

Common-Drain Dual N-Channel MOSFET

DESCRIPTION

SMC4270 is the Dual N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced trench technology to provide excellent $R_{DS(ON)}$. These 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 4270 W - TR G
 a b c d e

- a : Company name.
- b : Product Serial number.
- c : Package code W:TSSOP-8
- d : Handling code TR:Tape&Reel
- e : Green produce code G:RoHS Compliant

FEATURES

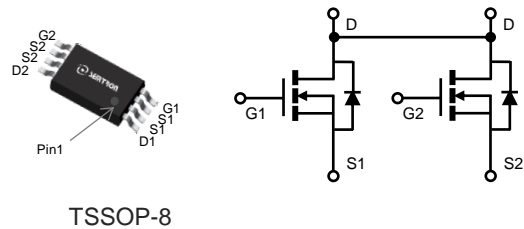
$V_{DS} = 20V, I_D = 7A$

- $R_{DS(ON)} = 16.5m\Omega(Typ.) @ V_{GS} = 4.5V$
- $R_{DS(ON)} = 17m\Omega(Typ.) @ V_{GS} = 4.0V$
- $R_{DS(ON)} = 18m\Omega(Typ.) @ V_{GS} = 3.2V$
- $R_{DS(ON)} = 20m\Omega(Typ.) @ V_{GS} = 2.5V$
- $R_{DS(ON)} = 23m\Omega(Typ.) @ V_{GS} = 1.8V$

- ◆ Fast switch
- ◆ High power and current handling capability
- ◆ Exceptional on-resistance

APPLICATIONS

- ◆ Power Management in Notebook Computer
- ◆ Portable Equipment and Battery Powered.



TSSOP-8

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 ($V_{GS} = 4.5V$) | $T_A = 25^\circ C$ | 7 |
| | | $T_A = 70^\circ C$ | 5.6 |
| I_{DM} | Pulsed Drain Current ^A | 28 | A |
| P_D | Power Dissipation ^B | $T_A = 25^\circ C$ | 1.4 |
| | | $T_A = 70^\circ C$ | 0.9 |
| 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 | | 80 | $^\circ C/W$ |
| | Thermal Resistance Junction to Ambient ^{BC} | | 120 | |
| $R_{\theta JC}$ | Thermal Resistance Junction to Case | | 70 | |

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

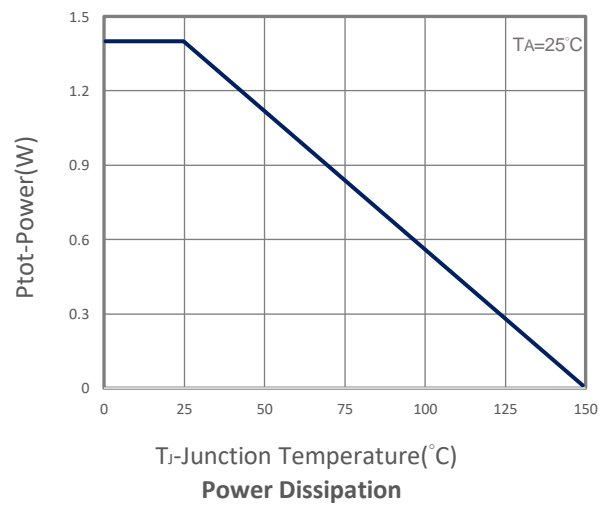
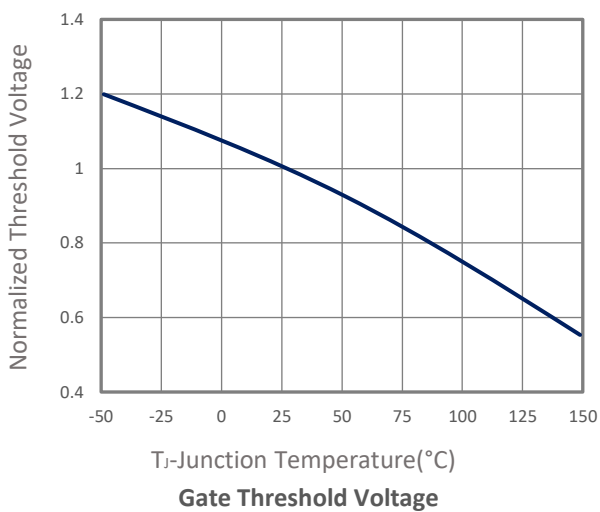
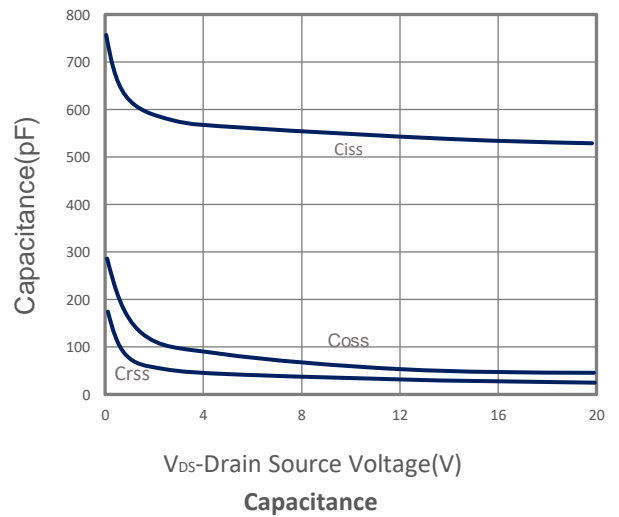
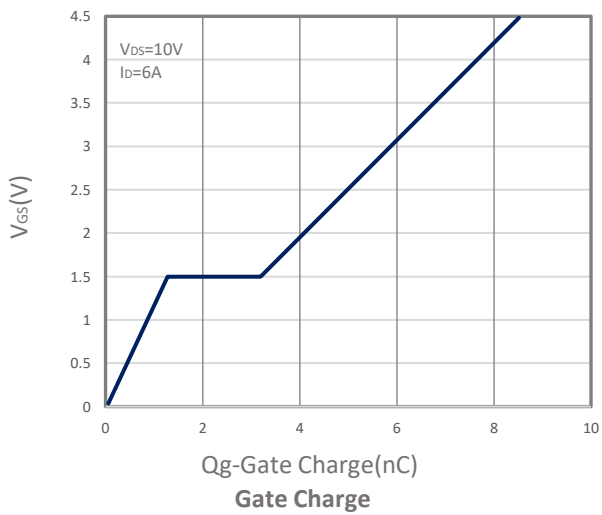
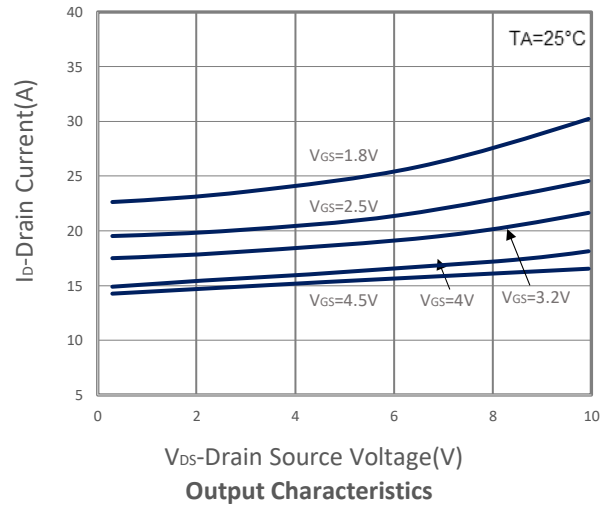
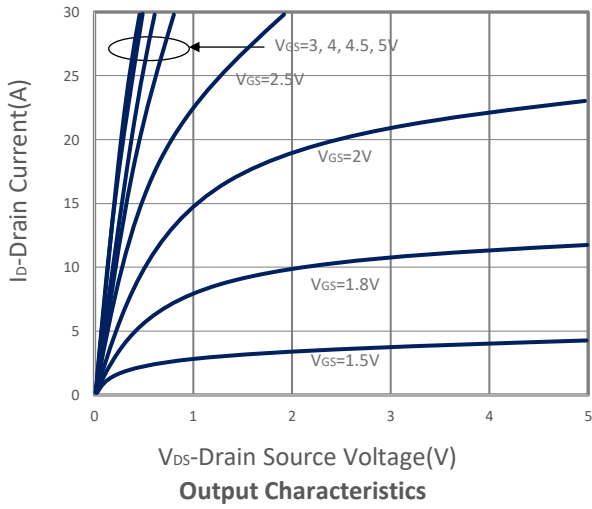
| Symbol | Parameter | Condition | Min | Typ | Max | Unit |
|---------------------------|---------------------------------|--|-----|------|------|------|
| Static Parameters | | | | | | |
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =250μA | 20 | | | V |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =250μA | 0.4 | 0.6 | 1.0 | V |
| I _{GSS} | Gate Leakage Current | V _{DS} =0V, V _{GS} =±12V | | | ±100 | nA |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =20V, V _{GS} =0V, T _J =25°C | | | 1 | μA |
| | | V _{DS} =16V, V _{GS} =0V, T _J =75°C | | | 10 | |
| R _{DS(ON)} | Drain-source On-Resistance | V _{GS} =4.5V, I _D =7A | | 16.5 | 19 | mΩ |
| | | V _{GS} =4.0V, I _D =6.0A | | 17 | 20 | |
| | | V _{GS} =3.2V, I _D =4.0A | | 18 | 21 | |
| | | V _{GS} =2.5V, I _D =3.0A | | 20 | 24 | |
| | | V _{GS} =1.8V, I _D =2.0A | | 23 | 28 | |
| Source-Drain Diode | | | | | | |
| V _{SD} | Diode Forward Voltage | I _S =1A, V _{GS} =0V | | 0.7 | 1 | V |
| I _S | Continuous Source Current | | | | 3.5 | A |
| Dynamic Parameters | | | | | | |
| Q _g | Total Gate Charge | V _{DS} =10V, V _{GS} =4.5V, I _D =6A | | 8.5 | 11.9 | nC |
| Q _{gs} | Gate-Source Charge | | | 1.4 | 2 | |
| Q _{gd} | Gate-Drain Charge | | | 2.2 | 3.1 | |
| C _{iss} | Input Capacitance | V _{DS} =10V, V _{GS} =0V, f=1MHz | | 550 | | pF |
| C _{oss} | Output Capacitance | | | 65 | | |
| C _{rss} | Reverse Transfer Capacitance | | | 41 | | |
| t _{d(on)} | Turn-On Time | V _{DD} =10V, V _{GEN} =4.5V R _G =3Ω, I _D =1A | | 4.8 | 9.1 | nS |
| t _r | | | | 13.5 | 25.7 | |
| t _{d(off)} | Turn-Off Time | | | 28 | 53.2 | |
| t _f | | | | 8.8 | 16.7 | |

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

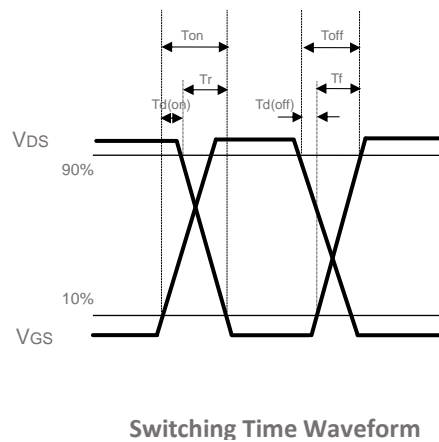
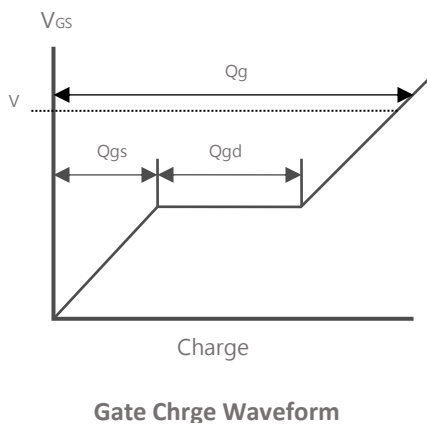
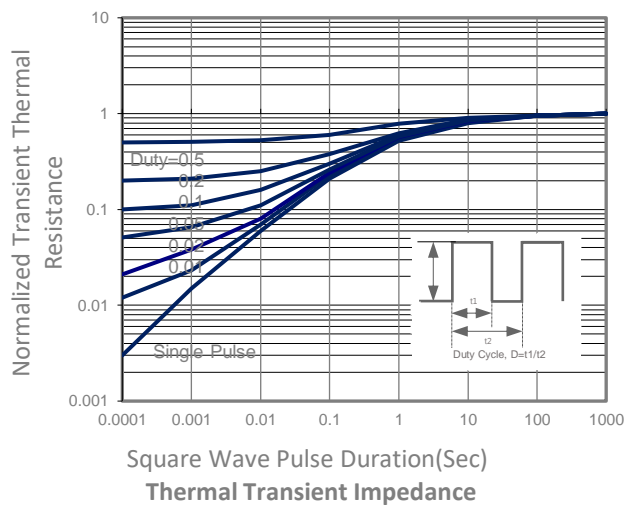
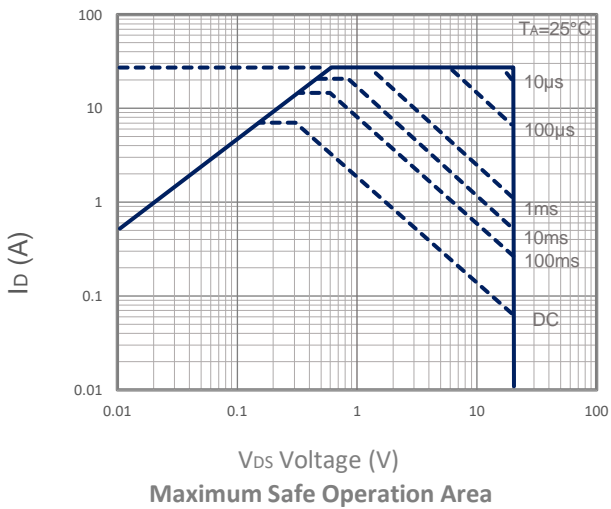
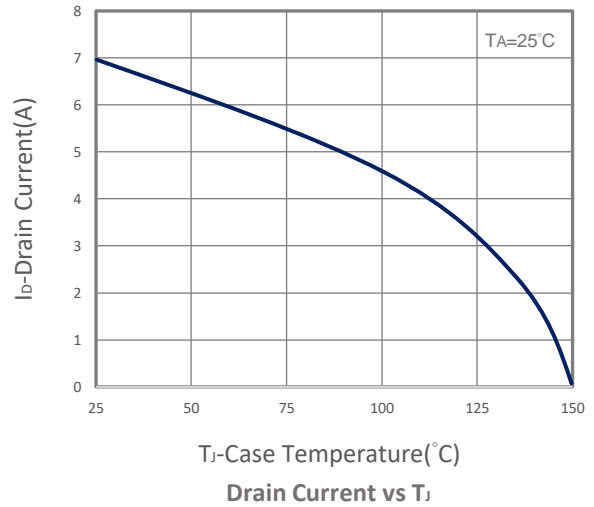
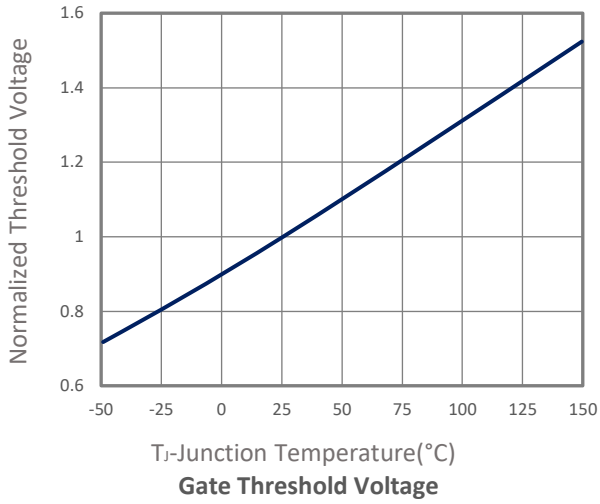
- Pulsed width limited by maximum junction temperature, T_{J(MAX)}=150°C.
- The value of R_{θJA} is measured with the device mounted on 1in2 FR-4 board in a still air environment with maximum junction temperature T_{J(MAX)}=150°C (initial temperature T_A=25°C).
- T_{J(MAX)}=150°C, using junction-to-case thermal resistance (R_{θJC}) is more useful in additional heat sinking is used.

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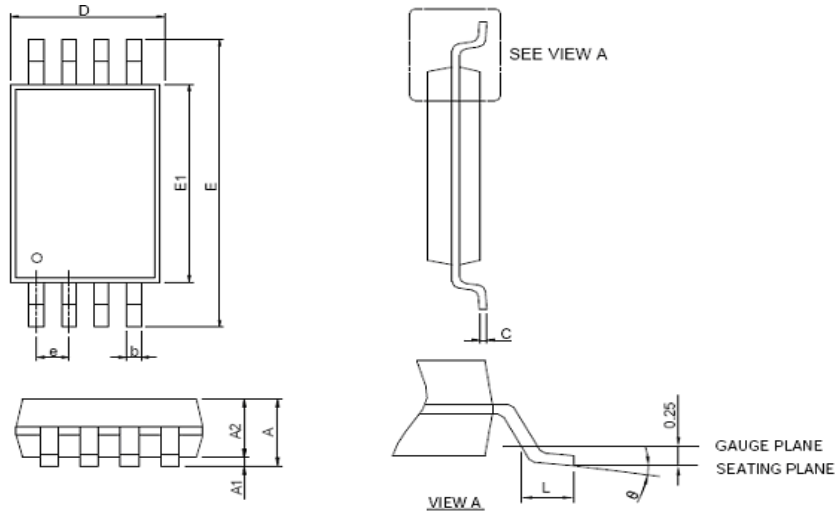
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS



TSSOP-8 PACKAGE DIMENSIONS



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|----------|---------------------------|-------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | | 1.200 | | 0.047 |
| A1 | 0.050 | 0.150 | 0.002 | 0.006 |
| A2 | 0.800 | 1.050 | 0.031 | 0.041 |
| b | 0.190 | 0.300 | 0.007 | 0.012 |
| c | 0.090 | 0.200 | 0.004 | 0.008 |
| D | 2.900 | 3.100 | 0.114 | 0.122 |
| E | 6.200 | 6.600 | 0.244 | 0.260 |
| E1 | 4.300 | 4.500 | 0.169 | 0.177 |
| e | 0.650 REF | | 0.026 REF | |
| L | 0.450 | 0.750 | 0.018 | 0.030 |
| θ | 0° | 8° | 0° | 8° |