SamHop Microelectronics Corp.

# SP2702

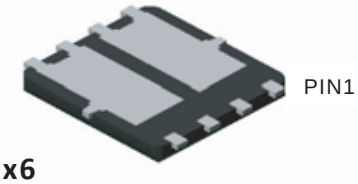
Ver 1.0

## Dual N-Channel Enhancement Mode Field Effect Transistor

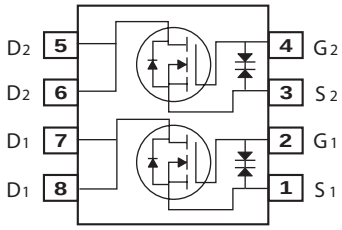
| PRODUCT SUMMARY | | |
|---|---|---|
| $V_{DSS}$ | $I_D$ | $R_{DS(ON)}$ (mΩ) Max |
| 75V | 1.6A | 513 @ VGS=10V |
| | | 614 @ VGS=4.5V |

### FEATURES

- Super high dense cell design for low $R_{DS(ON)}$.
- Rugged and reliable.
- Suface Mount Package.
- ESD Protected.




PDFN 5x6




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

| Symbol | Parameter | | Limit | Units |
|---|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | | 75 | V |
| $V_{GS}$ | Gate-Source Voltage | | ±20 | V |
| $I_D$ | Drain Current-Continuous [c] | $T_A$=25°C | 1.6 | A |
| | | $T_A$=70°C | 1.28 | A |
| $I_{DM}$ | -Pulsed [a c] | | 6.7 | A |
| $E_{AS}$ | Single Pulse Avalanche Energy [d] | | 6 | mJ |
| $P_D$ | Maximum Power Dissipation | $T_A$=25°C | 2.5 | W |
| | | $T_A$=70°C | 1.6 | W |
| $T_J$, $T_{STG}$ | Operating Junction and Storage Temperature Range | | -55 to 150 | °C |

### THERMAL CHARACTERISTICS

| | | | |
|---|---|---|---|
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient | 50 | °C/W |

## ELECTRICAL CHARACTERISTICS ($T_A$=25°C unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | |
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V , $I_D$=250uA | 75 | | | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=60V , $V_{GS}$=0V | | | 1 | uA |
| $I_{GSS}$ | Gate-Body Leakage Current | $V_{GS}$= ±20V , $V_{DS}$=0V | | | ±10 | uA |
| **ON CHARACTERISTICS** | | | | | | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$ , $I_D$=250uA | 1 | 2 | 3 | V |
| $R_{DS(ON)}$ | Drain-Source On-State Resistance | $V_{GS}$=10V , $I_D$=0.8A | | 410 | 513 | m ohm |
| | | $V_{GS}$=4.5V , $I_D$=0.7A | | 455 | 614 | m ohm |
| $g_{FS}$ | Forward Transconductance | $V_{DS}$=10V , $I_D$=0.8A | | 3.6 | | S |
| **SWITCHING CHARACTERISTICS** [b] | | | | | | |
| $t_{D(ON)}$ | Turn-On Delay Time | $V_{DD}$=37.5V<br>$I_D$=0.8A<br>$V_{GS}$=10V<br>$R_{GEN}$= 6 ohm | | 60 | | ns |
| tr | Rise Time | | | 48 | | ns |
| $t_{D(OFF)}$ | Turn-Off Delay Time | | | 872 | | ns |
| tf | Fall Time | | | 162 | | ns |
| $Q_g$ | Total Gate Charge | $V_{DS}$=37.5V,$I_D$=0.8A,$V_{GS}$=10V | | 3.4 | | nC |
| $Q_{gs}$ | Gate-Source Charge | $V_{DS}$=37.5V,$I_D$=0.8A,<br>$V_{GS}$=10V | | 0.86 | | nC |
| $Q_{gd}$ | Gate-Drain Charge | | | 1.1 | | nC |
| **DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS** | | | | | | |
| $V_{SD}$ | Diode Forward Voltage | $V_{GS}$=0V,$I_S$=1A | | 0.85 | 1.2 | V |

### Notes

a.Pulse Test:Pulse Width ≤ 10us, Duty Cycle ≤ 1%.
b.Guaranteed by design, not subject to production testing.
c.Drain current limited by maximum junction temperature.
d.Starting $T_J$=25°C,L=0.5mH,$V_{DD}$ = 40V.(See Figure12)
e.Mounted on FR4 Board of 1 inch$^2$ , 2oz.

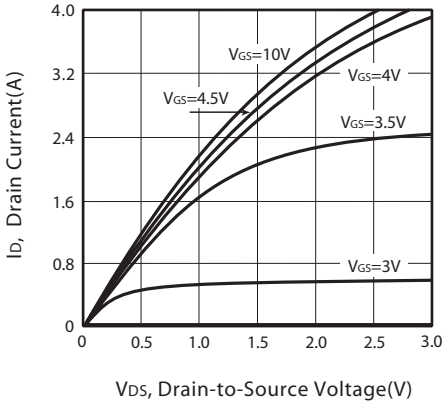



Figure 1. Output Characteristics

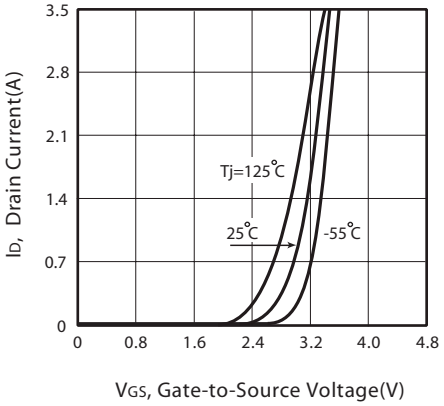



Figure 2. Transfer Characteristics

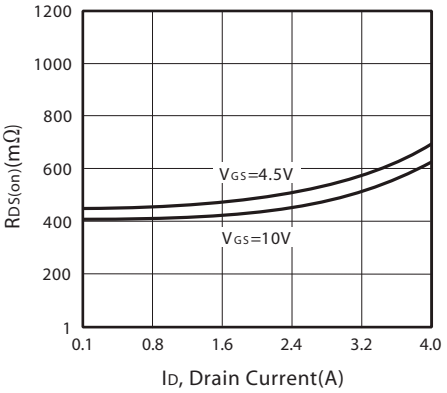



Figure 3. On-Resistance vs. Drain Current and Gate Voltage

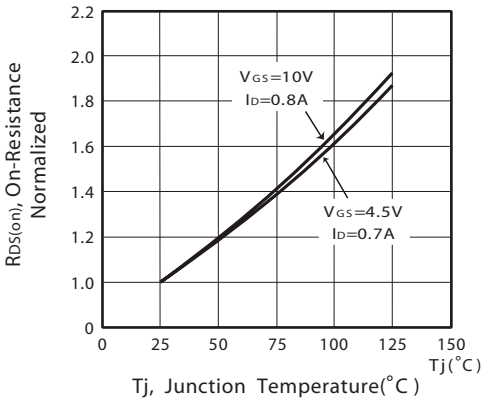



Figure 4. On-Resistance Variation with Drain Current and Temperature

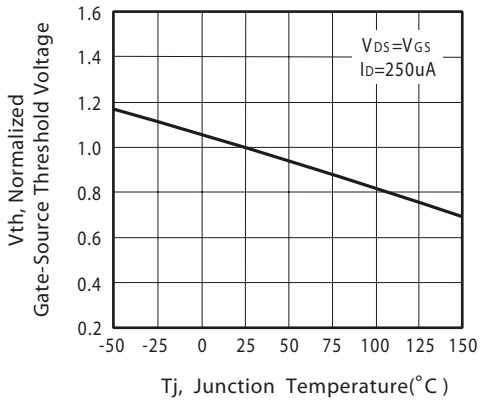



Figure 5. Gate Threshold Variation with Temperature

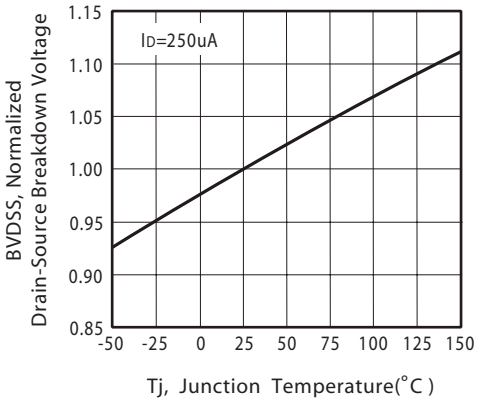



Figure 6. Breakdown Voltage Variation with Temperature

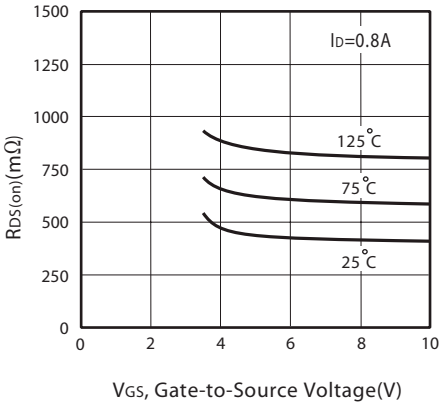



Figure 7. On-Resistance vs. Gate-Source Voltage

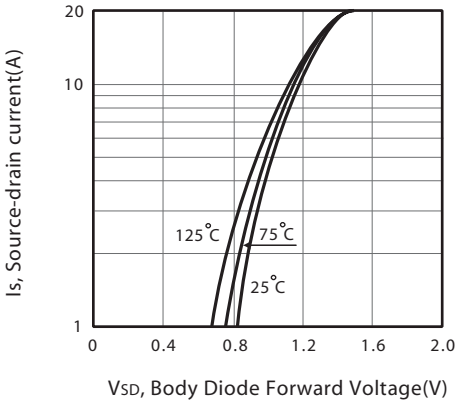



Figure 8. Body Diode Forward Voltage Variation with Source Current

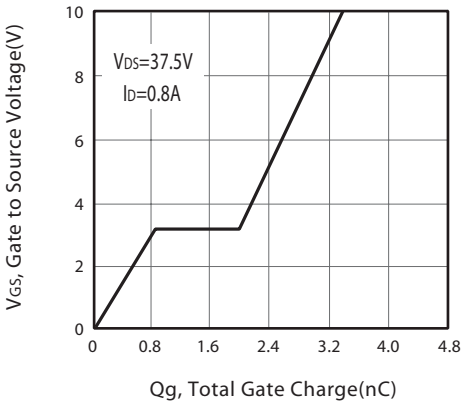



Figure 9. Gate Charge

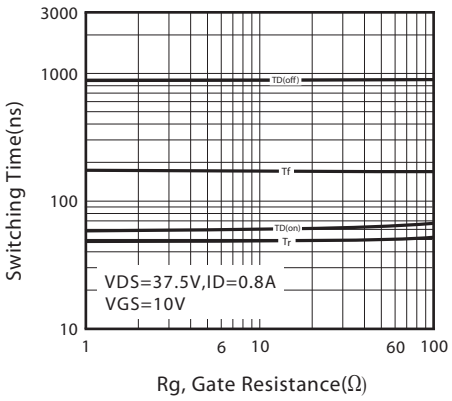



Figure 10. switching characteristics

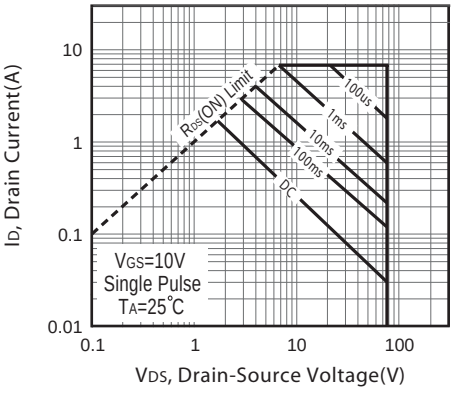
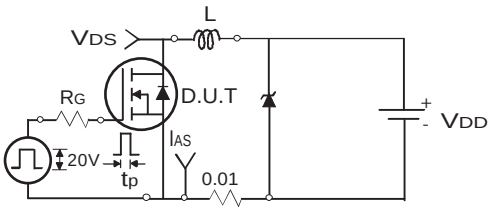
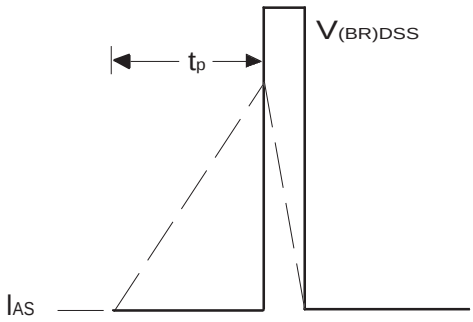



Figure 11. Maximum Safe Operating Area




Uncamped Inductive Test Circuit

Figure 12a.




Unclamped Inductive Waveforms

Figure 12b.

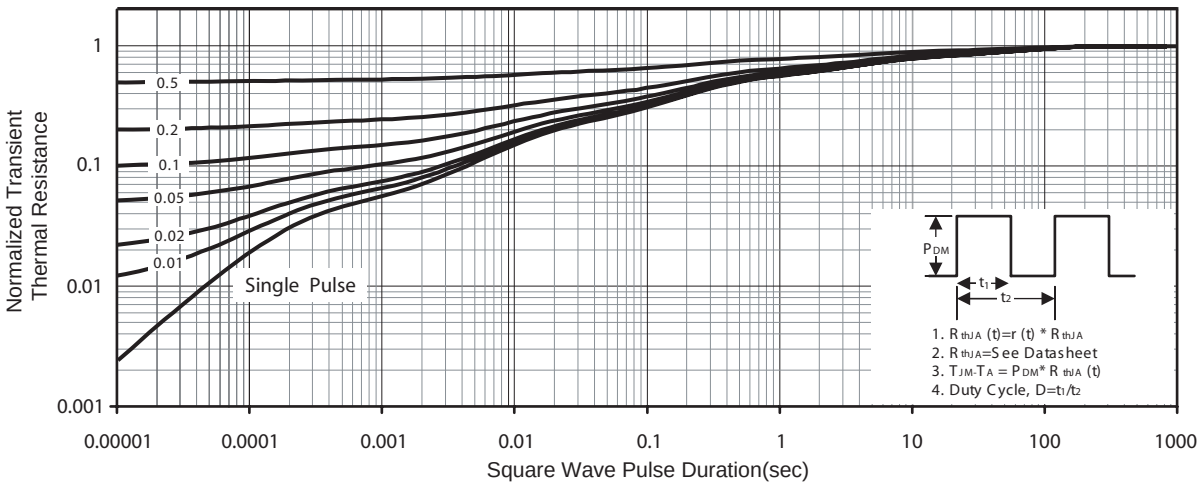



Figure 13. Normalized Thermal Transient Impedance Curve

## PACKAGE OUTLINE DIMENSIONS

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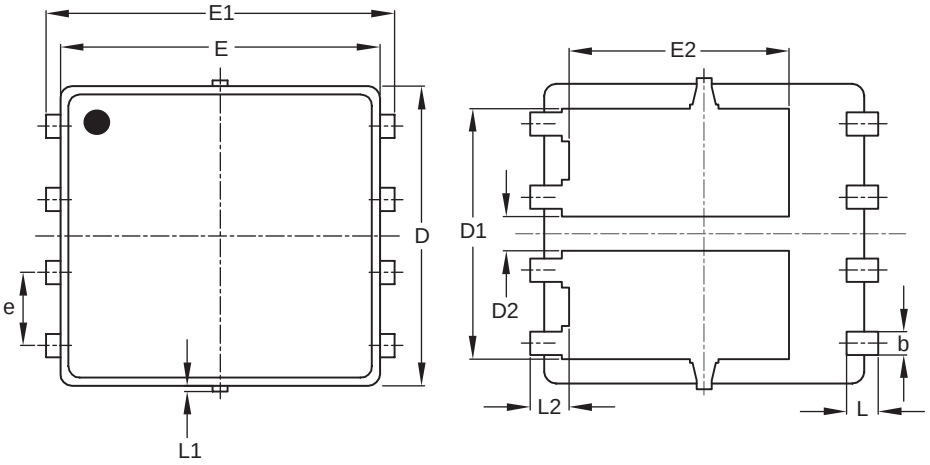
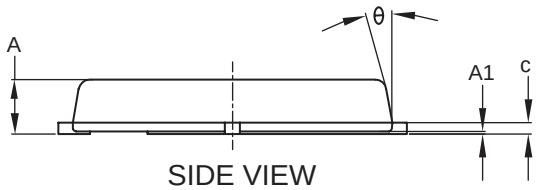



TOP VIEW

BOTTOM VIEW




SIDE VIEW

| SYMBOLS | MILLIMETERS | | |
|---|---|---|---|
| | MIN | NOM | MAX |
| A | 0.85 | 0.95 | 1.00 |
| A1 | 0.00 | — | 0.05 |
| b | 0.30 | 0.40 | 0.50 |
| c | 0.15 | 0.20 | 0.25 |
| D | | 5.20 BSC | |
| D1 | | 4.35 BSC | |
| D2 | 0.50 | 0.60 | 0.75 |
| E | | 5.55 BSC | |
| E1 | | 6.05 BSC | |
| E2 | | 3.82 BSC | |
| e | | 1.27 BSC | |
| L | 0.45 | 0.55 | 0.65 |
| L1 | 0.00 | — | 0.15 |
| L2 | | 0.68 REF | |
| θ | 0° | — | 10° |

## TOP MARKING DEFINITION

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