## Description

### JMT P-channel Enhancement Mode Power MOSFET

**Features**

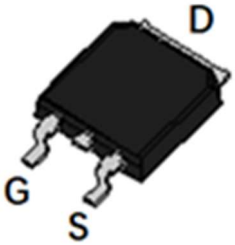
- $V_{DS}$=-30V, $I_D$=-50A
  $R_{DS(ON)}$ < 11mΩ @ $V_{GS}$ = -10V
  $R_{DS(ON)}$ < 18mΩ @ $V_{GS}$ = -4.5V
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired

**Application**

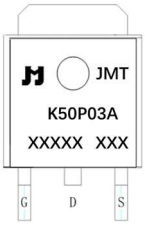
- PWM Applications
- Load Switch
- Power Management

RoHS

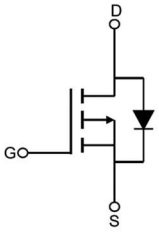
*100% UIS TESTED!*
*100% ΔVds TESTED!*




**TO-252(DPAK) top view**




**Marking and pin Assignment**




**Schematic Diagram**

## Package Marking and Ordering Information

| Device Marking | Device | OUTLINE | Device Package | Reel Size | Reel (PCS) | Per Carton (PCS) |
|---|---|---|---|---|---|---|
| JMTK50P03A | JMTK50P03A | TAPING | TO-252 | 13inch | 2500 | 25000 |

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

| Symbol | Parameter | | Max. | Units |
|---|---|---|---|---|
| $V_{DSS}$ | Drain-Source Voltage | | -30 | V |
| $V_{GSS}$ | Gate-Source Voltage | | ±20 | V |
| $I_D$ | Continuous Drain Current | $T_C$ = 25℃ | -50 | A |
| | | $T_C$ = 100℃ | -32.5 | A |
| $I_{DM}$ | Pulsed Drain Current note1 | | -200 | A |
| $E_{AS}$ | Single Pulsed Avalanche Energy note2 | | 78.8 | mJ |
| $P_D$ | Power Dissipation | $T_A$ = 25℃ | 44 | W |
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case | | 2.84 | ℃/W |
| $T_J$, $T_{STG}$ | Operating and Storage Temperature Range | | -55 to +150 | ℃ |

## Electrical Characteristics ($T_J$=25℃ unless otherwise specified)

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| **Off Characteristic** | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V,$I_D$= -250μA | -30 | - | - | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$ = -30V, $V_{GS}$ = 0V, | - | - | -1 | μA |
| $I_{GSS}$ | Gate to Body Leakage Current | $V_{DS}$ =0V, $V_{GS}$ = ±20V | - | - | ±100 | nA |
| **On Characteristics** | | | | | | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$= $V_{GS}$, $I_D$= -250μA | -1.0 | -1.5 | -2.5 | V |
| $R_{DS(on)}$ | Static Drain-Source on-Resistance note3 | $V_{GS}$ =-10V, $I_D$ =-12A | - | 8.6 | 11 | mΩ |
| | | $V_{GS}$ =-4.5V, $I_D$ =-8A | - | 13 | 18 | |
| **Dynamic Characteristics** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$ = -15V, $V_{GS}$ = 0V, f = 1.0MHz | - | 2800 | - | pF |
| $C_{oss}$ | Output Capacitance | | - | 346 | - | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | - | 319 | - | pF |
| $Q_g$ | Total Gate Charge | $V_{DS}$= -15V, $I_D$ = -20A, $V_{GS}$ = -10V | - | 30 | - | nC |
| $Q_{gs}$ | Gate-Source Charge | | - | 5.3 | - | nC |
| $Q_{gd}$ | Gate-Drain(“Miller”) Charge | | - | 7.6 | - | nC |
| **Switching Characteristics** | | | | | | |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{DD}$ = -15V, $I_D$ = -20A, $V_{GS}$=-10V, $R_{GEN}$=2.5Ω | - | 14 | - | ns |
| $t_r$ | Turn-on Rise Time | | - | 20 | - | ns |
| $t_{d(off)}$ | Turn-off Delay Time | | - | 95 | - | ns |
| $t_f$ | Turn-off Fall Time | | - | 65 | - | ns |
| **Drain-Source Diode Characteristics and Maximum Ratings** | | | | | | |
| $I_S$ | Maximum Continuous Drain to Source Diode Forward Current | | - | - | -10 | A |
| $I_{SM}$ | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | -40 | A |
| $V_{SD}$ | Drain to Source Diode Forward Voltage | $V_{GS}$ = 0V, $I_S$ = -10A | - | -0.8 | -1.2 | V |

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. EAS condition: $T_J$=25℃, VDD=-20V, VG=-10V, L=0.5mH, RG=25Ω, IAS=-17A

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%

## Typical Performance Characteristics

**Figure1:** Output Characteristics

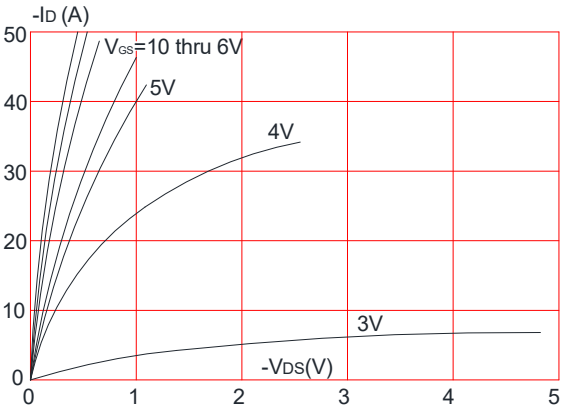



**Figure 2:** Typical Transfer Characteristics

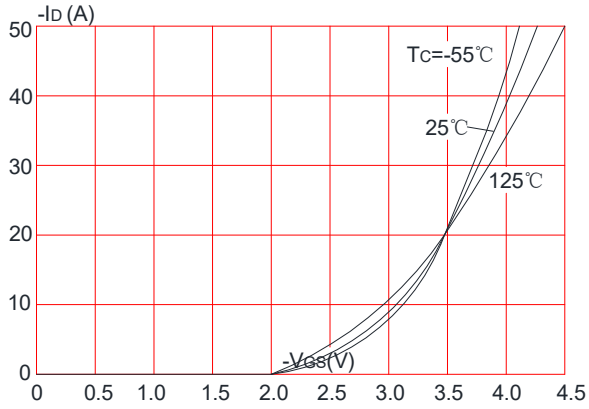



**Figure 3:**On-resistance vs. Drain Current

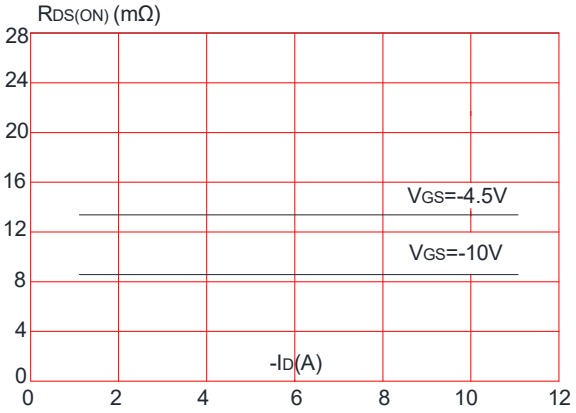



**Figure 4**: Body Diode Characteristics

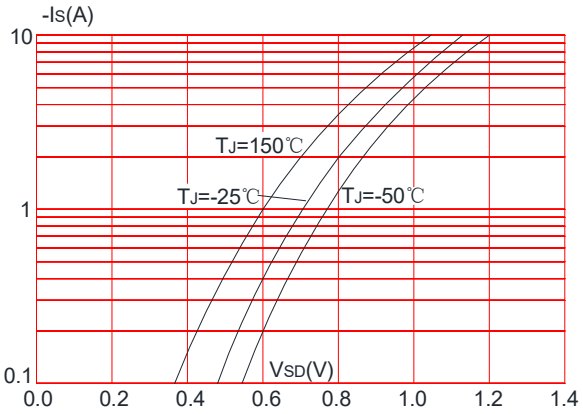



**Figure 5:** Gate Charge Characteristics

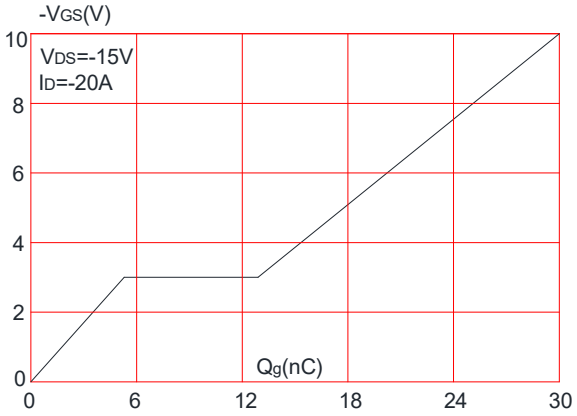



**Figure 6:** Capacitance Characteristics

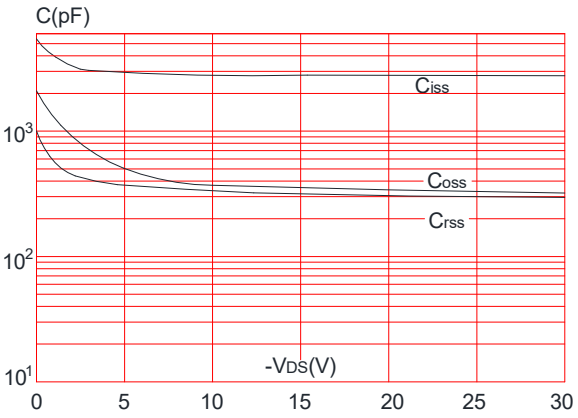


**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature

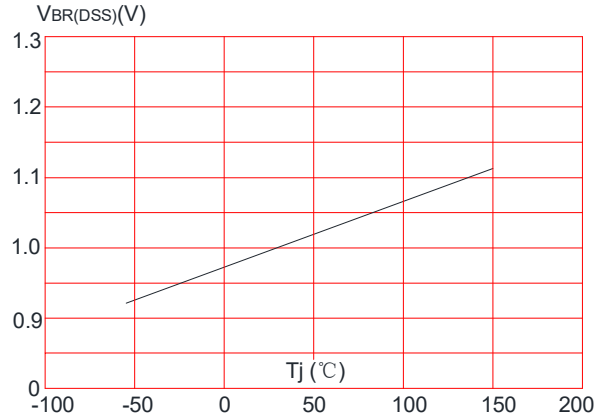



**Figure 8:** Normalized on Resistance vs. Junction Temperature

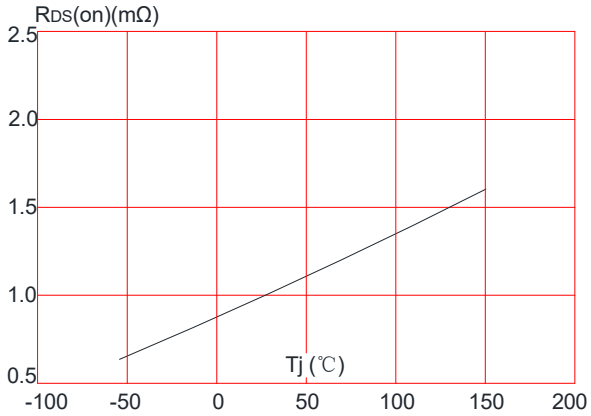



**Figure 9:** Maximum Safe Operating Area

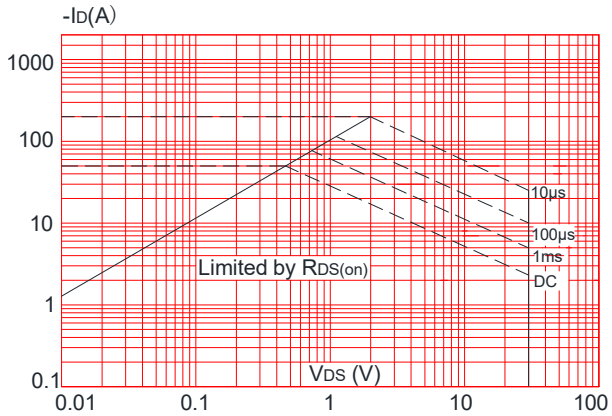



**Figure 10:** Maximum Continuous Drain Current vs. Case Temperature

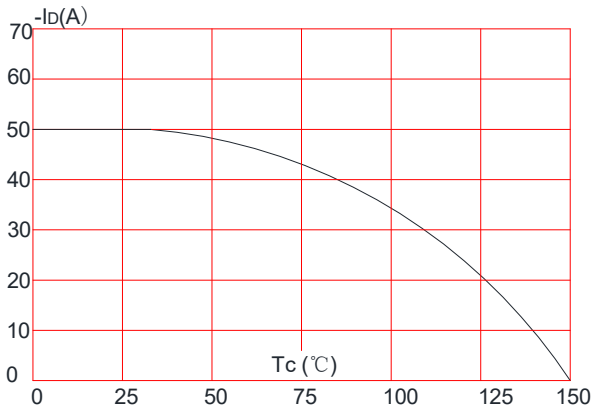
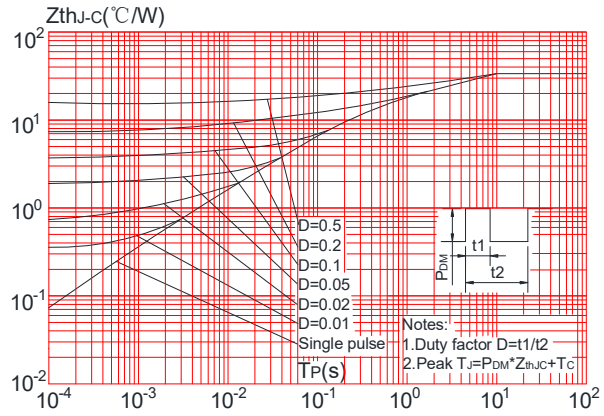
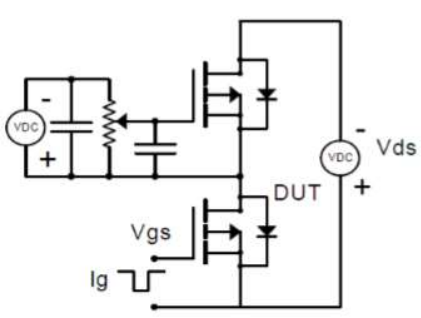
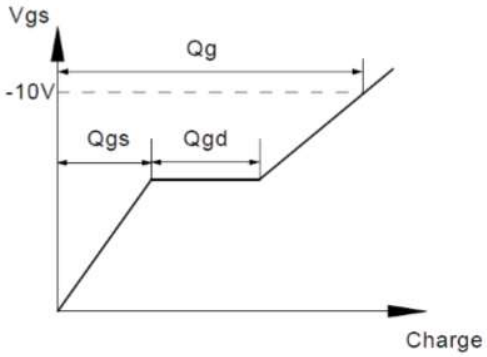



**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

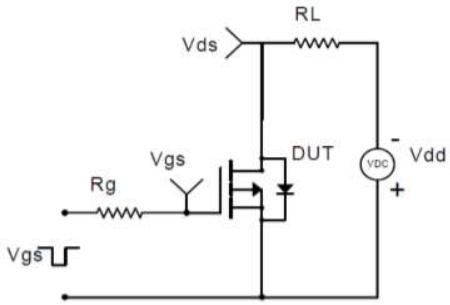


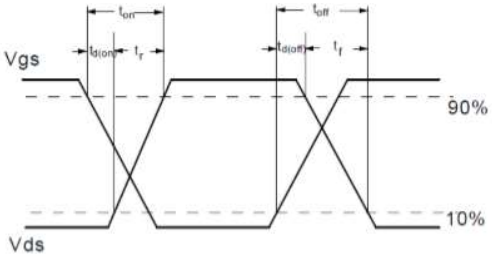
## Gate Charge Test Circuit & Waveform



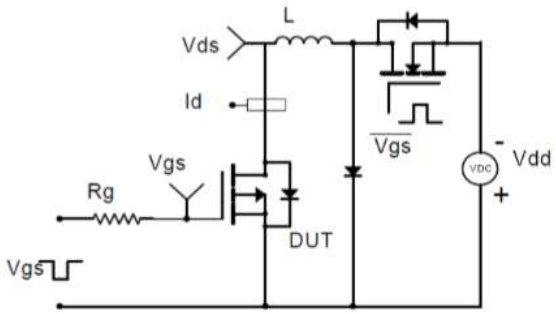



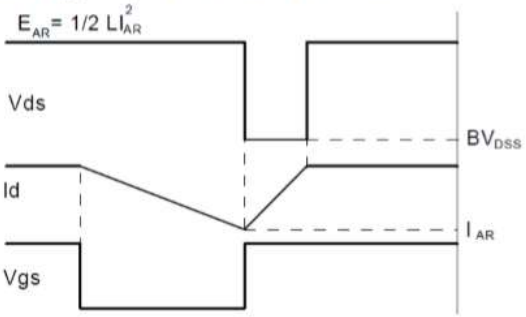

## Resistive Switching Test Circuit & Waveforms



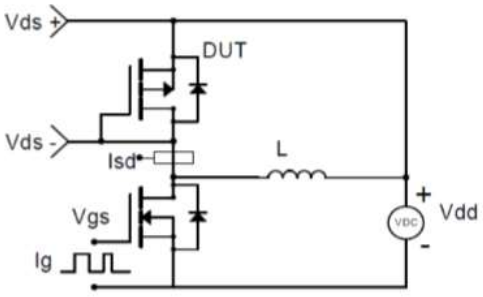



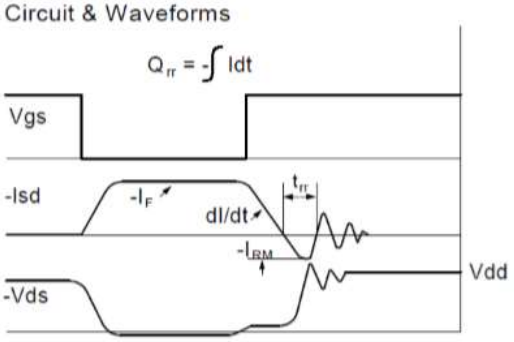

## Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



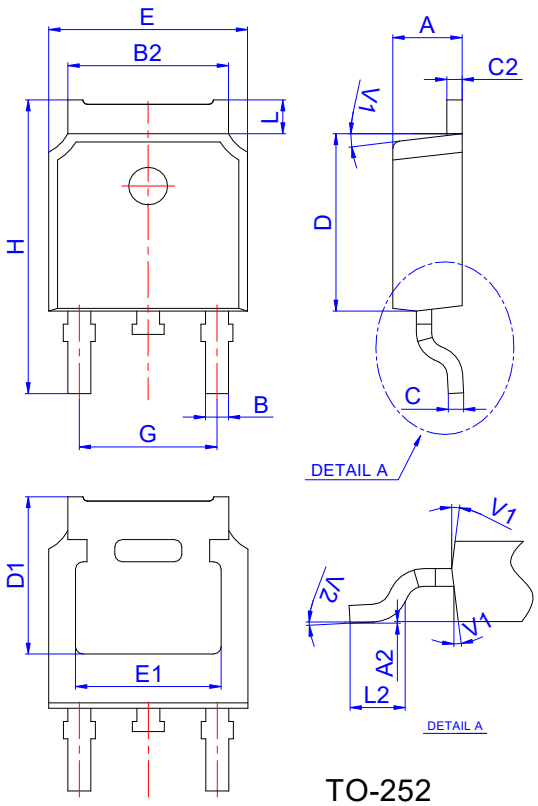




## Diode Recovery Test Circuit & Waveforms



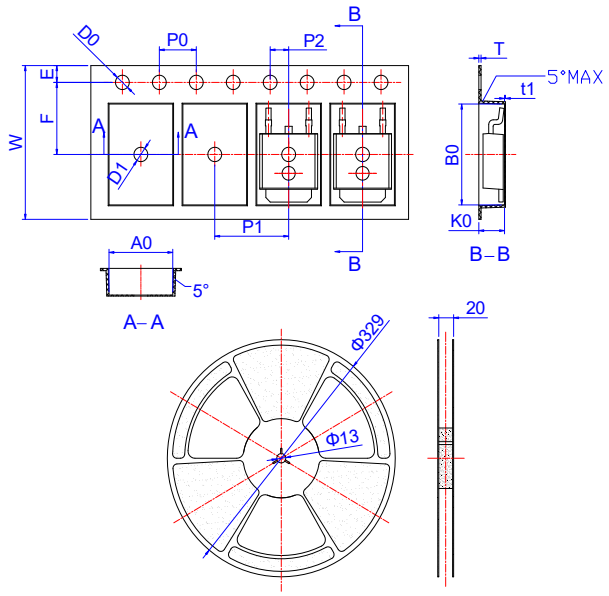
## Package Mechanical Data




TO-252

| Ref. | Dimensions | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 2.10 | | 2.50 | 0.083 | | 0.098 |
| A2 | 0 | | 0.10 | 0 | | 0.004 |
| B | 0.66 | | 0.86 | 0.026 | | 0.034 |
| B2 | 5.18 | | 5.48 | 0.202 | | 0.216 |
| C | 0.40 | | 0.60 | 0.016 | | 0.024 |
| C2 | 0.44 | | 0.58 | 0.017 | | 0.023 |
| D | 5.90 | | 6.30 | 0.232 | | 0.248 |
| D1 | 5.30REF | | | 0.209REF | | |
| E | 6.40 | | 6.80 | 0.252 | | 0.268 |
| E1 | 4.63 | | | 0.182 | | |
| G | 4.47 | | 4.67 | 0.176 | | 0.184 |
| H | 9.50 | | 10.70 | 0.374 | | 0.421 |
| L | 1.09 | | 1.21 | 0.043 | | 0.048 |
| L2 | 1.35 | | 1.65 | 0.053 | | 0.065 |
| V1 | | 7° | | | 7° | |
| V2 | 0° | | 6° | 0° | | 6° |

## Reel Specification-TO-252




| Ref. | Dimensions | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| W | 15.90 | 16.00 | 16.10 | 0.626 | 0.630 | 0.634 |
| E | 1.65 | 1.75 | 1.85 | 0.065 | 0.069 | 0.073 |
| F | 7.40 | 7.50 | 7.60 | 0.291 | 0.295 | 0.299 |
| D0 | 1.40 | 1.50 | 1.60 | 0.055 | 0.059 | 0.063 |
| D1 | 1.40 | 1.50 | 1.60 | 0.055 | 0.059 | 0.063 |
| P0 | 3.90 | 4.00 | 4.10 | 0.154 | 0.157 | 0.161 |
| P1 | 7.90 | 8.00 | 8.10 | 0.311 | 0.315 | 0.319 |
| P2 | 1.90 | 2.00 | 2.10 | 0.075 | 0.079 | 0.083 |
| A0 | 6.85 | 6.90 | 7.00 | 0.270 | 0.271 | 0.276 |
| B0 | 10.45 | 10.50 | 10.60 | 0.411 | 0.413 | 0.417 |
| K0 | 2.68 | 2.78 | 2.88 | 0.105 | 0.109 | 0.113 |
| T | 0.24 | | 0.27 | 0.009 | | 0.011 |
| t1 | 0.10 | | | 0.004 | | |
| 10P0 | 39.80 | 40.00 | 40.20 | 1.567 | 1.575 | 1.583 |