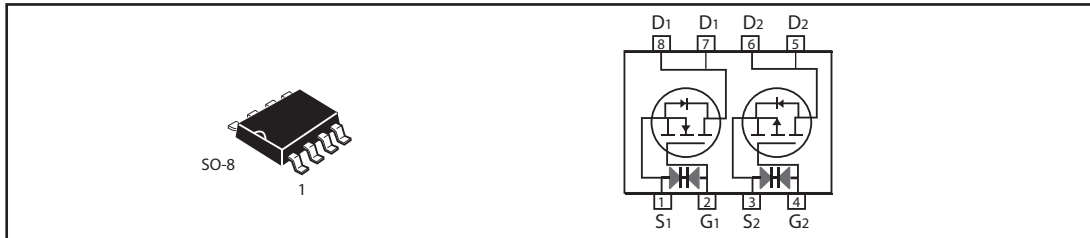




Dual Enhancement Mode Field Effect Transistor (N and P Channel)

| PRODUCT SUMMARY (N-Channel) | | |
|-----------------------------|----|--------------------|
| VDSS | ID | RDS(ON) (mΩ) Max |
| 30V | 7A | 23 @ VGS = 10V |
| | | 30 @ VGS = 4.5V |

| PRODUCT SUMMARY (P-Channel) | | |
|-----------------------------|-----|--------------------|
| VDSS | ID | RDS(ON) (mΩ) Max |
| -30V | -6A | 35 @ VGS = -10V |
| | | 52 @ VGS = -4.5V |



ABSOLUTE MAXIMUM RATINGS (TA=25 C unless otherwise noted)

| Parameter | Symbol | N-Channel | P-Channel | Unit |
|---|----------|------------|-----------|------|
| Drain-Source Voltage | VDS | 30 | -30 | V |
| Gate-Source Voltage | VGS | ±20 | ±20 | V |
| Drain Current-Continuous @TJ=25 C ° -Pulsed ^b | ID | 7 | -6 | A |
| | IDM | 28 | -24 | A |
| Drain-Source Diode Forward Current ^a | IS | 1.7 | -1.7 | A |
| Maximum Power Dissipation ^a | PD | 2.0 | | W |
| Operating Junction and Storage Temperature Range | TJ, TSTG | -55 to 150 | | °C |

THERMAL CHARACTERISTICS

| | | | |
|--|------|------|------|
| Thermal Resistance, Junction-to-Ambient ^a | R θA | 62.5 | °C/W |
|--|------|------|------|

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N-Channel ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ ^c | Max | Unit |
|--|--------------|--|-----|------------------|----------|---------|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=250\mu A$ | 30 | | | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=24V, V_{GS}=0V$ | | | 1 | μA |
| Gate-Body Leakage | I_{GSS} | $V_{GS}=\pm 20V, V_{DS}=0V$ | | | ± 10 | μA |
| ON CHARACTERISTICS ^b | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 1.0 | 1.9 | 3 | V |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}=10V, I_D=7A$ | | 17 | 23 | m ohm |
| | | $V_{GS}=4.5V, I_D=5A$ | | 23 | 30 | m ohm |
| On-State Drain Current | $I_{D(ON)}$ | $V_{DS}=15V, V_{GS}=10V$ | 20 | | | A |
| Forward Transconductance | g_{FS} | $V_{DS}=10V, I_D=7A$ | | 14 | | S |
| DYNAMIC CHARACTERISTICS ^c | | | | | | |
| Input Capacitance | C_{ISS} | $V_{DS}=15V, V_{GS}=0V$ $f=1.0MHz$ | | 680 | | pF |
| Output Capacitance | C_{OSS} | | | 190 | | pF |
| Reverse Transfer Capacitance | C_{RSS} | | | 115 | | pF |
| SWITCHING CHARACTERISTICS ^c | | | | | | |
| Turn-On Delay Time | $t_{D(ON)}$ | $V_{DD}=15V,$ $I_D=7A,$ $R_L=2.1\text{ ohm},$ $V_{GS}=10V,$ $R_{GEN}=6\text{ ohm}$ | | 12 | | ns |
| Rise Time | t_r | | | 17.5 | | ns |
| Turn-Off Delay Time | $t_{D(OFF)}$ | | | 41 | | ns |
| Fall Time | t_f | | | 15 | | ns |
| Total Gate Charge | Q_g | $V_{DS}=15V, I_D=7A, V_{GS}=10V$ | | 11 | | nC |
| | | $V_{DS}=15V, I_D=7A, V_{GS}=4.5V$ | | 5.5 | | nC |
| Gate-Source Charge | Q_{gs} | $V_{DS}=15V, I_D=7A,$ $V_{GS}=10V$ | | 1.7 | | nC |
| Gate-Drain Charge | Q_{gd} | | | 3.3 | | nC |

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P-Channel ELECTRICAL CHARACTERISTICS (TA=25°C unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ ^c | Max | Unit |
|--|---------------------|--|-----|------------------|-----|-------|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} =0V, I _D =-250uA | -30 | | | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =-24V, V _{GS} =0V | | | -1 | uA |
| Gate-Body Leakage | I _{GSS} | V _{GS} =±20V, V _{DS} =0V | | | ±10 | uA |
| ON CHARACTERISTICS^b | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =-250uA | -1 | -1.9 | -3 | V |
| Drain-Source On-State Resistance | R _{DS(ON)} | V _{GS} =-10V, I _D =-5A | | 29 | 35 | m ohm |
| | | V _{GS} =-4.5V, I _D =-4A | | 44 | 52 | m ohm |
| On-State Drain Current | I _{D(ON)} | V _{DS} =-15V, V _{GS} =-10V | -20 | | | A |
| Forward Transconductance | g _{FS} | V _{DS} =-15V, I _D =-5A | | 8.5 | | S |
| DYNAMIC CHARACTERISTICS^c | | | | | | |
| Input Capacitance | C _{ISS} | V _{DS} =-15V, V _{GS} =0V f=1.0MHz | | 870 | | pF |
| Output Capacitance | C _{OSS} | | | 225 | | pF |
| Reverse Transfer Capacitance | C _{RSS} | | | 125 | | pF |
| SWITCHING CHARACTERISTICS^c | | | | | | |
| Turn-On Delay Time | t _{D(ON)} | V _D =-15V, R _L =15 ohm, I _D =-1A, V _{GEN} =-10V, R _{GEN} =6 ohm | | 12 | | ns |
| Rise Time | t _r | | | 18 | | ns |
| Turn-Off Delay Time | t _{D(OFF)} | | | 70 | | ns |
| Fall Time | t _f | | | 40 | | ns |
| Total Gate Charge | Q _g | V _{DS} =-15V, I _D =-5A, V _{GS} =-10V | | 15 | | nC |
| | | V _{DS} =-15V, I _D =-5A, V _{GS} =-4.5V | | 7.5 | | nC |
| Gate-Source Charge | Q _{gs} | V _{DS} =-15V, I _D =-5A, V _{GS} =-10V | | 1.7 | | nC |
| Gate-Drain Charge | Q _{gd} | | | 4.5 | | nC |

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

| Parameter | Symbol | Condition | Min | Typ ^c | Max | Unit |
|---|----------|--|------|------------------|------|------|
| DRAIN-SOURCE DIODE CHARACTERISTICS^b | | | | | | |
| Diode Forward Voltage | V_{SD} | $V_{GS} = 0\text{V}, I_S = 1.7\text{A}$ | N-Ch | 0.8 | 1.2 | V |
| | | $V_{GS} = 0\text{V}, I_S = -1.7\text{A}$ | P-Ch | -0.8 | -1.2 | |

Notes

- a. Surface Mounted on FR4 Board, $t \leq 10\text{sec}$.
 - b. Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2\%$.
 - c. Guaranteed by design, not subject to production testing.
- N-Channel

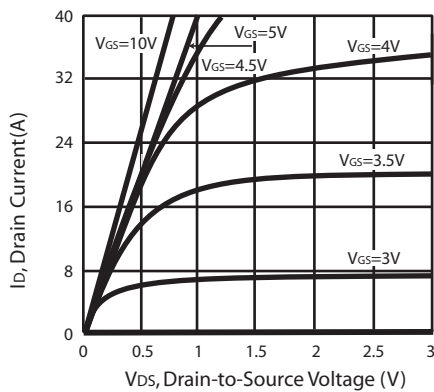


Figure 1. Output Characteristics

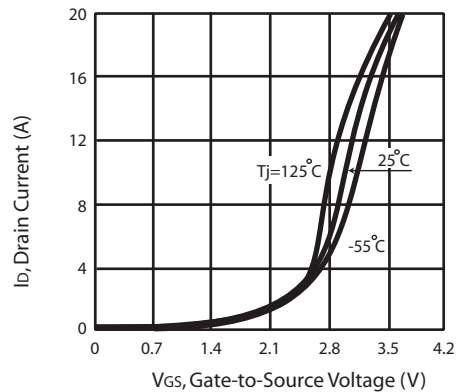


Figure 2. Transfer Characteristics

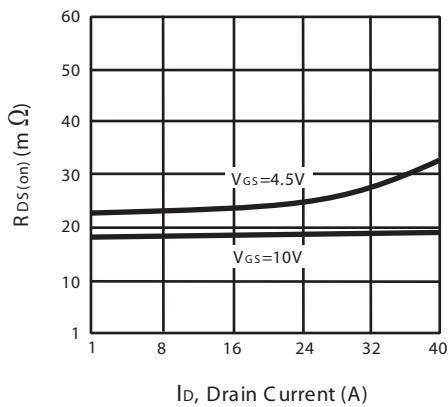


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

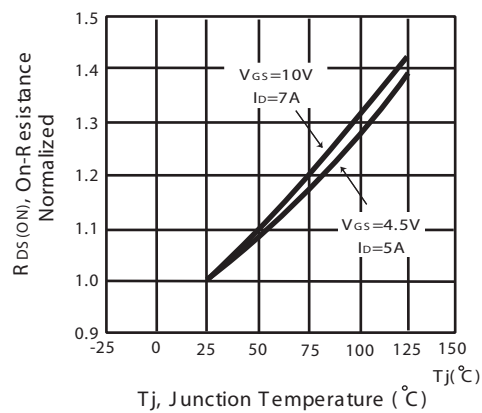


Figure 4. On-Resistance Variation with Drain Current and Temperature

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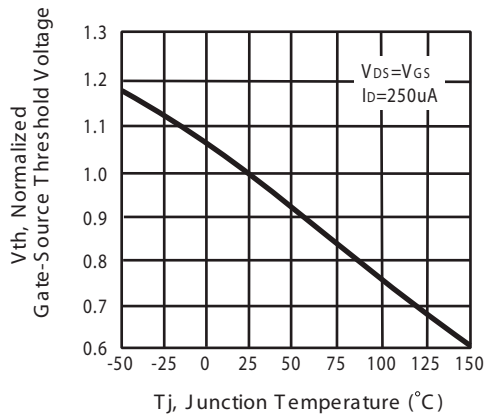


Figure 5. Gate Threshold Variation with Temperature

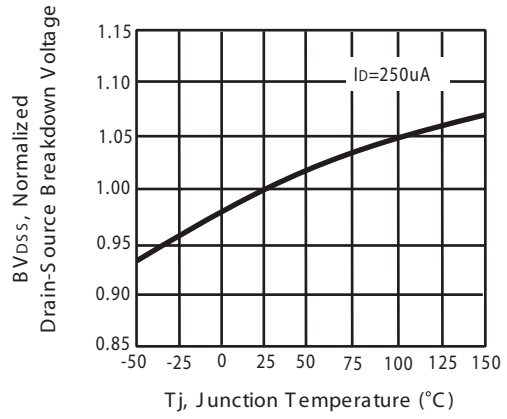


Figure 6. Breakdown Voltage Variation with Temperature

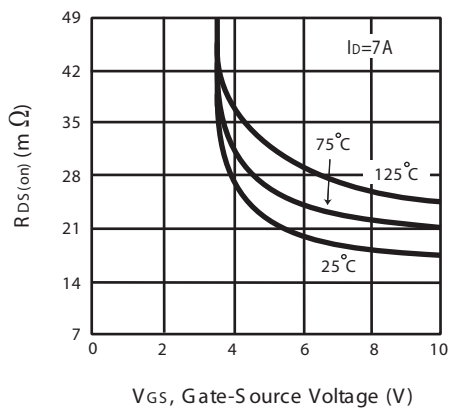


Figure 7. On-Resistance vs. Gate-Source Voltage

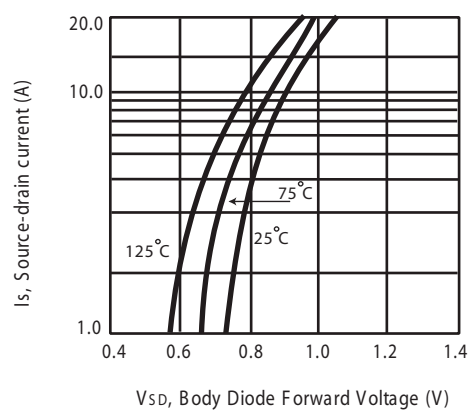


Figure 8. Body Diode Forward Voltage Variation with Source Current

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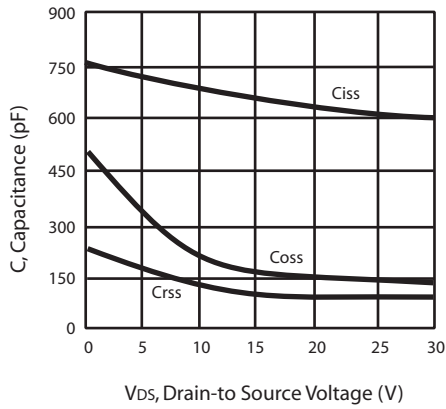


Figure 8. Capacitance

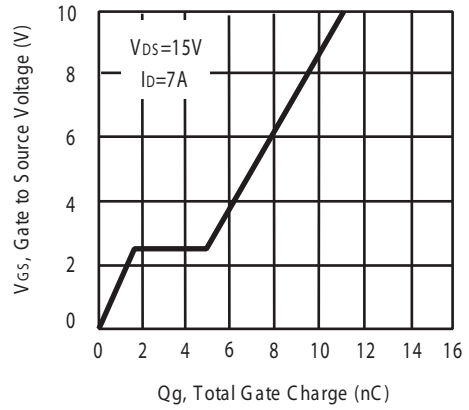


Figure 9. Gate Charge

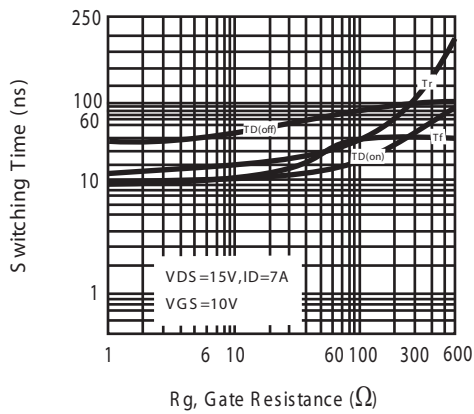


Figure 11. switching characteristics

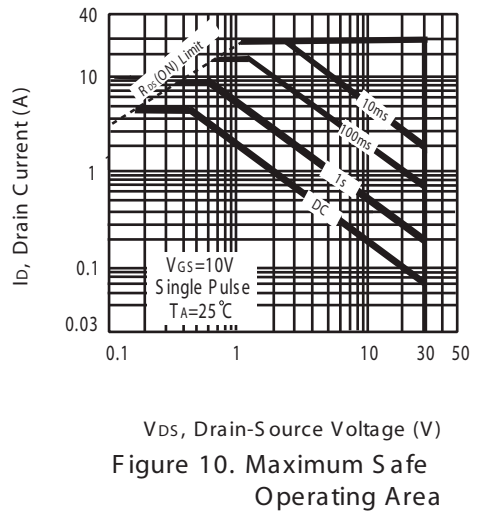


Figure 10. Maximum Safe Operating Area

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P-Channel

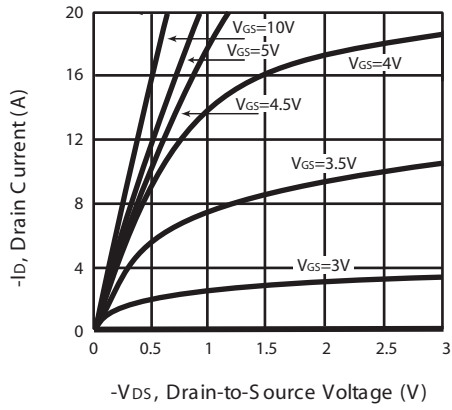


Figure 1. Output Characteristics

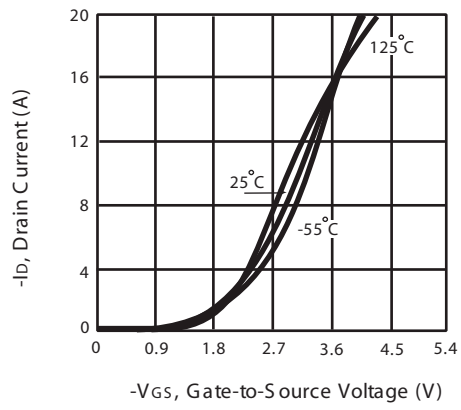


Figure 2. Transfer Characteristics

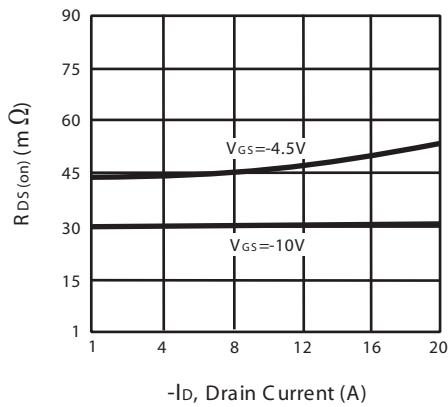


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

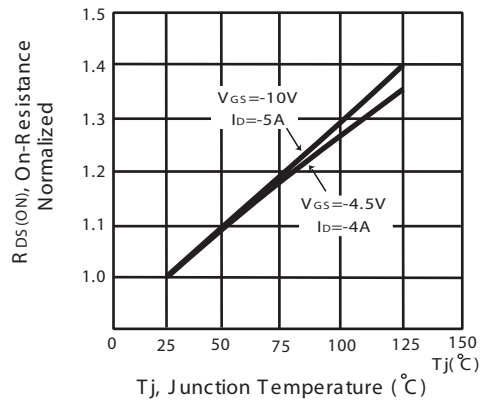
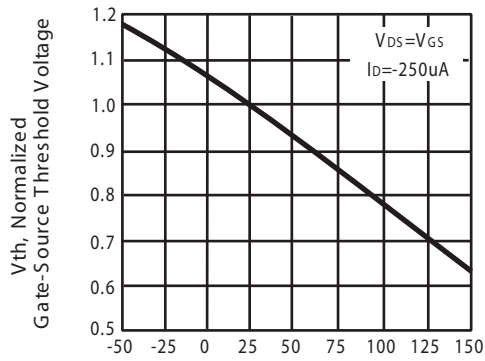


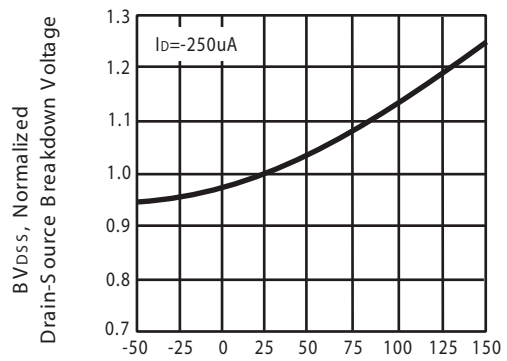
Figure 4. On-Resistance Variation with Drain Current and Temperature

STM8309



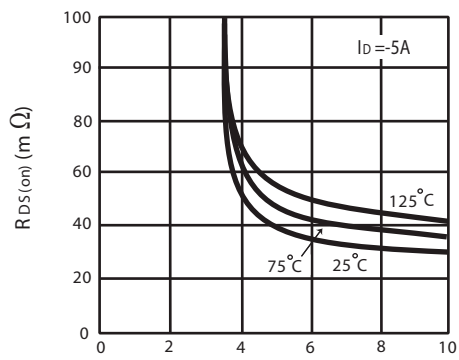
Tj, Junction Temperature (°C)

Figure 5. Gate Threshold Variation with Temperature



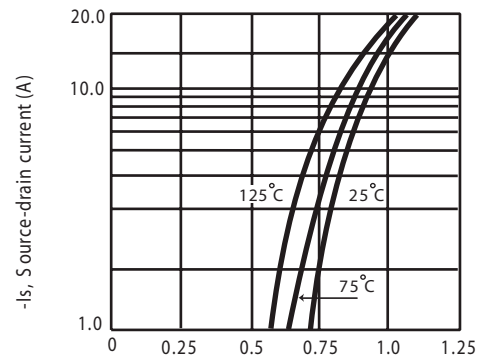
Tj, Junction Temperature (°C)

Figure 6. Breakdown Voltage Variation with Temperature



-VGS, Gate- Source Voltage (V)

Figure 7. On-Resistance vs. Gate-Source Voltage



-VSD, Body Diode Forward Voltage (V)

Figure 8. Body Diode Forward Voltage Variation with Source Current

STM8309

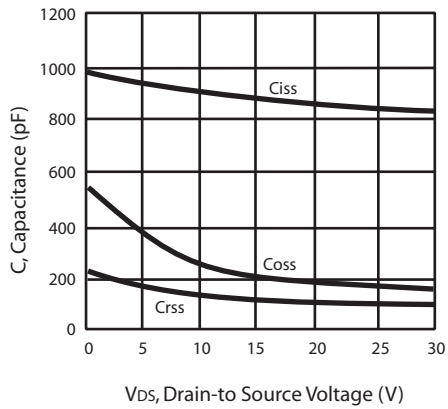


Figure 8. Capacitance

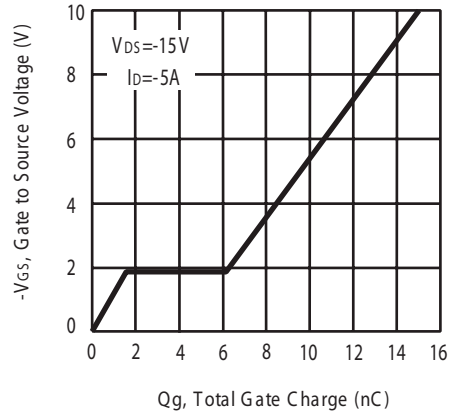


Figure 9. Gate Charge

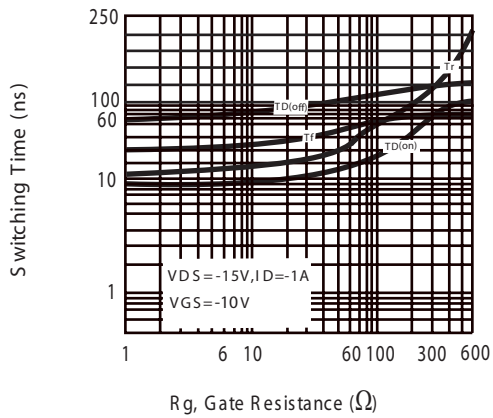


Figure 11. switching characteristics

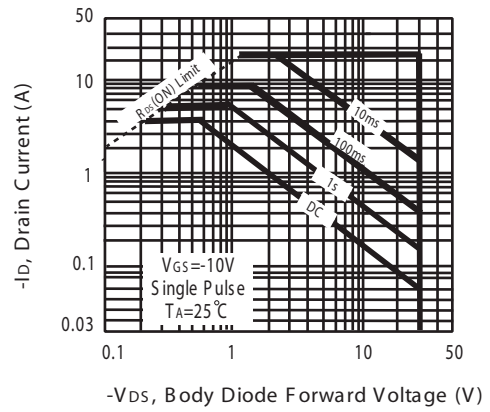


Figure 10. Maximum Safe Operating Area

STM8309

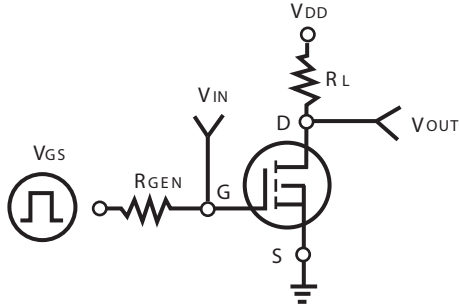


Figure 13. Switching Test Circuit

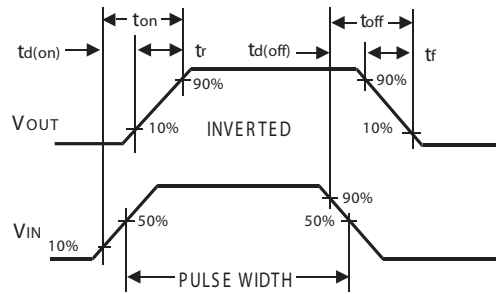
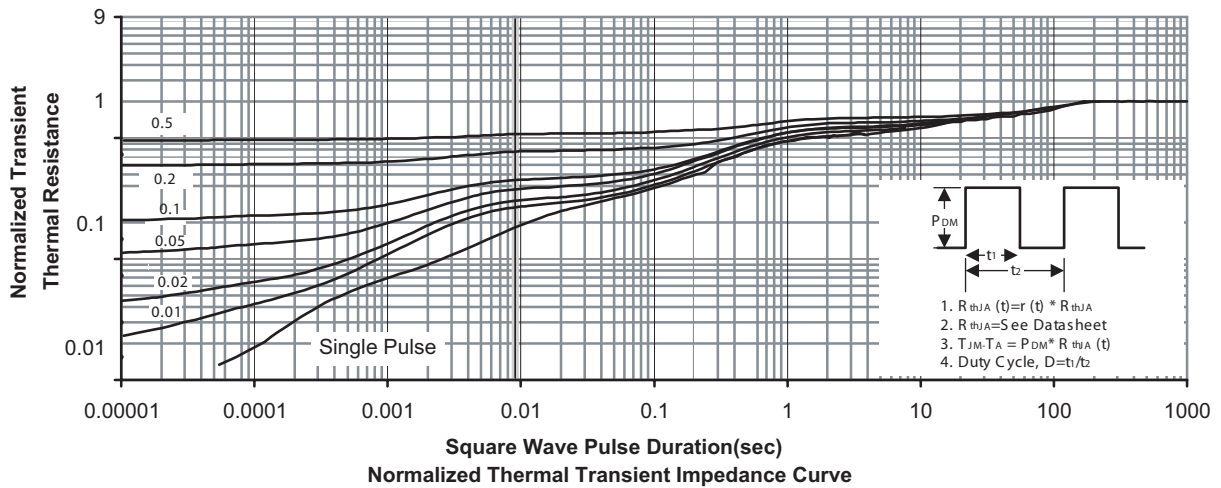
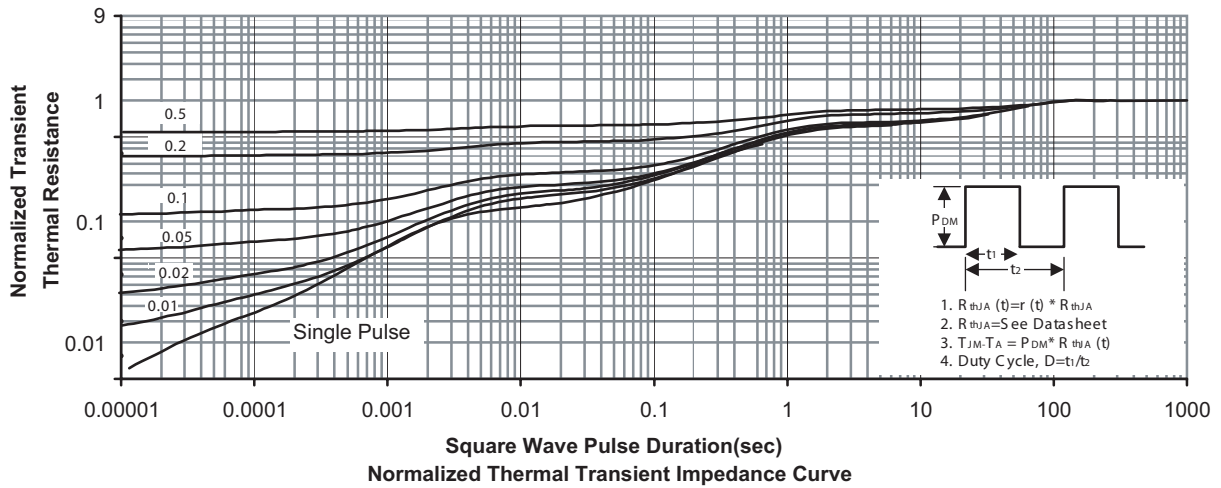


Figure 14. Switching Waveforms

N-Channel



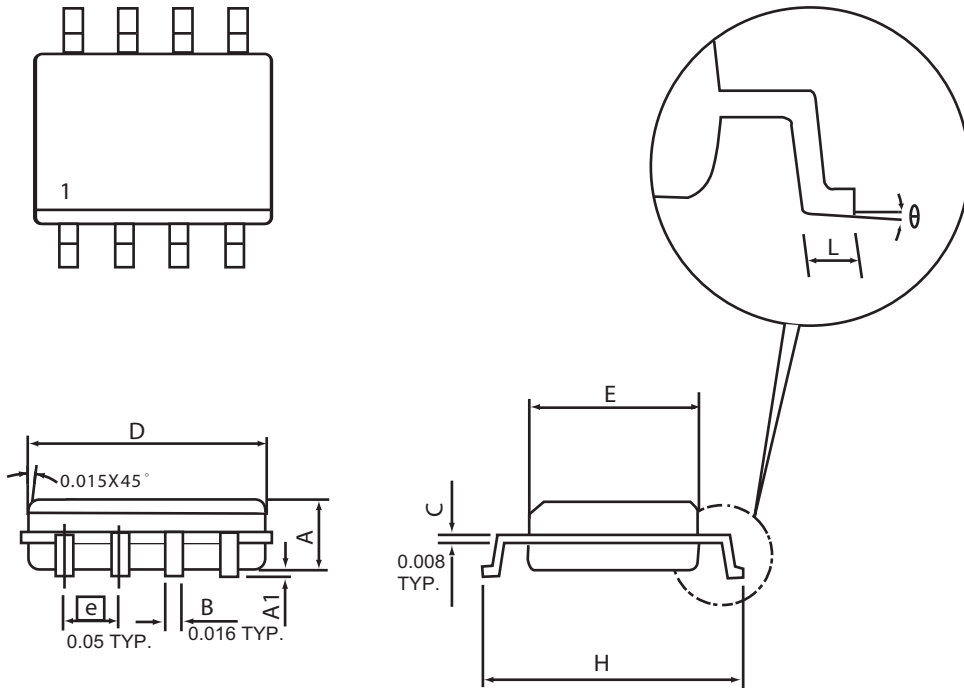
P-Channel



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PACKAGE OUTLINE DIMENSIONS

SO-8

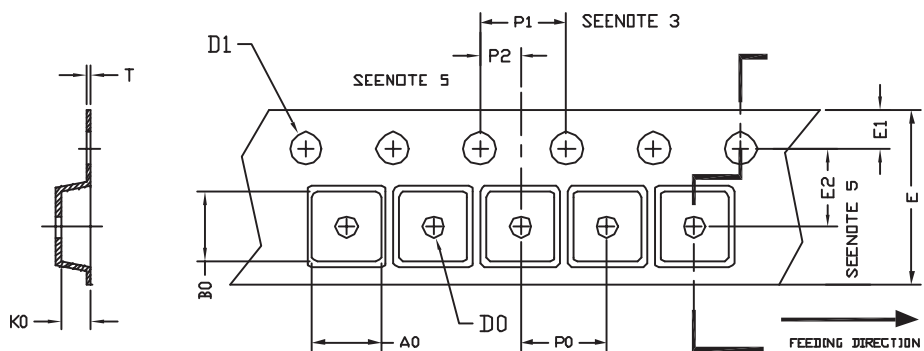


| SYMBOLS | MILLIMETERS | | INCHES | |
|----------|-------------|------|--------|-------|
| | MIN | MAX | MIN | MAX |
| A | 1.35 | 1.75 | 0.053 | 0.069 |
| A1 | 0.10 | 0.25 | 0.004 | 0.010 |
| D | 4.80 | 4.98 | 0.189 | 0.196 |
| E | 3.81 | 3.99 | 0.150 | 0.157 |
| H | 5.79 | 6.20 | 0.228 | 0.244 |
| L | 0.41 | 1.27 | 0.016 | 0.050 |
| θ | 0° | 8° | 0° | 8° |

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SO-8 Tape and Reel Data

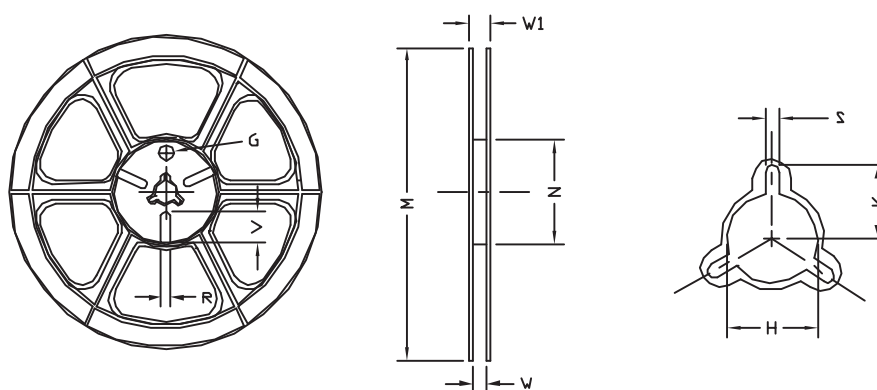
SO-8 Carrier Tape



unit:mm

| PACKAGE | A0 | B0 | K0 | D0 | D1 | E | E1 | E2 | P0 | P1 | P2 | T |
|------------------|------|------|------|---------------------|----------------------------|-------------------|------|----------------|-----|-----|----------------|----------------|
| SOP 8N 150mil | 6.40 | 5.20 | 2.10 | $\phi 1.5$ (MIN) | $\phi 1.5$ +0.1 -0.0 | 12.0 ± 0.3 | 1.75 | 5.5 ± 0.05 | 8.0 | 4.0 | 2.0 ± 0.05 | 0.3 ± 0.05 |

SO-8 Reel



UNIT:mm

| TAPE SIZE | REEL SIZE | M | N | W | W1 | H | K | S | G | R | V |
|-----------|------------|----------------|-----------------|-----------|-----------|------------------------|-----|----------------|-----|-----|-----|
| 12 mm | $\phi 330$ | 330 ± 1 | 62 ± 1.5 | 12.4+ 0.2 | 16.8- 0.4 | $\phi 12.75$ + 0.15 | --- | 2.0 ± 0.15 | --- | --- | --- |