

Description

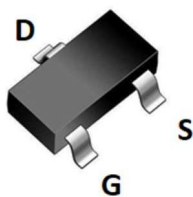
PECJ P-channel Enhancement Mode Power MOSFET

Features

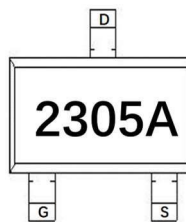
- $V_{DS} = -20V$, $I_D = -4.1A$
 $R_{DS(ON)} < 42m\Omega$ @ $V_{GS} = -4.5V$
 $R_{DS(ON)} < 60m\Omega$ @ $V_{GS} = -2.5V$
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired

Application

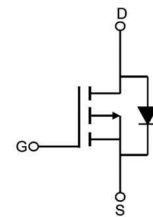
- PWM Applications
- Load Switch
- Power Management



SOT-23 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) |
|----------------|-----------|---------|----------------|-----------|------------|------------------|
| 2305A | PECJ2305A | TAPING | SOT-23 | 7inch | 3000 | 180000 |

Absolute Maximum Ratings ($T_A=25^\circ C$ unless otherwise specified)

| Symbol | Parameter | Max. | Units |
|-----------------|---|---------------------|--------------|
| V_{DSS} | Drain-Source Voltage | -20 | V |
| V_{GSS} | Gate-Source Voltage | ± 12 | V |
| I_D | Continuous Drain Current | $T_C = 25^\circ C$ | -4.1 |
| | | $T_C = 100^\circ C$ | -2.6 |
| I_{DM} | Pulsed Drain Current ^{note1} | -16 | A |
| P_D | Power Dissipation | 1 | W |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 125 | $^\circ C/W$ |
| T_J, T_{STG} | Operating and Storage Temperature Range | -55 to +150 | $^\circ C$ |

Electrical Characteristics (T_J=25°C 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 | -20 | - | - | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} = -20V, V _{GS} = 0V, | - | - | -1 | μA |
| I _{GSS} | Gate to Body Leakage Current | V _{DS} =0V, V _{GS} = ±12V | - | - | ±100 | nA |
| On Characteristics | | | | | | |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} = V _{GS} , I _D = -250μA | -0.4 | -0.7 | -1.0 | V |
| R _{DS(on)} | Static Drain-Source on-Resistance <small>note2</small> | V _{GS} =-4.5V, I _D =-4.1A | - | 32 | 42 | mΩ |
| | | V _{GS} =-2.5V, I _D =-3A | - | 42 | 60 | |
| Dynamic Characteristics | | | | | | |
| C _{iss} | Input Capacitance | V _{DS} = -10V, V _{GS} = 0V, f = 1.0MHz | - | 830 | - | pF |
| C _{oss} | Output Capacitance | | - | 132 | - | pF |
| C _{rss} | Reverse Transfer Capacitance | | - | 85 | - | pF |
| Q _g | Total Gate Charge | V _{DS} = -10V, I _D = -4.1A, V _{GS} = -4.5V | - | 7.2 | - | nC |
| Q _{gs} | Gate-Source Charge | | - | 1.2 | - | nC |
| Q _{gd} | Gate-Drain("Miller") Charge | | - | 1.6 | - | nC |
| Switching Characteristics | | | | | | |
| t _{d(on)} | Turn-on Delay Time | V _{DD} = -10V, I _D = -3.3A, R _G = 1Ω, V _{GEN} =-4.5V, R _L =1.2Ω | - | 15 | - | ns |
| t _r | Turn-on Rise Time | | - | 63 | - | ns |
| t _{d(off)} | Turn-off Delay Time | | - | 21 | - | ns |
| t _f | Turn-off Fall Time | | - | 12 | - | ns |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| I _S | Maximum Continuous Drain to Source Diode Forward Current | | - | - | -4.1 | A |
| I _{SM} | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | -16 | A |
| V _{SD} | Drain to Source Diode Forward Voltage | V _{GS} = 0V, I _S = -4.1A | - | - | -1.2 | V |
| t _{rr} | Reverse Recovery Time | V _{GS} =0V, I _S =-4.1A, di/dt=100A/μs | - | 20 | - | ns |
| Q _{rr} | Reverse Recovery Charge | | - | 9 | - | nC |

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

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

Figure 1: Output Characteristics

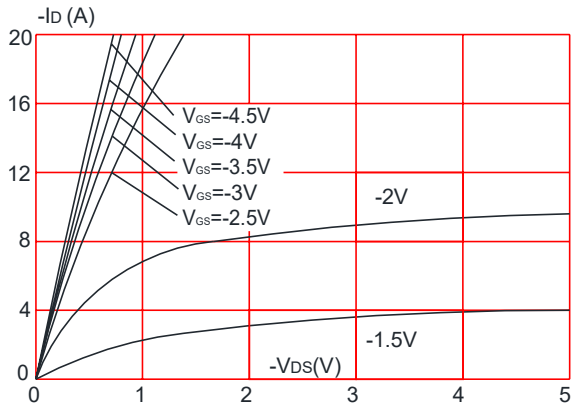


Figure 2: Typical Transfer Characteristics

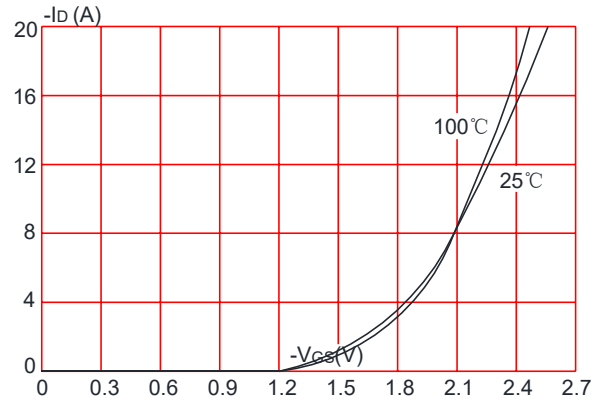


Figure 3: On-resistance vs. Drain Current

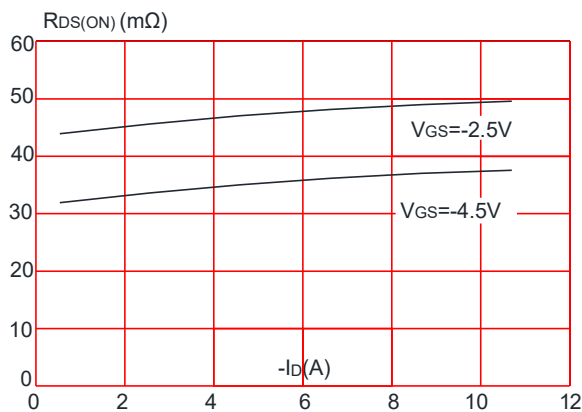


Figure 4: Body Diode Characteristics

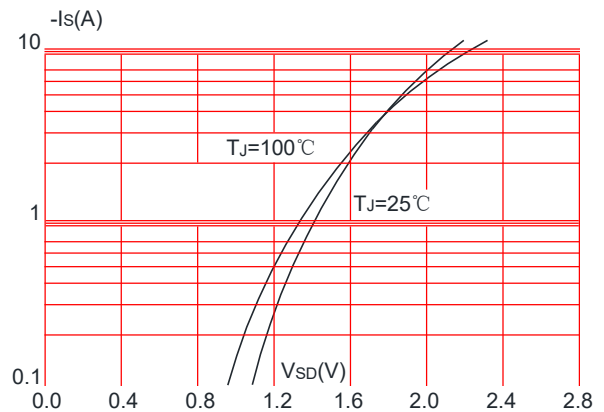


Figure 5: Gate Charge Characteristics

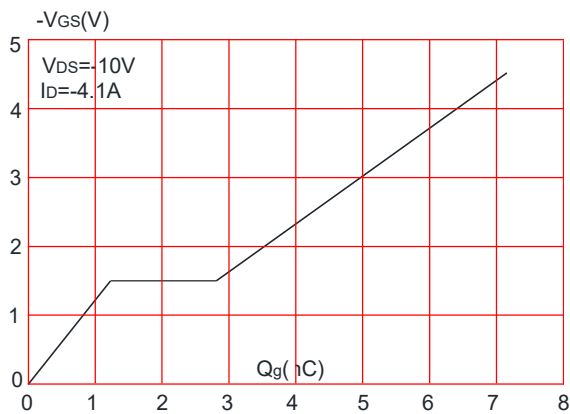


Figure 6: Capacitance Characteristics

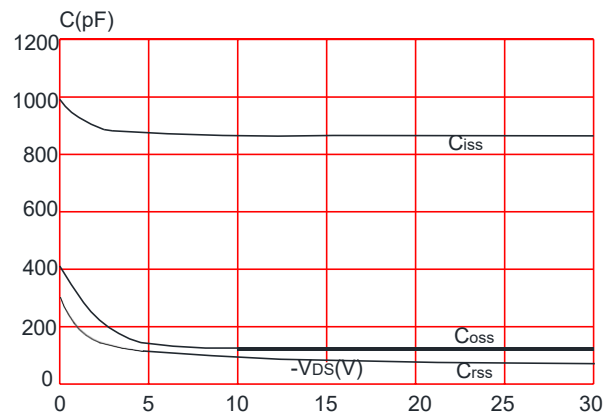


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

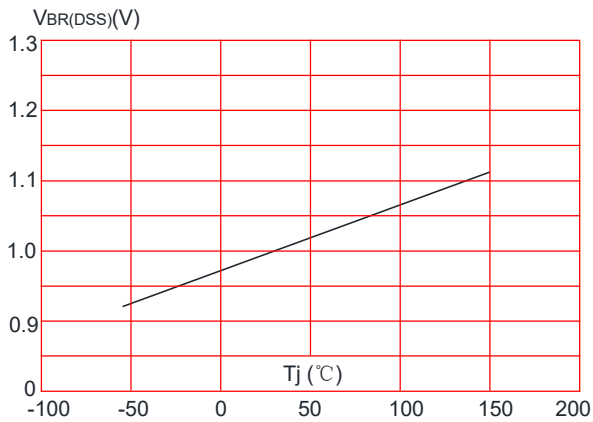


Figure 8: Normalized on Resistance vs. Junction Temperature

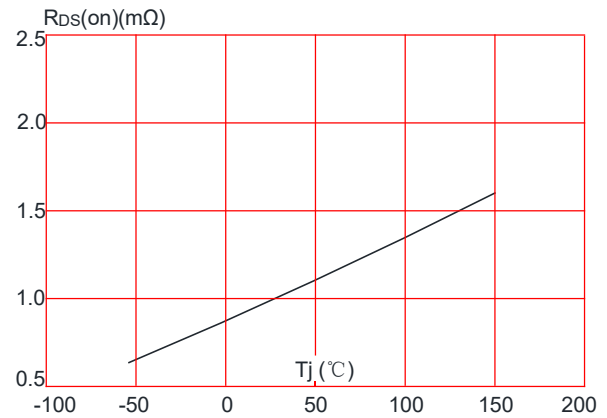


Figure 9: Maximum Safe Operating Area

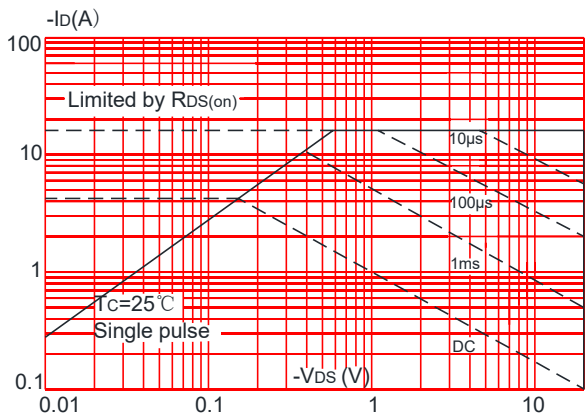


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

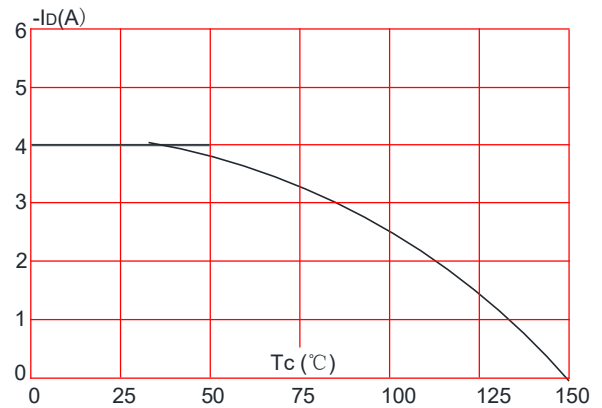
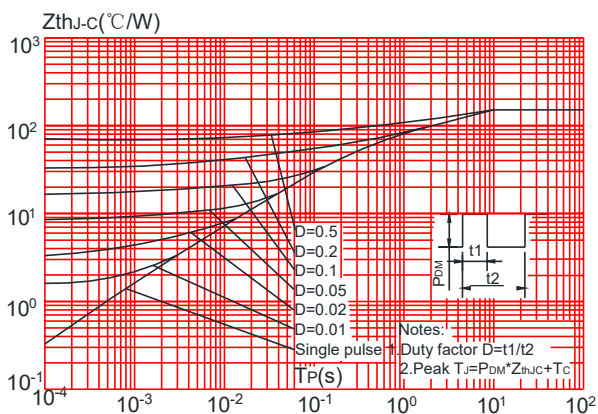
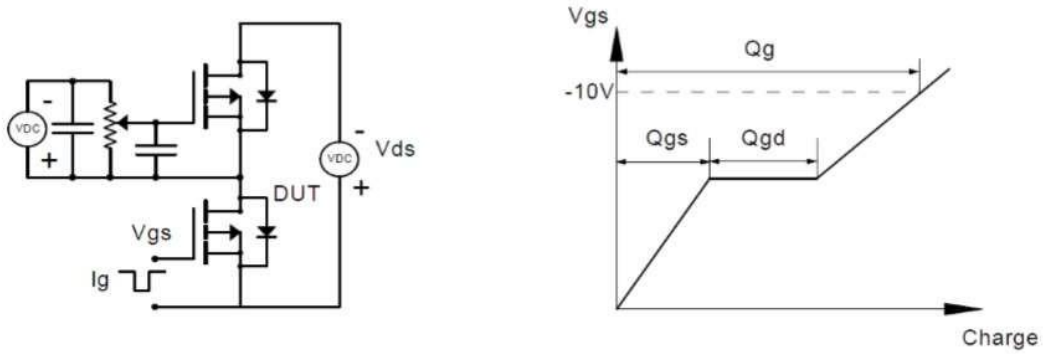


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

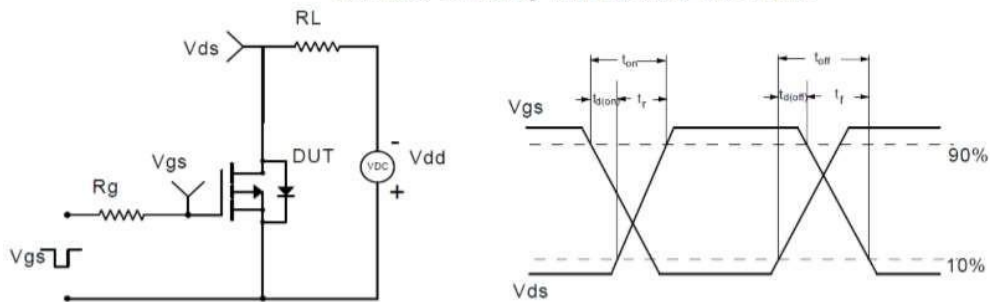


Test Circuit

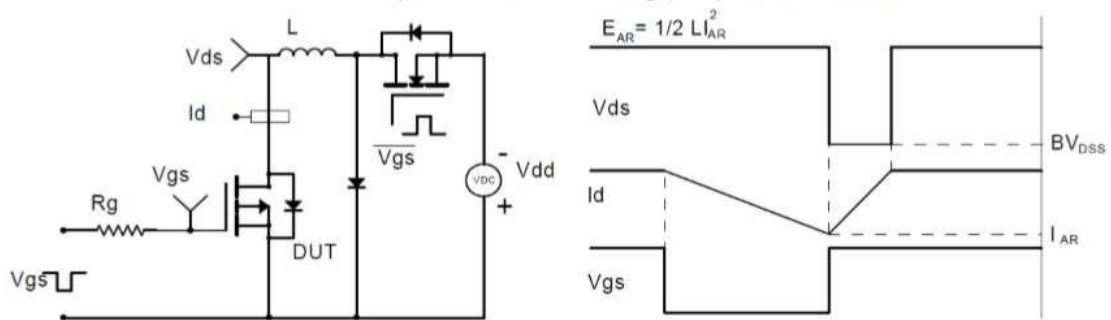
Gate Charge Test Circuit & Waveform



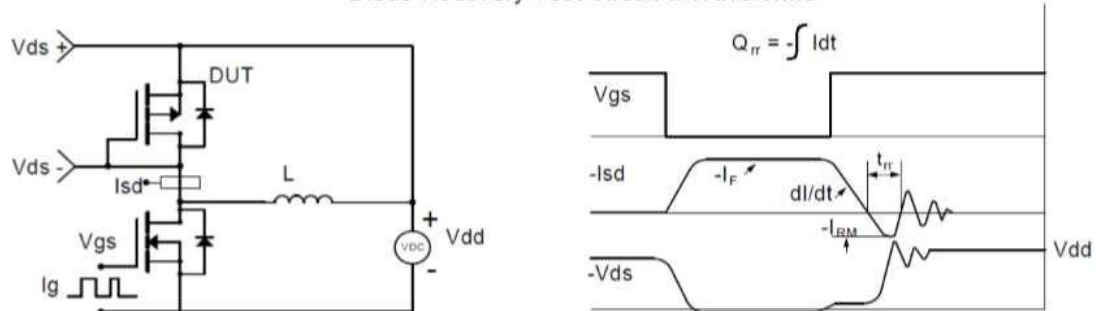
Resistive Switching Test Circuit & Waveforms



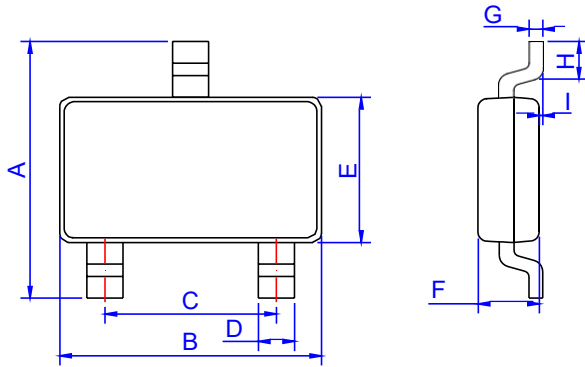
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



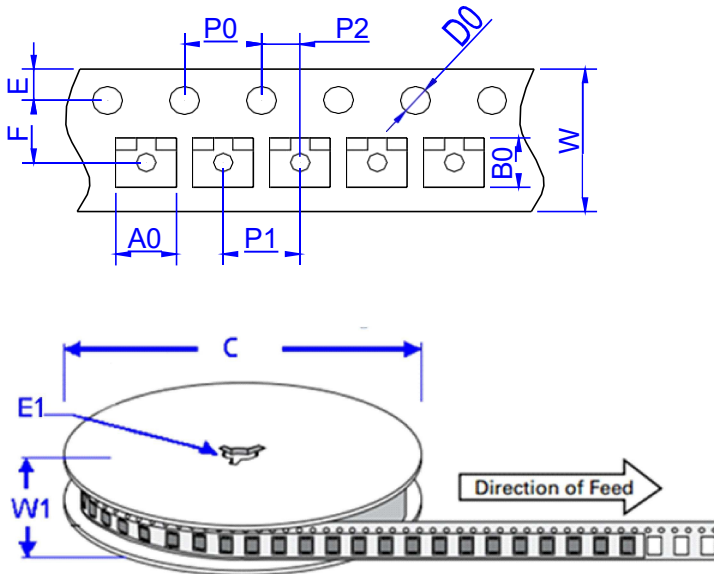
Package Mechanical Data



SOT-23

| Ref. | Dimensions | | | | | |
|------|-------------|------|------|-----------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 2.30 | 2.40 | 2.50 | 0.091 | 0.095 | 0.098 |
| B | 2.80 | 2.90 | 3.00 | 0.110 | 0.114 | 0.118 |
| C | 1.90 REF | | | 0.075 REF | | |
| D | 0.35 | 0.40 | 0.45 | 0.014 | 0.016 | 0.018 |
| E | 1.20 | 1.30 | 1.40 | 0.047 | 0.051 | 0.055 |
| F | 0.90 | 1.00 | 1.10 | 0.035 | 0.039 | 0.043 |
| G | | 0.10 | 0.15 | | 0.004 | 0.006 |
| H | 0.20 | | | 0.008 | | |
| I | 0 | | 0.10 | 0 | | 0.004 |

Package Information-SOT-23



| Ref. | Dimensions | |
|------|-------------|---------------|
| | Millimeters | Inches |
| A0 | 3.15 ± 0.3 | 0.124 ± 0.012 |
| B0 | 2.77 ± 0.3 | 0.109 ± 0.012 |
| C | 178 | 7.0 |
| D0 | 1.50 ± 0.1 | 0.059 ± 0.004 |
| E | 1.75 ± 0.2 | 0.069 ± 0.008 |
| E1 | 13.3 ± 0.3 | 0.524 ± 0.012 |
| F | 3.5 ± 0.2 | 0.138 ± 0.008 |
| P0 | 4.00 ± 0.2 | 0.157 ± 0.008 |
| P1 | 4.00 ± 0.2 | 0.157 ± 0.008 |
| P2 | 2.00 ± 0.2 | 0.079 ± 0.008 |
| W | 8.00 ± 0.2 | 0.315 ± 0.008 |
| W1 | 11.5 ± 1.0 | 0.453 ± 0.039 |