

Single P-Channel MOSFET

DESCRIPTION

SMC2305 is the P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced trench technology devices are well suited for high efficiency fast switching applications, low in-line power loss are needed in small outline surface mount package.

PART NUMBER INFORMATION

SMC 2305 SN - TR G
 a b c d e

- a : Company name.
- b : Product Serial number.
- c : Package code SN: SOT-23
- d : Handling code TR: Tape&Reel
- e : Green produce code G: *RoHS Compliant*

FEATURES

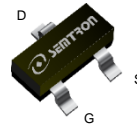
$V_{DS} = -20V$, $I_D = -4.2A$

- $R_{DS(ON)}=38m\Omega(Typ.)@V_{GS}=-10V$
- $R_{DS(ON)}=45m\Omega(Typ.)@V_{GS}=-4.5V$
- $R_{DS(ON)}=60m\Omega(Typ.)@V_{GS}=-2.5V$
- $R_{DS(ON)}=80m\Omega(Typ.)@V_{GS}=-1.8V$

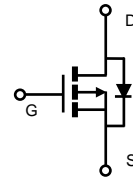
- ◆ Fast switch
- ◆ 1.8V Low gate drive applications
- ◆ High power and current handling capability

APPLICATIONS

- ◆ Hand-Held Instruments
- ◆ Load Switch



SOT-23



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ C$ Unless otherwise noted)

| Symbol | Parameter | Rating | Units | |
|-----------|--|------------------|------------|---|
| V_{DSS} | Drain-Source Voltage | -20 | V | |
| V_{GSS} | Gate-Source Voltage | ± 12 | V | |
| I_D | Continuous Drain Current ($V_{GS}=4.5V$) | $T_A=25^\circ C$ | -4.2 | A |
| | | $T_A=70^\circ C$ | -3.3 | A |
| I_{DM} | Pulsed Drain Current ^A | 16.8 | A | |
| P_D | Power Dissipation ^B | $T_A=25^\circ C$ | 1.4 | W |
| | | $T_A=70^\circ C$ | 0.9 | W |
| T_J | Operation Junction Temperature | -55/150 | $^\circ C$ | |
| T_{STG} | Storage Temperature Range | -55/150 | $^\circ C$ | |

THERMAL RESISTANCE

| Symbol | Parameter | Typ | Max | Units |
|-----------------|--|--------------|-----|--------------|
| $R_{\theta JA}$ | Thermal Resistance Junction to Ambient ^B | $t \leq 10s$ | 90 | $^\circ C/W$ |
| | Thermal Resistance Junction to Ambient ^{BC} | Steady-State | 120 | |

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ Unless otherwise noted)

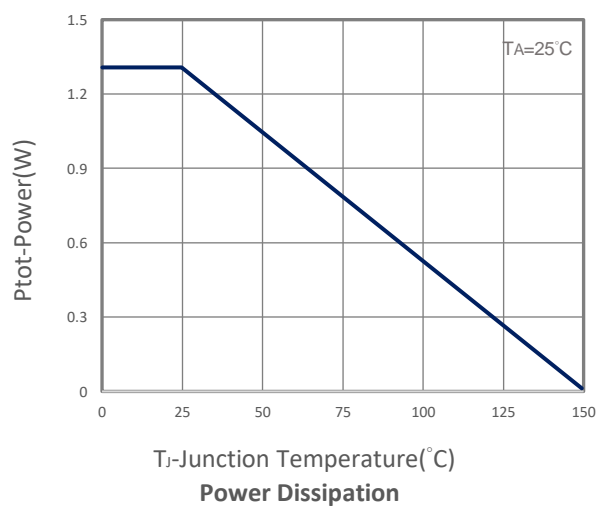
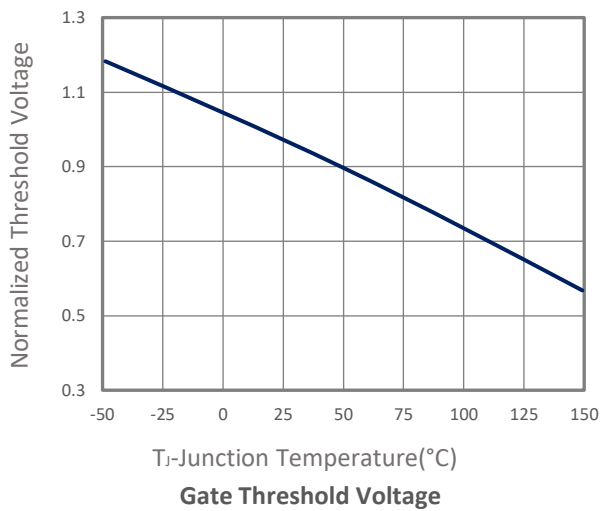
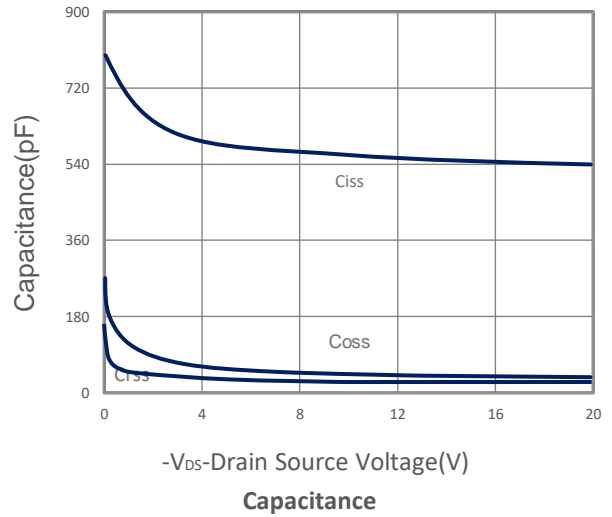
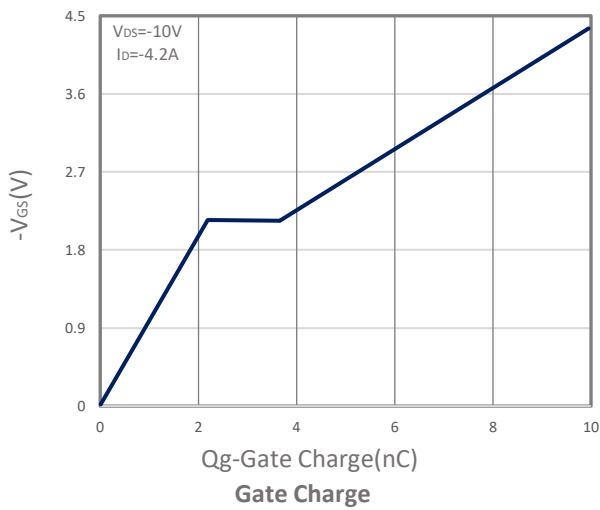
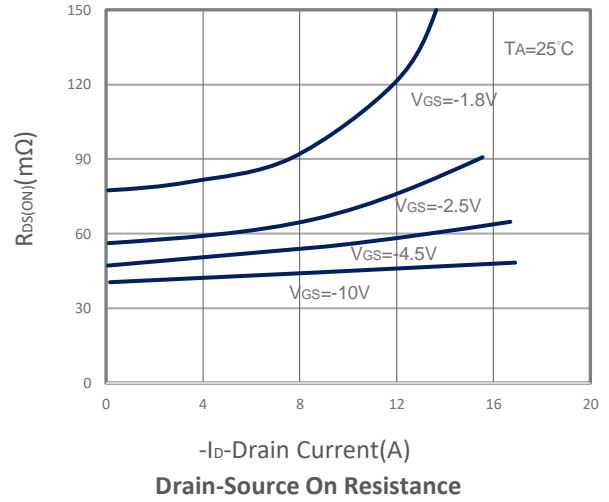
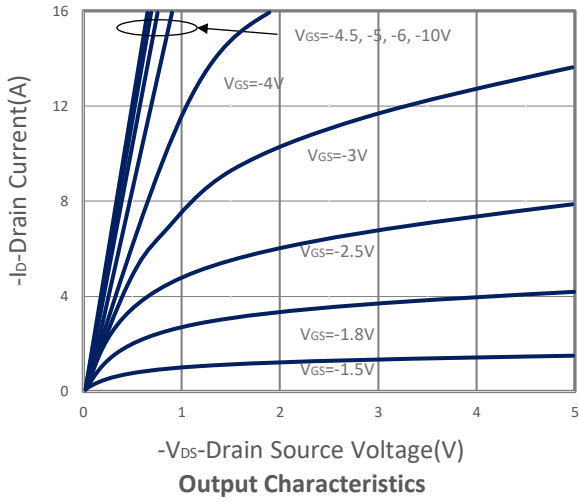
| Symbol | Parameter | Condition | Min | Typ | Max | Unit |
|---|------------------------------------|---|------|------|-----------|------------|
| Static Parameters | | | | | | |
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =-250 μ A | -20 | | | V |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =-250 μ A | -0.5 | -0.7 | -1 | V |
| I _{GSS} | Gate Leakage Current | V _{DS} =0V, V _{GS} = \pm 12V | | | \pm 100 | nA |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =-20V, V _{GS} =0V, T _J =25 $^\circ$ C | | | -1 | μ A |
| | | V _{DS} =-16V, V _{GS} =0V, T _J =75 $^\circ$ C | | | -10 | |
| R _{DS(ON)} | Drain-source On-Resistance | V _{GS} =-10V, I _D =-4.5A | | 38 | 43 | m Ω |
| | | V _{GS} =-4.5V, I _D =-4.2A | | 45 | 50 | |
| | | V _{GS} =-2.5V, I _D =-2.5A | | 60 | 68 | |
| | | V _{GS} =-1.8V, I _D =-2A | | 80 | 95 | |
| G _{fs} | Forward Transconductance | V _{DS} =-10V, I _D =-3A | | 5.5 | | S |
| Diode Characteristics | | | | | | |
| V _{SD} | Diode Forward Voltage ^B | I _S =-1A, V _{GS} =0V | | -0.7 | -1 | V |
| I _S | Continuous Source Current | | | | -2.1 | A |
| Dynamic and Switching Parameters | | | | | | |
| Q _g | Total Gate Charge | V _{DS} =-10V, V _{GS} =-4.5V I _D =-4.2A | | 7.6 | 10.6 | nC |
| Q _{gs} | Gate-Source Charge | | | 1.62 | 2.3 | |
| Q _{gd} | Gate-Drain Charge | | | 1.2 | 1.7 | |
| C _{iss} | Input Capacitance | V _{DS} =-10V, V _{GS} =0V, f=1MHz | | 680 | | pF |
| C _{oss} | Output Capacitance | | | 76 | | |
| C _{rss} | Reverse Transfer Capacitance | | | 45 | | |
| t _{d(on)} | Turn-On Time | V _{DD} =-10V, V _{GEN} =-4.5V, R _G =6 Ω , I _D =-1A | | 6 | 11 | nS |
| t _r | | | | 8.7 | 17 | |
| t _{d(off)} | Turn-Off Time | | | 38 | 72 | |
| t _f | | | | 11 | 21 | |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

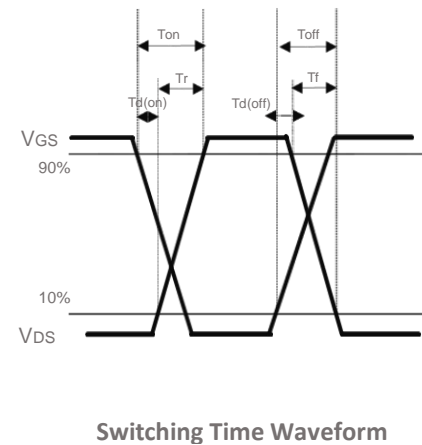
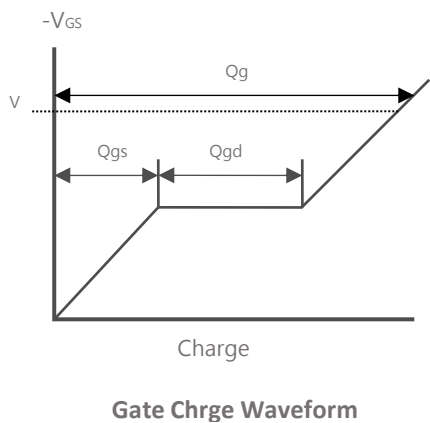
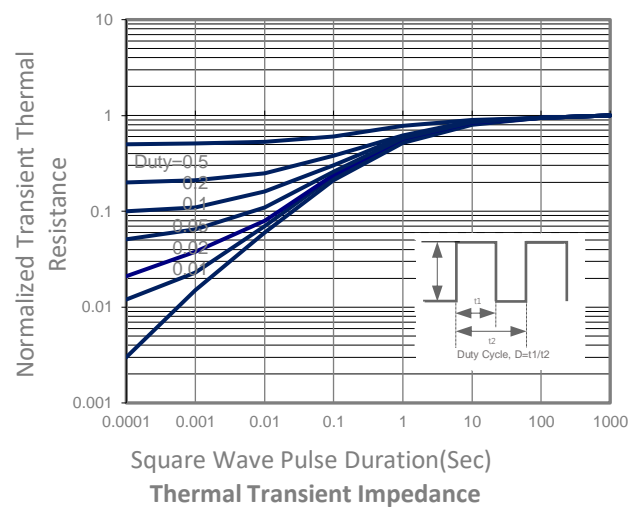
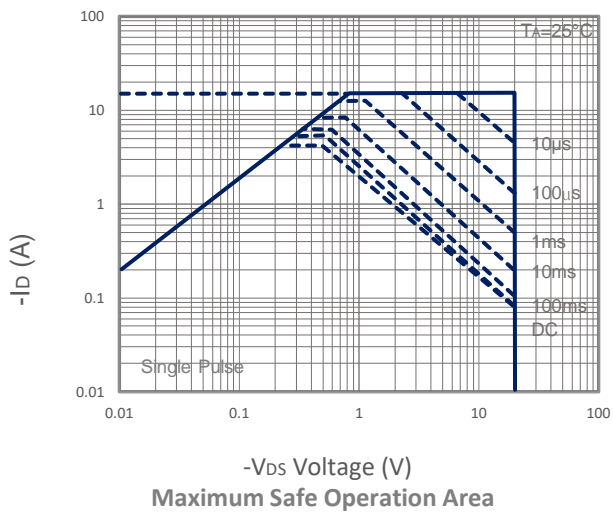
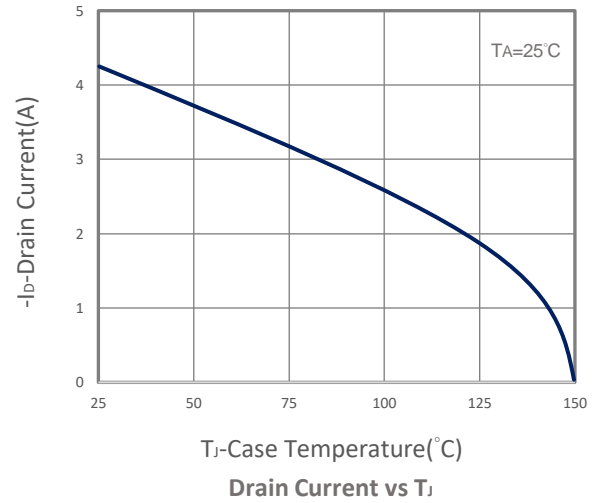
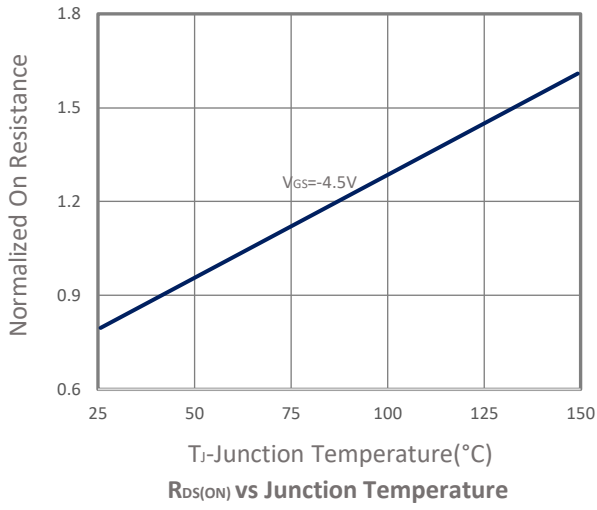
- A. Pulsed width limited by maximum junction temperature, T_{J(MAX)}=150 $^\circ$ C.
- B. The value of R θ JA is measured with the device mounted on 1in2 FR-4 board in a still air environment with maximum junction temperature T_{J(MAX)}=150 $^\circ$ C (initial temperature T_A=25 $^\circ$ C).
- C. T_{J(MAX)}=150 $^\circ$ C, using junction-to-case thermal resistance (R θ JC) is more useful in additional heat sinking is used.

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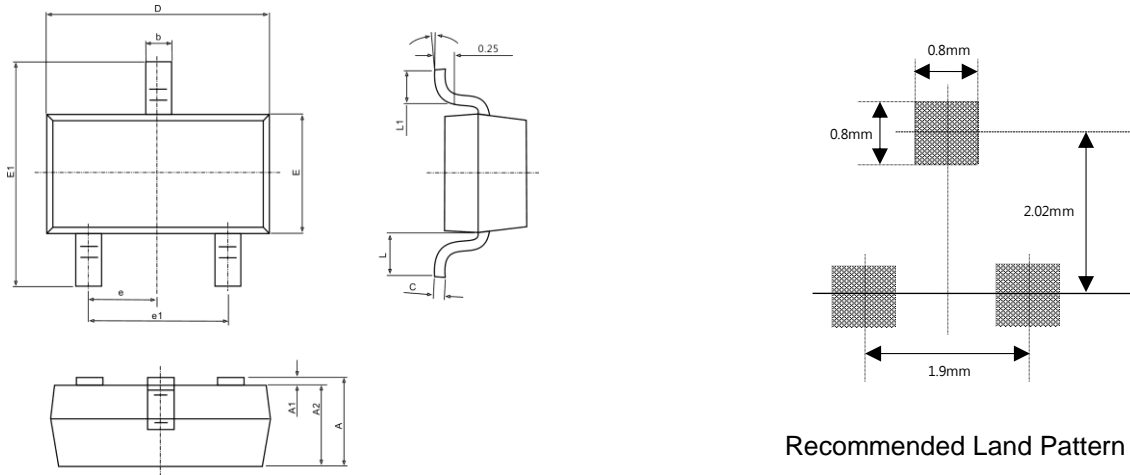
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS



■ SOT-23 PACKAGE DIMENSIONS



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|----------|---------------------------|-------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 0.900 | 1.150 | 0.035 | 0.045 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.050 | 0.035 | 0.041 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| D | 2.800 | 3.000 | 0.110 | 0.118 |
| E | 1.200 | 1.400 | 0.047 | 0.055 |
| E1 | 2.250 | 2.550 | 0.089 | 0.100 |
| e | 0.950 TYP. | | 0.037 TYP | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.550 REF. | | 0.022 REF. | |
| L1 | 0.300 | 0.500 | 0.012 | 0.020 |
| θ | 0° | 8° | 0° | 8° |