

Fast Switching EmCon Diode

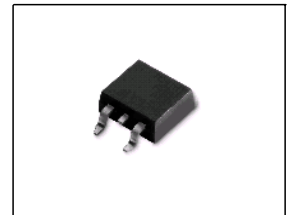
Feature

- 1200 V EmCon technology
- Fast recovery
- Soft switching
- Low reverse recovery charge
- Low forward voltage
- Easy paralleling
- Qualified according to JEDEC⁰⁾ for target applications

Product Summary

| | | |
|------------|------|----|
| V_{RRM} | 1200 | V |
| I_F | 9 | A |
| V_F | 1.65 | V |
| T_{jmax} | 150 | °C |

PG-TO263-3-2



| Type | Package | Ordering Code | Marking | Pin 1 | PIN 2 | PIN 3 |
|-----------|--------------|---------------|---------|-------|-------|-------|
| IDB09E120 | PG-TO263-3-2 | - | D09E120 | NC | C | A |

Maximum Ratings, at $T_j = 25\text{ °C}$, unless otherwise specified

| Parameter | Symbol | Value | Unit |
|--|----------------|------------|------|
| Repetitive peak reverse voltage | V_{RRM} | 1200 | V |
| Continuous forward current | I_F | 9 | A |
| $T_C=25\text{ °C}$ | | 23 | |
| $T_C=90\text{ °C}$ | | 14.4 | |
| Surge non repetitive forward current | I_{FSM} | 50 | |
| $T_C=25\text{ °C}$, $t_p=10\text{ ms}$, sine halfwave | | | |
| Maximum repetitive forward current | I_{FRM} | 36 | |
| $T_C=25\text{ °C}$, t_p limited by T_{jmax} , $D=0.5$ | | | |
| Power dissipation | P_{tot} | 69 | W |
| $T_C=25\text{ °C}$ | | 69 | |
| $T_C=90\text{ °C}$ | | 33 | |
| Operating and storage temperature | T_j, T_{stg} | -55...+150 | °C |
| Soldering temperature | T_S | 245 | °C |
| reflow soldering, MSL1 | | | |

Thermal Characteristics

| Parameter | Symbol | Values | | | Unit |
|---|------------|--------|------|------|------|
| | | min. | typ. | max. | |
| Characteristics | | | | | |
| Thermal resistance, junction - case | R_{thJC} | - | - | 1.8 | K/W |
| Thermal resistance, junction - ambient, leaded | R_{thJA} | - | - | 62 | |
| SMD version, device on PCB: @ min. footprint @ 6 cm ² cooling area ¹⁾ | R_{thJA} | - | - | 62 | |
| | | - | 35 | - | |

Electrical Characteristics, at $T_j = 25\text{ °C}$, unless otherwise specified

| Parameter | Symbol | Values | | | Unit |
|--|--------|--------|-------------|------------|---------------|
| | | min. | typ. | max. | |
| Static Characteristics | | | | | |
| Reverse leakage current $V_R=1200\text{V}$, $T_j=25\text{°C}$ $V_R=1200\text{V}$, $T_j=150\text{°C}$ | I_R | - | - | 100 700 | μA |
| Forward voltage drop $I_F=9\text{A}$, $T_j=25\text{°C}$ $I_F=9\text{A}$, $T_j=150\text{°C}$ | V_F | - | 1.65 1.7 | 2.15 - | V |

⁰J-STD20 and JESD22

¹Device on 40mm*40mm*1.5mm epoxy PCB FR4 with 6cm² (one layer, 70 μm thick) copper area for drain connection. PCB is vertical without blown air.

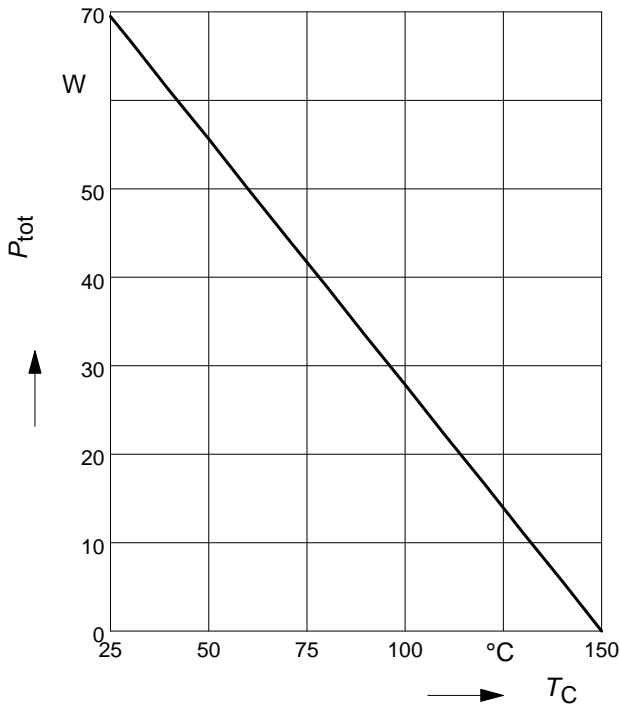
Electrical Characteristics, at $T_j = 25\text{ °C}$, unless otherwise specified

| Parameter | Symbol | Values | | | Unit |
|---|-----------|--------|------|------|------|
| | | min. | typ. | max. | |
| Dynamic Characteristics | | | | | |
| Reverse recovery time $V_R=800\text{V}$, $I_F=9\text{A}$, $di_F/dt=750\text{A}/\mu\text{s}$, $T_j=25\text{°C}$ $V_R=800\text{V}$, $I_F=9\text{A}$, $di_F/dt=750\text{A}/\mu\text{s}$, $T_j=125\text{°C}$ $V_R=800\text{V}$, $I_F=9\text{A}$, $di_F/dt=750\text{A}/\mu\text{s}$, $T_j=150\text{°C}$ | t_{rr} | - | 140 | - | ns |
| Peak reverse current $V_R=800\text{V}$, $I_F = 9\text{A}$, $di_F/dt=750\text{A}/\mu\text{s}$, $T_j=25\text{°C}$ $V_R=800\text{V}$, $I_F = 9\text{A}$, $di_F/dt=750\text{A}/\mu\text{s}$, $T_j=125\text{°C}$ $V_R=800\text{V}$, $I_F = 9\text{A}$, $di_F/dt=750\text{A}/\mu\text{s}$, $T_j=150\text{°C}$ | I_{rrm} | - | 13.3 | - | A |
| Reverse recovery charge $V_R=800\text{V}$, $I_F=9\text{A}$, $di_F/dt=750\text{A}/\mu\text{s}$, $T_j=25\text{°C}$ $V_R=800\text{V}$, $I_F = 9\text{A}$, $di_F/dt=750\text{A}/\mu\text{s}$, $T_j=125\text{°C}$ $V_R=800\text{V}$, $I_F = 9\text{A}$, $di_F/dt=750\text{A}/\mu\text{s}$, $T_j=150\text{°C}$ | Q_{rr} | - | 950 | - | nC |
| Reverse recovery softness factor $V_R=800\text{V}$, $I_F=9\text{A}$, $di_F/dt=750\text{A}/\mu\text{s}$, $T_j=25\text{°C}$ $V_R=800\text{V}$, $I_F=9\text{A}$, $di_F/dt=750\text{A}/\mu\text{s}$, $T_j=125\text{°C}$ $V_R=800\text{V}$, $I_F=9\text{A}$, $di_F/dt=750\text{A}/\mu\text{s}$, $T_j=150\text{°C}$ | S | - | 5.4 | - | |

1 Power dissipation

$P_{tot} = f(T_C)$

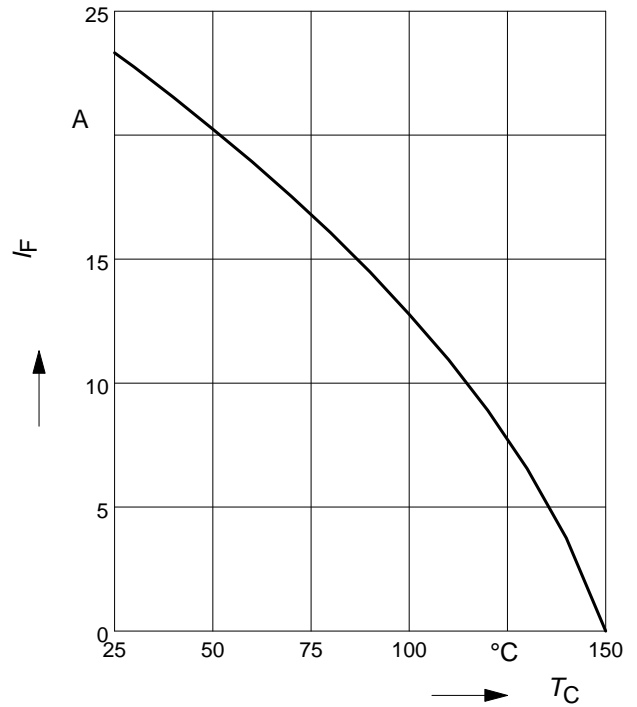
parameter: $T_j \leq 150\text{ }^\circ\text{C}$



2 Diode forward current

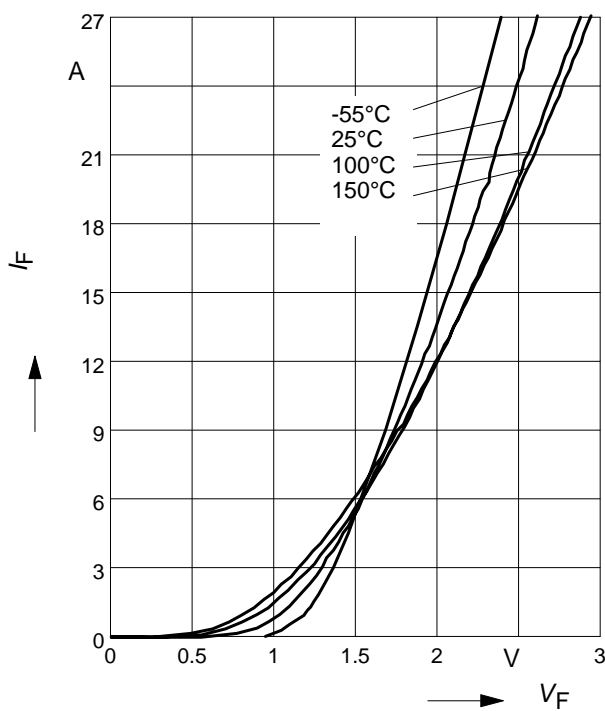
$I_F = f(T_C)$

parameter: $T_j \leq 150\text{ }^\circ\text{C}$



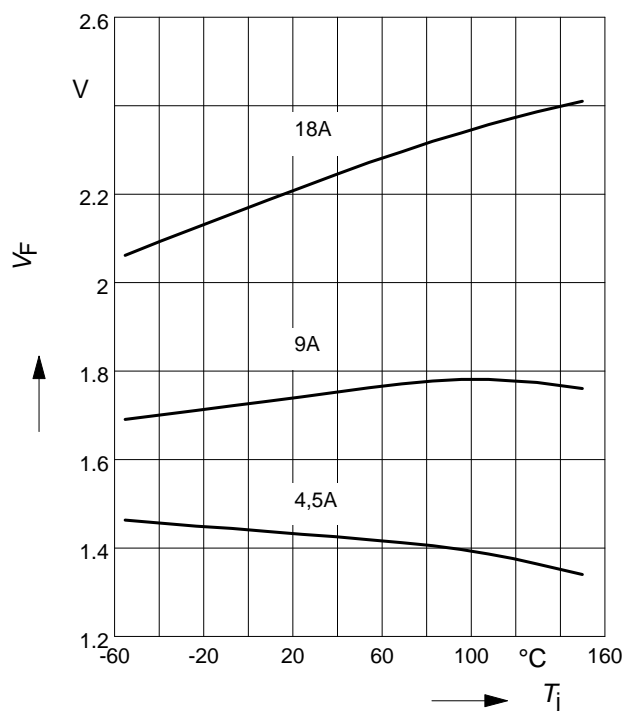
3 Typ. diode forward current

$I_F = f(V_F)$



4 Typ. diode forward voltage

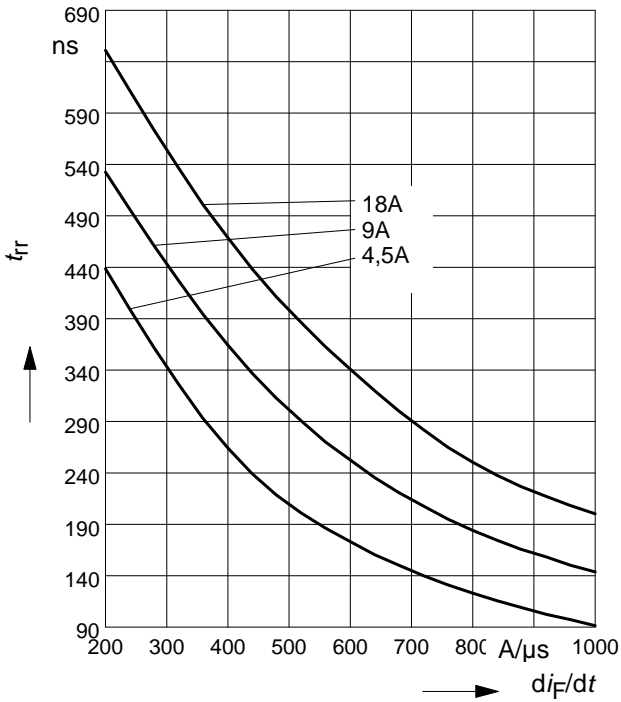
$V_F = f(T_j)$



5 Typ. reverse recovery time

$$t_{rr} = f(dI_F/dt)$$

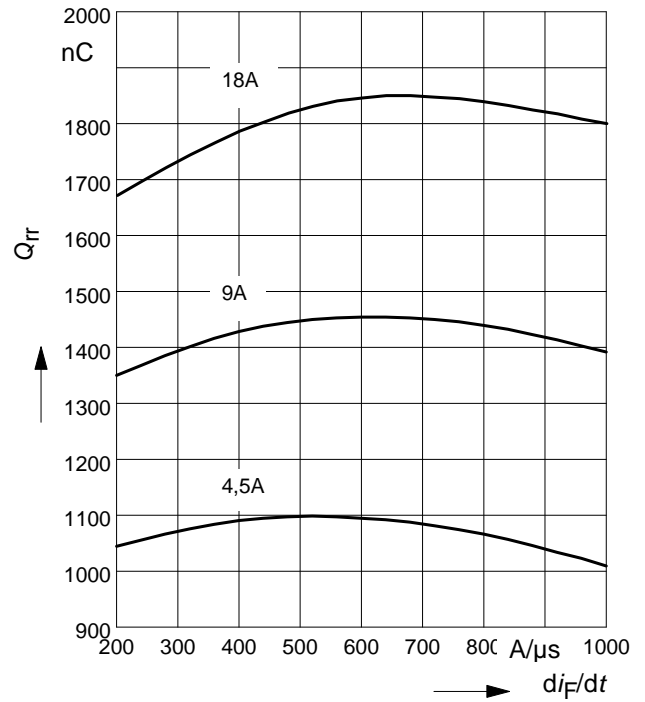
parameter: $V_R = 800V, T_j = 125^\circ C$



6 Typ. reverse recovery charge

$$Q_{rr} = f(dI_F/dt)$$

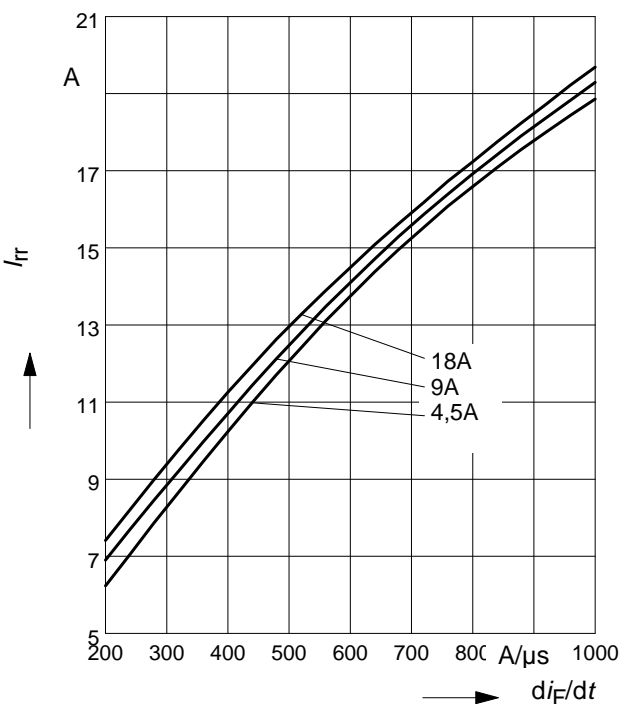
parameter: $V_R = 800V, T_j = 125^\circ C$



7 Typ. reverse recovery current

$$I_{rr} = f(dI_F/dt)$$

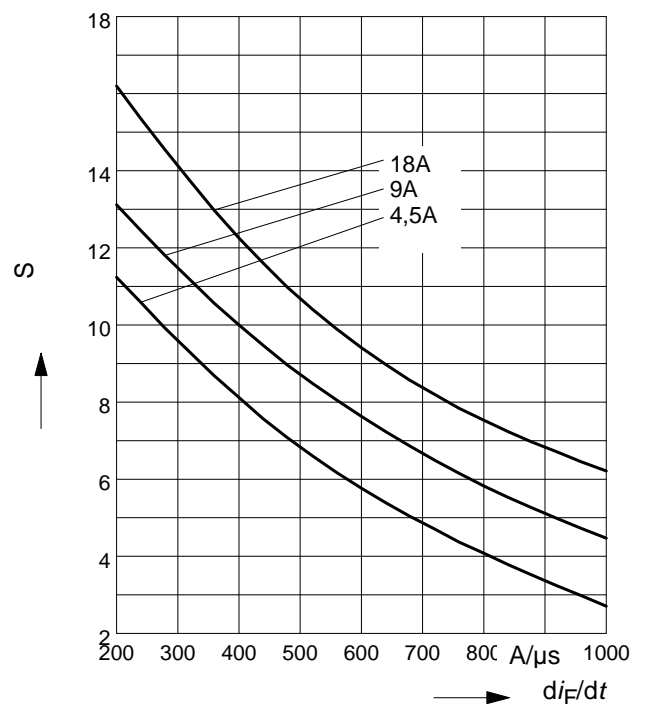
parameter: $V_R = 800V, T_j = 125^\circ C$



8 Typ. reverse recovery softness factor

$$S = f(dI_F/dt)$$

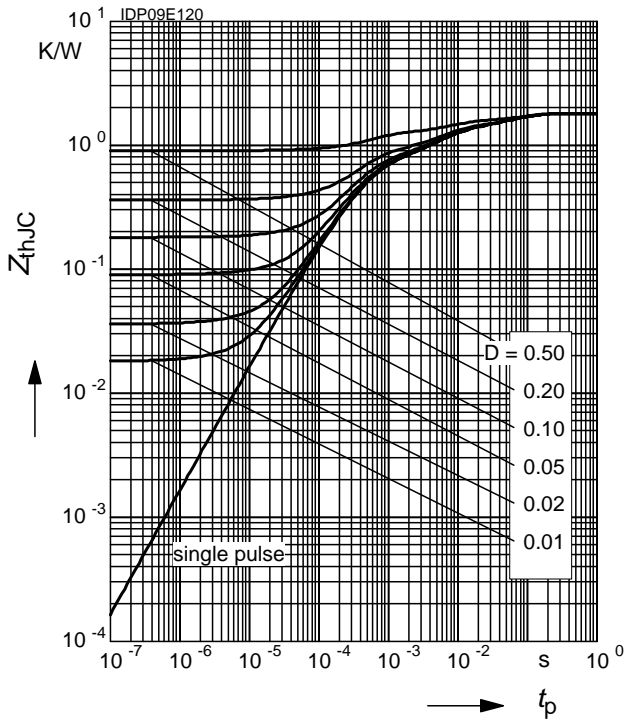
parameter: $V_R = 800V, T_j = 125^\circ C$

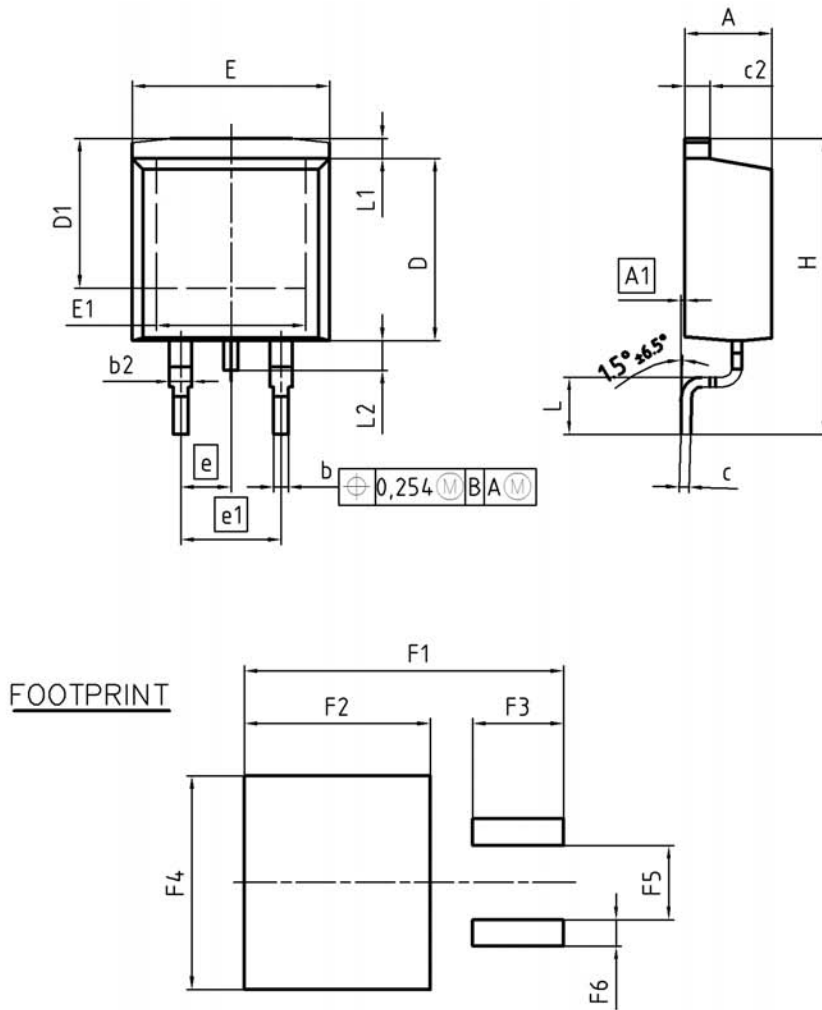


9 Max. transient thermal impedance

$$Z_{thJC} = f(t_p)$$

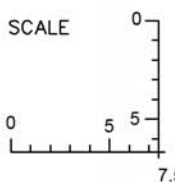
parameter : $D = t_p/T$

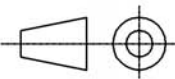




| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|-------|--------|-------|
| | MIN | MAX | MIN | MAX |
| A | 4.30 | 4.57 | 0.169 | 0.180 |
| A1 | 0.00 | 0.25 | 0.000 | 0.010 |
| b | 0.65 | 0.85 | 0.026 | 0.033 |
| b2 | 0.95 | 1.15 | 0.037 | 0.045 |
| c | 0.33 | 0.65 | 0.013 | 0.026 |
| c2 | 1.17 | 1.40 | 0.046 | 0.055 |
| D | 8.51 | 9.45 | 0.335 | 0.372 |
| D1 | 7.10 | 7.90 | 0.280 | 0.311 |
| E | 9.80 | 10.31 | 0.386 | 0.406 |
| E1 | 6.50 | 8.60 | 0.256 | 0.339 |
| e | 2.54 | | 0.100 | |
| e1 | 5.08 | | 0.200 | |
| N | 2 | | 2 | |
| H | 14.61 | 15.88 | 0.575 | 0.625 |
| L | 2.29 | 3.00 | 0.090 | 0.118 |
| L1 | 0.70 | 1.60 | 0.028 | 0.063 |
| L2 | 1.00 | 1.78 | 0.039 | 0.070 |
| F1 | 16.05 | 16.25 | 0.632 | 0.640 |
| F2 | 9.30 | 9.50 | 0.366 | 0.374 |
| F3 | 4.50 | 4.70 | 0.177 | 0.185 |
| F4 | 10.70 | 10.90 | 0.421 | 0.429 |
| F5 | 3.65 | 3.85 | 0.144 | 0.152 |
| F6 | 1.25 | 1.45 | 0.049 | 0.057 |

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