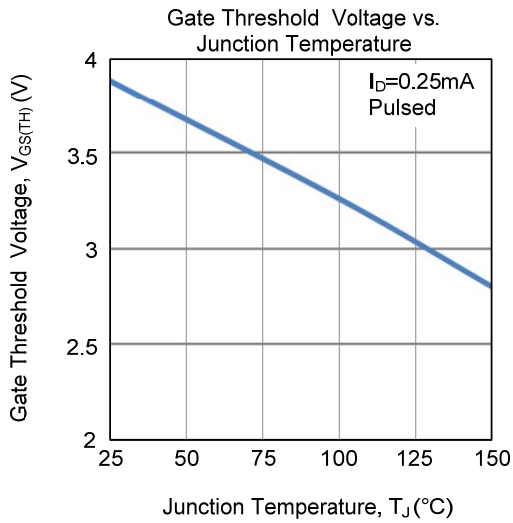
■ TEST CIRCUITS AND WAVEFORMS



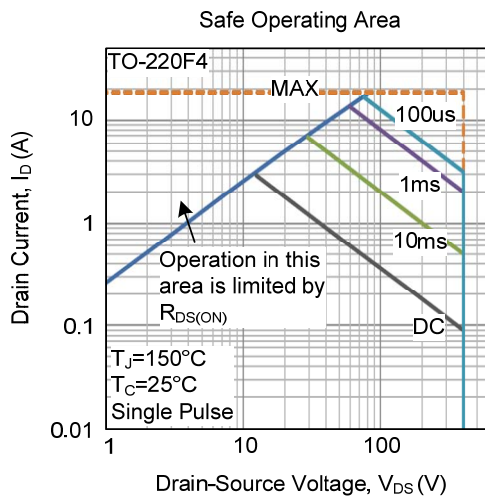
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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