

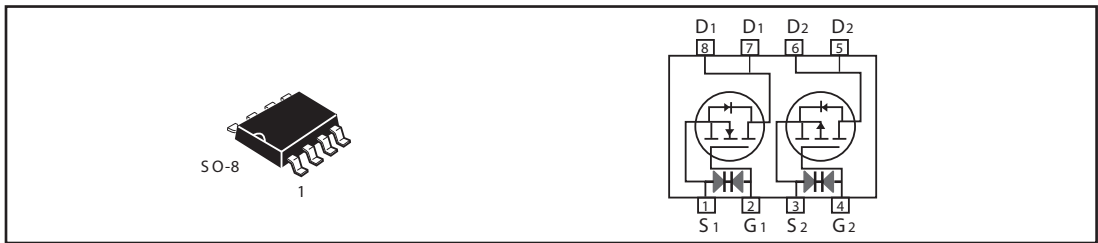


STM8457

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

| PRODUCT SUMMARY (N-Channel) | | |
|-----------------------------|----------------|--------------------------------|
| V _{DSS} | I _D | R _{DS(ON)} (mΩ) Max |
| 40V | 6A | 26 @ V _{GS} = 10V |
| | | 33 @ V _{GS} = 4.5V |

| PRODUCT SUMMARY (P-Channel) | | |
|-----------------------------|----------------|--------------------------------|
| V _{DSS} | I _D | R _{DS(ON)} (mΩ) Max |
| -40V | -5A | 42 @ V _{GS} = -10V |
| | | 62 @ V _{GS} = -4.5V |



ABSOLUTE MAXIMUM RATINGS (T_A=25°C unless otherwise noted)

| Parameter | | Symbol | N-Channel | P-Channel | Unit |
|--|----------------------|-----------------------------------|------------|-----------|------|
| Drain-Source Voltage | | V _{DS} | 40 | -40 | V |
| Gate-Source Voltage | | V _{GS} | ±20 | ±20 | V |
| Drain Current-Continuous ^a @ T _a | 25°C | I _D | 6 | -5 | A |
| | 70°C | | 5.1 | -4.2 | A |
| -Pulsed ^b | | I _{DM} | 28 | -20 | A |
| Drain-Source Diode Forward Current ^a | | I _S | 1.7 | -1.7 | A |
| Maximum Power Dissipation ^a | T _a =25°C | P _D | 2 | | W |
| | T _a =70°C | | 1.44 | | |
| Operating Junction and Storage Temperature Range | | T _J , T _{STG} | -55 to 150 | | °C |

THERMAL CHARACTERISTICS

| | | | |
|--|------------------|------|------|
| Thermal Resistance, Junction-to-Ambient ^a | R _{θJA} | 62.5 | °C/W |
|--|------------------|------|------|

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N-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 | 40 | | | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} = 32V, 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 | 1.0 | 1.8 | 3.0 | V |
| Drain-Source On-State Resistance | R _{DS(ON)} | V _{GS} = 10V, I _D = 5A | | 20 | 26 | m ohm |
| | | V _{GS} = 4.5V, I _D = 4A | | 27 | 33 | m ohm |
| On-State Drain Current | I _{D(ON)} | V _{DS} = 5V, V _{GS} = 10V | 20 | | | A |
| Forward Transconductance | g _{FS} | V _{DS} = 5V, I _D = 5A | | 15 | | S |
| DYNAMIC CHARACTERISTICS^c | | | | | | |
| Input Capacitance | C _{ISS} | V _{DS} = 20V, V _{GS} = 0V f = 1.0MHz | | 750 | | pF |
| Output Capacitance | C _{OSS} | | | 125 | | pF |
| Reverse Transfer Capacitance | C _{RSS} | | | 75 | | pF |
| SWITCHING CHARACTERISTICS^c | | | | | | |
| Turn-On Delay Time | t _{D(ON)} | V _{DD} = 20V I _D = 1 A V _{GS} = 10V R _{GEN} = 3.3 ohm | | 13 | | ns |
| Rise Time | t _r | | | 11 | | ns |
| Turn-Off Delay Time | t _{D(OFF)} | | | 37 | | ns |
| Fall Time | t _f | | | 10 | | ns |
| Total Gate Charge | Q _g | V _{DS} = 24V, I _D = 5A, V _{GS} = 10V | | 12.5 | | nC |
| | | V _{DS} = 24V, I _D = 5A, V _{GS} = 4.5V | | 6.4 | | nC |
| Gate-Source Charge | Q _{gs} | V _{DS} = 24V, I _D = 5 A V _{GS} = 4.5V | | 1.8 | | nC |
| Gate-Drain Charge | Q _{gd} | | | 3.6 | | 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 | -40 | | | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =-32V, 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 | -1.0 | -1.8 | -3.0 | V |
| Drain-Source On-State Resistance | R _{DS(ON)} | V _{GS} =-10V, I _D =-4A | | 35 | 42 | m ohm |
| | | V _{GS} =-4.5V, I _D =-3A | | 54 | 62 | m ohm |
| On-State Drain Current | I _{D(ON)} | V _{DS} =-5V, V _{GS} =-10V | 16 | | | A |
| Forward Transconductance | g _{FS} | V _{DS} =-5V, I _D =-4A | | 10 | | S |
| DYNAMIC CHARACTERISTICS^c | | | | | | |
| Input Capacitance | C _{ISS} | V _{DS} =-20V, V _{GS} =0V f=1.0MHz | | 960 | | pF |
| Output Capacitance | C _{OSS} | | | 142 | | pF |
| Reverse Transfer Capacitance | C _{RSS} | | | 75 | | pF |
| SWITCHING CHARACTERISTICS^c | | | | | | |
| Turn-On Delay Time | t _{D(ON)} | V _D =-20V I _D =-1A V _{GEN} =-10V R _{GEN} =3.3 ohm | | 15 | | ns |
| Rise Time | t _r | | | 13 | | ns |
| Turn-Off Delay Time | t _{D(OFF)} | | | 66 | | ns |
| Fall Time | t _f | | | 25 | | ns |
| Total Gate Charge | Q _g | V _{DS} =-24V, I _D =-4A, V _{GS} =-10V | | 15.6 | | nC |
| | | V _{DS} =-24V, I _D =-4A, V _{GS} =-4.5V | | 7.7 | | nC |
| Gate-Source Charge | Q _{gs} | V _{DS} =-24V, I _D =-4A V _{GS} =-4.5V | | 2.3 | | nC |
| Gate-Drain Charge | Q _{gd} | | | 4.3 | | 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} | $V_{GS} = 0V, I_s = 1.7A$ | N-Ch | 0.78 | 1.2 | V |
| | | $V_{GS} = 0V, I_s = -1.7A$ | P-Ch | -0.77 | -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

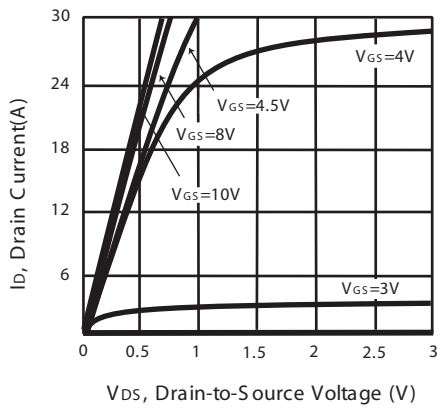


Figure 1. Output Characteristics

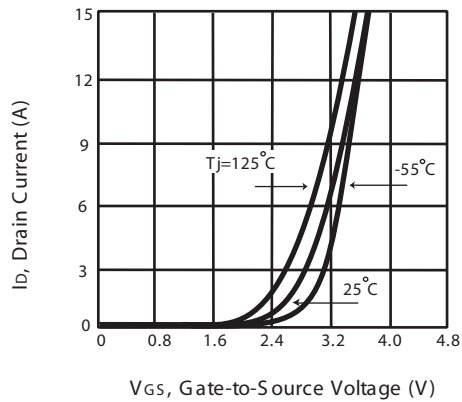


Figure 2. Transfer Characteristics

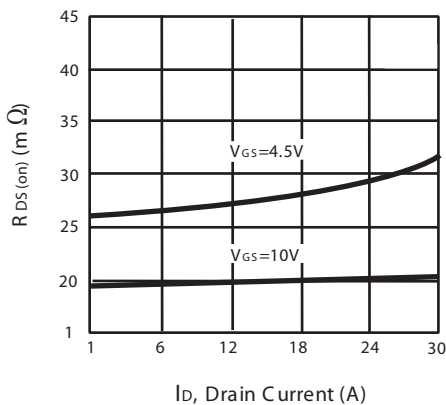


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

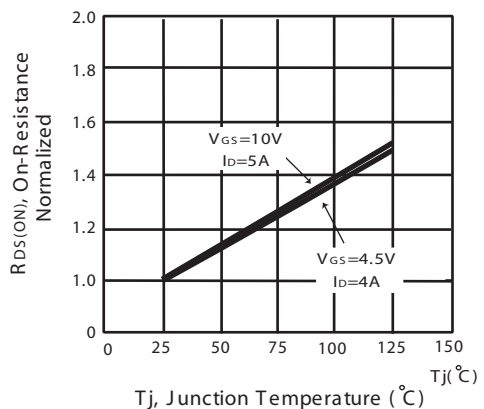


Figure 4. On-Resistance Variation with Drain Current and Temperature

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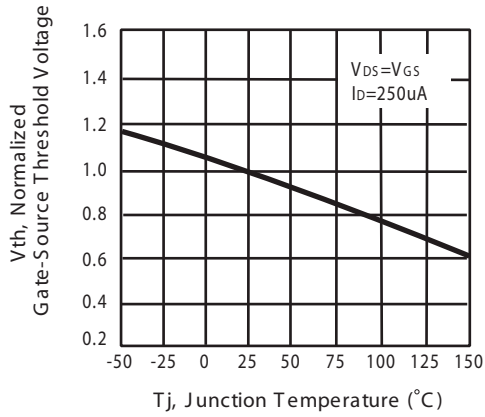


Figure 5. Gate Threshold Variation with Temperature

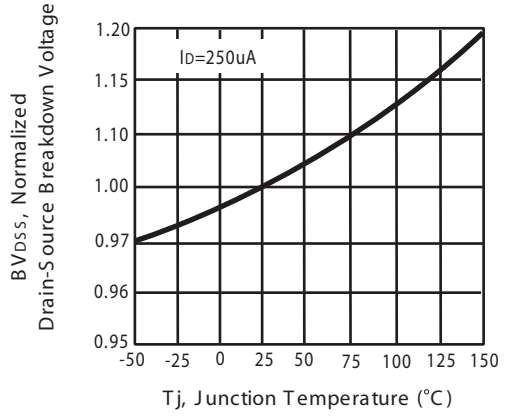


Figure 6. Breakdown Voltage Variation with Temperature

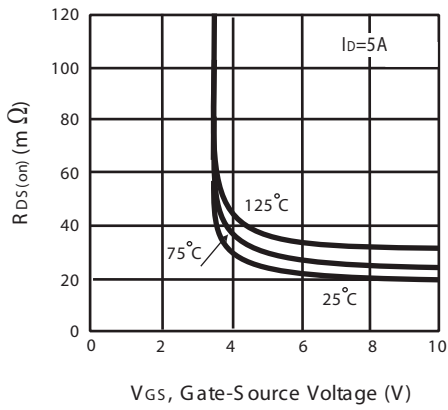


Figure 7. On-Resistance vs. Gate-Source Voltage

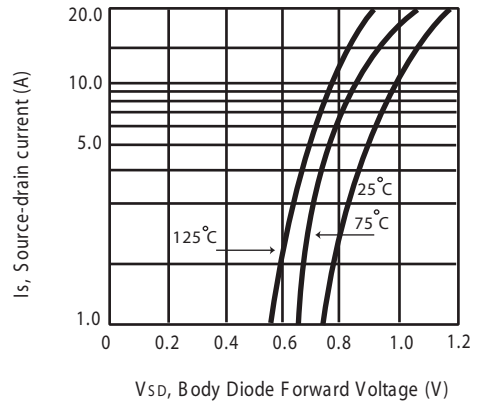


Figure 8. Body Diode Forward Voltage Variation with Source Current

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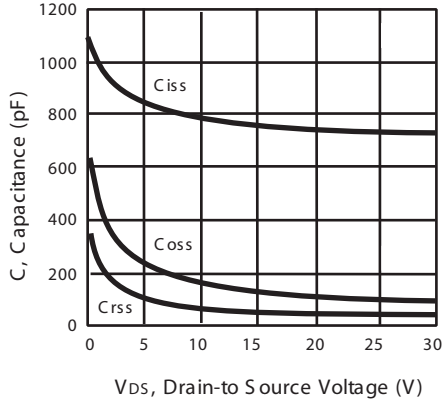


Figure 9. Capacitance

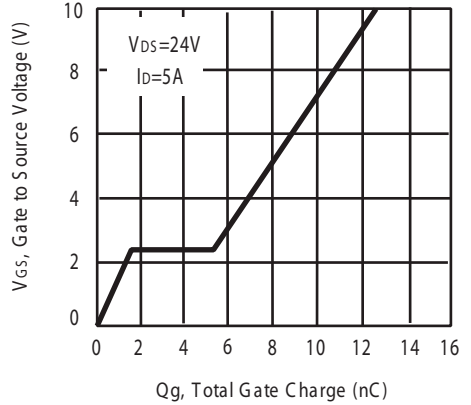


Figure 10. Gate Charge

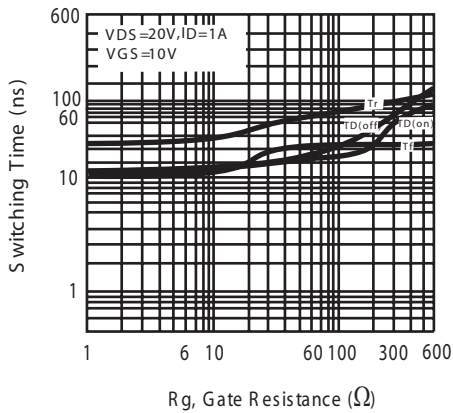


Figure 11. switching characteristics

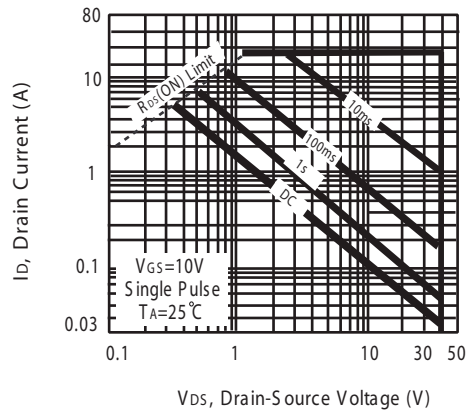
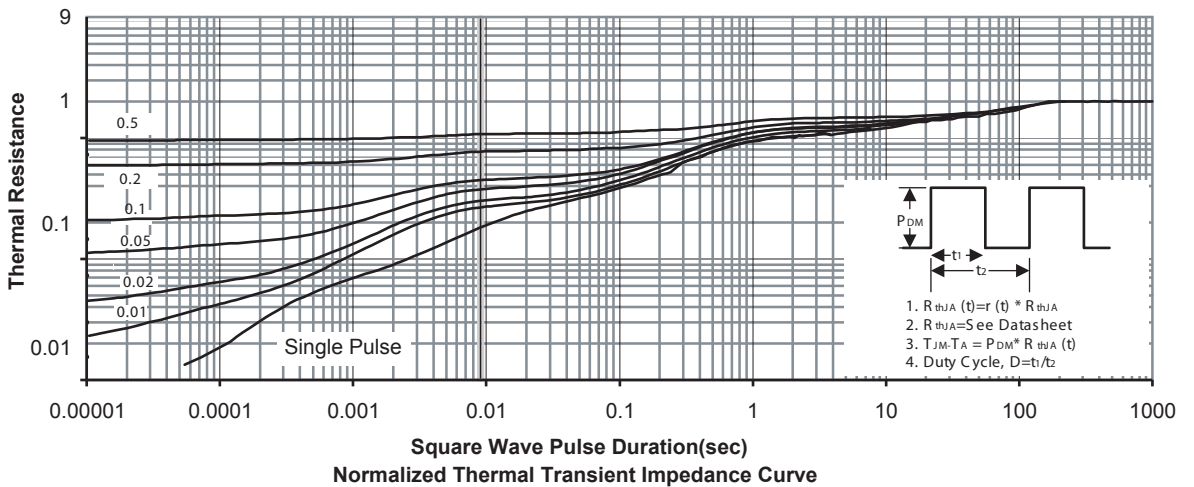


Figure 12. Maximum Safe Operating Area



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P-Channel

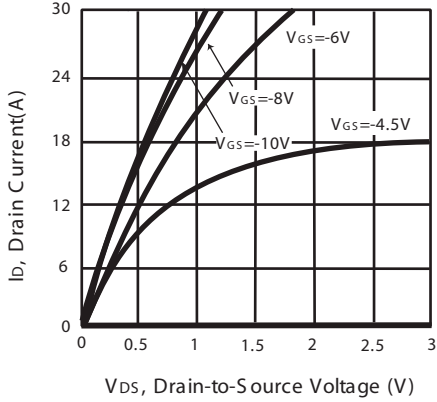


Figure 1. Output Characteristics

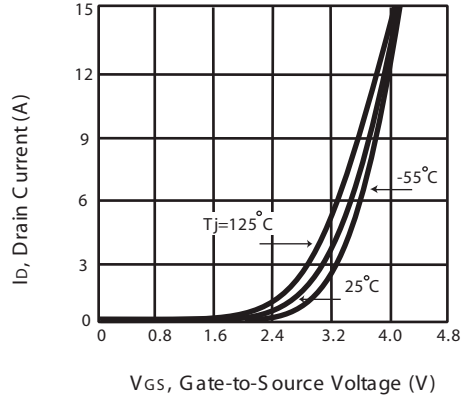


Figure 2. Transfer Characteristics

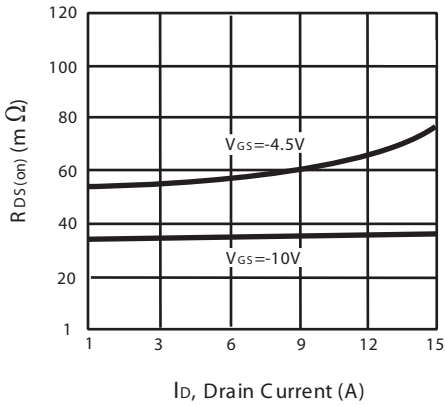


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

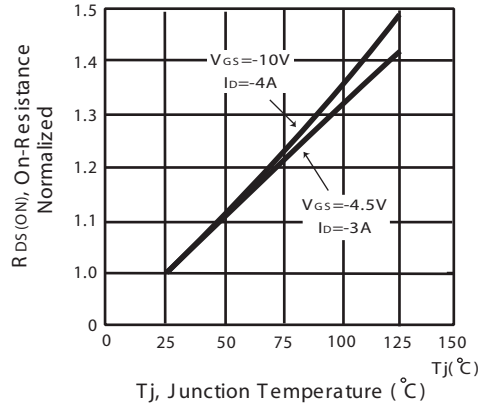


Figure 4. On-Resistance Variation with Drain Current and Temperature

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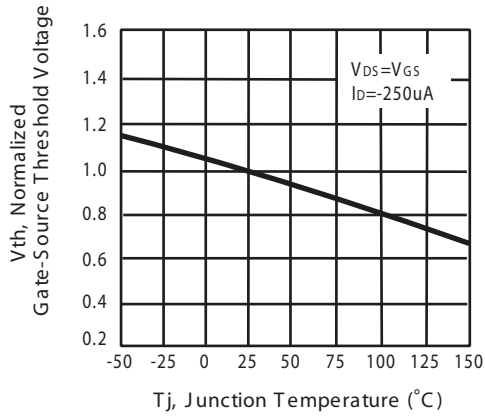


Figure 5. Gate Threshold Variation with Temperature

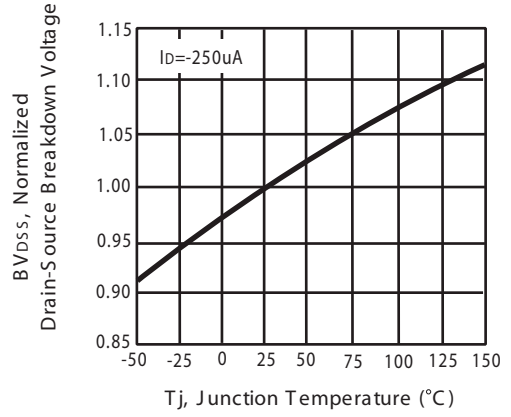


Figure 6. Breakdown Voltage Variation with Temperature

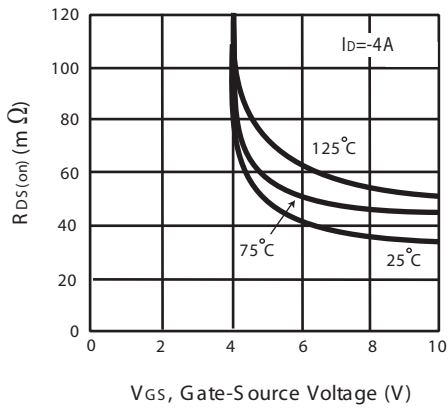


Figure 7. On-Resistance vs. Gate-Source Voltage

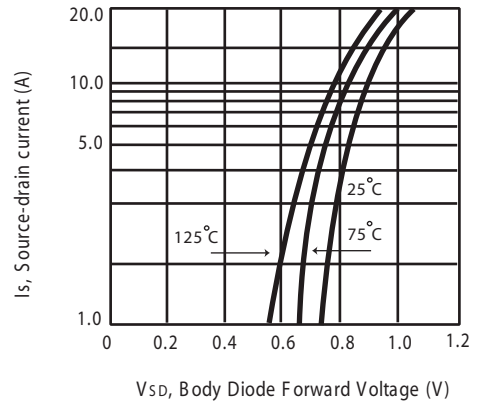


Figure 8. Body Diode Forward Voltage Variation with Source Current

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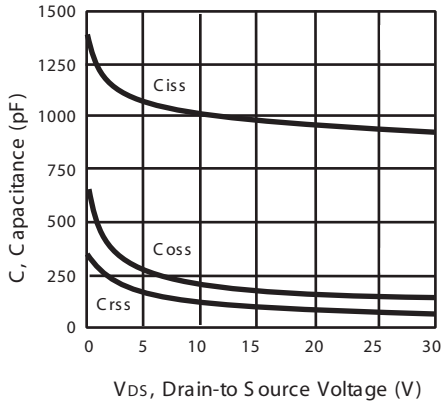


Figure 9. Capacitance

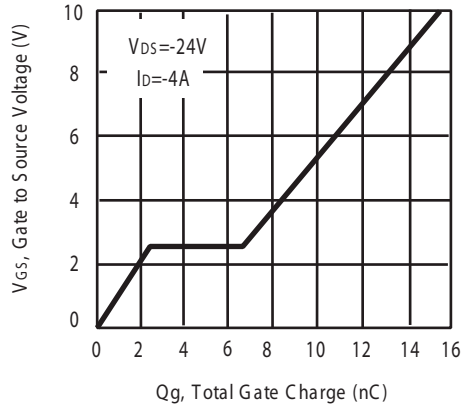


Figure 10. Gate Charge

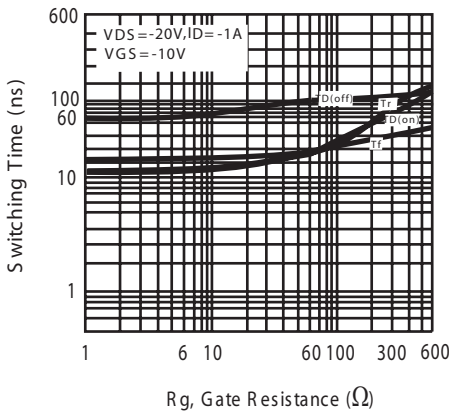


Figure 11. switching characteristics

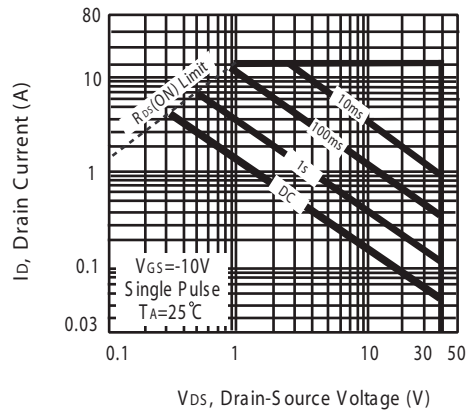
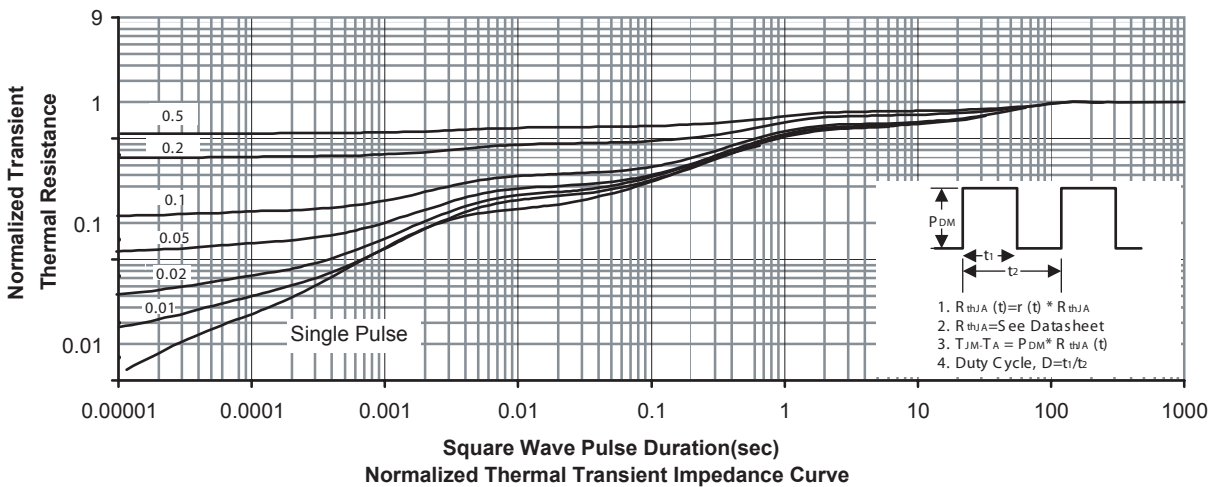


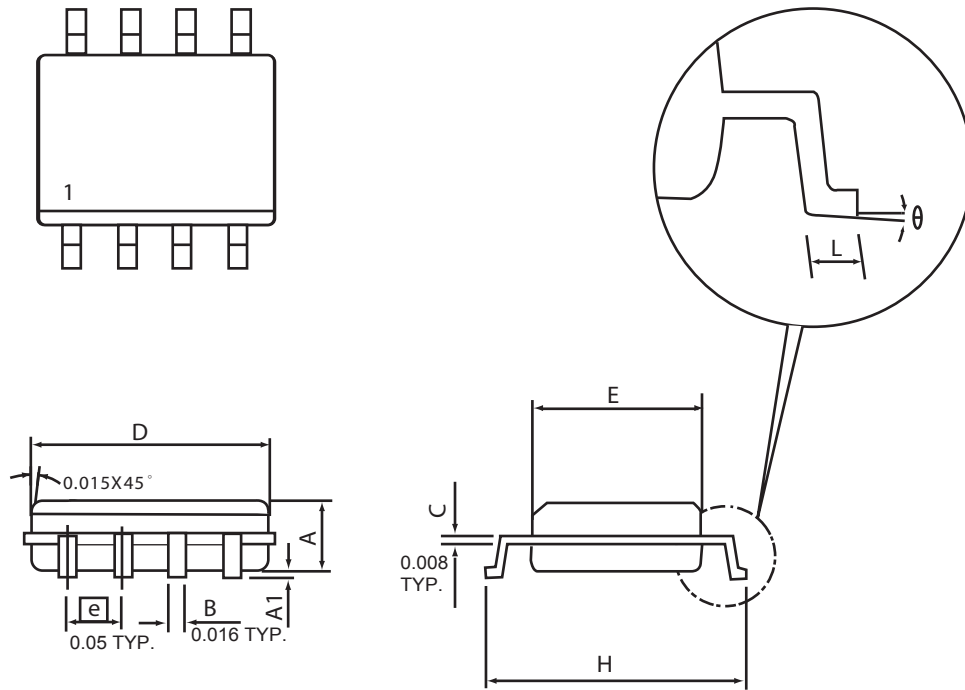
Figure 12. Maximum Safe Operating Area



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PACKAGE OUTLINE DIMENSIONS

SO-8

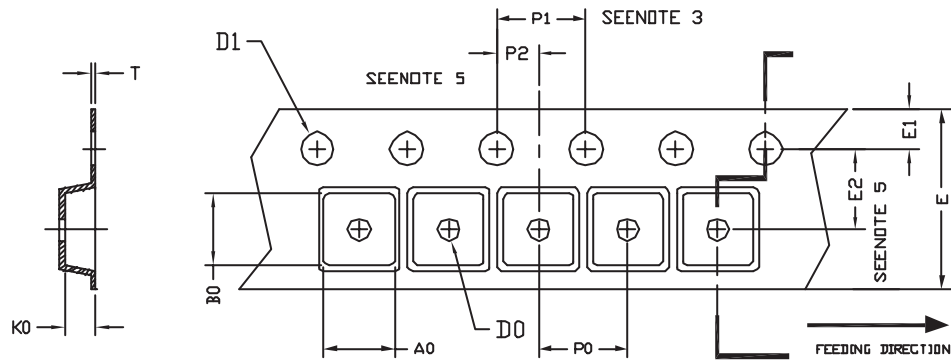


| SYMBOLS | MILLIMETERS | | INCHES | |
|----------|-------------|-----------|-----------|-----------|
| | MIN | MAX | MIN | MAX |
| A | 1.35 | 1.75 | 0.053 | 0.069 |
| A1 | 0.10 | 0.25 | 0.004 | 0.010 |
| D | 4.80 | 4.98 | 0.189 | 0.196 |
| E | 3.81 | 3.99 | 0.150 | 0.157 |
| H | 5.79 | 6.20 | 0.228 | 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

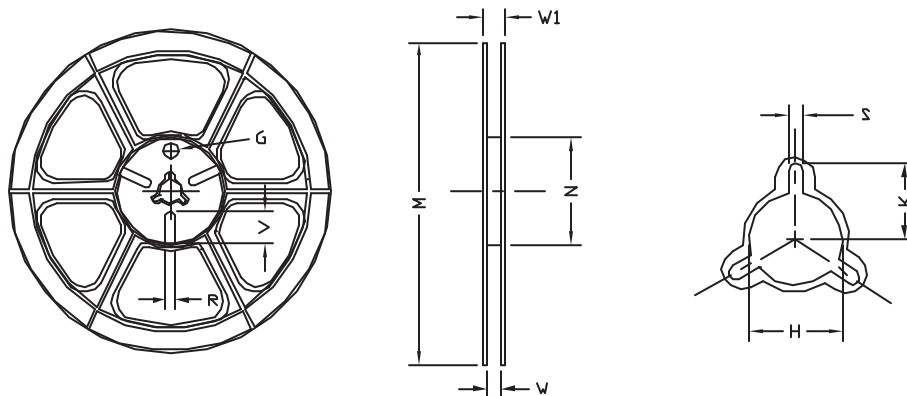
SO-8 Carrier Tape



unit:mm

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

SO-8 Reel



UNIT:mm

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