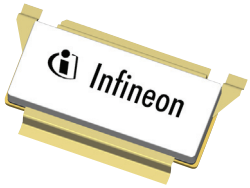
green Product

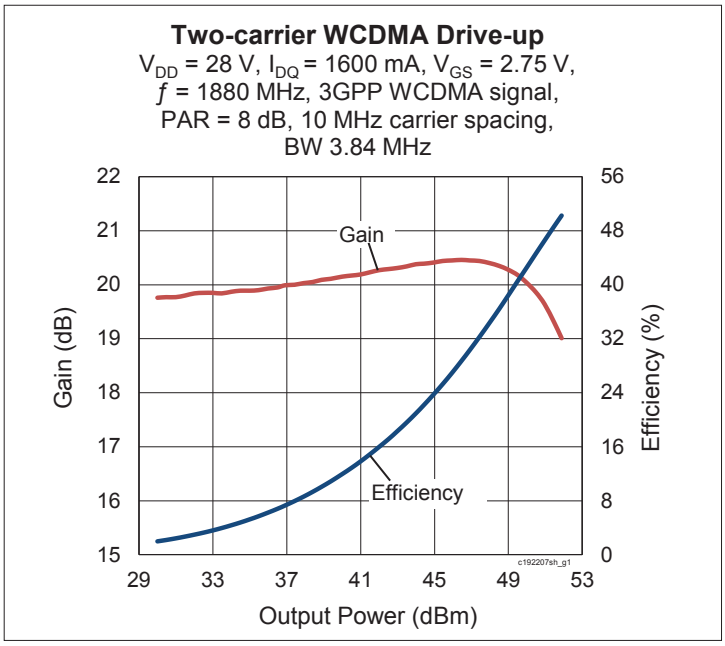
# Thermally-Enhanced High Power RF LDMOS FET
# 220 W, 28 V, 1805 – 1990 MHz

## Description

The PXFC192207SH is a 220-watt LDMOS FET intended for use in multi-standard cellular power amplifier applications in the 1805 to 1990 MHz frequency band. Features include input and output matching, high gain and thermally-enhanced package with earless flanges. Manufactured with Infineon's advanced LDMOS process, this device provides excellent thermal performance and superior reliability.

PXFC192207SH
Package H-37288G-4/2




## Features

- Broadband internal input and output matching
- Typical Pulsed CW performance, 1880 MHz, 28 V, 10 µs pulse width, 10% duty cycle, class AB
  - Output power at $P_{1dB}$ = 220 W
  - Efficiency = 55%
  - Gain = 20 dB
- Typical single-carrier WCDMA performance, 1880 MHz, 28 V, 10 dB PAR @ 0.01% CCDF
  - Output power = 50 W
  - Efficiency = 29%
  - Gain = 20 dB
  - ACPR = –34 dBc @5 MHz
- Capable of handling 10:1 VSWR @28 V, 200 W (CW) output power
- Integrated ESD protection
- Low thermal resistance
- Pb-free and RoHS compliant

## RF Characteristics

**Two-carrier WCDMA Specifications** (tested in Infineon production test fixture)
$V_{DD}$ = 28 V, $I_{DQ}$ = 1600 mA, $P_{OUT}$ = 50 W avg, $f_1$ = 1980 MHz, $f_2$ = 1990 MHz, 3GPP signal, channel bandwidth = 3.84 MHz, peak/average = 8 dB @ 0.01% CCDF

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| Gain | $G_{ps}$ | 19 | 20 | — | dB |
| Drain Efficiency | $\eta_D$ | 29 | 30.5 | — | % |
| Intermodulation Distortion | IMD | — | –32 | –29 | dBc |

*All published data at $T_{CASE}$ = 25°C unless otherwise indicated*

**ESD:** Electrostatic discharge sensitive device—observe handling precautions!

## DC Characteristics

| Characteristic | Conditions | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $V_{GS}$ = 0 V, $I_{DS}$ = 10 mA | $V_{(BR)DSS}$ | 65 | — | — | V |
| Drain Leakage Current | $V_{DS}$ = 28 V, $V_{GS}$ = 0 V | $I_{DSS}$ | — | — | 1 | µA |
| | $V_{DS}$ = 63 V, $V_{GS}$ = 0 V | $I_{DSS}$ | — | — | 10 | µA |
| On-State Resistance | $V_{GS}$ = 10 V, $V_{DS}$ = 0.1 V | $R_{DS(on)}$ | — | 0.03 | — | Ω |
| Operating Gate Voltage | $V_{DS}$ = 28 V, $I_{DQ}$ = 1600 mA | $V_{GS}$ | 2.3 | 2.6 | 2.9 | V |
| Gate Leakage Current | $V_{GS}$ = 10 V, $V_{DS}$ = 0 V | $I_{GSS}$ | — | — | 1 | µA |

## Maximum Ratings

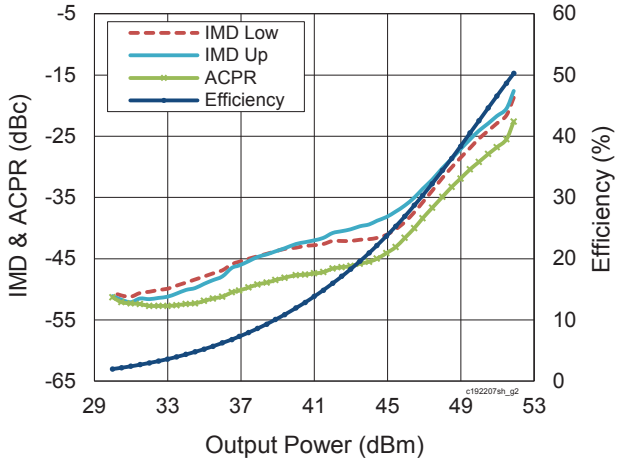
| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DSS}$ | 65 | V |
| Gate-Source Voltage | $V_{GS}$ | –6 to +10 | V |
| Operating Voltage | $V_{DD}$ | 0 to +32 | V |
| Junction Temperature | $T_J$ | 225 | °C |
| Storage Temperature Range | $T_{STG}$ | –65 to +150 | °C |
| Thermal Resistance ($T_{CASE}$ = 70°C, 200 W CW) | $R_{\theta JC}$ | 0.28 | °C/W |

## Ordering Information

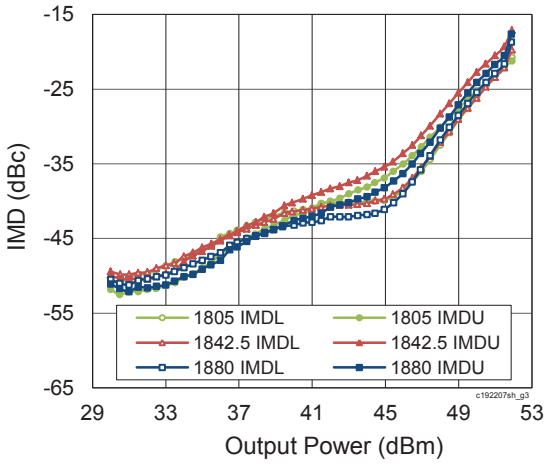
| Type and Version | Order Code | Package Description | Shipping |
|---|---|---|---|
| PXFC192207SH V1 R250 | PXFC192207SHV1R250XTMA1 | H-37288G-4/2, earless flange | Tape & Reel, 250 pcs |

## Typical Performance (data taken in a production test fixture)

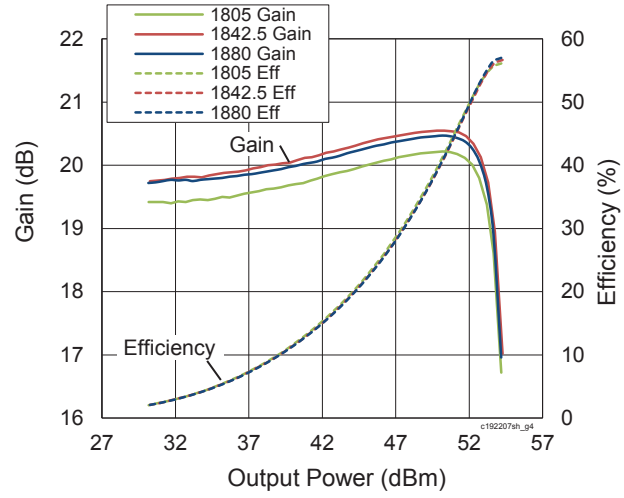
**Two-carrier WCDMA Drive-up**
$V_{DD}$ = 28 V, $I_{DQ}$ = 1600 mA, $V_{GS}$ = 2.75 V,
$f$ = 1880 MHz, 3GPP WCDMA signal,
PAR = 8 dB, 10 MHz carrier spacing,
BW 3.84 MHz



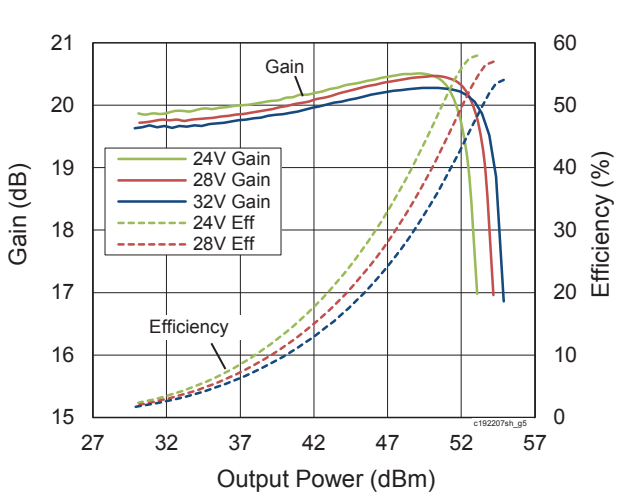

**Two-carrier WCDMA Drive-up**
$V_{DD}$ = 28 V, $I_{DQ}$ = 1600 mA, $V_{GS}$ = 2.75V,
3GPP WCDMA signal, PAR = 8 dB,
10 MHz carrier spacing, BW 3.84 MHz



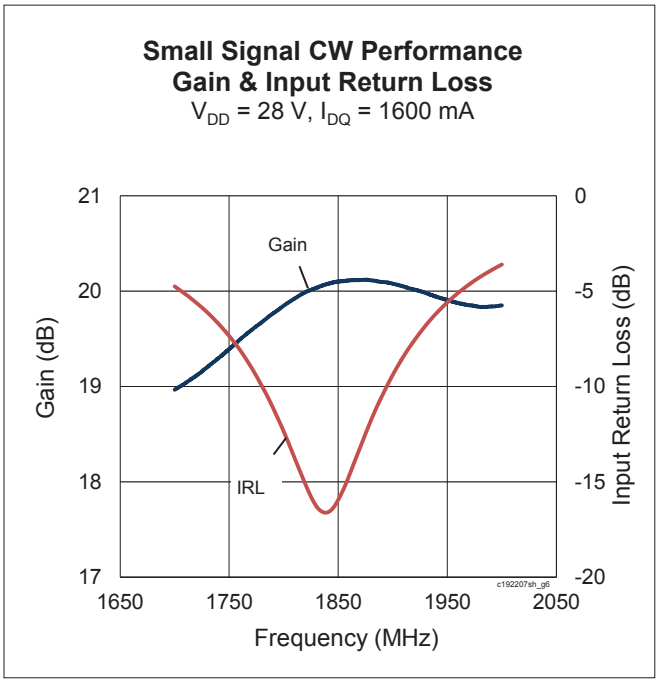

**Pulsed CW Performance**
$V_{DD}$ = 28 V, $I_{DQ}$ = 1600 mA



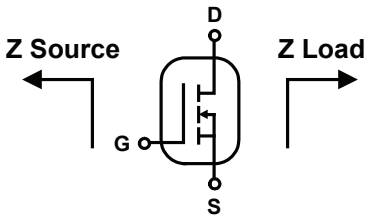

**Pulsed CW Performance at various $V_{DD}$**
$I_{DQ}$ = 1600 mA, $f$ = 1880 MHz



## Typical Performance (cont.)




## Broadband Circuit Impedance



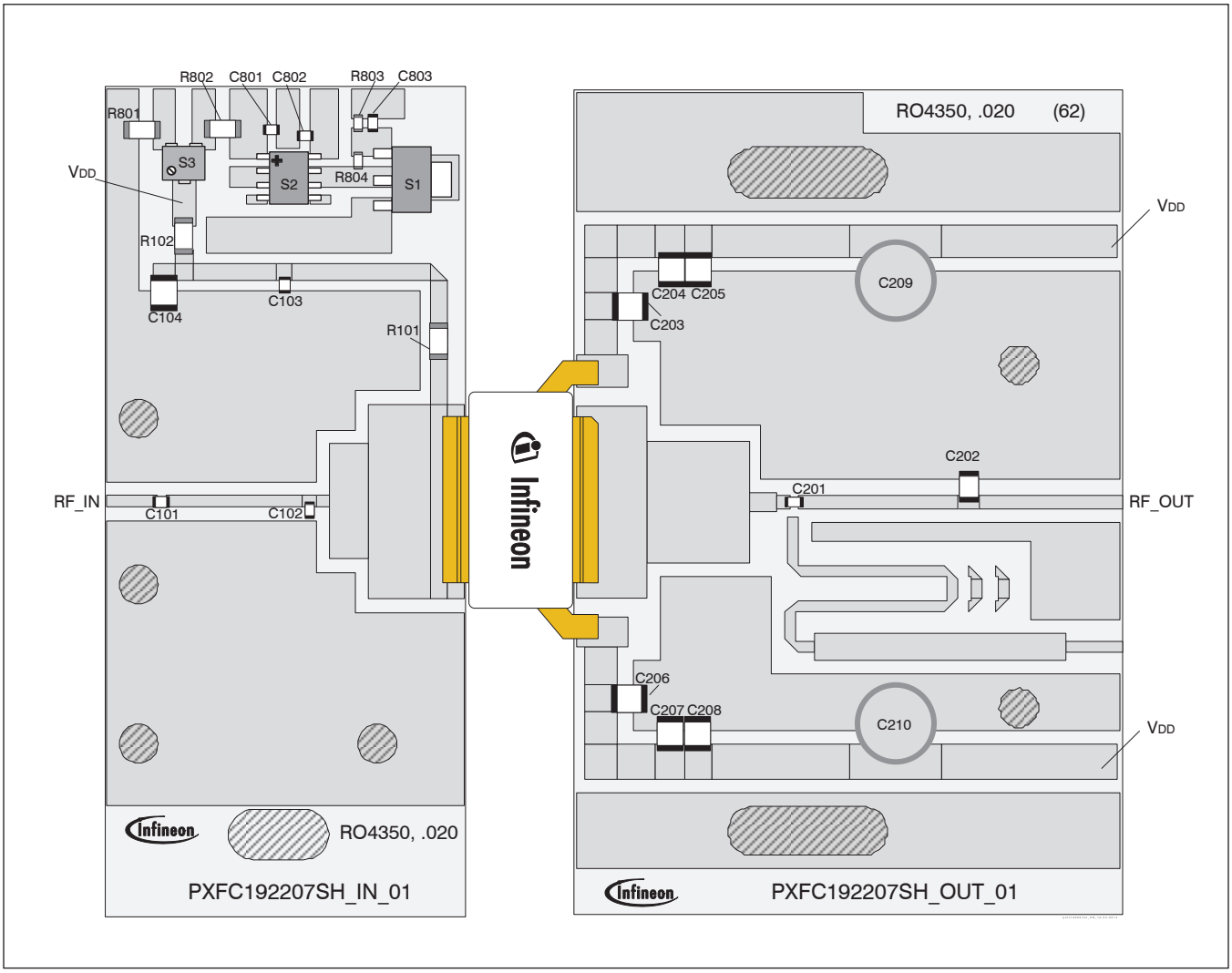

| Freq [MHz] | Z Source Ω | | Z Load Ω | |
|---|---|---|---|---|
| | R | jX | R | jX |
| 1805 | 1.57 | –6.18 | 1.13 | –3.50 |
| 1843 | 1.50 | –5.97 | 1.11 | –3.32 |
| 1880 | 1.42 | –5.76 | 1.09 | –3.18 |

## Load Pull Performance

**Main Side Load Pull Performance** – Pulsed CW signal: 10 µs, 10% duty cycle, $V_{DD}$ = 28 V, $I_{DQ}$ = 1600 mA

| | | $P_{1dB}$ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Max Output Power | | | | | Max PAE | | | | |
| Freq [MHz] | Zs [Ω] | Zl [Ω] | Gain [dB] | $P_{OUT}$ [dBm] | $P_{OUT}$ [W] | PAE [%] | Zl [Ω] | Gain [dB] | $P_{OUT}$ [dBm] | $P_{OUT}$ [W] | PAE [%] |
| 1805 | 0.62 – j4.61 | 0.79 – j3.74 | 19.7 | 54.30 | 269 | 50.8 | 2.00 – j3.31 | 22.7 | 52.30 | 170 | 61.7 |
| 1880 | 1.25 – j5.48 | 0.82 – j3.85 | 19.9 | 54.40 | 275 | 52.8 | 1.62 – j3.45 | 22.1 | 53.00 | 200 | 62.1 |
| 1930 | 1.83 – j6.05 | 0.79 – j4.00 | 19.5 | 54.30 | 269 | 51.1 | 1.60 – j3.33 | 22.2 | 52.50 | 178 | 61.2 |
| 1990 | 3.23 – j6.50 | 0.81 – j4.14 | 20.1 | 54.10 | 257 | 51.4 | 1.40 – j3.31 | 22.7 | 52.00 | 158 | 60.1 |

## Reference Circuit , 1805 – 1880 MHz




*Reference circuit assembly diagram (not to scale)*

## Reference Circuit (cont.)

### Reference Circuit Assembly

| | |
|---|---|
| DUT | PXFC192207SH V1 |
| Test Fixture Part No. | LTN/PXFC192207SH V1 |
| PCB | Rogers 4350, 0.508 mm [0.020"] thick, 2 oz. copper, $\varepsilon_r$ = 3.66, $f$ = 1805 – 1880 MHz |
| Find Gerber files for this test fixture on the Infineon Web site at http://www.infineon.com/rfpower | |

### Components Information

| Component | Description | Suggested Manufacturer | P/N |
|---|---|---|---|
| **Input** | | | |
| C101, C103 | Capacitor, 33 pF | ATC | ATC800A330JT250 |
| C102 | Capacitor, 0.9 pF | ATC | ATC800A0R9CT250 |
| C104 | Capacitor, 10 µF | Taiyo Yuden | UMK325C7106MM-T |
| C801, C802, C803 | Capacitor, 1000 pF | Panasonic Electronic Components | ECJ-1VB1H102K |
| R101, R102, R801 | Resistor, 10 Ω | Panasonic Electronic Components | ERJ-8GEYJ100V |
| R802 | Resistor, 100 Ω | Panasonic Electronic Components | ERJ-8GEYJ101V |
| R803 | Resistor, 1300 Ω | Panasonic Electronic Components | ERJ-3GEYJ132V |
| R804 | Resistor, 1200 Ω | Panasonic Electronic Components | ERJ-3GEYJ122V |
| S1 | Transistor | Infineon Technologies | BCP56 |
| S2 | Voltage Regulator | Texas Instruments | LM78L05ACM |
| S3 | Potentiometer, 2k Ω | Bourns Inc. | 3224W-1-202E |
| **Output** | | | |
| C201 | Capacitor, 33 pF | ATC | ATC800A330JT250 |
| C202 | Capacitor, 0.5 pF | ATC | ATC800B0R5CW500 |
| C203, C204, C205, C206, C207, C208 | Capacitor, 10 µF | Taiyo Yuden | UMK325C7106MM-T |
| C209, C210 | Capacitor, 220 µF | Panasonic Electronic Components | EEE-FP1V221AP |

## Package Outline Specifications

### Package H-37288G-4/2

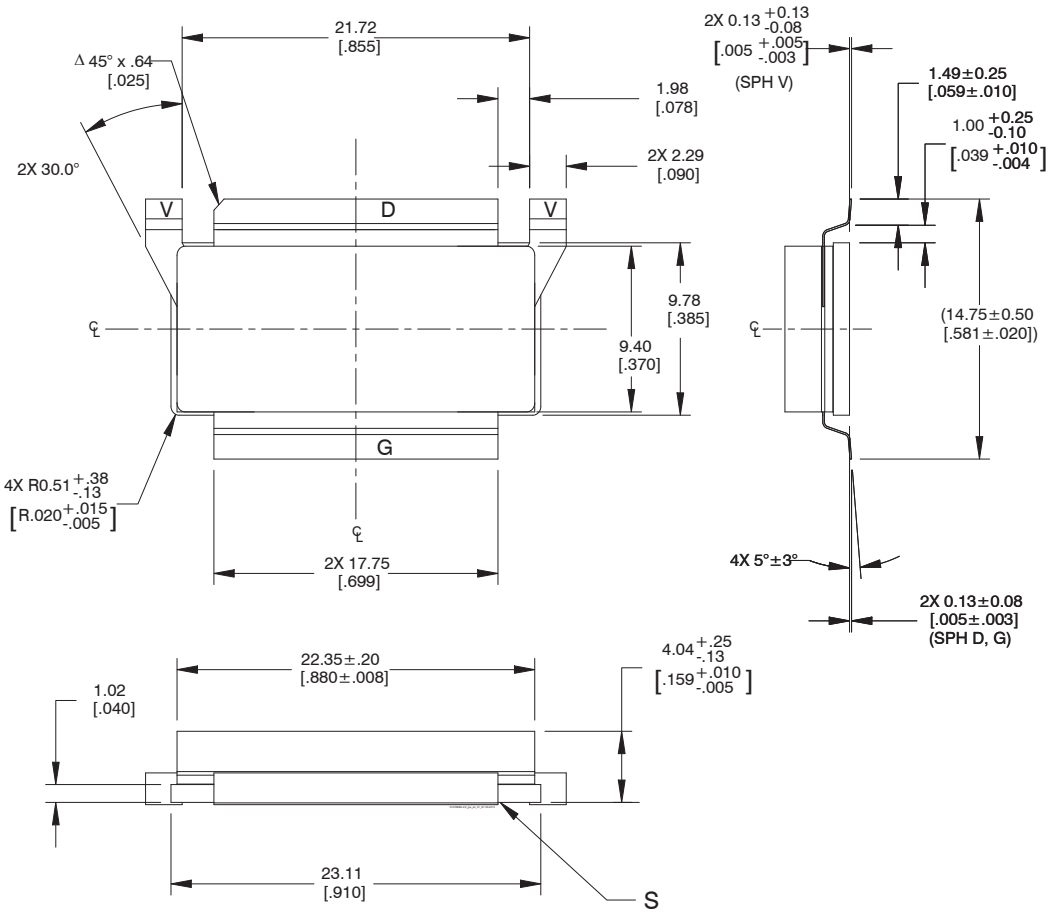



Diagram Notes—unless otherwise specified:

1. Interpret dimensions and tolerances per ASME Y14.5M-1994.
2. Primary dimensions are mm. Alternate dimensions are inches.
3. All tolerances ± 0.127 [.005] unless specified otherwise.
4. Pins: D – drain; G – gate; S – source; V – $V_{DD}$.
5. Lead thickness: 0.10 + 0.051/-0.025 mm [.004 +0.002/-0.001 inch].
6. Gold plating thickness: 1.14 ± 0.38 micron [45 ± 15 microinch].

*Find the latest and most complete information about products and packaging at the Infineon Internet page http://www.infineon.com/rfpower*

## Revision History

| Revision | Date | Data Sheet Type | Page | Subjects (major changes since last revision) |
|---|---|---|---|---|
| 01 | 2014-07-24 | Advance | All | Data Sheet reflects advance specification for product development |
| 02 | 2014-10-31 | Production | All | Data Sheet reflects released product specification |

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