## / Descriptions

TO-220 N MOS N-CHANNEL MOSFET in a TO-220 Plastic Package.

## / Features

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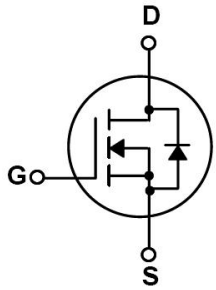
Low gate charge, low crss, fast switching.

## / Applications

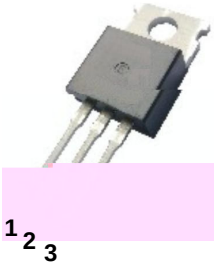
DC/DC

These devices are well suited for high efficiency switching DC/DC converters and switch mode power supplies.

## / Equivalent Circuit




## / Pinning




PIN1 G PIN 2 D PIN 3 S

## / $h_{FE}$ Classifications & Marking

See Marking Instructions.

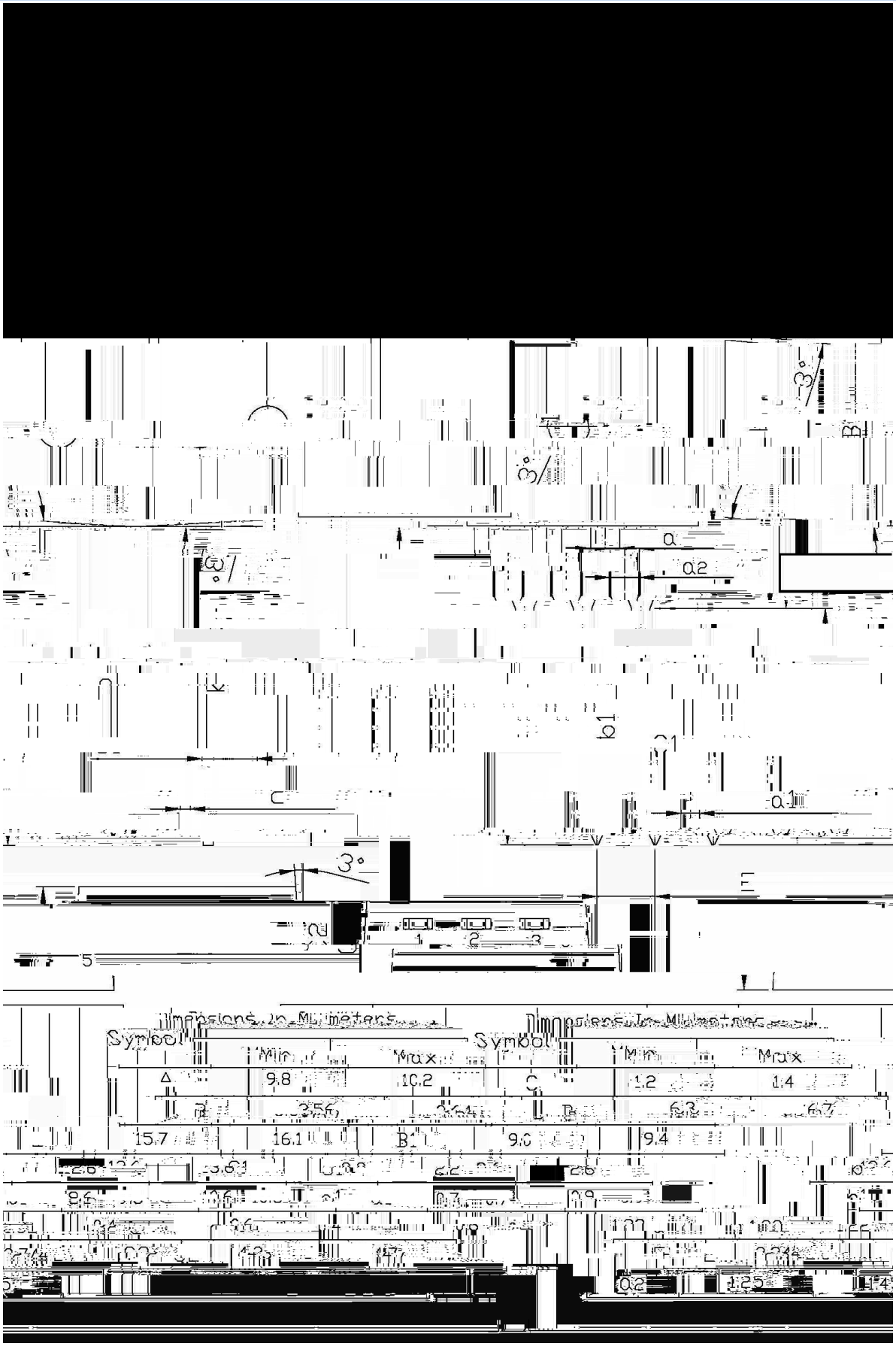
## / Absolute Maximum Ratings(Ta=25 )

| Parameter | Symbol | Rating | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DSS}$ | 600 | V |
| Drain Current | $I_D$(Tc=25 ) | 2.0 | A |
| | $I_D$(Tc=100 ) | 1.3 | A |
| Drain Current - Pulsed | $I_{DM}$ | 6.0 | A |
| Gate-Source Voltage | $V_{GSS}$ | ±30 | V |
| Single Pulsed Avalanche Energy | $E_{AS}$ | 120 | mJ |
| Repetitive Avalanche Energy | $E_{AR}$ | 5.4 | mJ |
| Avalanche Current | $I_{AR}$ | 2.0 | A |
| Power Dissipation | $P_D$(Tc=25 ) | 54 | W |
| Operating and Storage Temperature Range | $T_J$,$T_{STG}$ | -55 to 150 | |

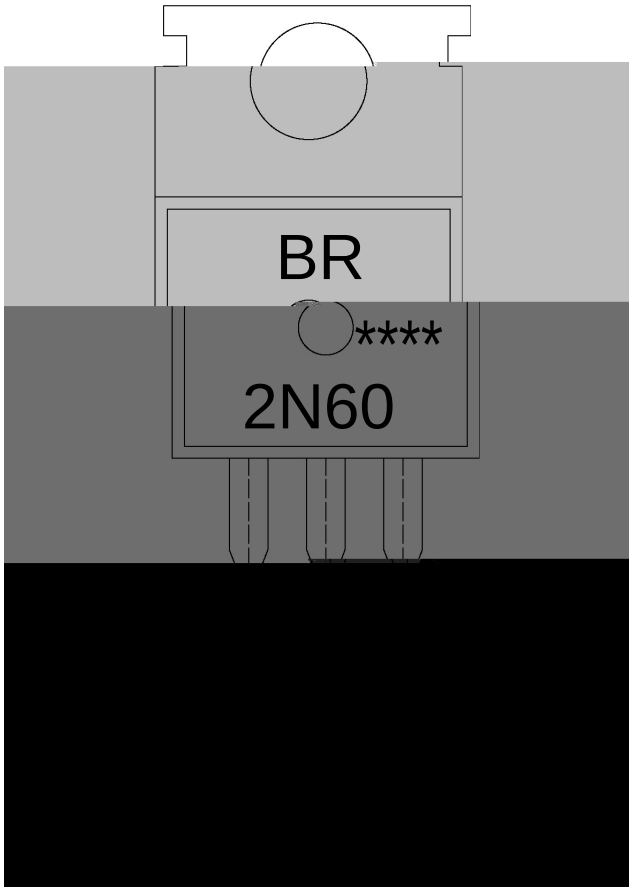
## / Electrical Characteristics(Ta=25 )

| Parameter | Symbol | Test Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V | $I_D$=250μA | 600 | | | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=600V | $V_{GS}$=0V | | | 1.0 | μA |
| | | $V_{DS}$=480V | $T_C$=125 | | | 100 | μA |
| Gate-Body Leakage Current, Forward | $I_{GSS}$ | $V_{GS}$=±30V | $V_{DS}$=0V | | | ±0.1 | μA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$ | $I_D$=250μA | 2.0 | | 4.0 | V |
| Static Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}$=10V | $I_D$=1.0A | | 4.0 | 5.0 | Ω |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$=40V | $I_D$=1.0A | | 2.05 | | S |
| Drain-Source Diode Forward Voltage | $V_{SD}$ | $V_{GS}$=0V | $I_S$=2.0A | | | 1.4 | V |
| Input Capacitance | $C_{iss}$ | $V_{DS}$=25V f=1.0MHz | $V_{GS}$=0V | | 320 | 420 | pF |
| Output Capacitance | $C_{oss}$ | | | | 35 | 46 | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | | | 4.5 | 6.0 | pF |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD}$=300V $R_G$=25Ω | $I_D$=2.0A | | 8.0 | 30 | ns |
| Turn-On Rise Time | $t_r$ | | | | 23 | 60 | ns |
| Turn-Off Delay Time | $t_{d(off)}$ | | | | 25 | 60 | ns |
| Turn-Off Fall Time | $t_f$ | | | | 28 | 70 | ns |

## / Package Dimensions



## / Marking Instructions




BR

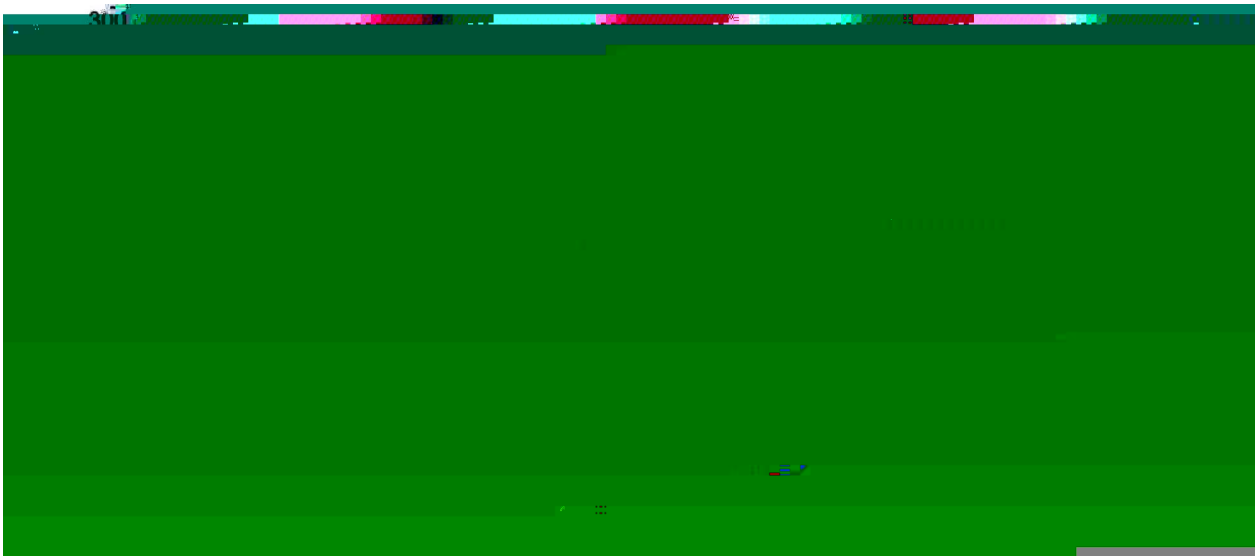
2N60

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Note:

| | |
|---|---|
| BR: | Company Code |
| 2N60: | Product Type. |
| ****: | Lot No. Code, code change with Lot No. |

## ( ) / Temperature Profile for Dip Soldering(Pb-Free)



| | | | | | |
|---|---|---|---|---|---|
| | | | | | Note: |
| 1 | 25 | 150 | 60 | 90sec; | 1.Preheating:25~150 , Time:60~90sec. |
| 2 | 255±5 | | | 5±0.5sec; | 2.Peak Temp.:255±5 , Duration:5±0.5sec. |
| 3 | | | 2 | 10 /sec. | 3. Cooling Speed: 2~10 /sec. |

## / Resistance to Soldering Heat Test Conditions

| | | | |
|---|---|---|---|
| 270±5 | 10±1 sec. | Temp.:270±5 | Time:10±1 sec |

## / Packaging SPEC.