## / Descriptions

TO-252 N

N-CHANNEL MOSFET in a TO-252 Plastic Package.

## / Features

$V_{DS}$ (V) = 20V $I_D$ =95A ($V_{GS}$ = ±20V)

$R_{DS(ON)}$@4.5V≤4mR(Typ.3.7mR)

$R_{DS(ON)}$@2.5V≤6mR(Typ.5.5mR)

$R_{DS(ON)}$@2.0V≤15mR(Typ.8mR)

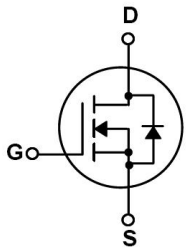
。HF Product.

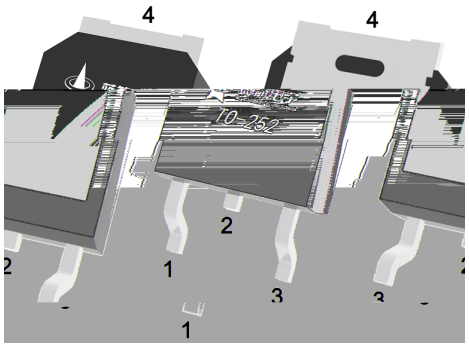
## / Applications

POL DC/DC

DC/DC Converters in Computing, Servers, and POL,Battery protection switch.

## / Equivalent Circuit




PIN1 G PIN 2 D PIN 3 S PIN 4 D

## / Marking

See Marking Instructions.

| Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DSS}$ | 20 | V |
| Drain Current | | $I_D$(Tc=25℃) | 95 | A |
| Drain Current - Pulsed | | $I_{DM}$ | 212 | A |
| Gate-Source Voltage | | $V_{GS}$ | ±12 | V |
| Avalanche Current | | $I_{AS}$ | 24 | A |
| Single Pulsed Avalanche Energy | | $E_{AS}$ | 201 | mJ |
| Power Dissipation | | $P_D$(Tc=25℃) | 55 | W |
| Storage Temperature Range | | $T_{stg}$ | -55～150 | ℃ |
| Thermal Resistance-Junction to Ambient | t ≤ 10s | $R_{\theta JA}$ | 20 | ℃/W |
| | Steady-State | | 50 | |
| Thermal Resistance-Junction to Case | Steady-State | $R_{\theta JC}$ | 2.27 | |

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V $I_D$=250μA | 20 | 24 | | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=20V $V_{GS}$=0V | | | 1.0 | μA |
| Gate-Body Leakage Current Forward | $I_{GSS}$ | $V_{GS}$=±12V $V_{DS}$=0V | | | ±100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$ $I_D$=250μA | 0.4 | 0.7 | 1 | V |
| Static Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}$=4.5V $I_D$=15A | | 3.7 | 4 | mΩ |
| | | $V_{GS}$=2.5V $I_D$=10A | | 5.5 | 6 | |
| | | $V_{GS}$=2.0V $I_D$=6.0A | | 8 | 15 | |
| Drain-Source Diode Forward Voltage | $V_{SD}$ | $V_{GS}$=0V $I_S$=1A | | | 1.25 | V |
| Gate resistance | $R_g$ | $V_{GS}$=0V $V_{DS}$=0V, f=1MHz | | 2.2 | | Ω |
| Input Capacitance | $C_{iss}$ | $V_{DS}$=10V $V_{GS}$=0V f=1.0MHz | | 2700 | | pF |
| Output Capacitance | $C_{oss}$ | | | 370 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 360 | | |
| Total Gate Charge | Qg(4.5V) | $V_{GS}$=4.5V $V_{DS}$=10V $I_D$=20A | | 31 | | nC |
| Gate Source Charge | $Q_{gs}$ | | | 5.2 | | |
| Gate Drain Charge | $Q_{gd}$ | | | 8 | | |

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Turn-On Delay Time | $t_{d(on)}$ | | | 7.5 | | |
| Turn-On Rise Time | $t_r$ | $V_{GS}$=10V $V_{DS}$=10V | | 15 | | ns |
| Turn-Off Delay Time | $t_{d(off)}$ | $R_L$=0.5Ω $R_{GEN}$=3Ω | | 72 | | |
| Turn-Off Fall Time | t | | | | | |

## / Electrical Characteristic Curve

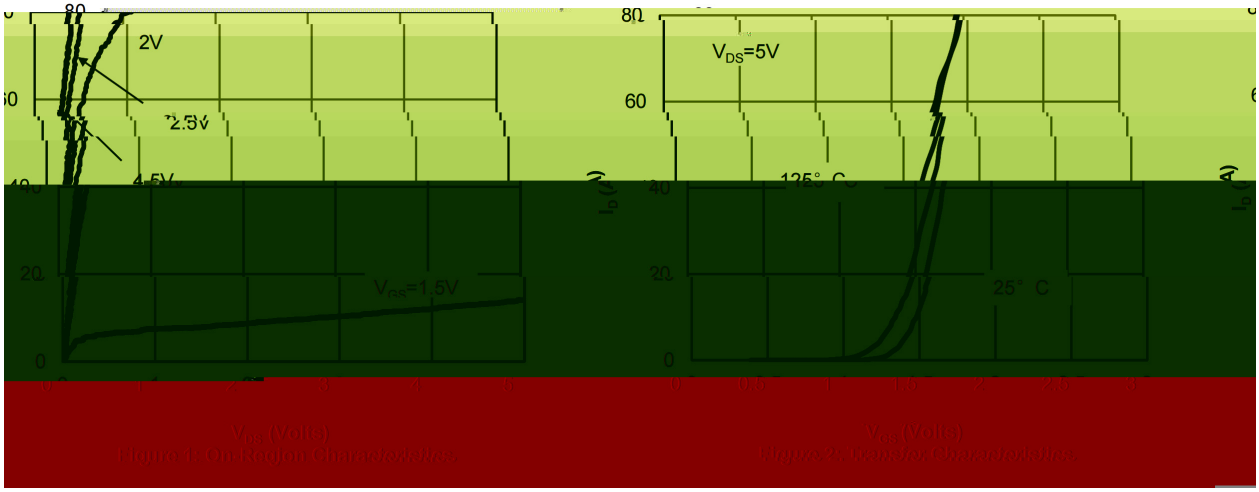
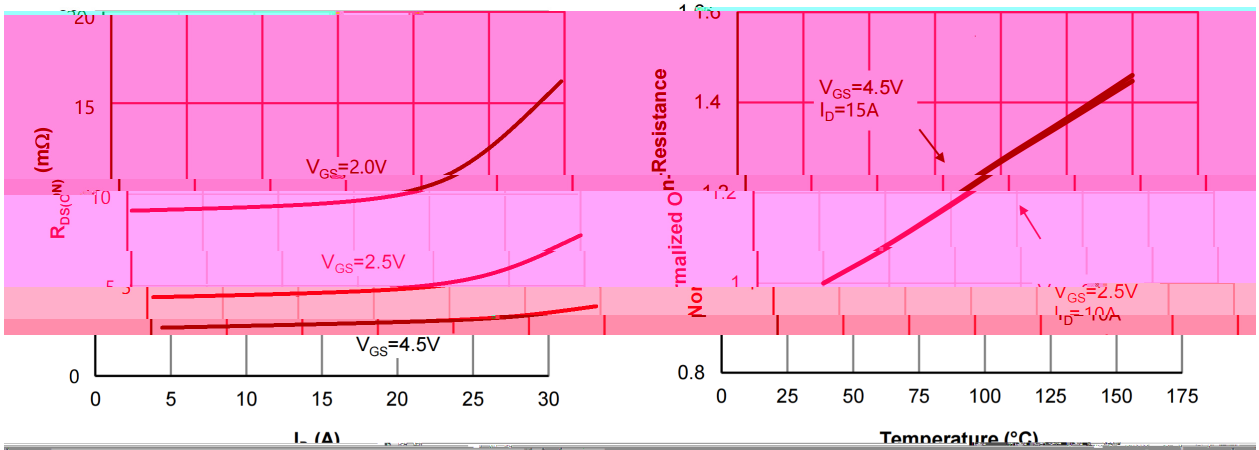



Figure 1: On-Region Characteristics

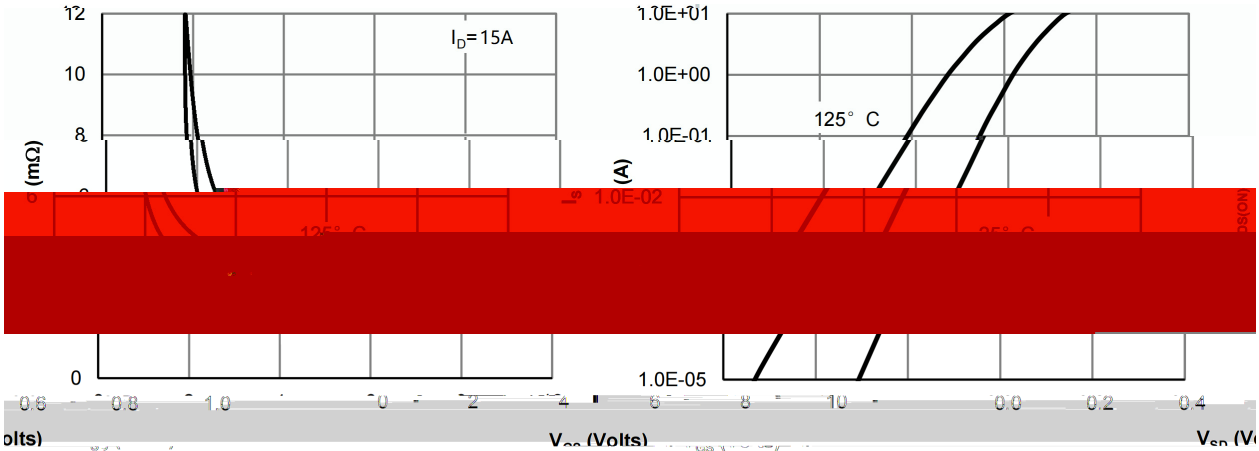
Figure 2: Transfer Characteristics




tion Temperature

Figure 3: On-Resistance vs. Drain Current and Gate Voltage

Figure 4: On-Resistance vs. Junc



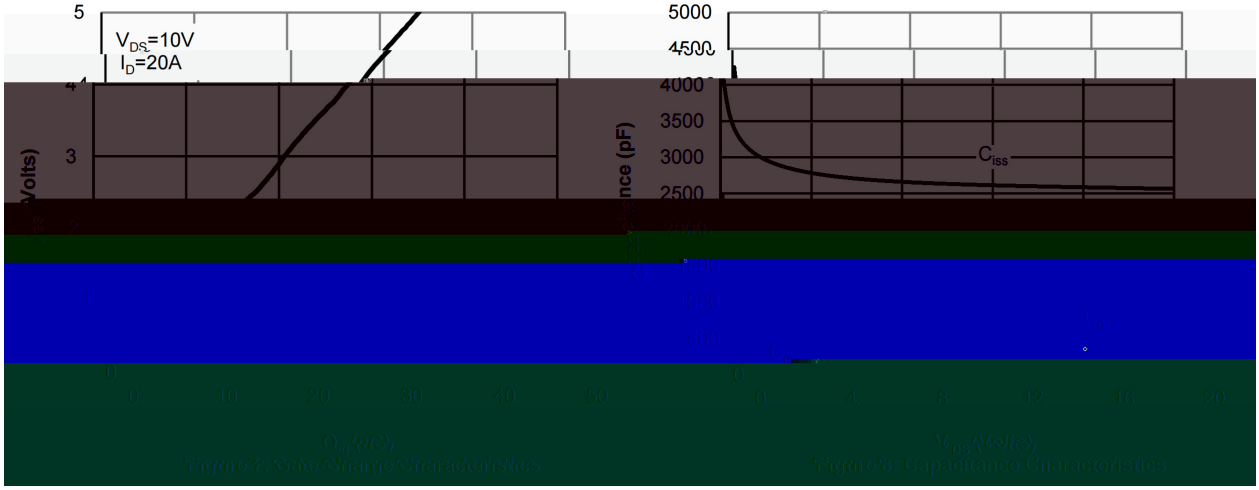

olts)

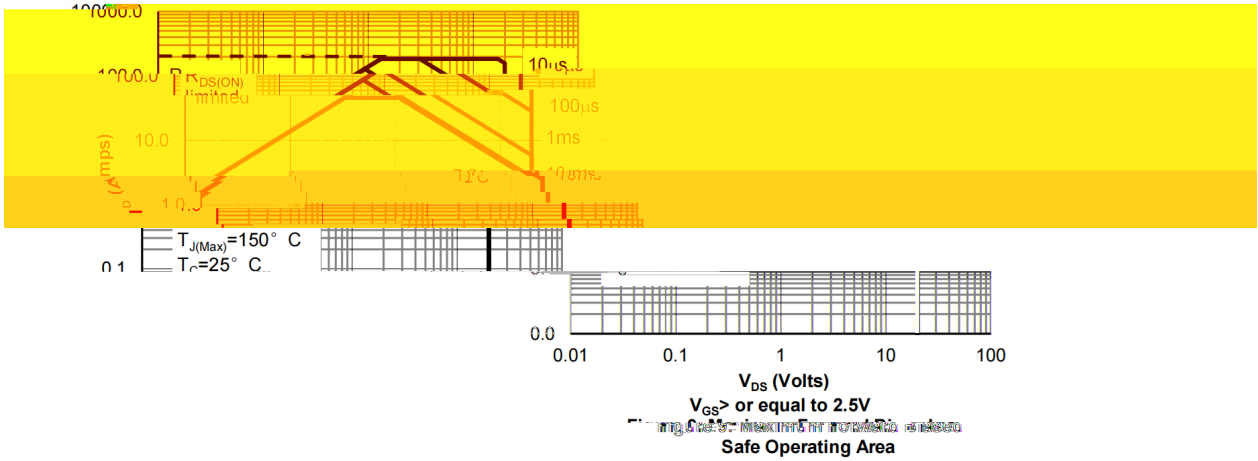
6: Body-Diode Characteristics

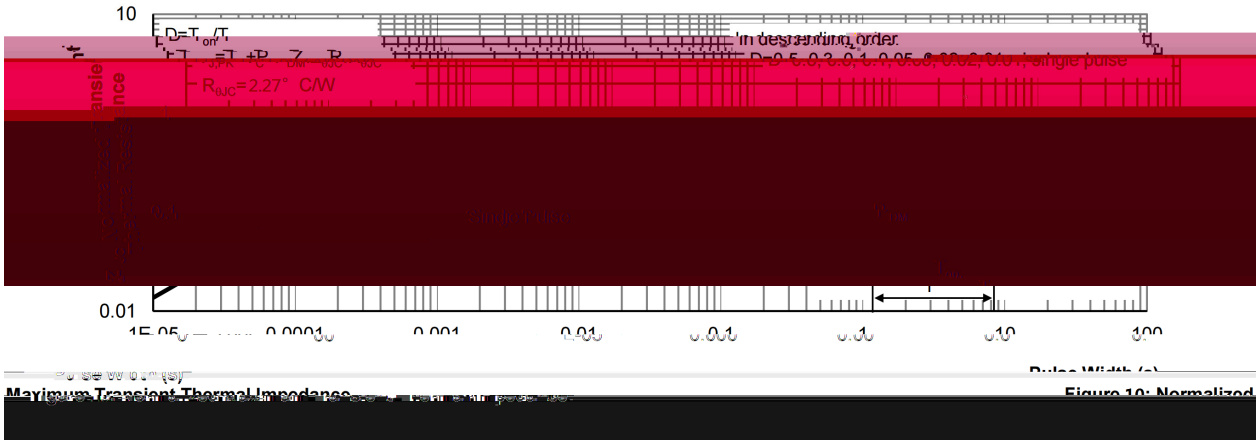
Figure 5: On-Resistance vs. Gate-Source Voltage

Figure

## / Electrical Characteristic Curve

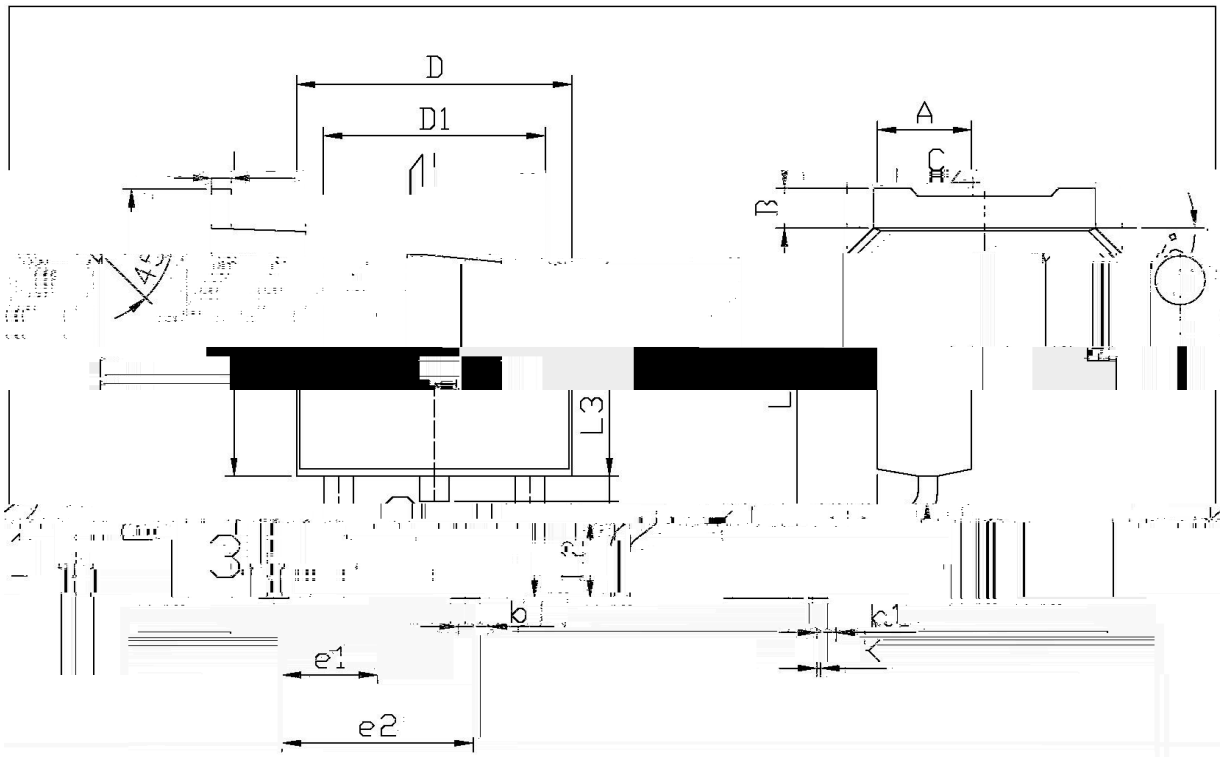



Maximum Transient Thermal Impedance Figure 10: Normalized

## / Package Dimensions

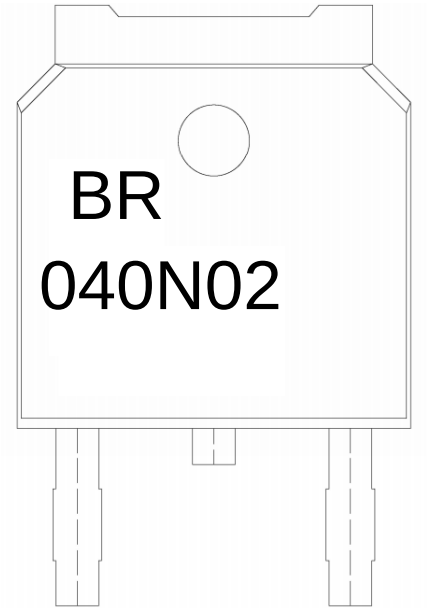



单位：mm

| Symbol | Dimensions In Millimeters | | Symbol | Dimensions In Millimeters | |
|---|---|---|---|---|---|
| | Min | Max | | Min | Max |
| E | 5.95 | 6.25 | A | 2.20 | 2.40 |
| e1 | 2.24 | 2.34 | B | 0.95 | 1.25 |
| e2 | 4.62 | 4.72 | b | 0.70 | 0.90 |
| c | 0.40 | 0.60 | c2 | 0.40 | 0.60 |
| L | 9.85 | 10.35 | L1 | 0.45 | 0.55 |
| L2 | 0.55 | 0.75 | L3 | 1.70 | 2.00 |
| H | 0.90 | 1.10 | D | 6.45 | 6.75 |
| H1 | 0.10 | 0.30 | D1 | 5.10 | 5.50 |
| | | | K | 0.00 | 0.20 |

TO-252

## / Marking Instructions




BR

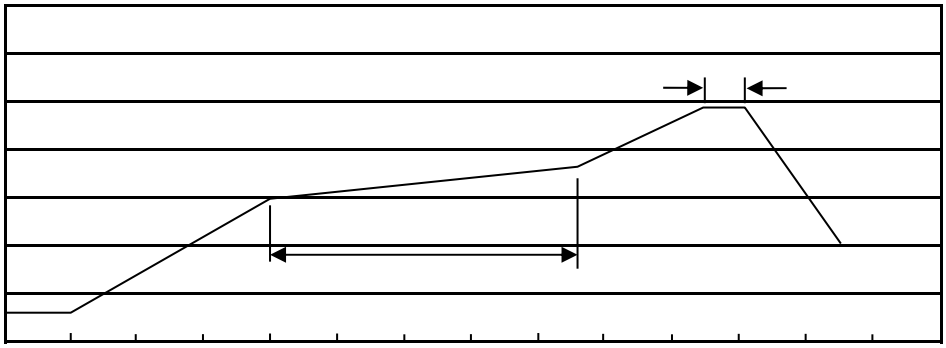
040N02

****

Note:

| | |
|---|---|
| BR: | Company Code |
| 040N02: | Product Type Code |
| ****: | Lot No. Code, code change with Lot No |

## ( ) /



Note:

| | | | | |
|---|---|---|---|---|
| 1 | 150 180 | 60 90sec; | 1.Preheating:150~180 | , Time:60~90sec. |
| 2 | 245±5 | 5±0.5sec; | 2.Peak Temp.:245±5 | , Duration:5±0.5sec. |
| 3 | 2 10 | /sec. | 3. Cooling Speed: 2~10 | /sec. |

## / Resistance to Soldering Heat Test Conditions

260±5 10±1 sec. Temp.:260±5℃ Time:10±1 sec

## / Packaging SPEC.

/ REEL

| Package Type | Units | | | | | Dimension | | (unit mm³) |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| TO-252 | 2,500 | 2 | 5,000 | 6 | 30,000 | 13″ ×16 | 360×360×50 | 380×335×366 |

/ TUBE

| Package Type | Units | | | | | Dimension | | (unit mm³) |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| TO-251/252 | 75 | 48 | 3,600 | 5 | 18,000 | 526×20.5×5.25 | 555×164×50 | 575×290×180 |

## / Notices