



12NN10

Power MOSFET

2.5A, 100V DUAL N-CHANNEL ENHANCEMENT MODE POWER MOSFET

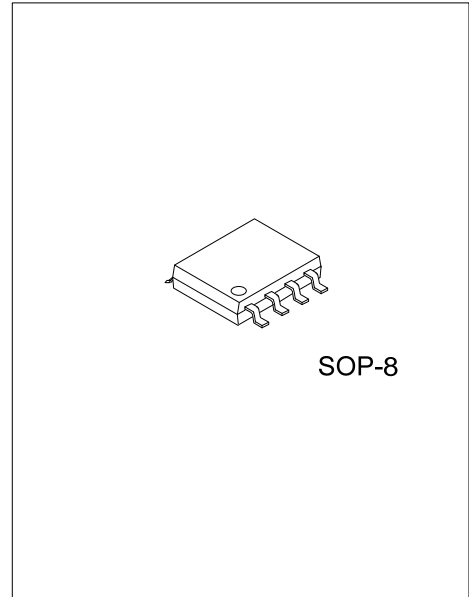
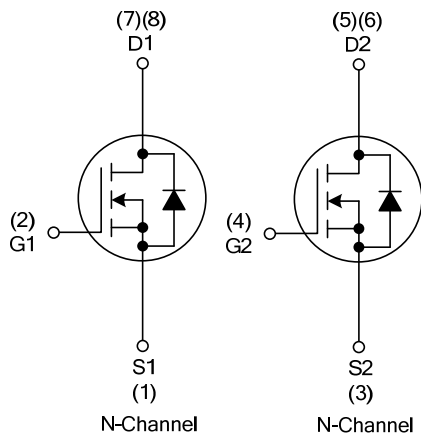
DESCRIPTION

The UTC **12NN10** is a dual N-Channel enhancement mode power MOSFET, it provides designer with fast switching speed, ruggedized device design, low on-resistance and cost-effectiveness.

FEATURES

- * Low Gate Charge (Typically 14.2nC)
- * $R_{DS(ON)} < 0.18\Omega @ V_{GS}=10V, I_D=2.0A$
- * Fast Switching Speed
- * Simple Drive Requirement

SYMBOL



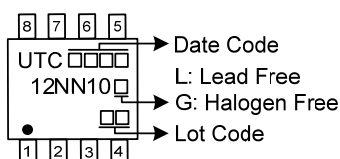
ORDERING INFORMATION

| Ordering Number | | Package | Pin Assignment | | | | | Packing | |
|-----------------|---------------|---------|----------------|----|----|----|------|---------|-----------|
| Lead Free | Halogen Free | | 1 | 2 | 3 | 4 | 5, 6 | | 7, 8 |
| 12NN10G-S08-R | 12NN10G-S08-R | SOP-8 | S1 | G1 | S2 | G2 | D2 | D1 | Tape Reel |

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

| | | |
|---------------|------------------|---|
| 12NN10G-S08-R | (1)Packing Type | (1) R: Tape Reel |
| | (2)Package Type | (2) S08: SOP-8 |
| | (3)Green Package | (3) G: Halogen Free and Lead Free, L: Lead Free |

MARKING



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

| PARAMETER | SYMBOL | RATINGS | UNIT |
|----------------------|--------------------|-----------------|------------------|
| Drain-Source Voltage | V_{DSS} | 100 | V |
| Gate-Source Voltage | V_{GSS} | ± 20 | V |
| Drain Current | Continuous(Note 3) | I_D | 2.5 |
| | Pulsed(Note 2) | I_{DM} | 10 |
| Power Dissipation | P_D | 2 | W |
| Junction Temperature | T_J | $-40 \sim +150$ | $^\circ\text{C}$ |
| Storage Temperature | T_{STG} | $-55 \sim +150$ | $^\circ\text{C}$ |

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. Pulse width limited by Max. junction temperature.

3. Surface mounted on 1 in² copper pad of FR4 board, $t < 10\text{sec}$; 135°C/W when mounted on Min. copper pad.

■ THERMAL DATA

| PARAMETER | SYMBOL | RATING | UNIT |
|---------------------|---------------|--------|--------------------|
| Junction to Ambient | θ_{JA} | 62.5 | $^\circ\text{C/W}$ |

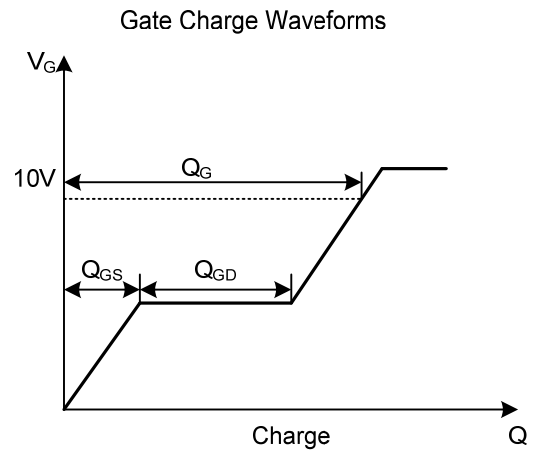
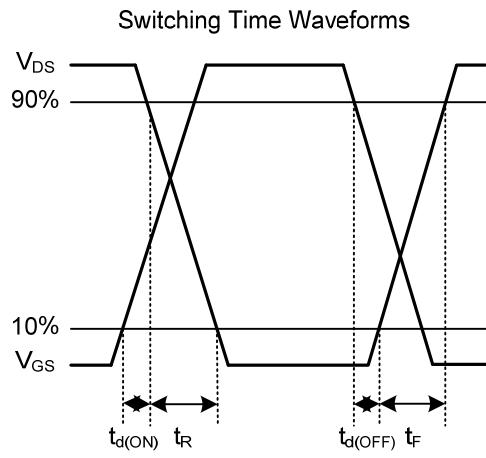
Note: Surface mounted on 1 in² copper pad of FR4 board, $t < 10\text{sec}$; 135°C/W when mounted on Min. copper pad.

■ ELECTRICAL CHARACTERISTICS ($T_J=25^\circ\text{C}$, unless otherwise specified)

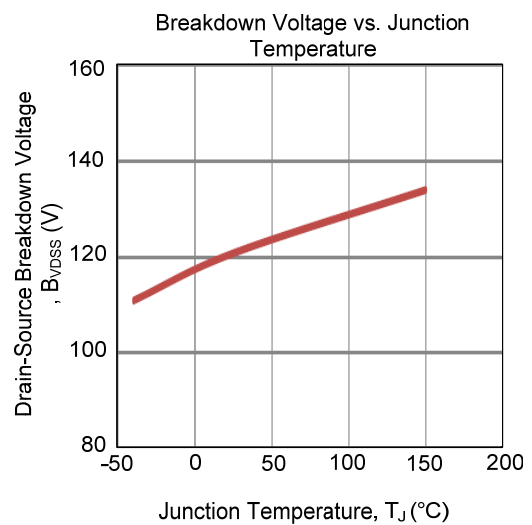
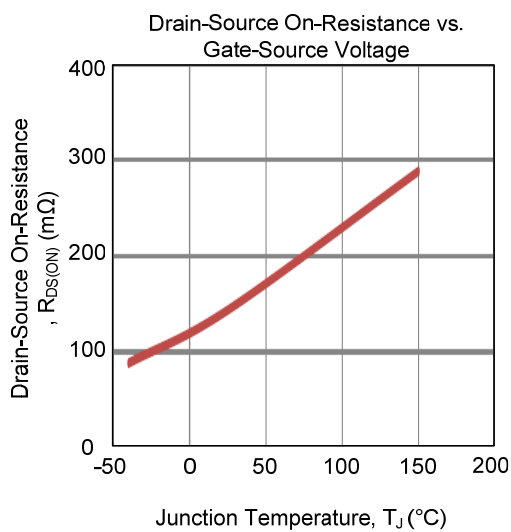
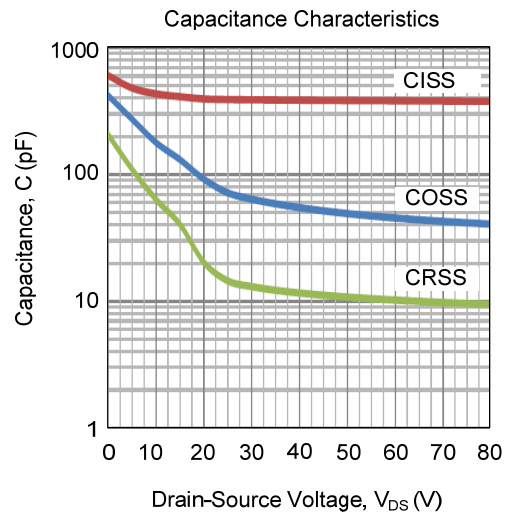
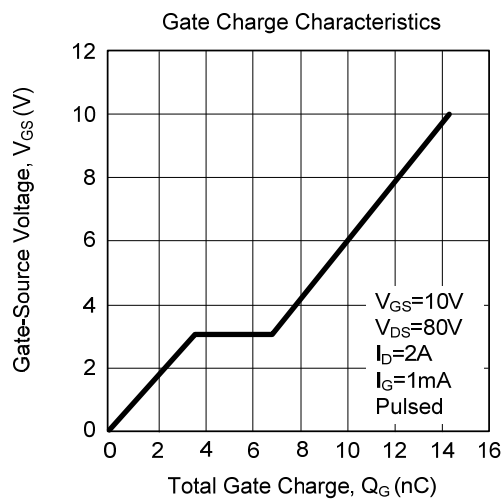
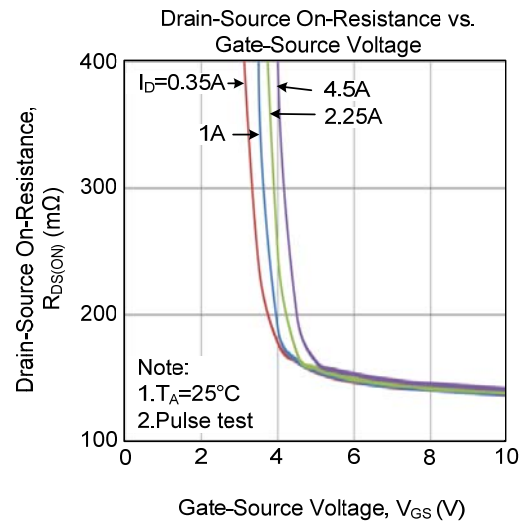
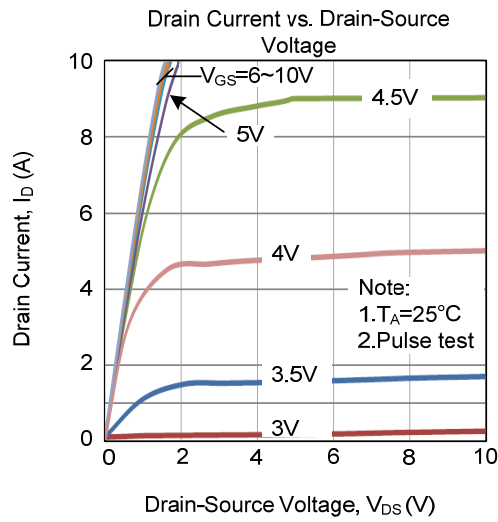
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--|--------------|--|--|------|------|---------------|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0\text{V}, I_D=250\mu\text{A}$ | 100 | | | V |
| Drain-Source Leakage Current | I_{DSS} | $V_{DS}=80\text{V}, V_{GS}=0\text{V}$ | | | 10 | μA |
| Gate-Source Leakage Current | Forward | I_{GSS} $V_{DS}=0\text{V}, V_{GS}=20\text{V}$ | | | 100 | nA |
| | Reverse | | $V_{DS}=0\text{V}, V_{GS}=-20\text{V}$ | | | -100 |
| ON CHARACTERISTICS | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{DS}=V_{GS}, I_D=250\mu\text{A}$ | 1.0 | | 3.0 | V |
| Drain-Source On-State Resistance (Note 1) | $R_{DS(ON)}$ | $V_{GS}=10\text{V}, I_D=2.0\text{A}$ | | 0.15 | 0.18 | Ω |
| Forward Transconductance | g_{FS} | $V_{DS}=10\text{V}, I_D=2.0\text{A}$ | | 2.8 | | S |
| DYNAMIC PARAMETERS | | | | | | |
| Input Capacitance | C_{ISS} | $V_{DS}=25\text{V}, V_{GS}=0\text{V}, f=1.0\text{MHz}$ | | 390 | | pF |
| Output Capacitance | C_{OSS} | | | 71 | | pF |
| Reverse Transfer Capacitance | C_{RSS} | | | 14 | | pF |
| SWITCHING PARAMETERS | | | | | | |
| Total Gate Charge (Note 1) | Q_G | $V_{DS}=80\text{V}, V_{GS}=5\text{V}, I_D=2.0\text{A}$ $I_G=1\text{mA}$ | | 8.8 | | nC |
| Total Gate Charge (Note 1) | Q_G | $V_{DS}=80\text{V}, V_{GS}=10\text{V},$ $I_D=2.0\text{A}, I_G=1\text{mA}$ | | 14.2 | | nC |
| Gate-Source Charge | Q_{GS} | | | 3.6 | | nC |
| Gate-Drain Charge | Q_{GD} | | | 3.2 | | nC |
| Turn-ON Delay Time (Note 1) | $t_{D(ON)}$ | $V_{DS}=50\text{V}, I_D=2\text{A}, R_G=3.3\Omega$ $V_{GS}=10\text{V}$ | | 6.5 | | ns |
| Turn-ON Rise Time | t_R | | | 7 | | ns |
| Turn-OFF Delay Time | $t_{D(OFF)}$ | | | 14 | | ns |
| Turn-OFF Fall Time | t_F | | | 3.5 | | ns |
| SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS | | | | | | |
| Drain-Source Diode Forward Voltage (Note 1) | V_{SD} | $I_S=1.5\text{A}, V_{GS}=0\text{V}$ | | | 1.3 | V |
| Body Diode Reverse Recovery Time (Note 1) | t_{rr} | $V_{GS}=0\text{V}, I_S=2.0\text{A},$ | | 40 | | ns |
| Body Diode Reverse Recovery Charge | Q_{rr} | $di_F/dt=100\text{A}/\mu\text{s}$ | | 75 | | nC |

Note: Pulse test.

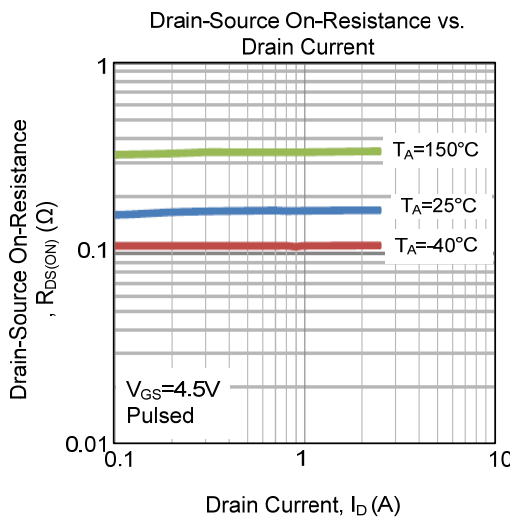
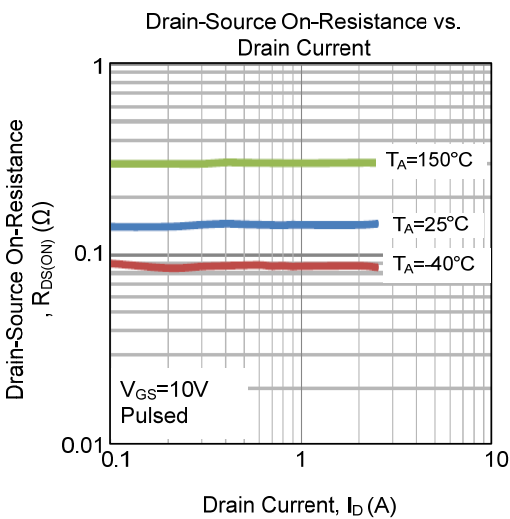
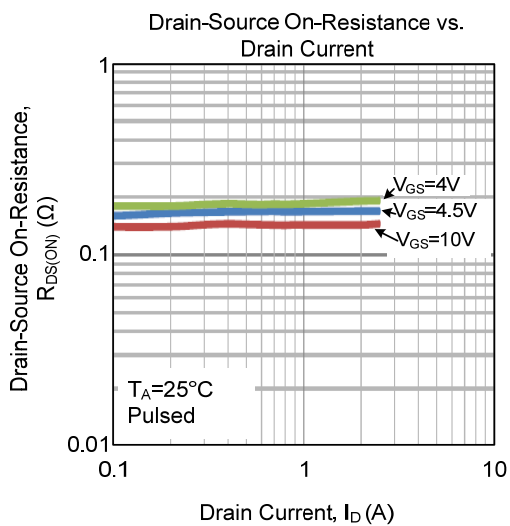
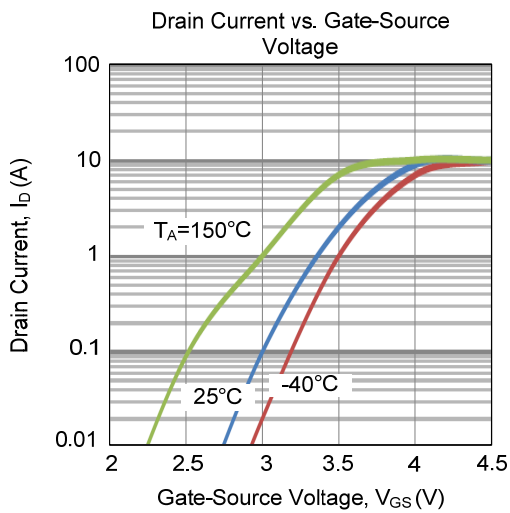
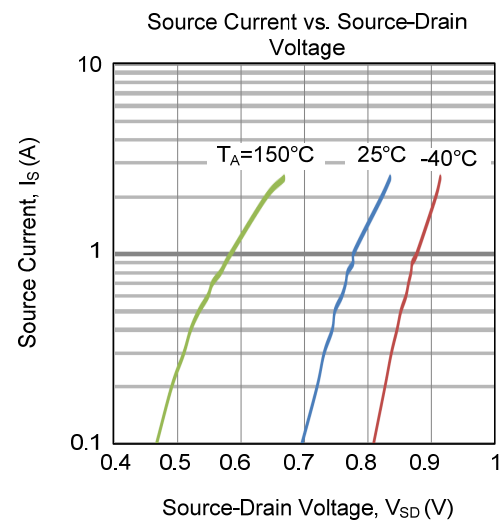
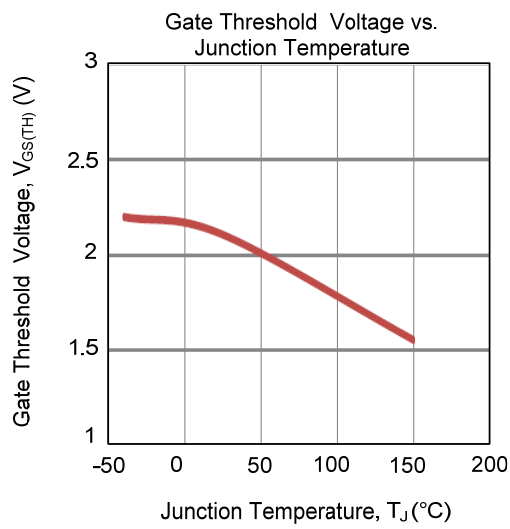
■ TEST CIRCUITS AND WAVEFORMS



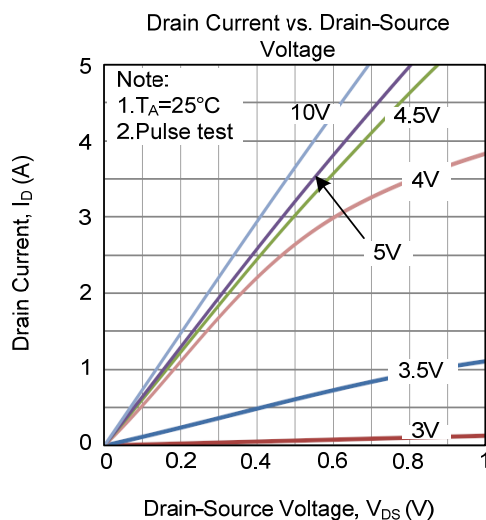
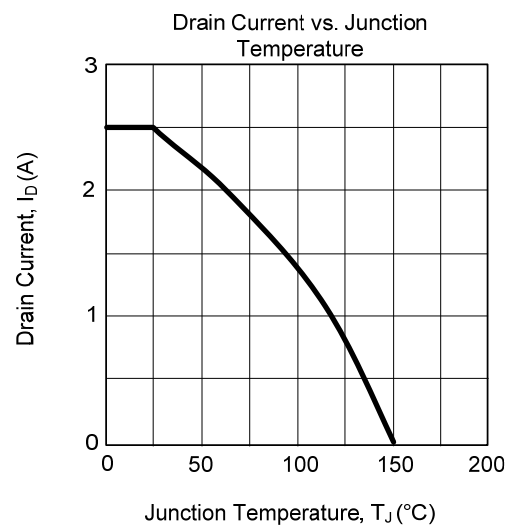
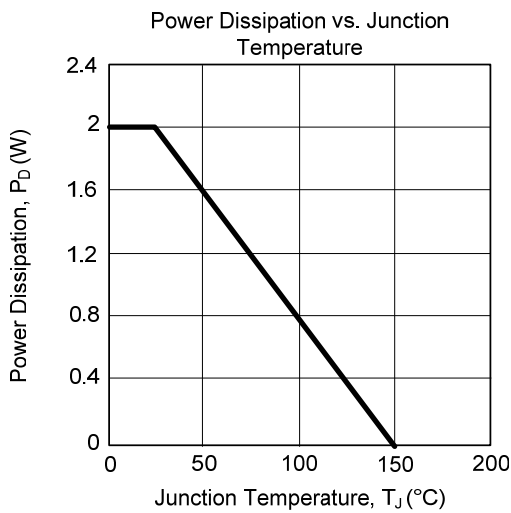
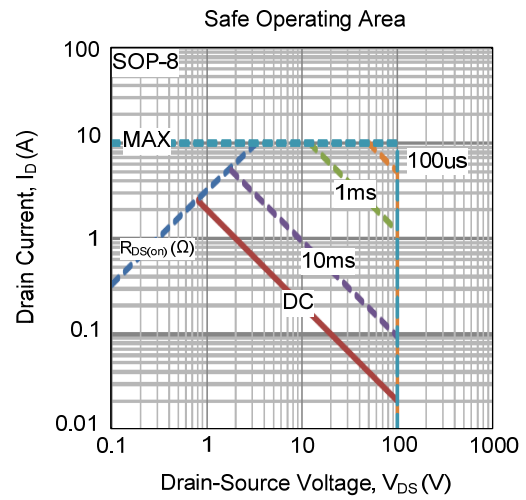
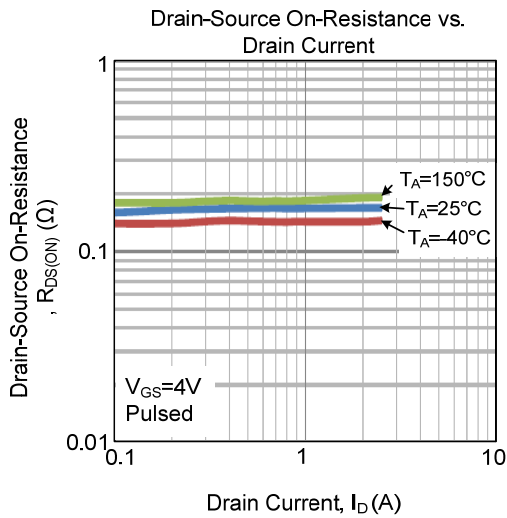
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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. UTC reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.