# FTP07N07N

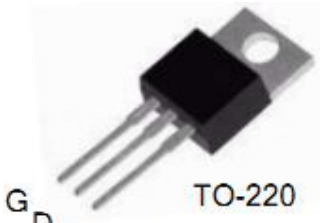
## N-Channel MOSFET

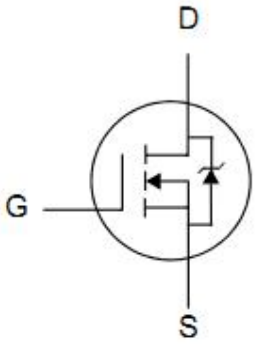
**Lead Free Package and Finish**

### Applications:
- Adaptor
- Charger
- SMPS

| $V_{DSS}$ | $R_{DS(ON)}$(Typ.) | $I_D$ |
|---|---|---|
| 70V | 6.5mΩ | 80A |

### Features:
- RoHS Compliant
- Low ON Resistance
- Low Gate Charge
- Peak Current vs Pulse Width Curve
- Inductive Switching Curves




### Ordering Information

| PART NUMBER | PACKAGE | BRAND |
|---|---|---|
| FTP07N07N | TO-220 | ***IPS*** |

### Absolute Maximum Ratings

$T_C$=25℃ unless otherwise specified

| Symbol | Parameter | FTP07N07N | Units |
|---|---|---|---|
| $V_{DSS}$ | Drain-to-Source Voltage | 70 | V |
| $I_D$ | Continuous Drain Current | 80 | A |
| | Continuous Drain Current $T_C$ =100℃ | 52 | A |
| $I_{DM}$ | Pulsed Drain Current (NOTE *1) | 320 | A |
| $P_D$ | Power Dissipation | 156 | W |
| | Derating Factor above 25℃ | 1.25 | W/℃ |
| $V_{GS}$ | Gate-to-Source Voltage | ±20 | V |
| $E_{AS}$ | Single Pulse Avalanche Energy(NOTE *2) | 325 | mJ |
| $T_L$ | Maximum Temperature for Soldering | 300 | ℃ |
| $T_J$ and $T_{STG}$ | Operating Junction and Storage Temperature Range | 150，-55 to150 | |

### Thermal Resistance

| Symbol | Parameter | Max. | Units | Test Conditions |
|---|---|---|---|---|
| $R_{\theta JC}$ | Junction-to-Case | 0.8 | ℃/W | Water cooled heatsink, $P_D$ adjusted for a peak junction temperature of +150℃. |
| $R_{\theta JA}$ | Junction-to-Ambient | 62.5 | | 1 cubic foot chamber, free air. |

**OFF Characteristics** $T_C$=25℃ unless otherwise specified

| Symbol | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain-to-Source Breakdown Voltage | 70 | -- | -- | V | $V_{GS}$=0V, $I_D$=250μA |
| $I_{DSS}$ | Drain-to-Source Leakage Current | -- | -- | 1 | μA | $V_{DS}$=70V, $V_{GS}$=0V $T_J$=25℃ |
| | | -- | -- | 100 | | $V_{DS}$=56V, $V_{GS}$=0V $T_J$=125℃ |
| $I_{GSS}$ | Gate-to-Source Forward Leakage | -- | -- | +100 | nA | $V_{GS}$=+20V |
| | Gate-to-Source Reverse Leakage | -- | -- | -100 | | $V_{GS}$= -20V |

**ON Characteristics** $T_J$=25℃ unless otherwise specified

| Symbol | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|
| $R_{DS(ON)}$ | StaticDrain-to-Source On-Resistance | -- | 6.5 | 7.9 | mΩ | $V_{GS}$=10V, $I_D$=40A |
| $V_{GS(TH)}$ | Gate Threshold Voltage | 2 | -- | 4 | V | $V_{DS}$=$V_{GS}$,$I_D$=250μA |
| Pulse width ≤300μs; duty cycle≤ 2% | | | | | | |

**Dynamic Characteristics** Essentially independent of operating temperature

| Symbol | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|
| $C_{iss}$ | Input Capacitance | -- | 2595 | -- | pF | $V_{GS}$= 0V,$V_{DS}$ = 25V f =1.0MHz |
| $C_{oss}$ | Output Capacitance | -- | 337 | -- | | |
| $C_{rss}$ | Reverse Transfer Capacitance | -- | 174 | -- | | |
| $Q_g$ | Total Gate Charge | -- | 50.7 | -- | nC | $I_D$=40A,$V_{DD}$=56V $V_{GS}$ = 10V |
| $Q_{gs}$ | Gate-to-Source Charge | -- | 11.6 | -- | | |
| $Q_{gd}$ | Gate-to-Drain (“Miller”) Charge | -- | 18.3 | -- | | |

**Resistive Switching Characteristics** Essentially independent of operating temperature

| Symbol | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|
| $t_{d(ON)}$ | Turn-on Delay Time | -- | 22 | -- | ns | $V_{DD}$=35V, $I_D$=40A, $V_G$=10V $R_G$=3Ω |
| $t_{rise}$ | Rise Time | -- | 21 | -- | | |
| $t_{d(OFF)}$ | Turn-Off Delay Time | -- | 44.5 | -- | | |
| $t_{fall}$ | Fall Time | -- | 8.6 | -- | | |

**Source-Drain Diode Characteristics** Tc=25℃ unless otherwise specified

| Symbol | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current (Body Diode) | -- | -- | 80 | A | $T_C$=25℃ |
| $I_{SM}$ | Maximum Pulsed Current (Body Diode) | -- | -- | 320 | A | |
| $V_{SD}$ | Diode Forward Voltage | -- | -- | 1.2 | V | $I_{SD}$=40A, $V_{GS}$=0V |
| $t_{rr}$ | Reverse Recovery Time | -- | 29.5 | -- | ns | $I_F$= $I_S$ di/dt=100A/us |
| $Q_{rr}$ | Reverse Recovery Charge | -- | 32.4 | -- | nC | |
| Pulse width ≤300μs; duty cycle ≤ 2% | | | | | | |

Notes:

*1. Repetitive rating; pulse width limited by maximum junction temperature.

*2. L=0.5mH, $I_D$=36.1A, Start $T_J$=25℃

## Characteristics Curve：

**Figure 1.Maximum Effective Thermal Impedance，Junction-to-Case**

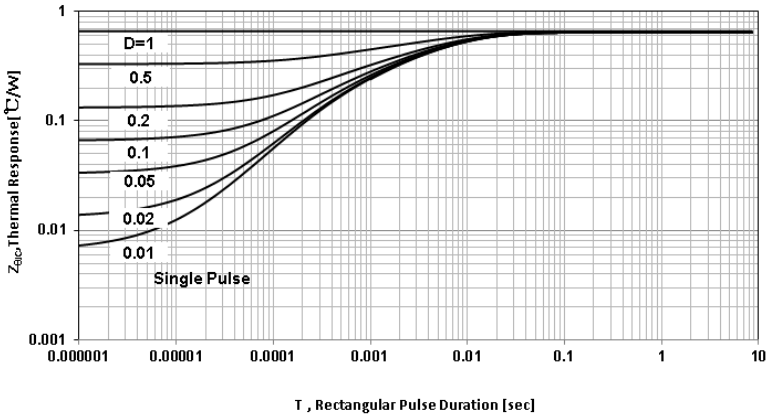



**Figure2.Max. Power Dissipation vs Case Temperature**

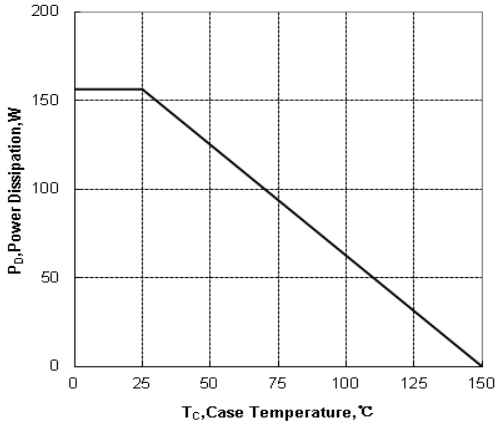



**Figure3.Max. Drain Current vs Case Temperature**

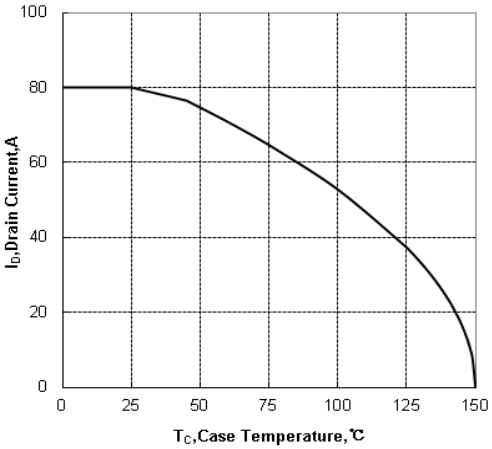



**Figure 4.Typical Output Characteristics**

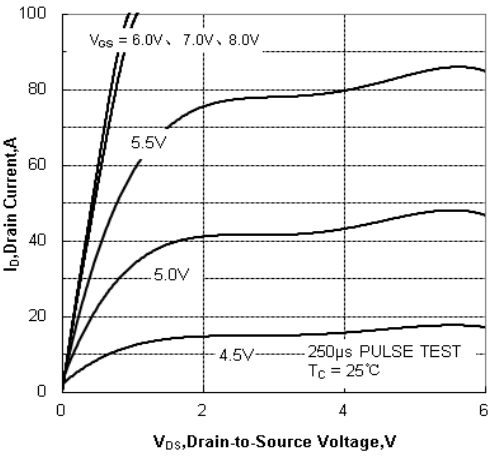



**Figure 5. Typical Transfer Characteristics**

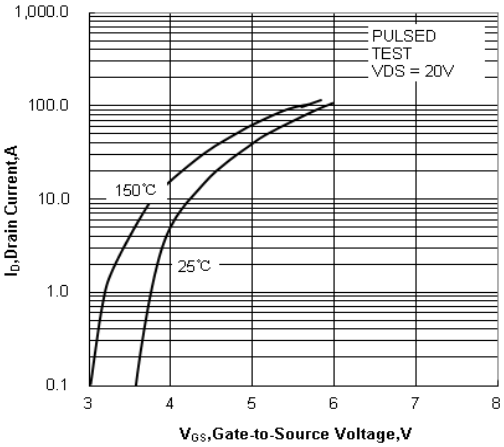


**Figure 6. Typical Body Diode Transfer Characteristics**

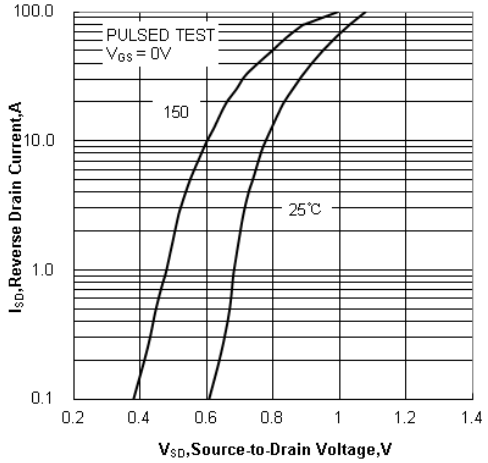



**Figure 7. Typical on Resistance VS Drain Current**

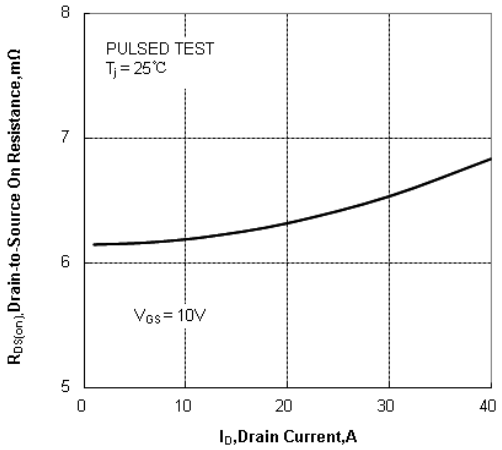



**Figure 8. Capacitance VS Drain-to-Source Voltage**

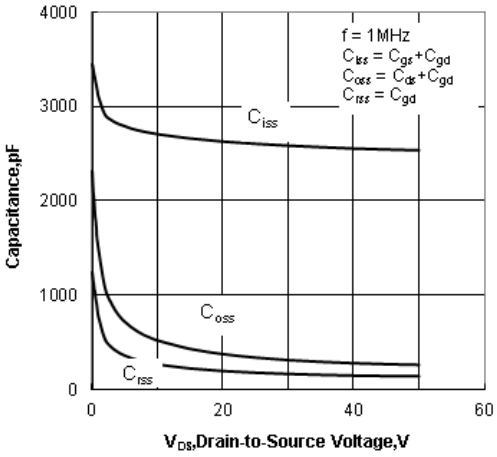



**Figure 9. Gate Charge VS Gate-to-Source Voltage**

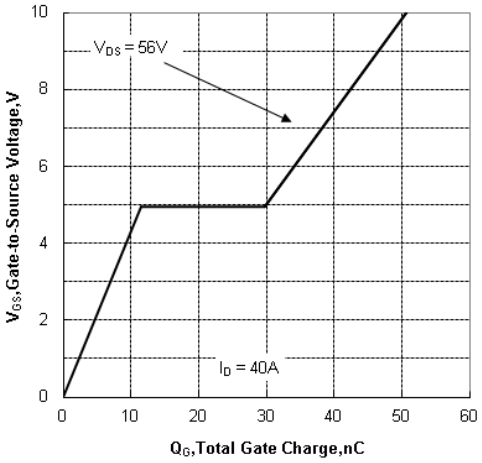


**Figure 10. Breakdown Voltage VS Temperature**

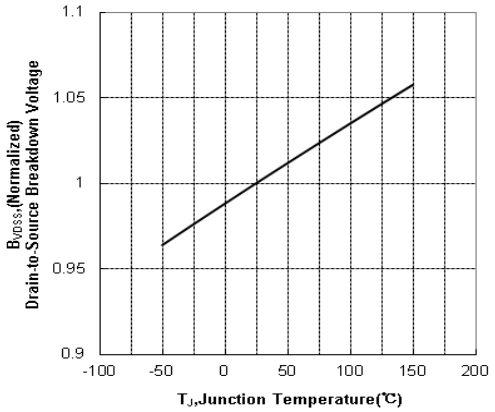



**Figure 11. on-Resistance VS Temperature**

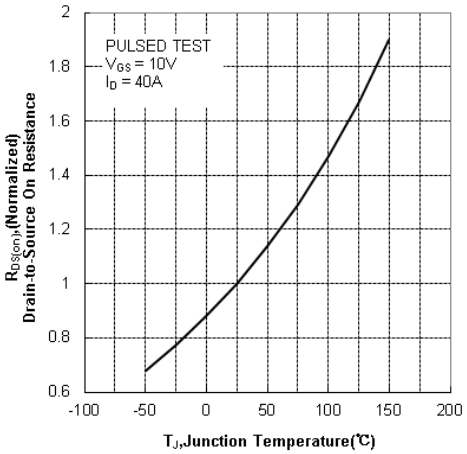



**Figure 12 Theshold Voltage vs Junction Temperature**

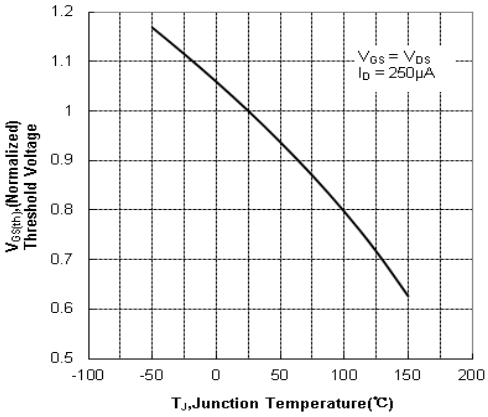
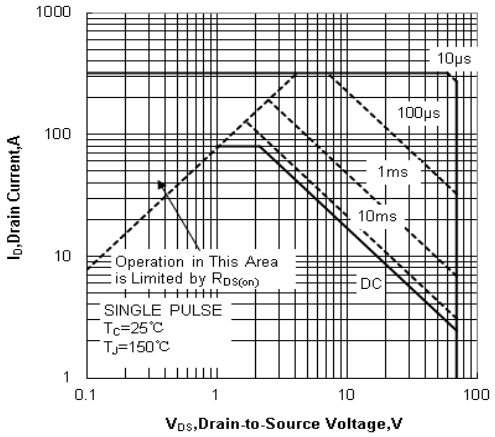



**Figure 13. Safe Operating Area**



## Test Circuits and Waveforms

**Figure 14. Gate Charge Test Circuit**

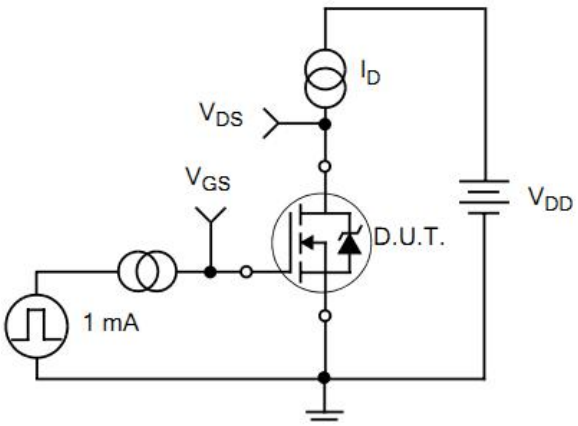



**Figure 15. Gate Charge Waveforms**

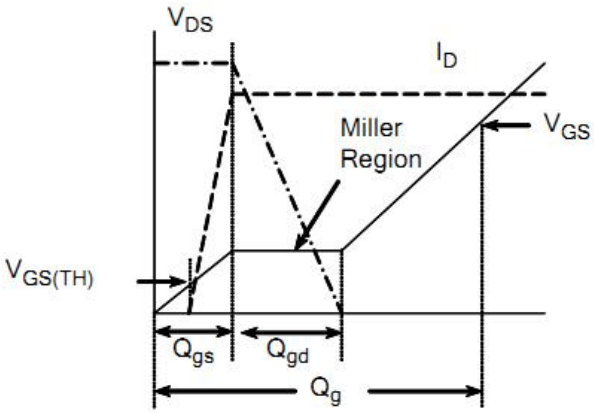



**Figure 16. Resistive Switching Test Circuit**

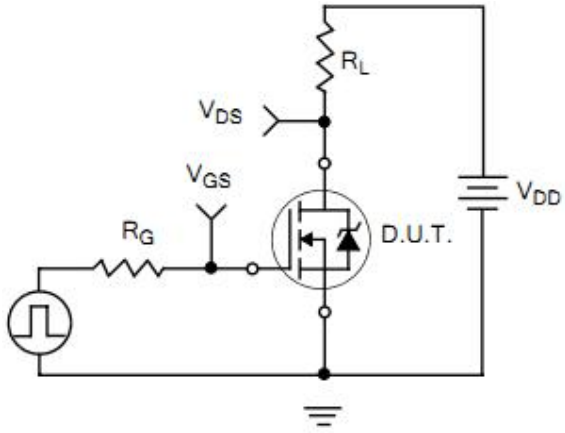



**Figure 17. Resistive Switching Waveforms**

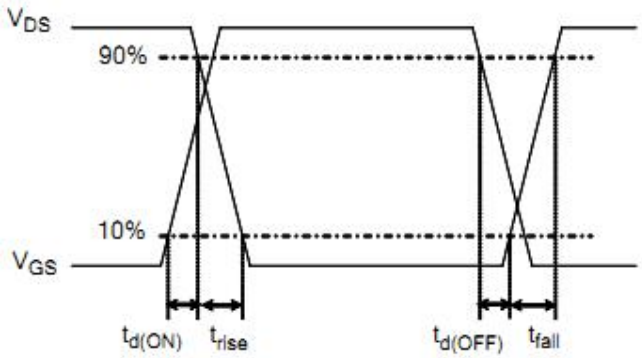


**Figure 18. Diode Reverse Recovery Test Circuit**

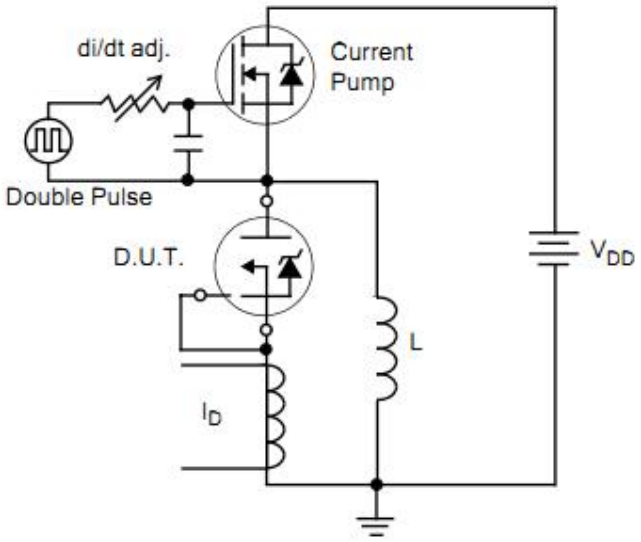



**Figure 19. Diode Reverse Recovery Waveform**

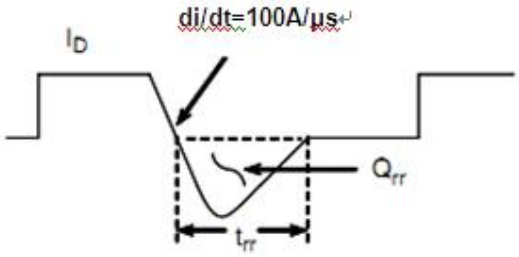



**Figure20.Unclamped Inductive Switching Test Circuit**

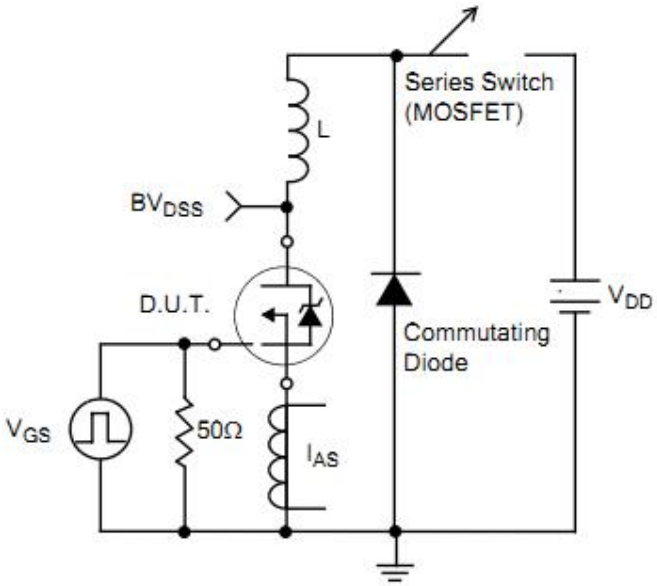
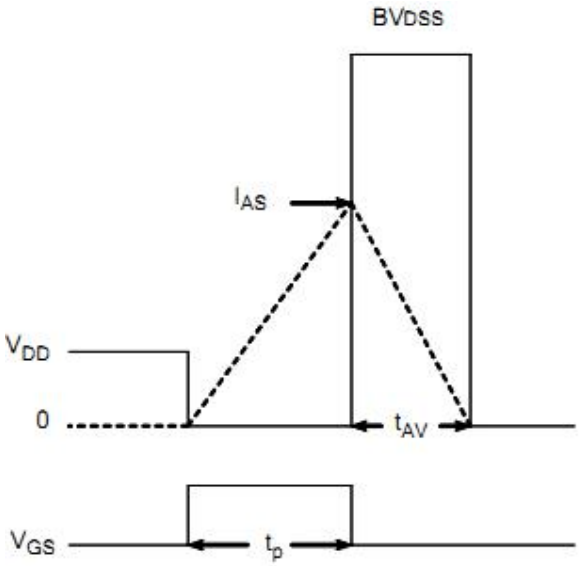



**Figure21.Unclamped Inductive Switching Waveform**




$$E_{AS} \quad \frac{I_{AS}^2 L}{2}$$

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