

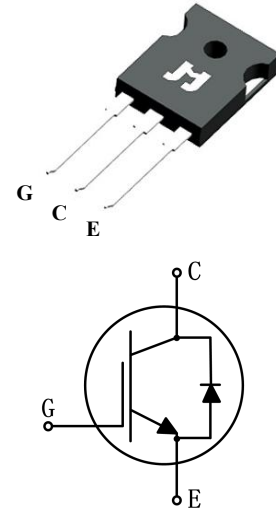
Key performance:

- $V_{CE}=1350V$
- $I_C=25A@T_c=100^{\circ}C$
- $V_{CE(sat)}=1.65V$

TO-247

Features:

- Trench and field-stop technology
- High speed switching
- Positive $V_{CE(sat)}$ temperature coefficient.
- Fast switching and short tail current.
- High ruggedness performance


Applications:

- Induction cooking
- Resonant converters

Package parameters

| Type | Marking | Package | Packaging Method |
|-------------|----------|---------|------------------|
| JJT25N135UE | T25135UE | TO-247 | Tube |

Maximum ratings

| Symbol | Parameter | Values | Unit |
|-----------|--|-------------|------|
| V_{CES} | Collector-emitter voltage | 1350 | V |
| V_{GES} | Gate-emitter voltage | ±20 | V |
| I_C | Continuous collector current ($T_C=25^\circ\text{C}$) | 50 | A |
| | Continuous collector current ($T_C=100^\circ\text{C}$) | 25 | A |
| I_{CM} | Pulsed collector current, t_p limited by T_{vjmax} | 100 | A |
| I_F | Diode continuous forward current ($T_C=100^\circ\text{C}$) | 25 | A |
| I_{FM} | Diode maximum current, t_p limited by T_{vjmax} | 100 | A |
| P_{tot} | Power dissipation ($T_C=25^\circ\text{C}$) | 283 | W |
| | Power dissipation ($T_C=100^\circ\text{C}$) | 142 | W |
| T_{vj} | Operating junction temperature range | -40 to +175 | °C |
| T_{stg} | Storage temperature range | -55 to +150 | °C |

Thermal characteristics

| Symbol | Parameter | Values | | Unit |
|---------------|--|--------|------|------|
| | | Typ. | Max. | |
| $R_{th(j-c)}$ | Thermal resistance, junction to case for IGBT | 0.53 | - | K/ W |
| $R_{th(j-c)}$ | Thermal resistance, junction to case for Diode | 1.40 | - | K/ W |
| $R_{th(j-a)}$ | Thermal resistance, junction to ambient | 32 | - | K/ W |

Electrical characteristics of IGBT ($T_{vj}=25^{\circ}\text{C}$ unless otherwise specified)

Static characteristics

| Symbol | Parameter | Test condition | Values | | | Unit |
|---------------|--------------------------------------|---|--------|------|------|---------------|
| | | | Min. | Typ. | Max. | |
| BV_{CES} | Collector-emitter breakdown voltage | $V_{GE}=0\text{V}, I_C=1\text{mA}$ | 1480 | - | - | V |
| I_{CES} | Collector-emitter leakage current | $V_{CE}=1350\text{V}, V_{GE}=0\text{V}$ | - | - | 100 | μA |
| I_{GES} | Gate leakage current, forward | $V_{GE}=20\text{V}, V_{CE}=0\text{V}$ | - | - | 100 | nA |
| | Gate leakage current, reverse | $V_{GE}=-20\text{V}, V_{CE}=0\text{V}$ | - | - | -100 | nA |
| $V_{GE(th)}$ | Gate-emitter threshold voltage | $V_{GE}=V_{CE}, I_C=1\text{mA}$ | 5.0 | 5.4 | 6.0 | V |
| $V_{CE(sat)}$ | Collector-emitter saturation voltage | $V_{GE}=15\text{V}, I_C=25\text{A}$ | - | 1.65 | - | V |
| | | $V_{GE}=15\text{V}, I_C=25\text{A}, T_{vj}=175^{\circ}\text{C}$ | - | 2.05 | - | V |

Dynamic characteristics

| Symbol | Parameter | Test condition | Values | | | Unit |
|-----------|------------------------------|--|--------|------|------|------|
| | | | Min. | Typ. | Max. | |
| C_{ies} | Input capacitance | $V_{CE}=30\text{V}$ $V_{GE}=0\text{V}$ $f=1\text{MHz}$ | - | 4530 | - | pF |
| C_{oes} | Output capacitance | | - | 47 | - | pF |
| C_{res} | Reverse transfer capacitance | | - | 20 | - | pF |
| Q_g | Total gate charge | $V_{CC}=1080\text{V}$ $V_{GE}=15\text{V}$ $I_C=25\text{A}$ | - | 147 | - | nC |

Switching characteristics

| Symbol | Parameter | Test condition | Values | | | Unit |
|--------------|------------------------|--|--------|------|------|------|
| | | | Min. | Typ. | Max. | |
| $t_{d(on)}$ | Turn-on delay time | $V_{CC}=600V$ $V_{GE}=0/15V$ $I_C=25A$ $R_G=10\Omega$ Inductive load | - | 37 | - | ns |
| t_r | Rise time | | - | 29 | - | ns |
| $t_{d(off)}$ | Turn-off delay time | | - | 192 | - | ns |
| t_f | Fall time | | - | 183 | - | ns |
| E_{on} | Turn-on energy | | - | 1.2 | - | mJ |
| E_{off} | Turn-off energy | | - | 1.1 | - | mJ |
| E_{ts} | Total switching energy | | - | 2.3 | - | mJ |
| $t_{d(on)}$ | Turn-on delay time | $V_{CC}=600V$ $V_{GE}=0/15V$ $I_C=25A$ $R_G=10\Omega, T_{vj}=175^\circ C$ Inductive load | - | 34 | - | ns |
| t_r | Rise time | | - | 28 | - | ns |
| $t_{d(off)}$ | Turn-off delay time | | - | 203 | - | ns |
| t_f | Fall time | | - | 231 | - | ns |
| E_{on} | Turn-on energy | | - | 1.3 | - | mJ |
| E_{off} | Turn-off energy | | - | 1.6 | - | mJ |
| E_{ts} | Total switching energy | | - | 2.9 | - | mJ |

Electrical characteristics of Diode ($T_{vj}=25^\circ C$ unless otherwise specified)

| Symbol | Parameter | Test condition | Values | | | Unit |
|--------|-----------------------|-------------------------------|--------|------|------|------|
| | | | Min. | Typ. | Max. | |
| V_F | Diode forward voltage | $I_F=25A$ | - | 1.75 | - | V |
| | | $I_F=25A, T_{vj}=175^\circ C$ | - | 1.70 | - | V |

Typical performance characteristics

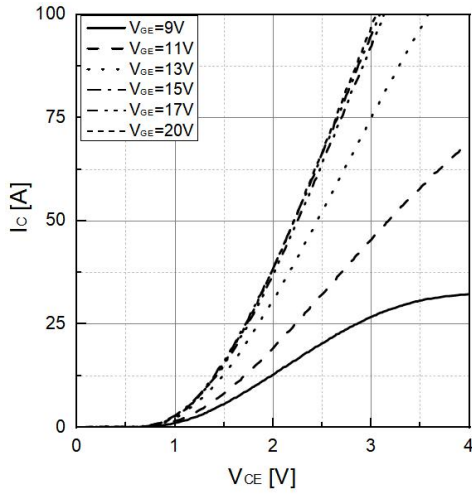


Fig 1. Typical output characteristic ($T_{vj}=25^{\circ}\text{C}$)

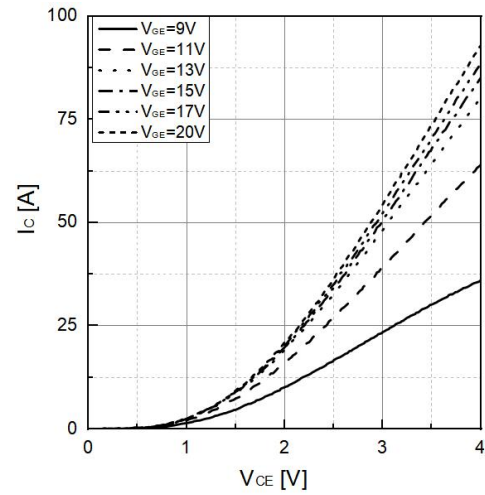


Fig 2. Typical output characteristic ($T_{vj}=175^{\circ}\text{C}$)

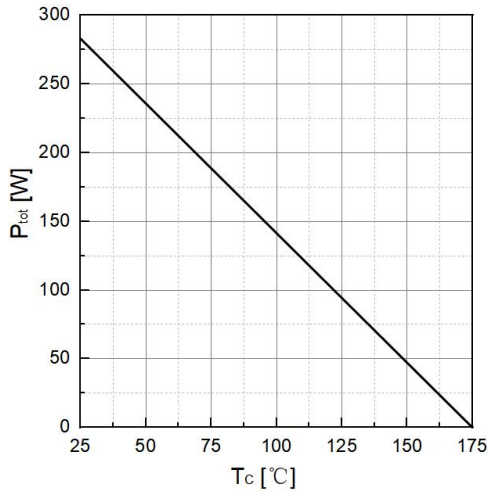


Fig 3. Power dissipation as a function of T_c

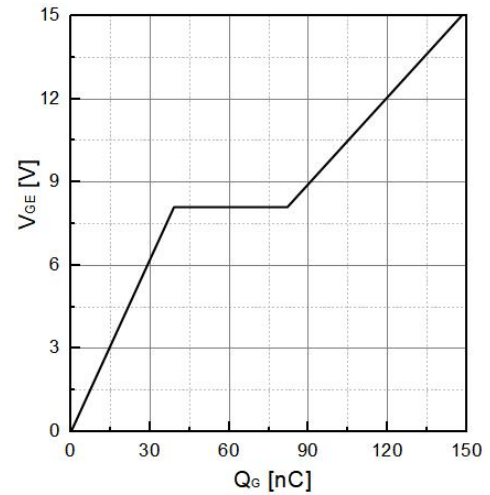


Fig 4. Typical Gate charge

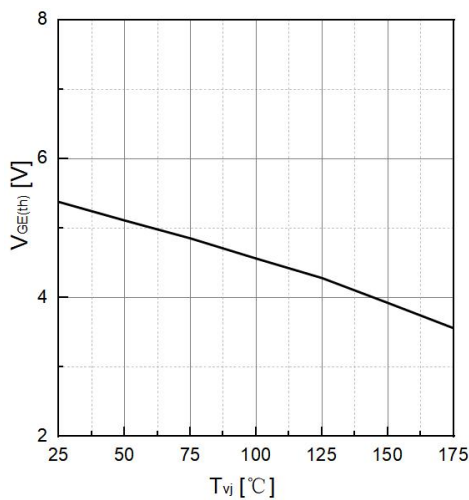


Fig 5. Typical $V_{GE(th)}$ as a function of T_{vj}
($I_C=1\text{mA}$)

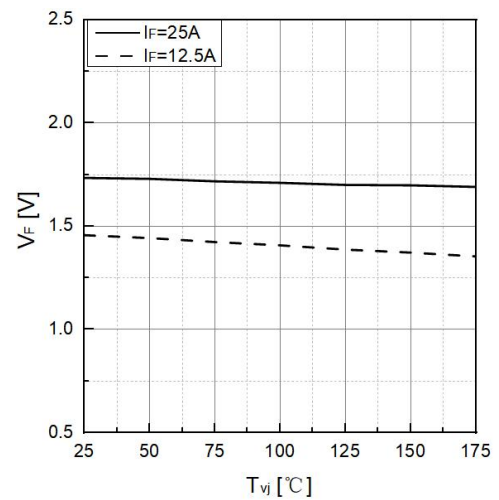


Fig 6. Typical V_F as a function of T_{vj}

Typical performance characteristics

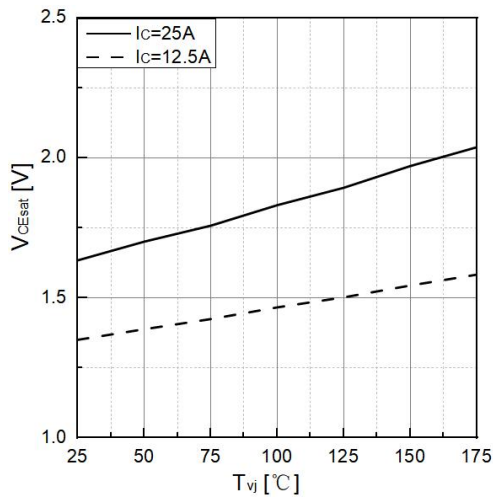


Fig 7. Typical V_{CEsat} as a function of T_{vj}

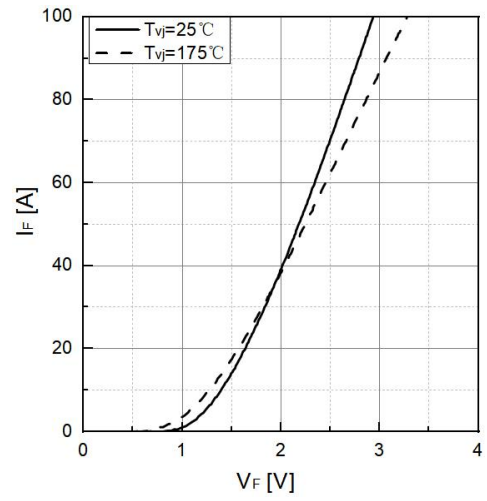


Fig 8. Typical I_F as a function of V_F

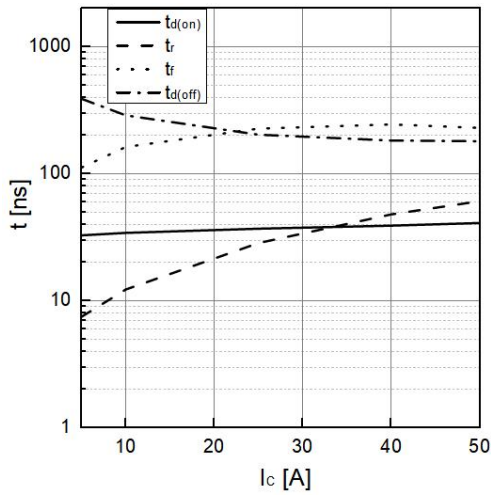


Fig 9. Typical switching time as a function of I_c

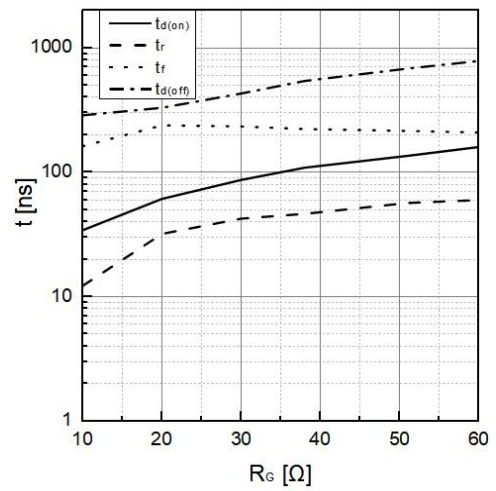


Fig 10. Typical switching times as a function of R_G

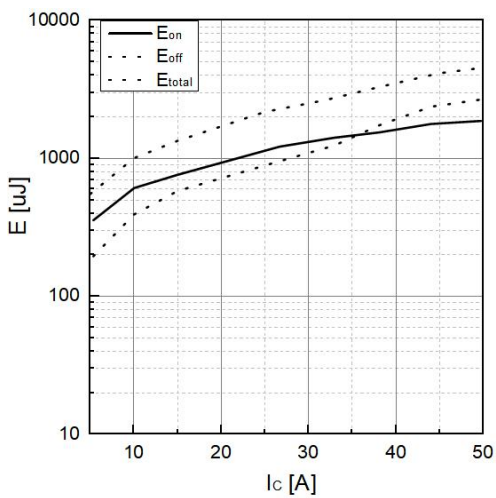


Fig 11. Typical switching energy losses as a function of I_c

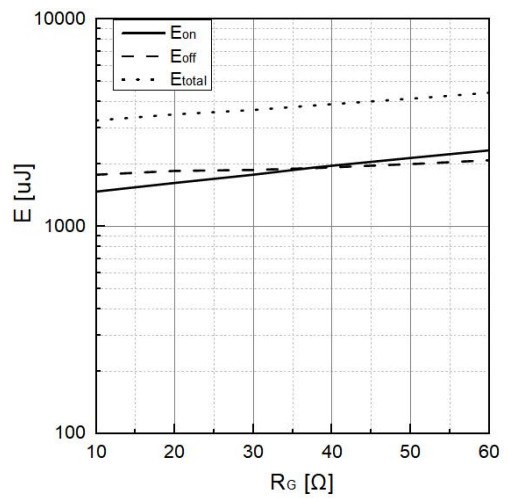


Fig 12. Typical switching energy losses as a function of R_G

Typical performance characteristics

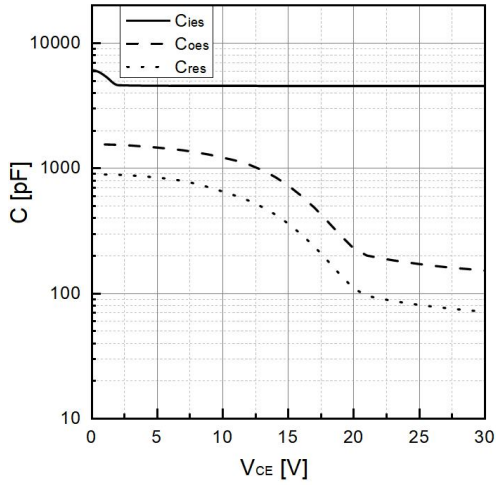


Fig 13. Typical capacitance as a function of V_{CE}
($f=1\text{MHz}$, $V_{GE}=0\text{V}$)

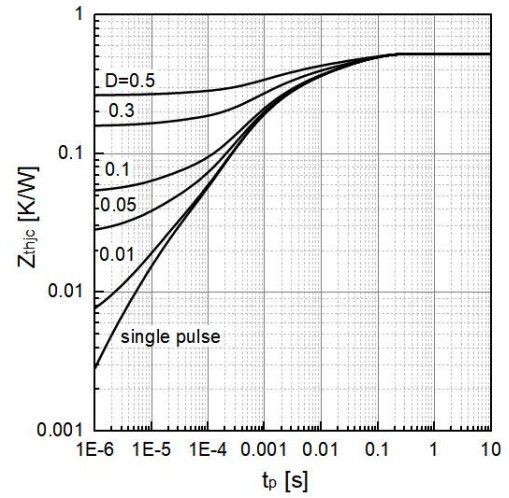


Fig 14. Transient thermal impedance of IGBT

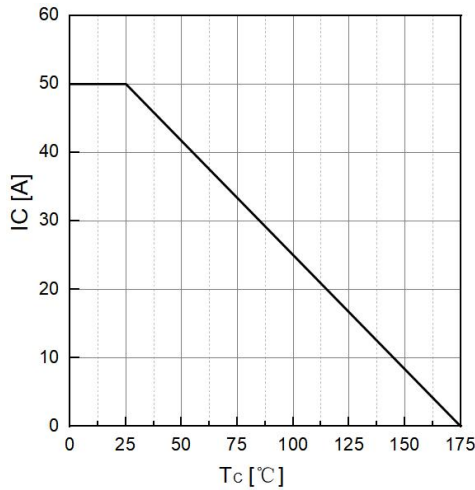


Fig 15. Continuous collector current as a function of T_c
($T_{vj} \leq 175^\circ\text{C}$)

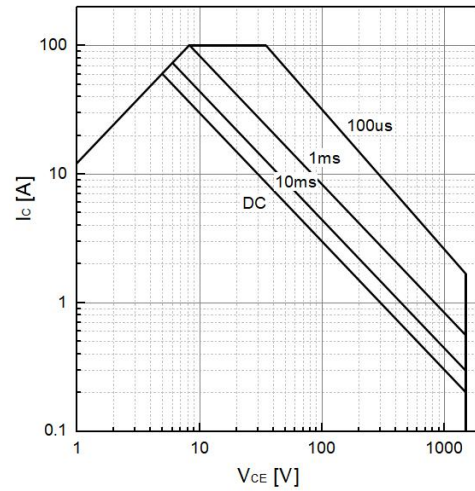


Fig.16 Forward bias safe operating area

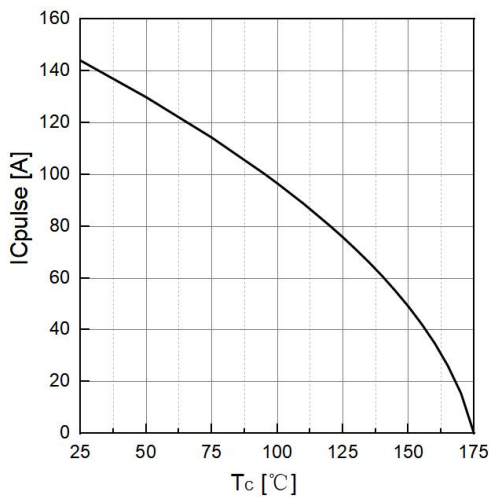
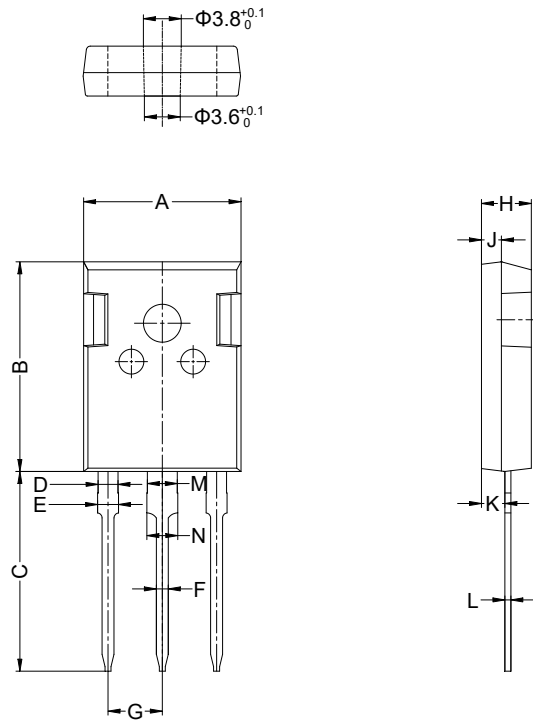


Fig 17. Pulsed collector current as a function of T_c
($T_{vj} \leq 175^\circ\text{C}$, $D=1$, $t_p=1\text{ms}$)

Package dimension

TO-247



| Ref. | Dimensions | | | | | |
|------|-------------|-------|-------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 15.50 | 15.80 | 16.10 | 0.610 | 0.622 | 0.634 |
| B | 20.80 | 21.00 | 21.20 | 0.819 | 0.827 | 0.835 |
| C | 19.70 | 20.00 | 20.30 | 0.776 | 0.787 | 0.799 |
| D | 1.80 | 2.00 | 2.20 | 0.071 | 0.079 | 0.087 |
| E | 1.90 | 2.10 | 2.30 | 0.075 | 0.083 | 0.091 |
| F | 1.00 | 1.20 | 1.40 | 0.039 | 0.047 | 0.055 |
| G | 5.25 | - | 5.65 | 0.207 | - | 0.222 |
| H | 4.80 | 5.00 | 5.20 | 0.189 | 0.197 | 0.205 |
| J | 1.90 | 2.00 | 2.10 | 0.075 | 0.079 | 0.083 |
| K | 2.20 | 2.35 | 2.50 | 0.087 | 0.093 | 0.098 |
| L | 0.41 | 0.60 | 0.79 | 0.016 | 0.024 | 0.031 |
| M | 2.80 | 3.00 | 3.20 | 0.110 | 0.118 | 0.126 |
| N | 2.90 | 3.10 | 3.30 | 0.114 | 0.122 | 0.130 |

Revision history

| Date | Revision | Changes |
|------------|----------|-----------------------------------|
| 2024-11-11 | Rev 1.1 | Update |
| 2024-11-20 | Rev 1.2 | Update |
| 2025-12-08 | Rev 1.3 | Update with full characterization |
| 2026-01-15 | Rev 1.5 | Update figure |
| | | |

Disclaimer

PLEASE NOTE - Jiangsu JieJie Microelectronics Co., Ltd ("JJM") reserves the right to amend, correct, modify and enhance the product and/or this document at any time without prior notice. If you intend to purchase this product, please obtain the latest information available before placing your order. The sale of JJM products is governed by JJM's prevailing terms and conditions at the time of purchase and purchasers are solely responsible for the selection and use of the products with no liability on JJM's part to supply application assistance or customization. Purchase of JJM products does not grant the purchaser license, express or implied, to JJM's intellectual property. Any warranties provided with JJM products are null and void upon resale unless accompanied by the information set forth herein in its entirety. The JJM name and logo are registered trademarks of Jiangsu JieJie Microelectronics Co., Ltd. This document supersedes all previous versions. ©2024 JJM - All rights reserved