# MJ N-Channel Enhancement Mode Power MOSFET

## Description

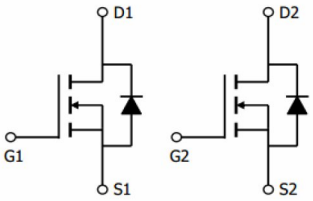
The MJ30ND35Q uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

## General Features

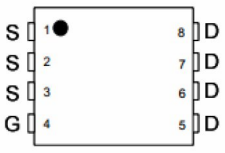
- $V_{DS}$=30V,$I_D$=35A
  $R_{DS(ON)}$<13mΩ @ $V_{GS}$=10V
  $R_{DS(ON)}$<19mΩ @ $V_{GS}$=4.5V
- High density cell design for ultra low Rdson
- Fully characterized Avalanche voltage and current
- Good stability and uniformity with high $E_{AS}$
- Excellent package for good heat dissipation
- Special process technology for high ESD capability

## Application

- Power switching application
- Hard Switched and High Frequency Circuits
- Uninterruptible Power Supply

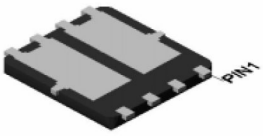



Schematic diagram




Pin Assignment


Top View




Bottom View

**100% UIS TESTED! 100% ΔVds TESTED!**

## Package Marking and Ordering Information

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity |
|---|---|---|---|---|---|
| MJ30ND35Q | MJ30ND35Q | DFN 3.3x3.3-8L | - | - | - |

## Absolute Maximum Ratings ($T_C$ =25 ℃unless otherwise noted)

| Parameter | Symbol | Limit | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 30 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | V |
| Drain Current-Continuous | $I_D$ | 35 | A |
| Drain Current-Continuous($T_C$ =100℃) | $I_{D(100℃)}$ | 24.8 | A |
| Pulsed Drain Current | $I_{DM}$ | 140 | A |
| Maximum Power Dissipation | $P_D$ | 30 | W |
| Single pulse avalanche energy (Note 5) | $E_{AS}$ | 0.24 | mJ |
| Derating factor | | 72 | W/℃ |
| Operating Junction and Storage Temperature Range | $T_J$ ,$T_{STG}$ | -55 To 150 | ℃ |

## Thermal Characteristic

| | | | |
|---|---|---|---|
| Thermal Resistance,Junction-to-Case (Note 2) | $R_{\theta JA}$ | 4.17 | ℃/W |

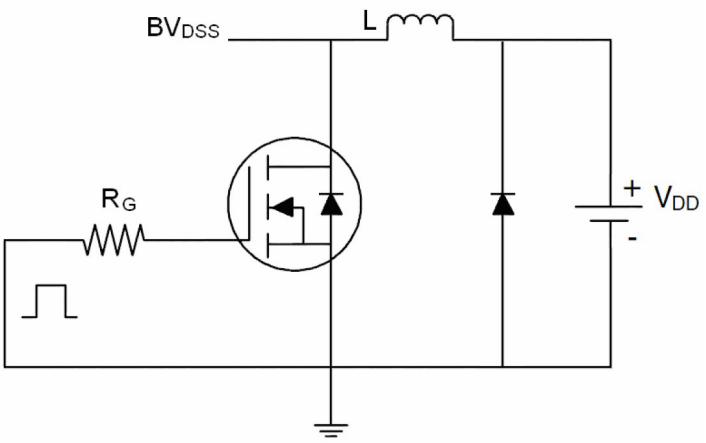
## Electrical Characteristics ($T_A$ =25℃unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V $I_D$=250μA | 30 | - | - | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=30V,$V_{GS}$=0V | - | - | 1 | μA |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{DS}$=±20V,$V_{DS}$=0V | - | - | ±100 | nA |
| **On Characteristics** (Note 3) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ =$V_{GS}$ ,$I_D$ =250μA | 0.9 | 1.3 | 2.0 | V |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}$ =10V, $I_D$ =20A | - | 11 | 13 | mΩ |
| | | $V_{GS}$ =4.5V, $I_D$ =20A | - | 14.5 | 19 | mΩ |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$ =5V,$I_D$ =20A | 26 | - | - | S |
| **Dynamic Characteristics** (Note 4) | | | | | | |
| Input Capacitance | $C_{lss}$ | $V_{DS}$=15V,$V_{GS}$=0V, F=1.0MHz | - | 1000 | - | PF |
| Output Capacitance | $C_{oss}$ | | - | 180.8 | - | PF |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 164.4 | - | PF |
| **Switching Characteristics** (Note 4) | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}$=15V, $R_L$=0.75Ω $V_{GS}$=10V,$R_G$=3Ω | - | 5 | - | nS |
| Turn-on Rise Time | $t_r$ | | - | 12 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 19 | - | nS |
| Turn-Off Fall Time | $t_f$ | | - | 6 | - | nS |
| Total Gate Charge | $Q_g$ | $V_{DS}$=15V,$I_D$=20A, $V_{GS}$=10V | - | 17 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 2.8 | - | nC |
| Gate-Drain Charge | $Q_{gd}$ | | - | 3.9 | - | nC |
| **Drain-Source Diode Characteristics** | | | | | | |
| Diode Forward Voltage (Note 3) | $V_{SD}$ | $V_{GS}$=0V,$I_S$=-20A | - | | 1.2 | V |
| Diode Forward Current (Note 2) | $I_S$ | | - | - | 35 | A |
| Reverse Recovery Time | $t_{rr}$ | $T_J$=25°C, $I_F$=20A di/dt=100A/μs (Note 3) | - | 19 | - | nS |
| Reverse Recovery Charge | $Q_{rr}$ | | - | 10 | - | nC |
| Forward Turn-On Time | ton | Intrinsic turn-on time is negligible(turn-on is dominated by LS+LD) | | | | |

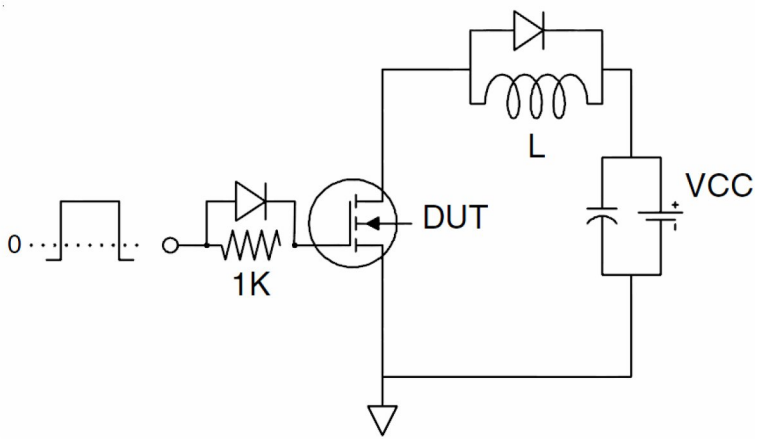
### Notes:

① Repetitive Rating: Pulse width limited by maximum junction temperature.
② Surface Mounted on FR4 Board, t ≤ 10 sec.
③ Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
④ Guaranteed by design, not subject to production
⑤ EAS condition: Tj=25℃,$V_{DD}$=15V,$V_G$=10V,L=0.5mH,Rg=25Ω

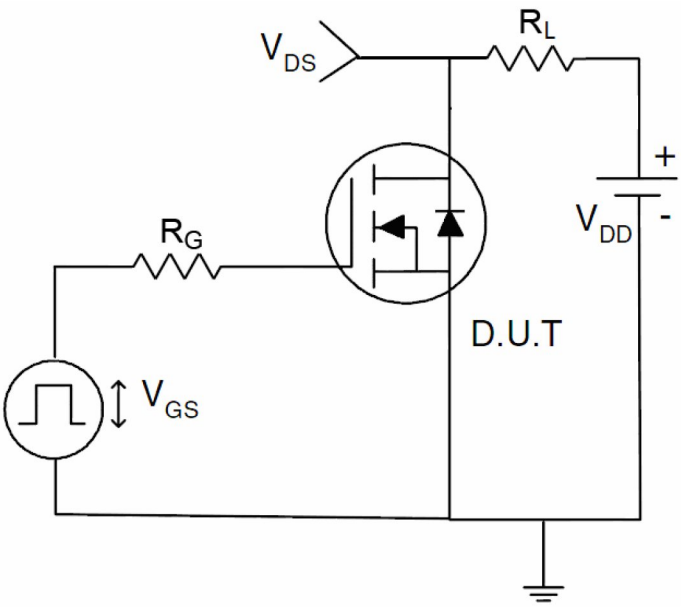
Test circuit




EAS test Circuit




Gate charge test Circuit




Switch Time Test Circuit

## Typical Electrical and Thermal Characteristics (Curves)

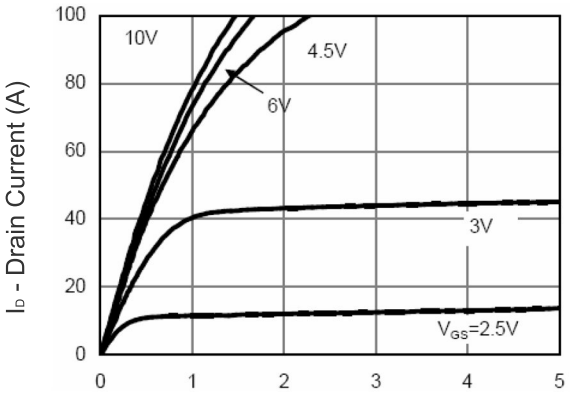



Figure 1 Output Characteristics

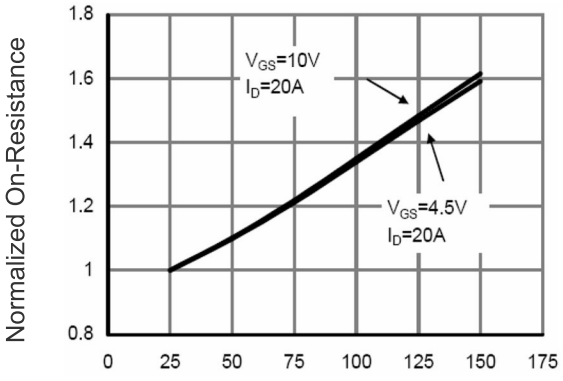



Figure 4 Rdson-Junction Temperature

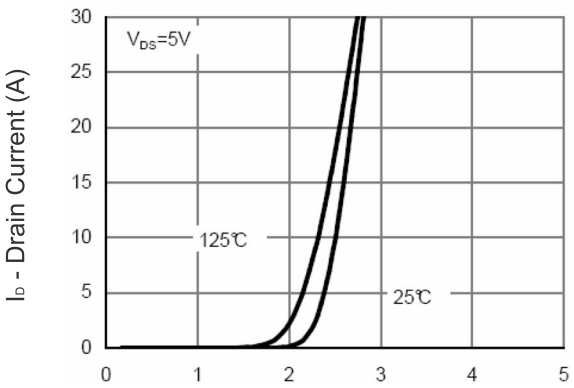



Figure 2 Transfer Characteristics

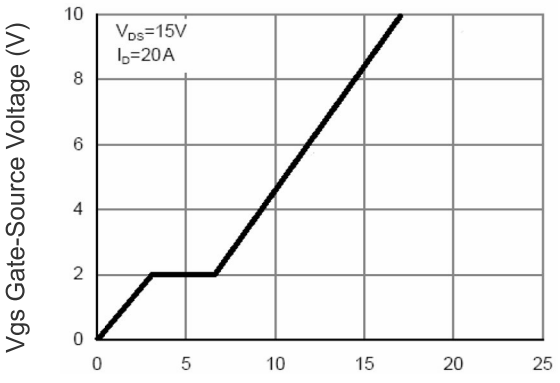



Figure 5 Gate Charge

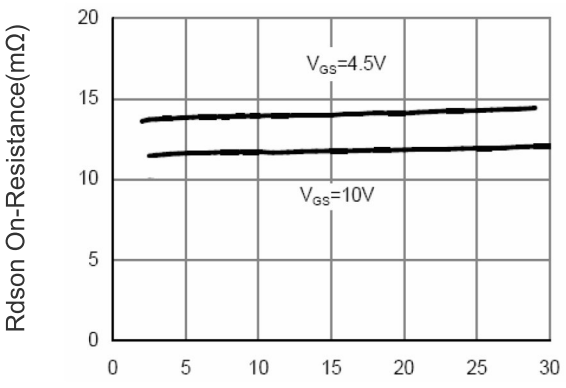



Figure 3 Rdson- Drain Current

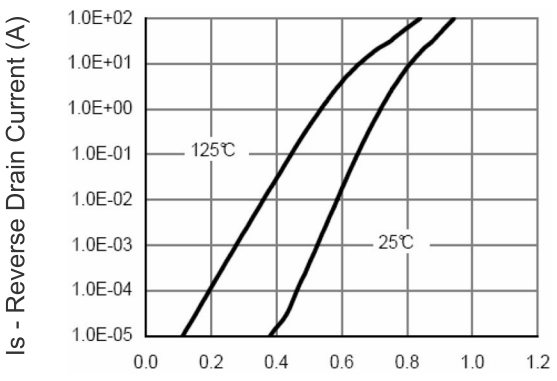



Figure 6 Source- Drain Diode Forward

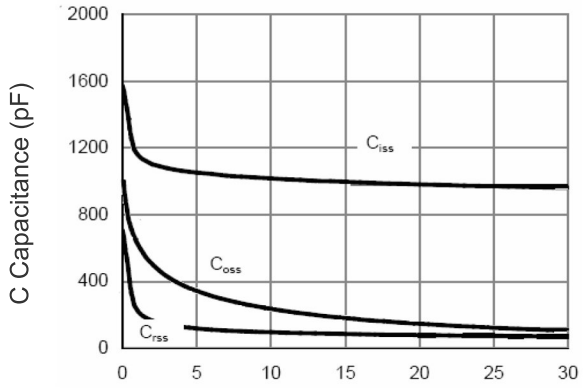



Figure 7 Capacitance vs Vds

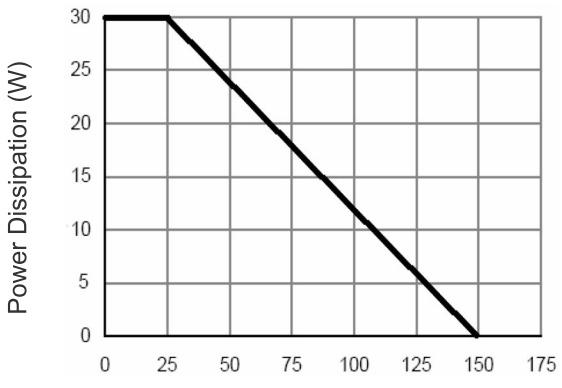



Figure 9 Power De-rating

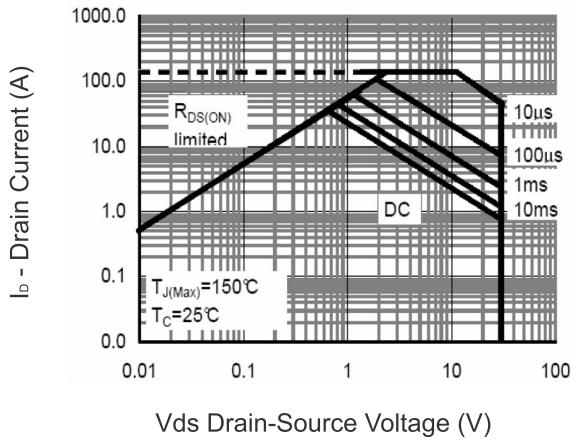



Figure 8 Safe Operation Area

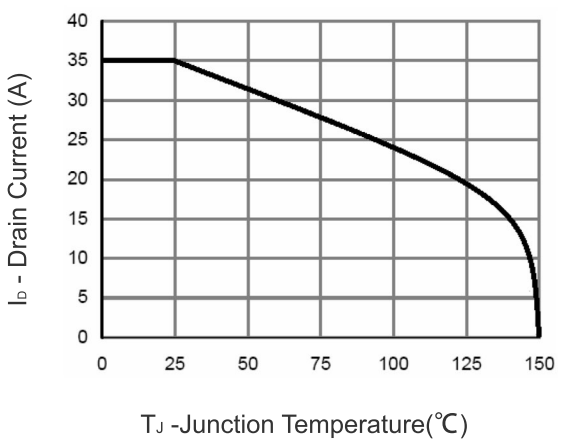



Figure 10 ID Current De-rating

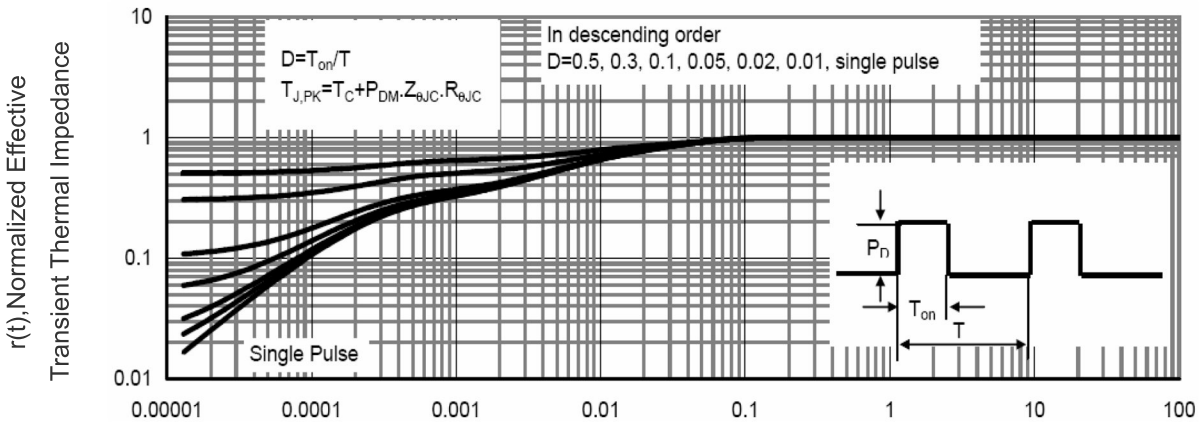
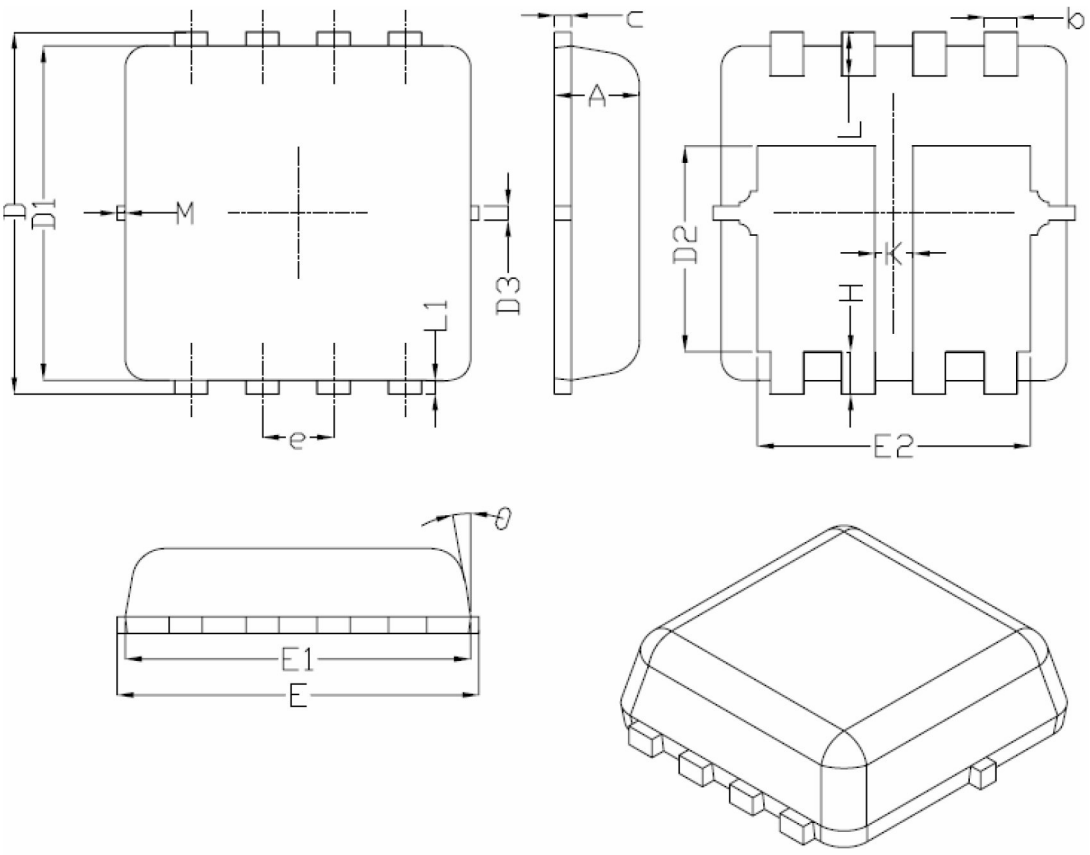


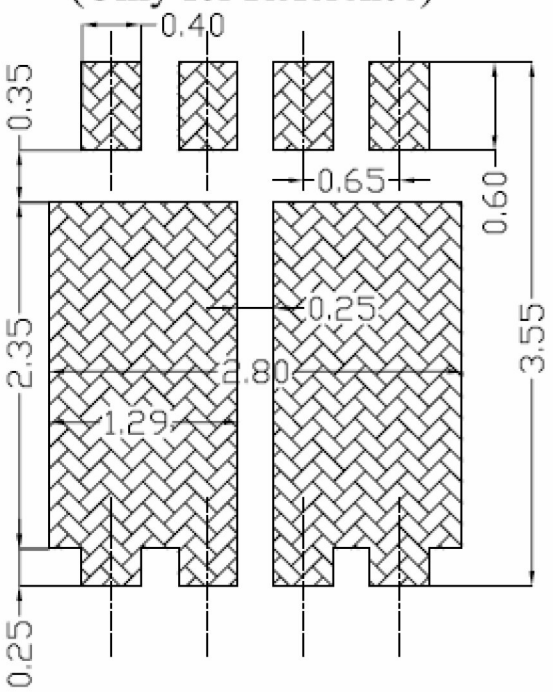

Figure 11 Normalized Maximum Transient Thermal Impedance

## DFN3.3X3.3-8L Package Information




| SYMBOL | DIMENSIONAL REQMTS | | |
|---|---|---|---|
| | MIN | NOM | MAX |
| A | 0.70 | 0.75 | 0.80 |
| b | 0.25 | 0.30 | 0.35 |
| c | 0.10 | 0.15 | 0.25 |
| D | 3.25 | 3.35 | 3.45 |
| D1 | 3.00 | 3.10 | 3.20 |
| D2 | 1.78 | 1.88 | 1.98 |
| D3 | --- | 0.13 | --- |
| E | 3.20 | 3.30 | 3.40 |
| E1 | 3.00 | 3.15 | 3.20 |
| E2 | 2.39 | 2.49 | 2.59 |
| e | 0.65BSC | | |
| H | 0.30 | 0.39 | 0.50 |
| L | 0.30 | 0.40 | 0.50 |
| L1 | --- | 0.13 | --- |
| K | 0.30 | --- | --- |
| θ | --- | 10° | 12° |
| M | * | * | 0.15 |
| * Not specified | | | |

Land Pattern
(Only for Reference)



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