SamHop Microelectronics Corp.

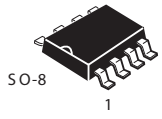
# STM8455

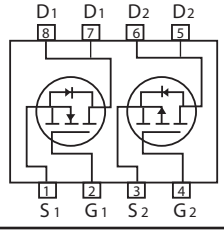
Aug.16,2006

## 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 | 29 @ $V_{GS}$ = 10V |
| | | 40 @ $V_{GS}$ = 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] @ Ta | 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] | Ta= 25°C | $P_D$ | 2 | | W |
| | Ta=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] | $R_{\theta JA}$ | 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 | | | ±100 | nA |
| **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 | | 23 | 29 | m ohm |
| | | $V_{GS}$=4.5V, $I_D$=4A | | 30 | 40 | 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<br>f=1.0MHz | | 890 | | pF |
| Output Capacitance | $C_{OSS}$ | | | 115 | | pF |
| Reverse Transfer Capacitance | $C_{RSS}$ | | | 65 | | pF |
| **SWITCHING CHARACTERISTICS [c]** | | | | | | |
| Turn-On Delay Time | $t_{D(ON)}$ | $V_{DD}$=20V<br>$I_D$=5 A<br>$V_{GS}$=10V<br>$R_{GEN}$=3.3 ohm | | 16 | | ns |
| Rise Time | $t_r$ | | | 12 | | ns |
| Turn-Off Delay Time | $t_{D(OFF)}$ | | | 30 | | ns |
| Fall Time | $t_f$ | | | 8 | | ns |
| Total Gate Charge | $Q_g$ | $V_{DS}$=24V, $I_D$=5A, $V_{GS}$=10V | | 17 | | nC |
| | | $V_{DS}$=24V, $I_D$=5A, $V_{GS}$=4.5V | | 8.5 | | nC |
| Gate-Source Charge | $Q_{gs}$ | $V_{DS}$=24V, $I_D$=5 A<br>$V_{GS}$=4.5V | | 2.2 | | nC |
| Gate-Drain Charge | $Q_{gd}$ | | | 4.3 | | 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 | -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 | | | ±100 | nA |
| 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 | | 50 | 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<br>f=1.0MHz | | 900 | | pF |
| Output Capacitance | $C_{OSS}$ | | | 140 | | pF |
| Reverse Transfer Capacitance | $C_{RSS}$ | | | 85 | | pF |
| SWITCHING CHARACTERISTICS [c] | | | | | | |
| Turn-On Delay Time | $t_{D(ON)}$ | $V_D$=-20V<br>$I_D$=-4A<br>$V_{GEN}$=-10V<br>$R_{GEN}$=3.3 ohm | | 12 | | ns |
| Rise Time | $t_r$ | | | 16 | | ns |
| Turn-Off Delay Time | $t_{D(OFF)}$ | | | 55 | | ns |
| Fall Time | $t_f$ | | | 30 | | ns |
| Total Gate Charge | $Q_g$ | $V_{DS}$=-24V,$I_D$=-4A,$V_{GS}$=-10V | | 17.6 | | nC |
| | | $V_{DS}$=-24V,$I_D$=-4A,$V_{GS}$=-4.5V | | 8.8 | | nC |
| Gate-Source Charge | $Q_{gs}$ | $V_{DS}$=-24V, $I_D$=-4A<br>$V_{GS}$=-4.5V | | 1.8 | | nC |
| Gate-Drain Charge | $Q_{gd}$ | | | 5 | | nC |

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## ELECTRICAL CHARACTERISTICS ($T_A$=25°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, Is =1.7A | N-Ch | | 0.8 | 1.3 | V |
| | | $V_{GS}$ = 0V, Is =-1.7A | P-Ch | | -0.77 | -1.3 | |

Notes

a.Surface Mounted on FR4 Board, t <=10sec.

b.Pulse Test:Pulse Width ≤ 300us, Duty Cycle ≤ 2%.

c.Guaranteed by design, not subject to production testing.

N-Channel

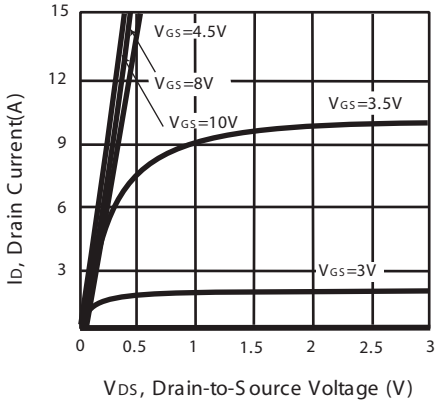



Figure 1. Output Characteristics

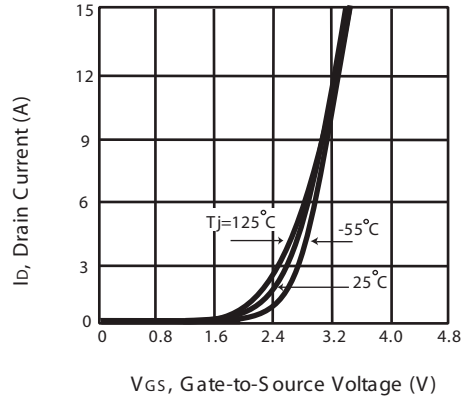



Figure 2. Transfer Characteristics

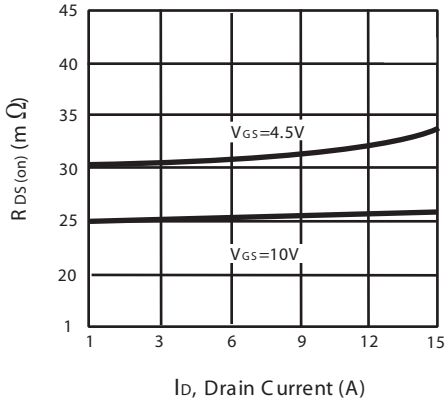



Figure 3. On-Resistance vs. Drain Current and Gate Voltage

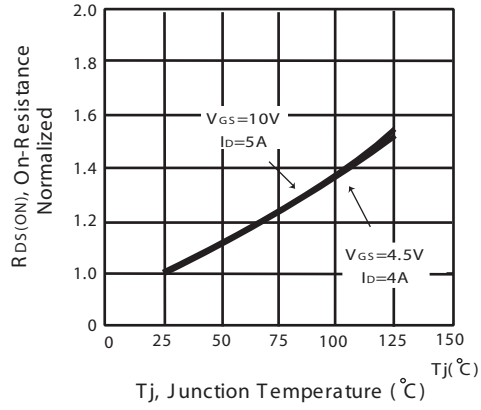



Figure 4. On-Resistance Variation with Drain Current and Temperature

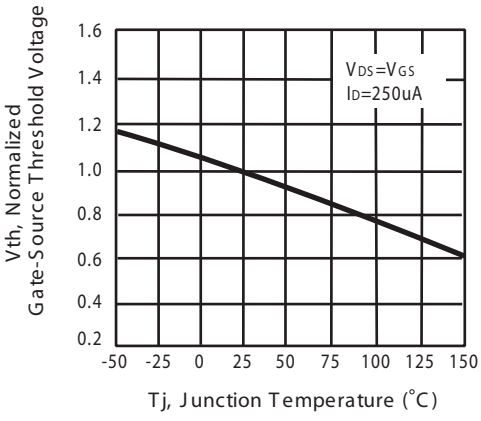



Figure 5. Gate Threshold Variation with Temperature

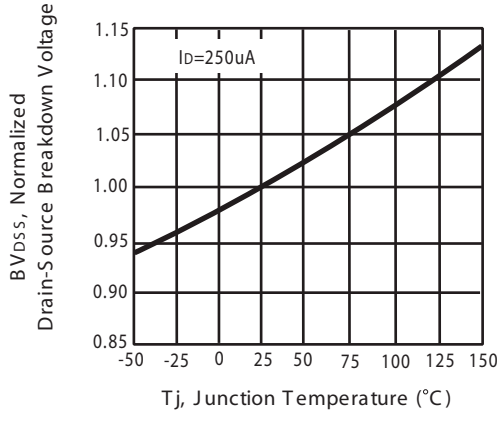



Figure 6. Breakdown Voltage Variation with Temperature

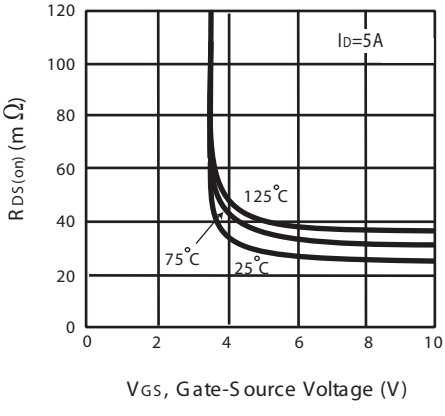



Figure 7. On-Resistance vs. Gate-Source Voltage

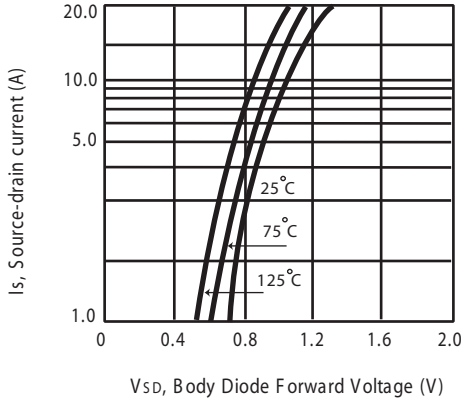



Figure 8. Body Diode Forward Voltage Variation with Source Current

# STM8455

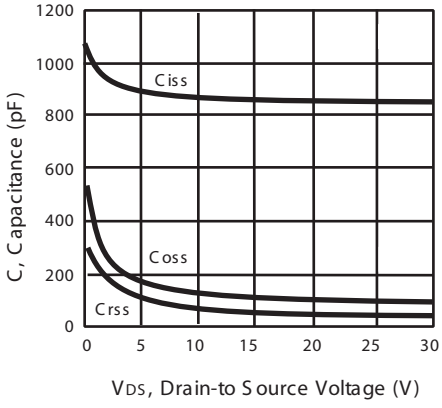



Figure 9. Capacitance

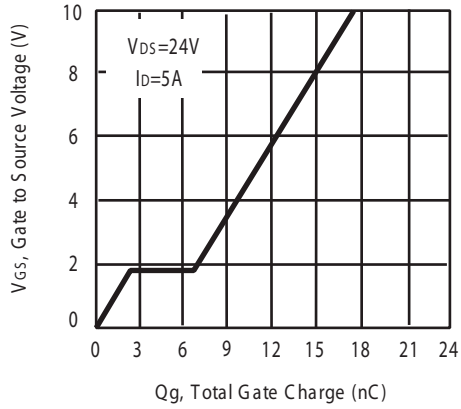



Figure 10. Gate Charge

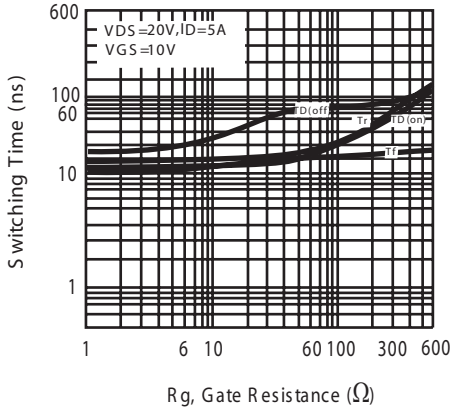



Figure 11.switching characteristics

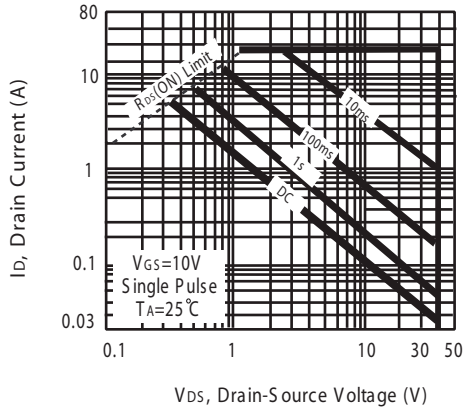
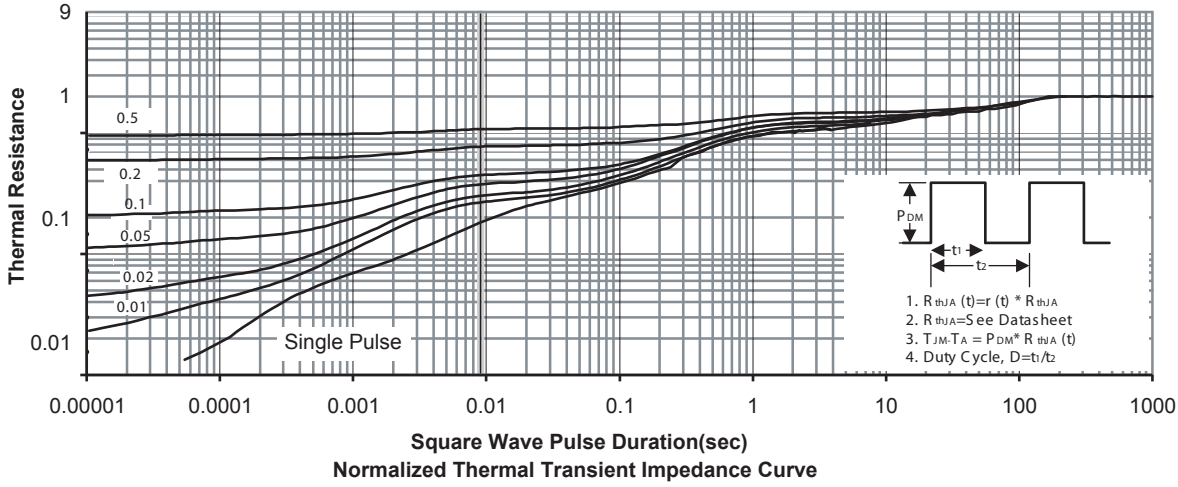



Figure 12. Maximum Safe Operating Area




**Normalized Thermal Transient Impedance Curve**

P-Channel

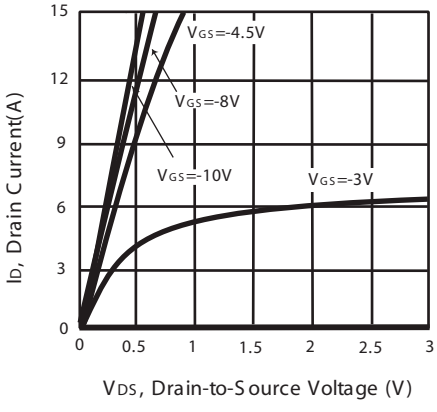



Figure 1. Output Characteristics

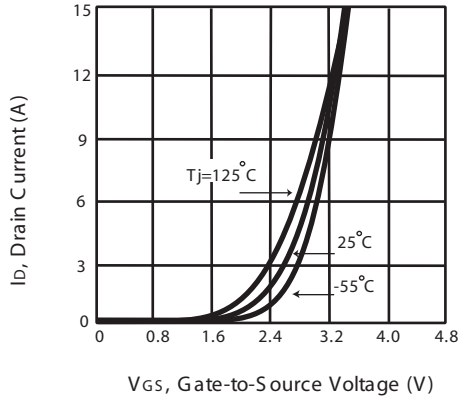



Figure 2. Transfer Characteristics

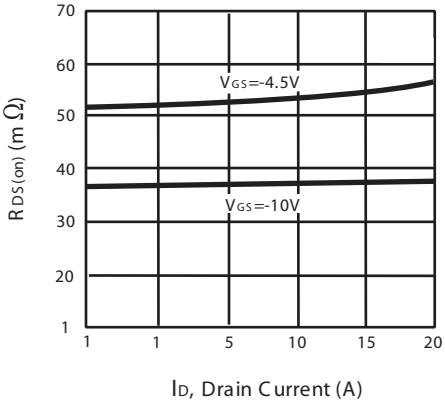



Figure 3. On-Resistance vs. Drain Current and Gate Voltage

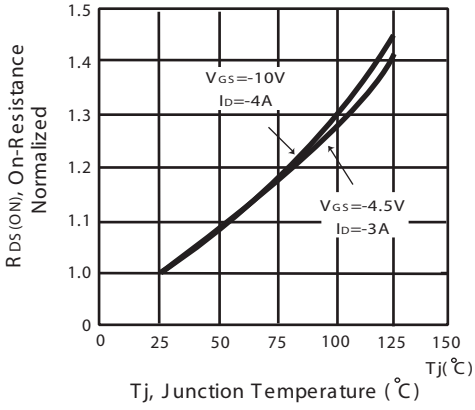



Figure 4. On-Resistance Variation with Drain Current and Temperature

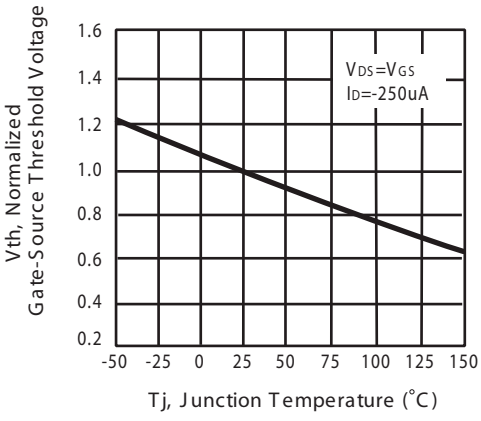



Figure 5. Gate Threshold Variation with Temperature

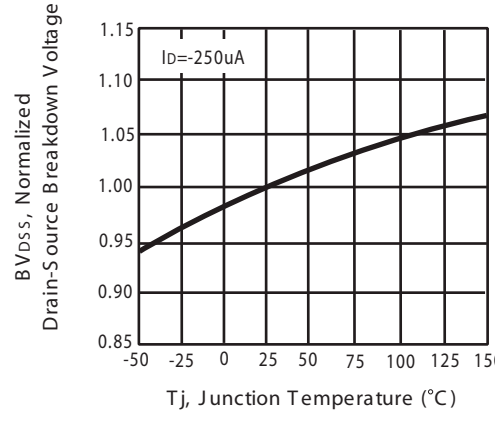



Figure 6. Breakdown Voltage Variation with Temperature

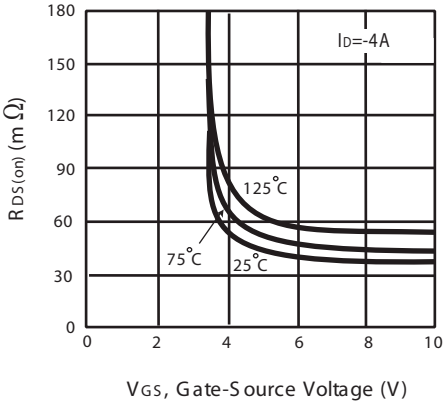



Figure 7. On-Resistance vs. Gate-Source Voltage

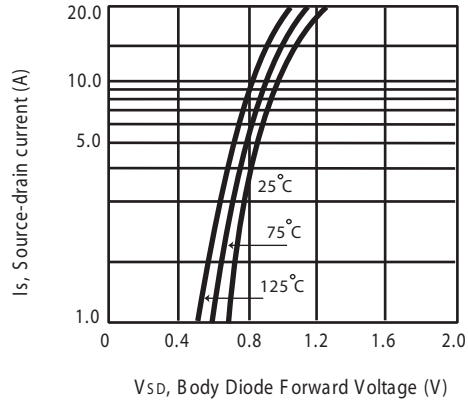



Figure 8. Body Diode Forward Voltage Variation with Source Current

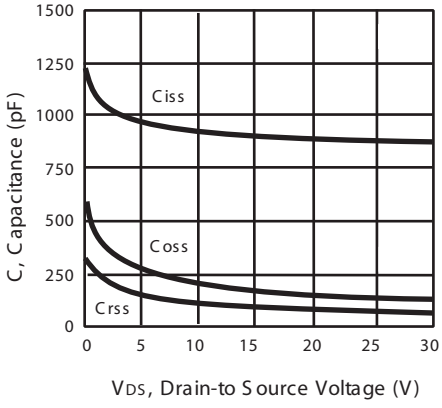



Figure 9. Capacitance

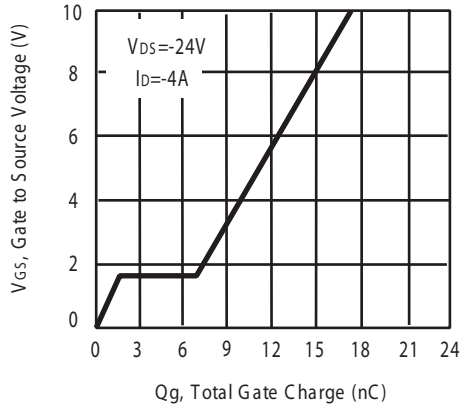



Figure 10. Gate Charge

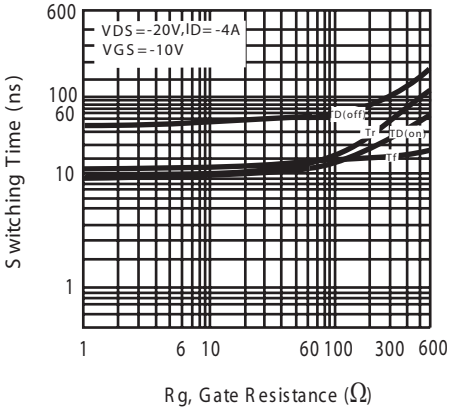



Figure 11.switching characteristics

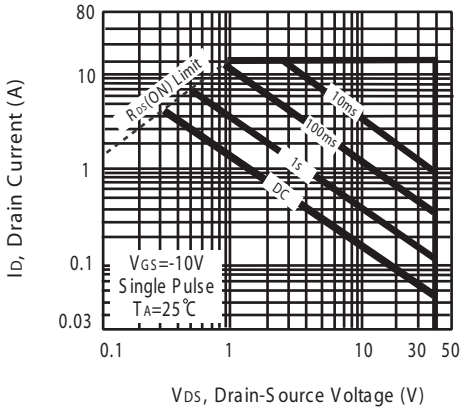
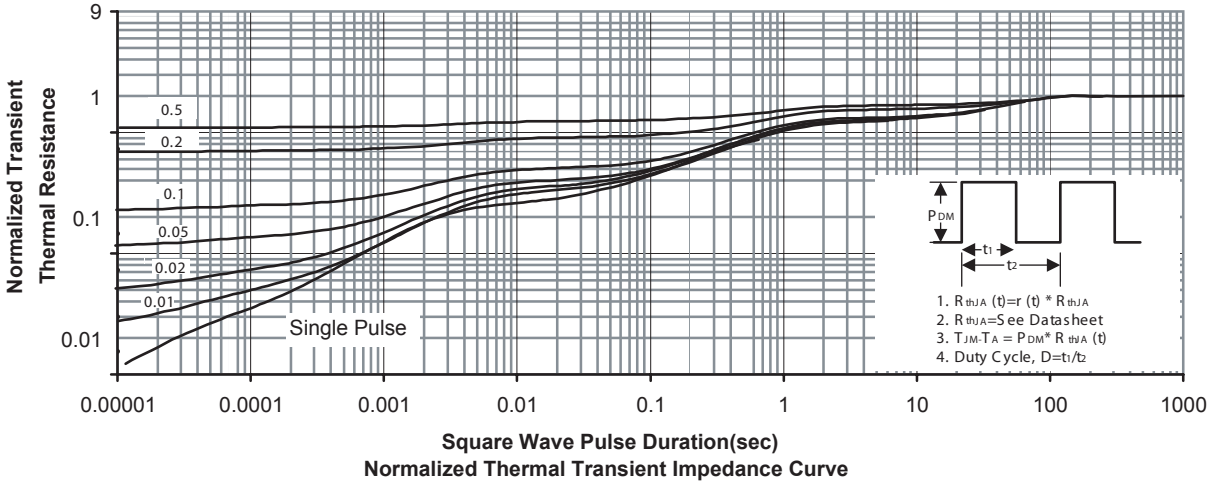



Figure 12. Maximum Safe Operating Area

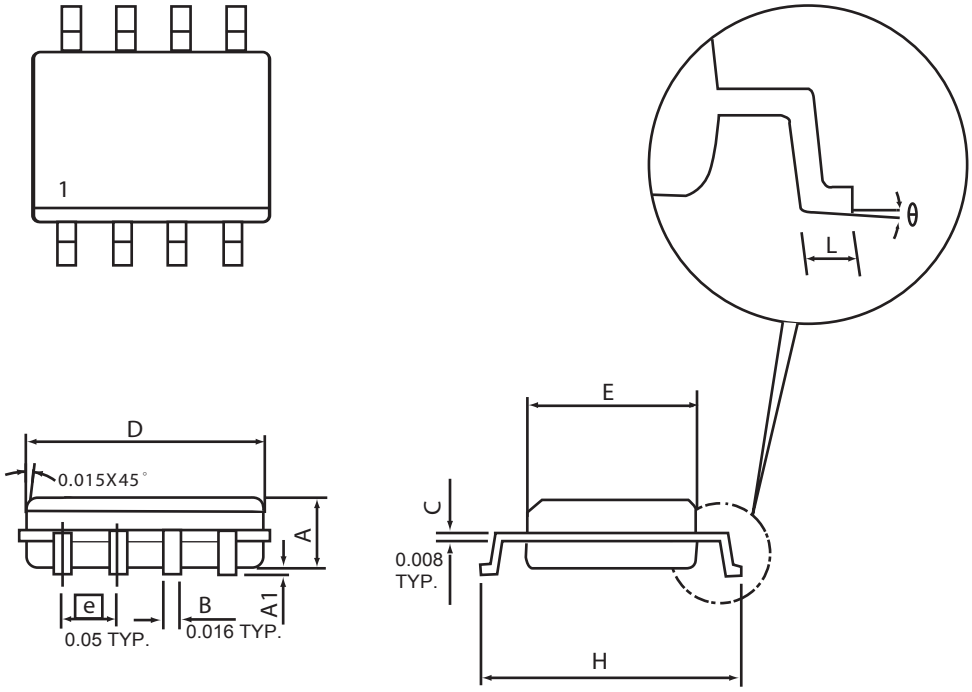



Normalized Thermal Transient Impedance Curve

# STM8455

## PACKAGE OUTLINE DIMENSIONS

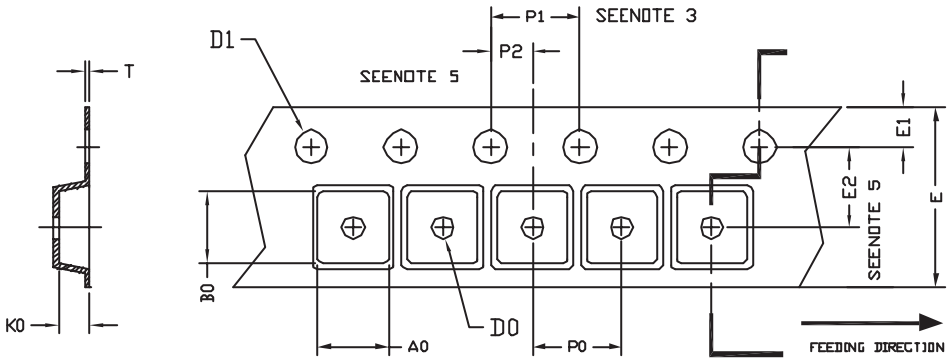
### SO-8




| 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° |

## SO-8 Tape and Reel Data

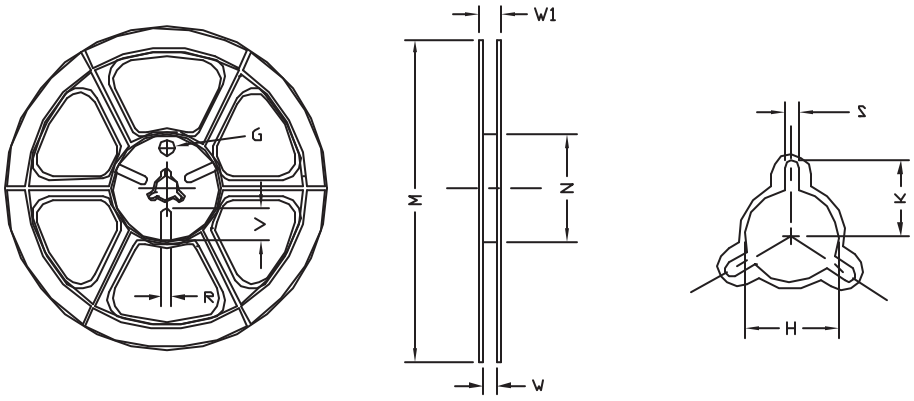
### SO-8 Carrier Tape




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