

Single N-Channel MOSFET

DESCRIPTION

SMC3346 is the N-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 3346 S - TR G
 a b c d e

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

FEATURES

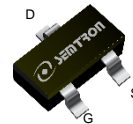
$V_{DS} = 30V, I_D = 6.1A$

$R_{DS(ON)}=20m\Omega(Typ.)@V_{GS}=10V$
 $R_{DS(ON)}=23m\Omega(Typ.)@V_{GS}=4.5V$
 $R_{DS(ON)}=27m\Omega(Typ.)@V_{GS}=2.5V$

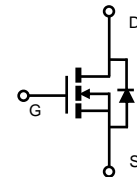
- ◆ Fast switch
- ◆ Low gate drive applications
- ◆ High power and current handling capability

APPLICATIONS

- ◆ Hand-Held Instruments
- ◆ Load Switch
- ◆ PWM Applications



SOT-23L



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

| Symbol | Parameter | Rating | Units |
|-----------|---|------------------|------------|
| V_{DSS} | Drain-Source Voltage | 30 | V |
| V_{GSS} | Gate-Source Voltage | ± 12 | V |
| I_D | Continuous Drain Current | $T_A=25^\circ C$ | 6.1 |
| | | $T_A=70^\circ C$ | 4.8 |
| I_{DM} | Pulsed Drain Current ^A | 24 | A |
| I_{AS} | Avalanche Current ^A | 15 | A |
| E_{AS} | Single Pulse Avalanche energy $L=0.1mH$ ^{AD} | 11 | mJ |
| P_D | Power Dissipation ^B | $T_A=25^\circ C$ | 1.6 |
| | | $T_A=70^\circ C$ | 1 |
| 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 | $t \leq 10s$ | 80 | $^\circ C/W$ |
| | Thermal Resistance Junction to Ambient ^{BC} | Steady-State | 120 | |

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

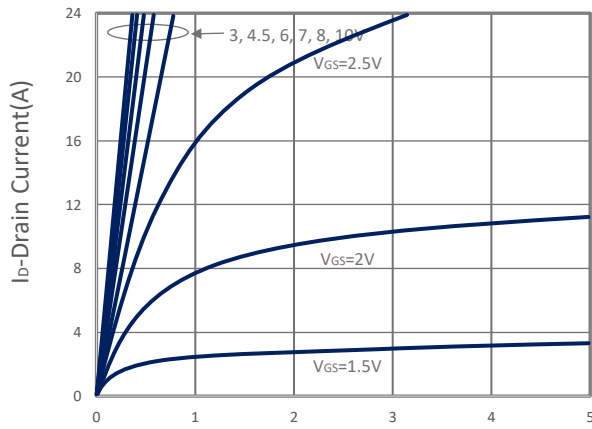
| Symbol | Parameter | Condition | Min | Typ | Max | Unit |
|---|---------------------------------|--|-----|------|-----------|------------|
| Static Parameters | | | | | | |
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =250 μ A | 30 | | | V |
| V _{GS(th)} | Gate Threshold Voltage | 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} =30V, V _{GS} =0V, T _J =25 $^\circ$ C | | | 1 | μ A |
| | | V _{DS} =24V, V _{GS} =0V, T _J =75 $^\circ$ C | | | 10 | |
| R _{DS(ON)} | Drain-source On-Resistance | V _{GS} =10V, I _D =6.1A | | 20 | 24 | m Ω |
| | | V _{GS} =4.5V, I _D =5A | | 23 | 26 | |
| | | V _{GS} =2.5V, I _D =3.2A | | 27 | 32 | |
| G _{fs} | Forward Transconductance | V _{DS} =10V, I _D =5A | | 9 | | S |
| Diode Characteristics | | | | | | |
| V _{SD} | Diode Forward Voltage | I _S =1A, V _{GS} =0V | | 0.7 | 1.0 | V |
| I _S | Continuous Source Current | | | | 3 | A |
| Dynamic and Switching Parameters | | | | | | |
| Q _g | Total Gate Charge | V _{DS} =15V, V _{GS} =10V, I _D =5A | | 11.5 | 16.1 | nC |
| Q _g | Total Gate Charge (4.5V) | | | 5.6 | 7.8 | |
| Q _{gs} | Gate-Source Charge | | | 2.3 | 3.2 | |
| Q _{gd} | Gate-Drain Charge | | | 2 | 2.8 | |
| C _{iss} | Input Capacitance | V _{DS} =15V, V _{GS} =0V, f=1MHz | | 585 | | pF |
| C _{oss} | Output Capacitance | | | 70 | | |
| C _{rss} | Reverse Transfer Capacitance | | | 52 | | |
| t _{d(on)} | Turn-On Time | V _{DD} =15V, V _{GEN} =10V R _G =3.3 Ω , I _D =1A | | 2.7 | 5 | nS |
| t _r | | | | 7.6 | 14 | |
| t _{d(off)} | Turn-Off Time | | | 19 | 36 | |
| t _f | | | | 4.2 | 8 | |

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

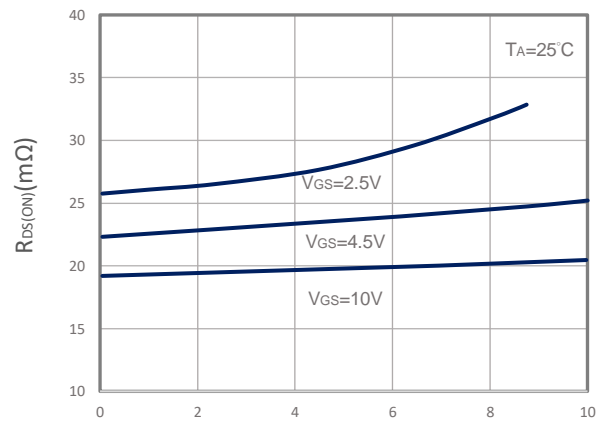
- Pulsed width limited by maximum junction temperature, T_{J(MAX)}=150 $^\circ$ C.
- The value of R _{θ JA} is measured with the device mounted on 1in2 FR-4 board in a still air environment with maximum junction temperature T_{J(MAX)}=150 $^\circ$ C (initial temperature T_A=25 $^\circ$ C).
- T_{J(MAX)}=150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

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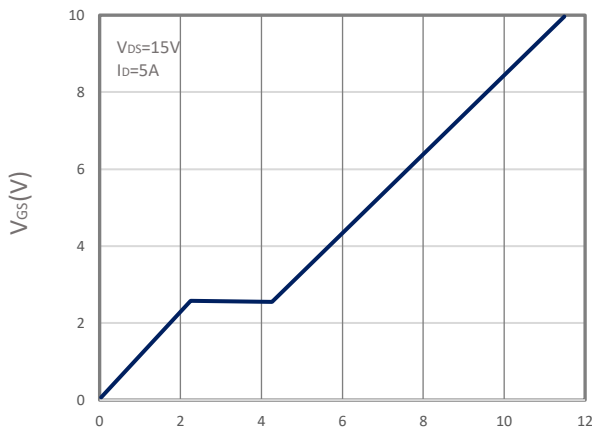
TYPICAL CHARACTERISTICS



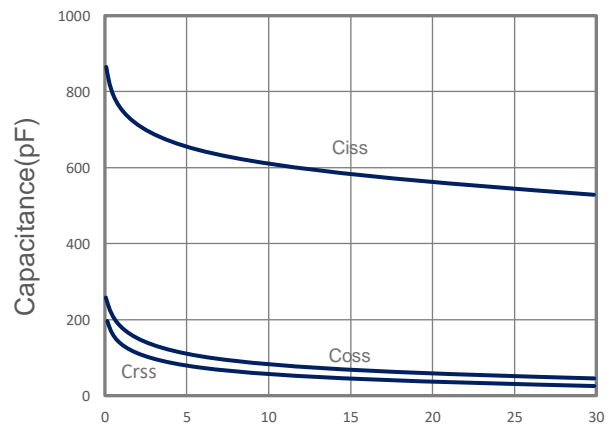
V_{DS} -Drain Source Voltage (V)
Output Characteristics



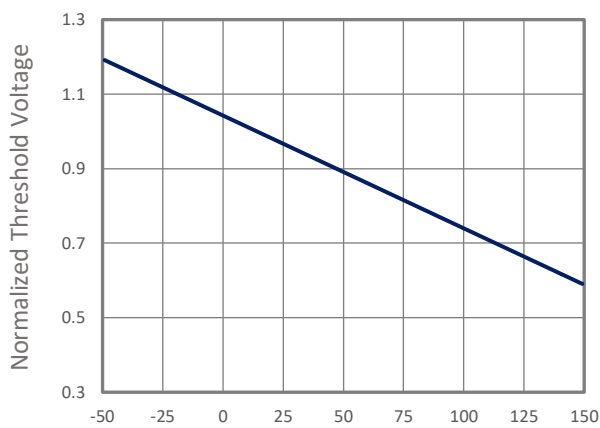
I_D -Drain Current (A)
Drain-Source On Resistance



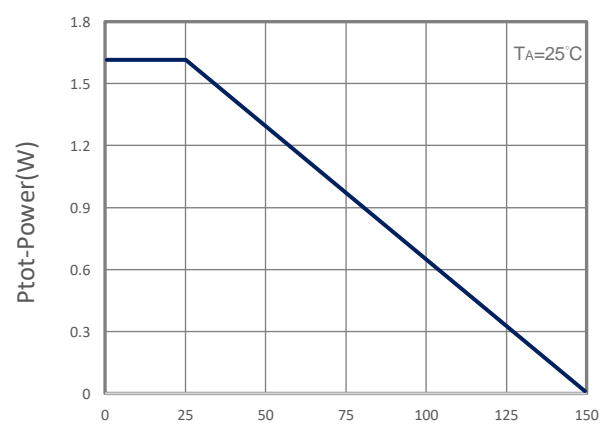
Q_g -Gate Charge (nC)
Gate Charge



V_{DS} -Drain Source Voltage (V)
Capacitance

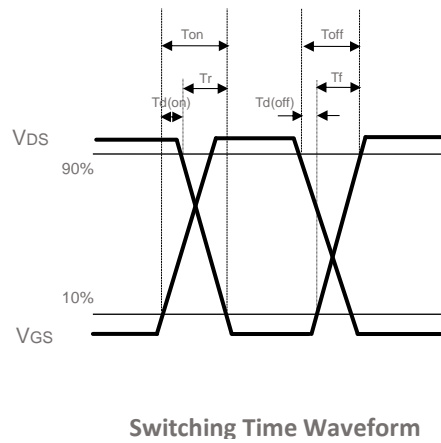
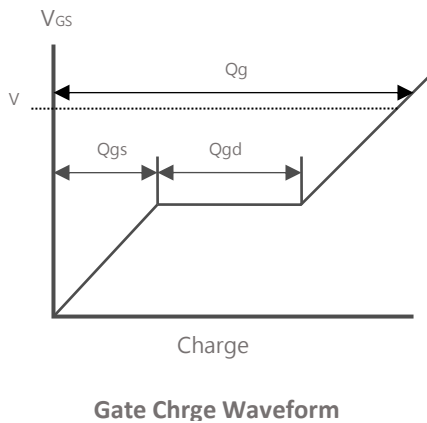
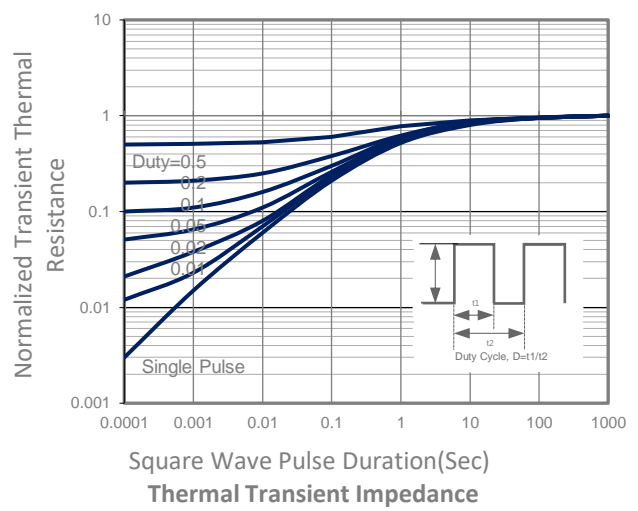
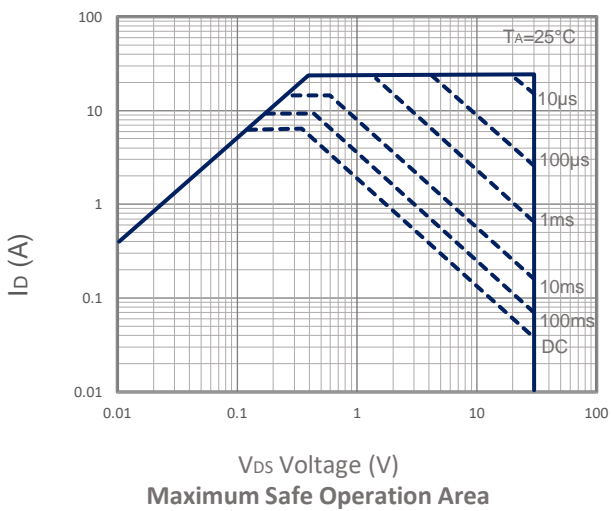
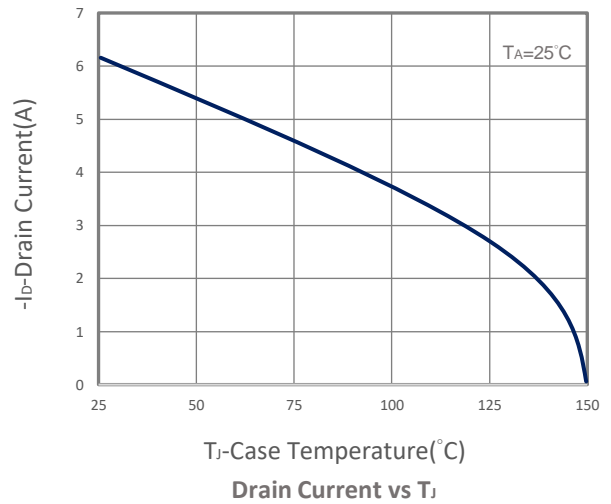
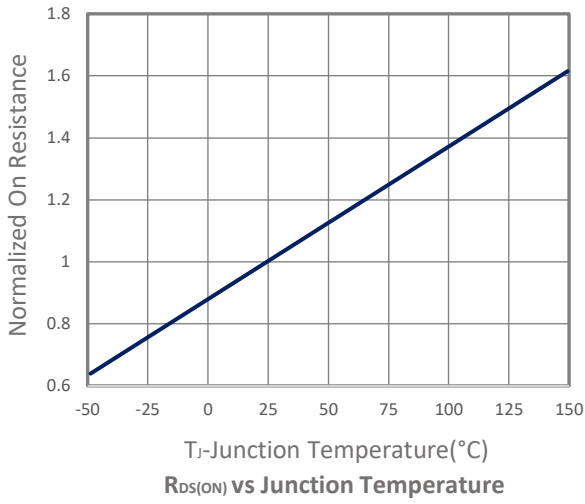


T_J -Junction Temperature ($^\circ\text{C}$)
Gate Threshold Voltage

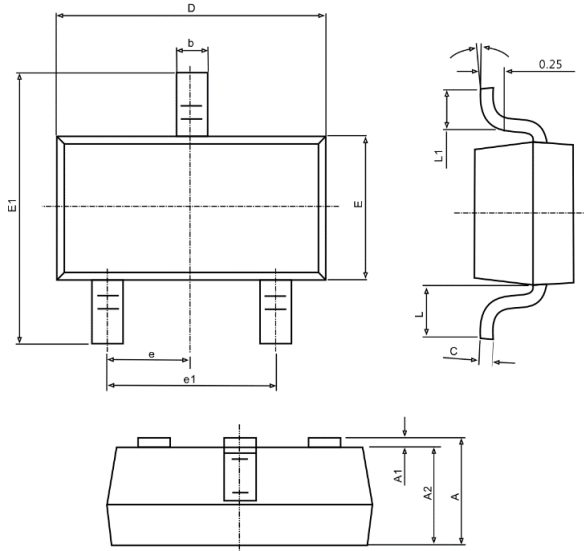


T_J -Junction Temperature ($^\circ\text{C}$)
Power Dissipation

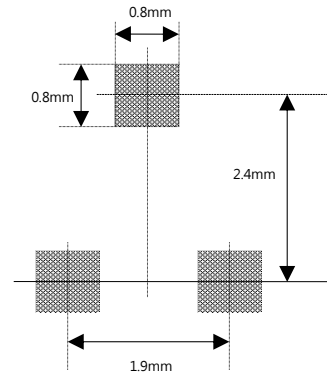
TYPICAL CHARACTERISTICS



■ SOT-23L PACKAGE DIMENSIONS



Recommended Minimum Pad(mm)



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 1.000 | 1.300 | 0.039 | 0.049 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 1.000 | 1.200 | 0.039 | 0.047 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.047 | 0.207 | 0.002 | 0.008 |
| D | 2.800 | 3.000 | 0.110 | 0.118 |
| E | 1.500 | 1.700 | 0.059 | 0.067 |
| E1 | 2.600 | 3.000 | 0.102 | 0.118 |
| e | 0.950 TYP. | | 0.037 TYP. | |
| e1 | 1.900 TYP. | | 0.075 TYP. | |
| L1 | 0.250 | 0.550 | 0.010 | 0.022 |
| θ | 0° | 8° | 0° | 8° |