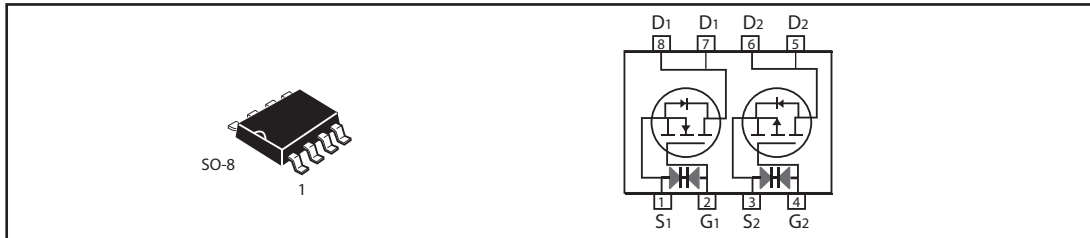




Dual Enhancement Mode Field Effect Transistor (N and P Channel)

| 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

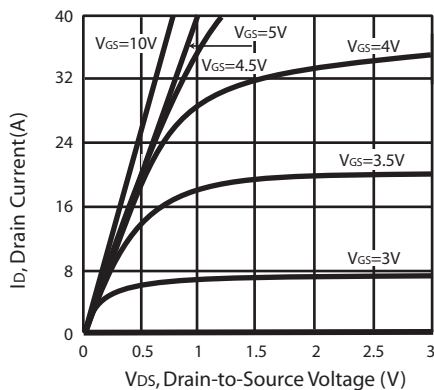


Figure 1. Output Characteristics

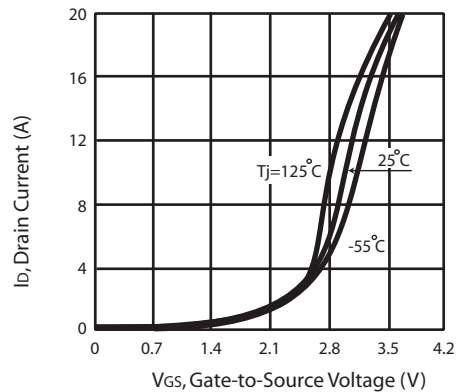


Figure 2. Transfer Characteristics

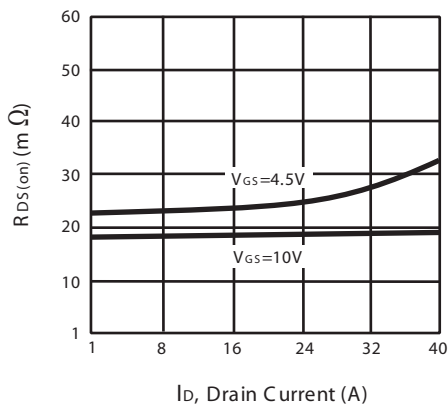


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

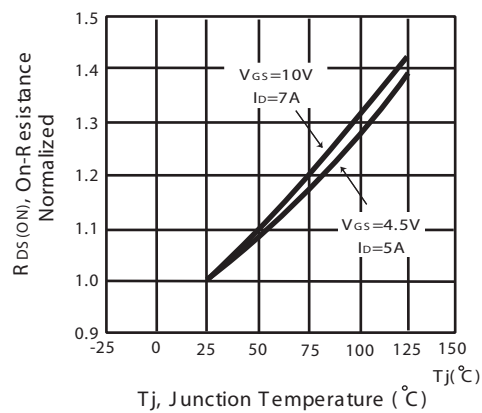


Figure 4. On-Resistance Variation with Drain Current and Temperature

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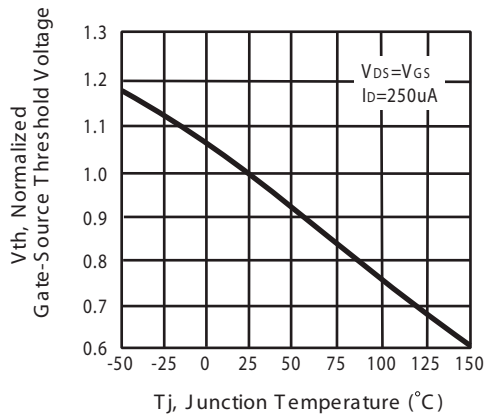


Figure 5. Gate Threshold Variation with Temperature

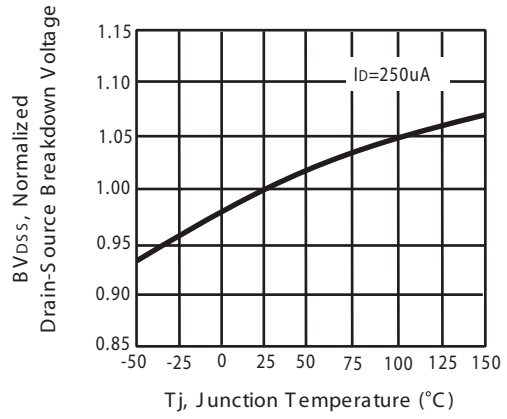


Figure 6. Breakdown Voltage Variation with Temperature

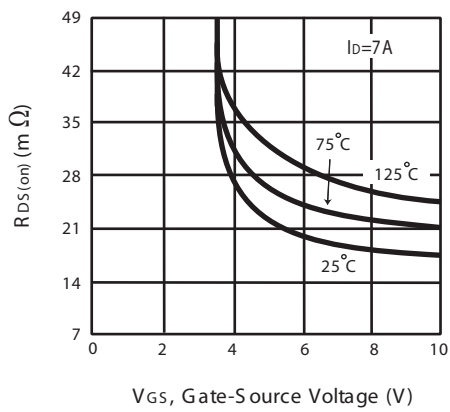


Figure 7. On-Resistance vs. Gate-Source Voltage

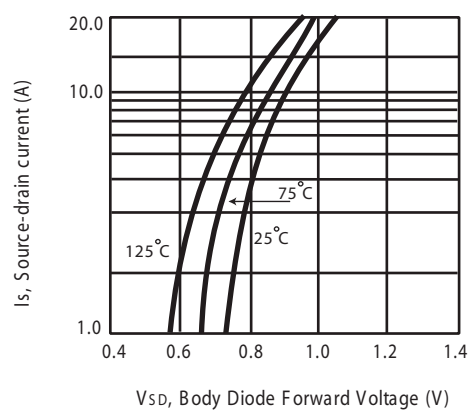
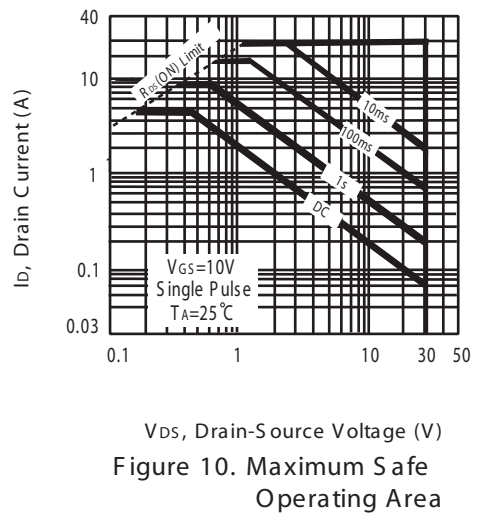
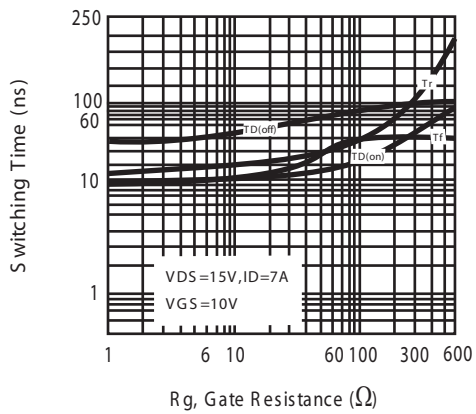
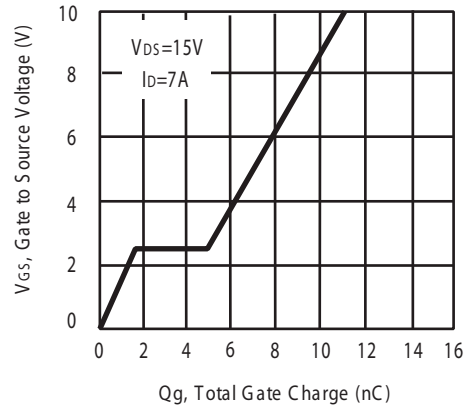
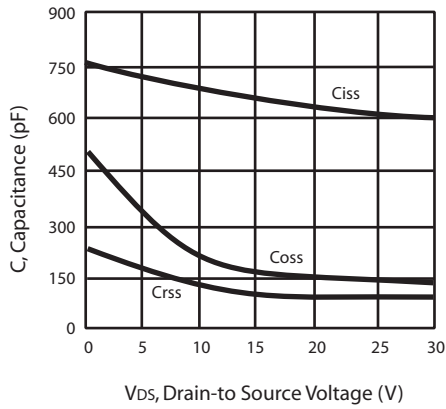


Figure 8. Body Diode Forward Voltage Variation with Source Current

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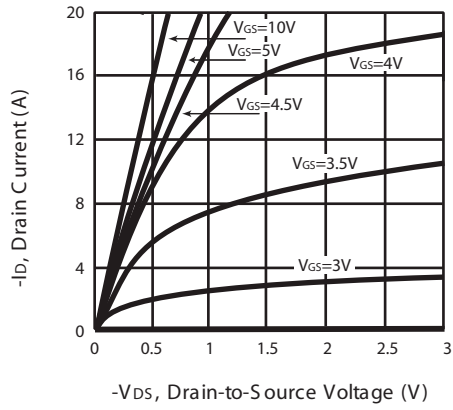


Figure 1. Output Characteristics

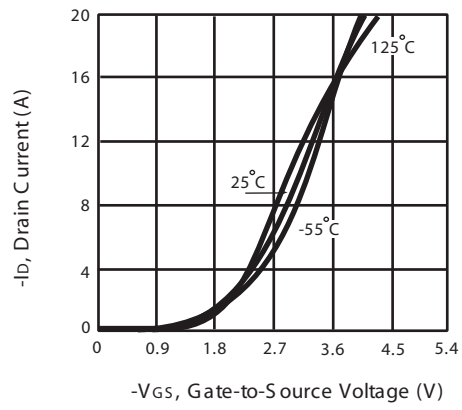


Figure 2. Transfer Characteristics

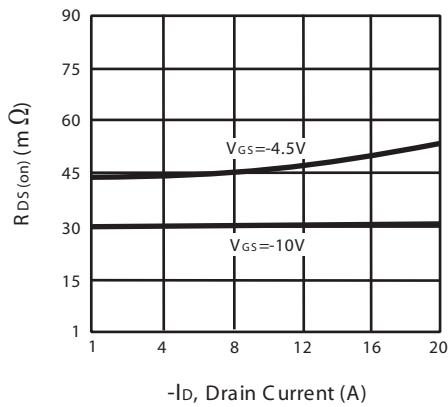


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

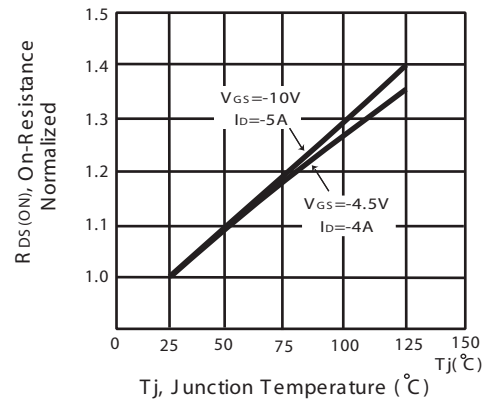


Figure 4. On-Resistance Variation with Drain Current and Temperature

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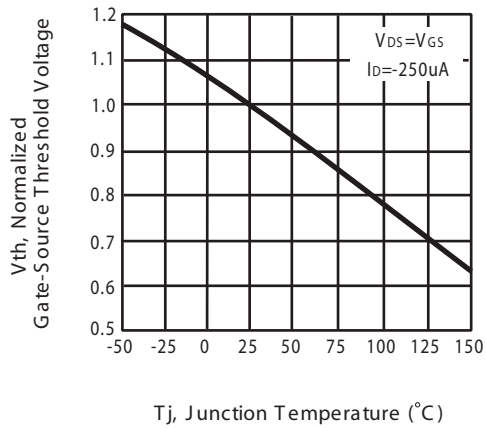


Figure 5. Gate Threshold Variation with Temperature

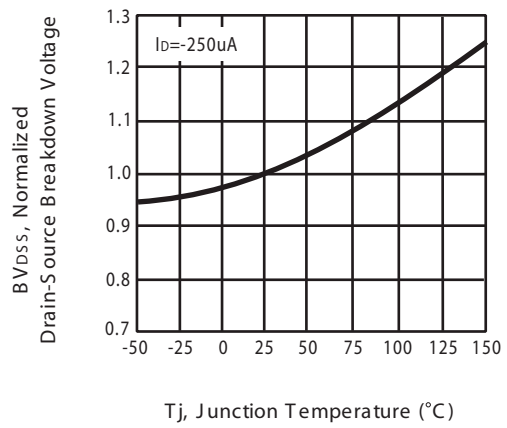


Figure 6. Breakdown Voltage Variation with Temperature

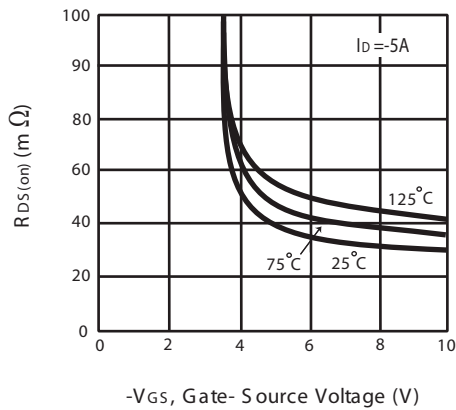


Figure 7. On-Resistance vs. Gate-Source Voltage

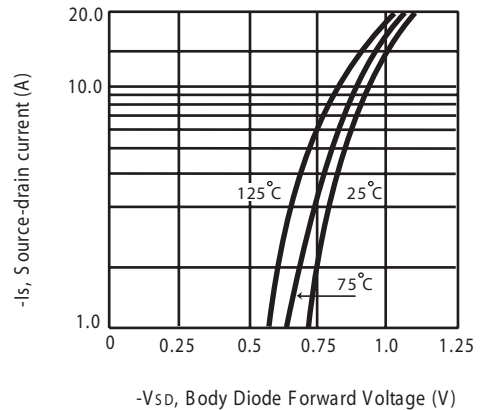


Figure 8. Body Diode Forward Voltage Variation with Source Current

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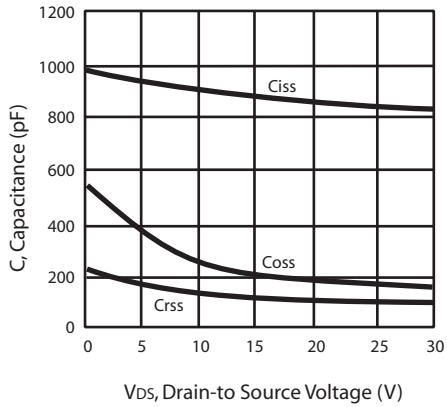


Figure 8. Capacitance

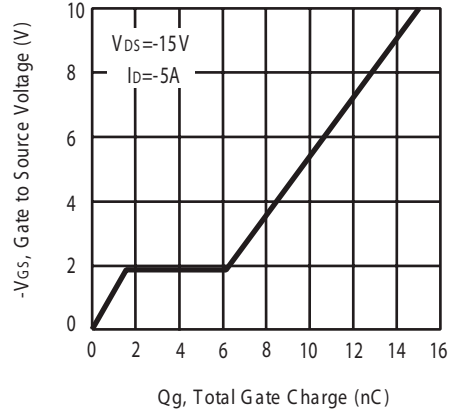


Figure 9. Gate Charge

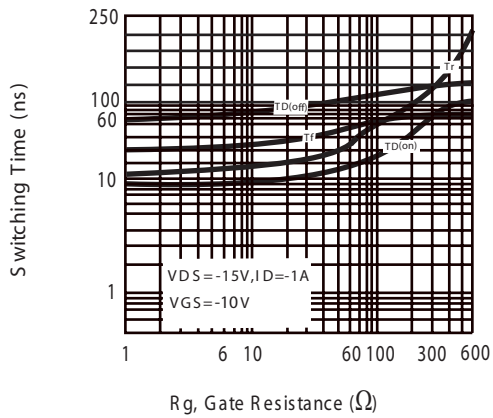


Figure 11. switching characteristics

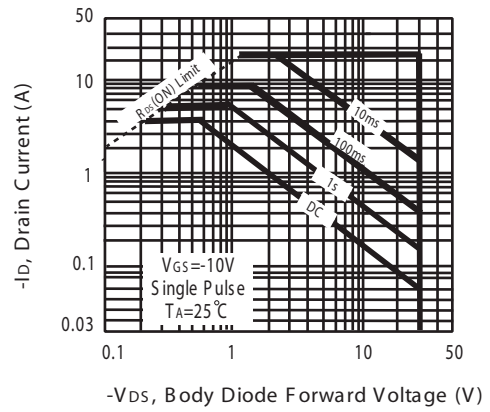


Figure 10. Maximum Safe Operating Area

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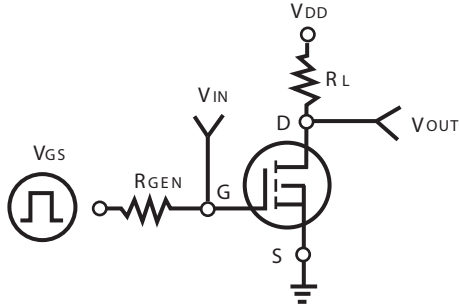


Figure 13. Switching Test Circuit

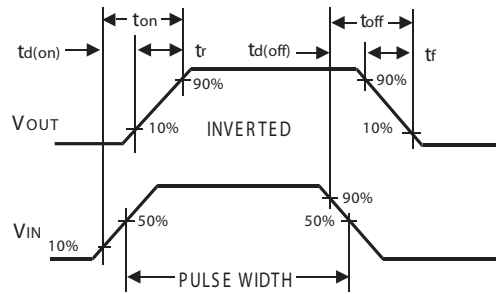
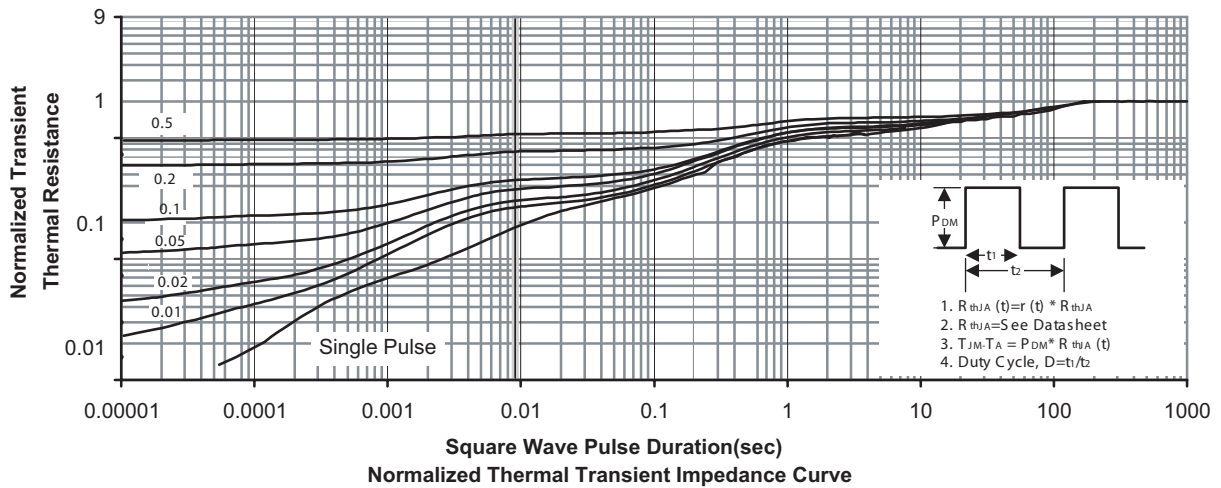
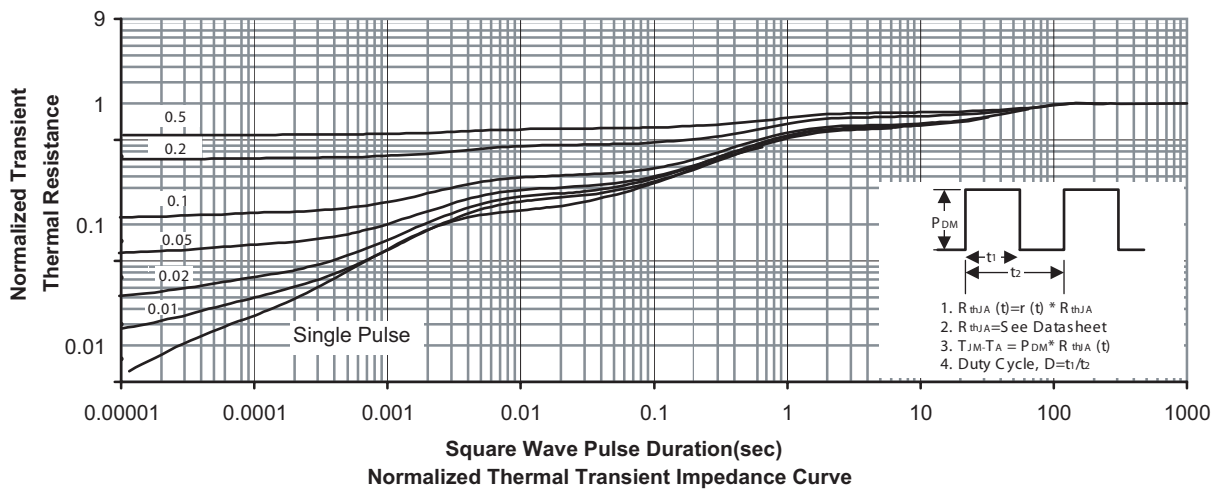


Figure 14. Switching Waveforms

N-Channel



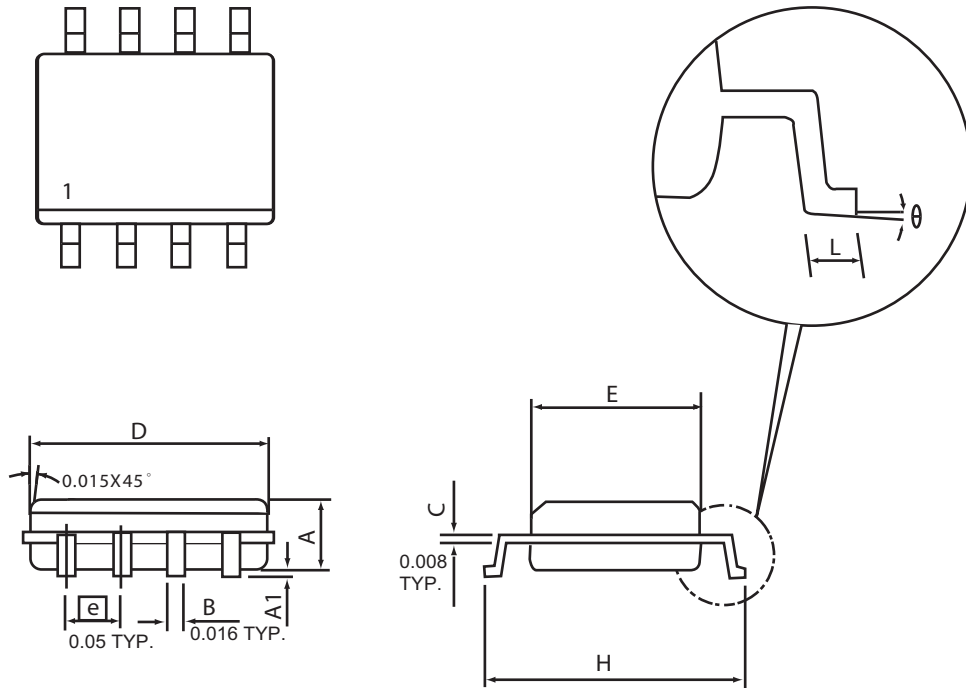
P-Channel



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PACKAGE OUTLINE DIMENSIONS

SO-8

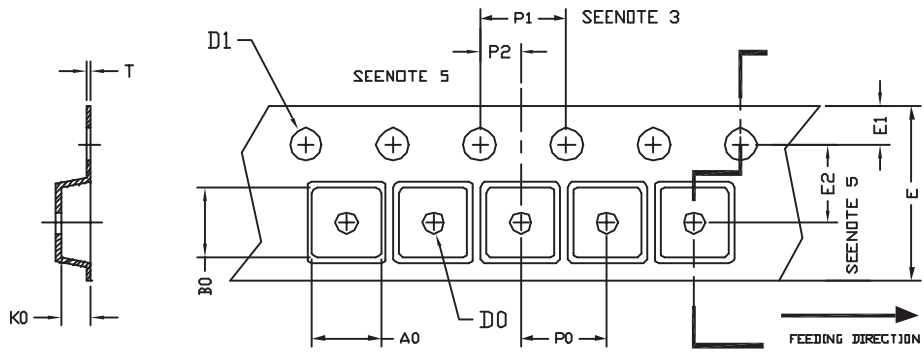


| SYMBOLS | MILLIMETERS | | INCHES | |
|----------|-------------|------|--------|-------|
| | MIN | MAX | MIN | MAX |
| A | 1.35 | 1.75 | 0.053 | 0.069 |
| A1 | 0.10 | 0.25 | 0.004 | 0.010 |
| D | 4.80 | 4.98 | 0.189 | 0.196 |
| E | 3.81 | 3.99 | 0.150 | 0.157 |
| H | 5.79 | 6.20 | 0.228 | 0.244 |
|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

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SO-8 Tape and Reel Data

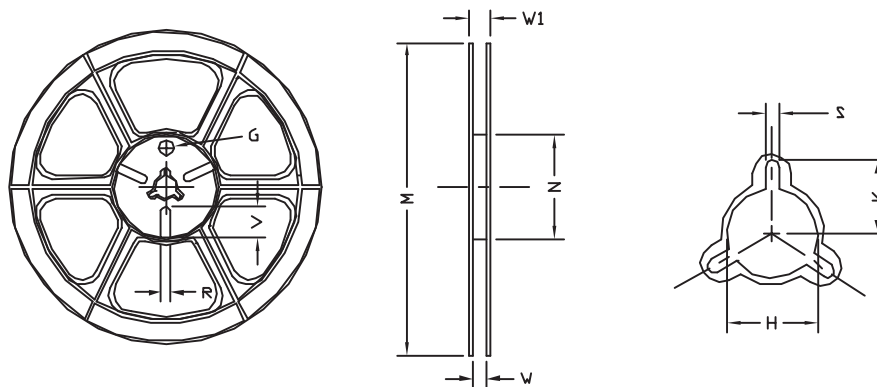
SO-8 Carrier Tape



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 | --- | --- | --- |