

**Dual N-Ch 30V Fast Switching MOSFETs**
**Description**

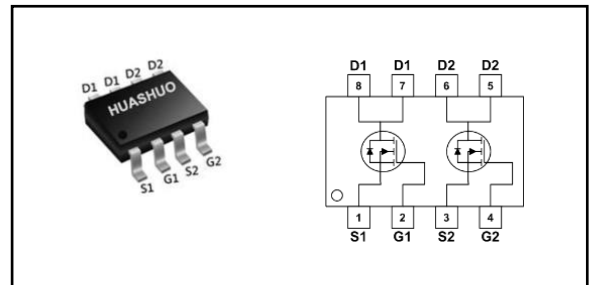
The HSM3202 is the high cell density trenched N-ch MOSFETs, which provide excellent R<sub>DS(ON)</sub> and gate charge for most of the synchronous buck converter applications.

The HSM3202 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

- Super Low Gate Charge
- 100% EAS Guaranteed
- Green Device Available
- Excellent CdV/dt effect decline
- Advanced high cell density Trench technology

**Product Summary**

|                         |     |    |
|-------------------------|-----|----|
| V <sub>DS</sub>         | 30  | V  |
| R <sub>DS(ON),max</sub> | 18  | mΩ |
| I <sub>D</sub>          | 7.8 | A  |

**Dual SOP8 Pin Configuration**

**Absolute Maximum Ratings**

| Symbol                               | Parameter  | Rating     | Units |
|--------------------------------------|--|------------|-------|
| V <sub>DS</sub>                      | Drain-Source Voltage   | 30         | V     |
| V <sub>GS</sub>                      | Gate-Source Voltage  | ±20        | V     |
| I <sub>D</sub> @T <sub>A</sub> =25°C | Continuous Drain Current, V <sub>GS</sub> @ 10V <sub>1</sub> | 7.8        | A     |
| I <sub>D</sub> @T <sub>A</sub> =70°C | Continuous Drain Current, V <sub>GS</sub> @ 10V <sub>1</sub> | 5.8        | A     |
| I <sub>DM</sub>                      | Pulsed Drain Current <sub>2</sub>                            | 37         | A     |
| EAS                                  | Single Pulse Avalanche Energy <sub>3</sub>                   | 22.1       | mJ    |
| I <sub>AS</sub>                      | Avalanche Current  | 21         | A     |
| P <sub>D</sub> @T <sub>A</sub> =25°C | Total Power Dissipation <sub>4</sub>                         | 1.5        | W     |
| T <sub>STG</sub>                     | Storage Temperature Range                                    | -55 to 150 | °C    |
| T <sub>J</sub>                       | Operating Junction Temperature Range                         | -55 to 150 | °C    |

**Thermal Data**

| Symbol           | Parameter  | Typ. | Max. | Unit |
|------------------|--|------|------|------|
| R <sub>θJA</sub> | Thermal Resistance Junction-ambient <sub>1</sub> | ---  | 85   | °C/W |
| R <sub>θJC</sub> | Thermal Resistance Junction-Case <sub>1</sub>    | ---  | 25   | °C/W |

**Dual N-Ch 30V Fast Switching MOSFETs**
**Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**

| Symbol                              | Parameter                                      | Conditions   | Min. | Typ.  | Max. | Unit  |
|-------------------------------------|--|--|------|-------|------|-------|
| BV <sub>DSS</sub>                   | Drain-Source Breakdown Voltage                 | V <sub>GS</sub> =0V, I <sub>D</sub> =250uA   | 30   | ---   | ---  | V     |
| ΔBV <sub>DSS</sub> /ΔT <sub>J</sub> | BVDSS Temperature Coefficient                  | Reference to 25°C, I <sub>D</sub> =1mA   | ---  | 0.034 | ---  | V/°C  |
| R <sub>DS(ON)</sub>                 | Static Drain-Source On-Resistance <sup>2</sup> | V <sub>GS</sub> =10V, I <sub>D</sub> =7A   | ---  | ---   | 18   | mΩ    |
|                                     |  | V <sub>GS</sub> =4.5V, I <sub>D</sub> =4A  | ---  | ---   | 28   |       |
| V <sub>GS(th)</sub>                 | Gate Threshold Voltage                         | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA                               | 1.2  | ---   | 2.5  | V     |
| ΔV <sub>GS(th)</sub>                | V <sub>GS(th)</sub> Temperature Coefficient    |  | ---  | -5.8  | ---  | mV/°C |
| I <sub>DSS</sub>                    | Drain-Source Leakage Current                   | V <sub>DS</sub> =24V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C                        | ---  | ---   | 1    | uA    |
|                                     |  | V <sub>DS</sub> =24V, V <sub>GS</sub> =0V, T <sub>J</sub> =55°C                        | ---  | ---   | 5    |       |
| I <sub>GSS</sub>                    | Gate-Source Leakage Current                    | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V   | ---  | ---   | ±100 | nA    |
| g <sub>fs</sub>                     | Forward Transconductance                       | V <sub>DS</sub> =5V, I <sub>D</sub> =7A  | ---  | 6     | ---  | S     |
| R <sub>g</sub>                      | Gate Resistance                                | V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, f=1MHz                                       | ---  | 2.5   | ---  | Ω     |
| Q <sub>g</sub>                      | Total Gate Charge (4.5V)                       | V <sub>DS</sub> =15V, V <sub>GS</sub> =4.5V, I <sub>D</sub> =7A                        | ---  | 6     | ---  | nC    |
| Q <sub>gs</sub>                     | Gate-Source Charge                             |  | ---  | 2.5   | ---  |       |
| Q <sub>gd</sub>                     | Gate-Drain Charge                              |  | ---  | 2.1   | ---  |       |
| T <sub>d(on)</sub>                  | Turn-On Delay Time                             | V <sub>DD</sub> =15V, V <sub>GS</sub> =10V, R <sub>G</sub> =3.3Ω<br>I <sub>D</sub> =7A | ---  | 2.4   | ---  | ns    |
| T <sub>r</sub>                      | Rise Time                                      |  | ---  | 7.8   | ---  |       |
| T <sub>d(off)</sub>                 | Turn-Off Delay Time                            |  | ---  | 22    | ---  |       |
| T <sub>f</sub>                      | Fall Time                                      |  | ---  | 4     | ---  |       |
| C <sub>iss</sub>                    | Input Capacitance                              | V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1MHz                                      | ---  | 572   | ---  | pF    |
| C <sub>oss</sub>                    | Output Capacitance                             |  | ---  | 80    | ---  |       |
| C <sub>rss</sub>                    | Reverse Transfer Capacitance                   |  | ---  | 65    | ---  |       |

**Diode Characteristics**

| Symbol          | Parameter                                | Conditions  | Min. | Typ. | Max. | Unit |
|-----------------|--|---|------|------|------|------|
| I <sub>S</sub>  | Continuous Source Current <sup>1,5</sup> | V <sub>G</sub> =V <sub>D</sub> =0V, Force Current             | ---  | ---  | 7.8  | A    |
| I <sub>SM</sub> | Pulsed Source Current <sup>2,5</sup>     |   | ---  | ---  | 37   | A    |
| V <sub>SD</sub> | Diode Forward Voltage <sup>2</sup>       | V <sub>GS</sub> =0V, I <sub>S</sub> =1A, T <sub>J</sub> =25°C | ---  | ---  | 1.2  | V    |
| t <sub>rr</sub> | Reverse Recovery Time                    | I <sub>F</sub> =7A, dI/dt=100A/μs, T <sub>J</sub> =25°C       | ---  | 20   | ---  | nS   |
| Q <sub>rr</sub> | Reverse Recovery Charge                  |   | ---  | 1.1  | ---  | nC   |

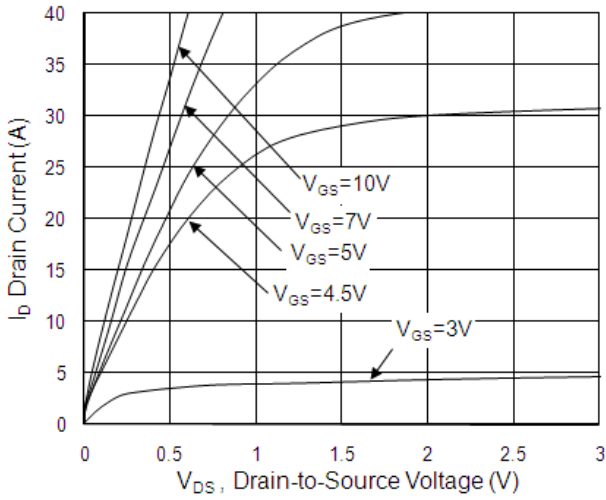
Note :

- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 20Z copper.
- 2.The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
- 3.The EAS data shows Max. rating. The test condition is V<sub>DD</sub>=25V, V<sub>GS</sub>=10V, L=0.1mH, I<sub>AS</sub>=21A
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub>, in real applications, should be limited by total power dissipation.

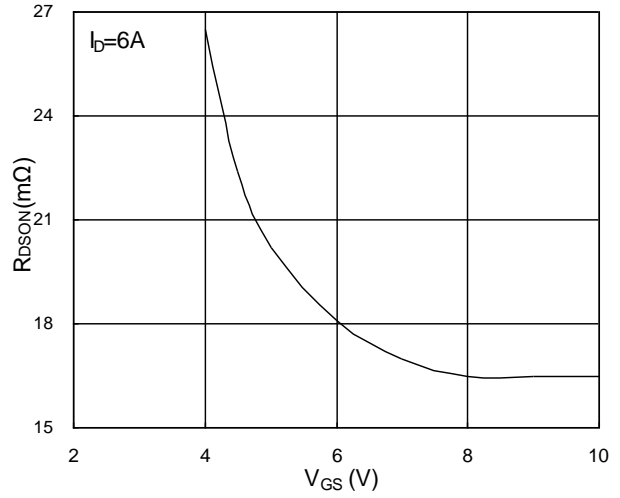


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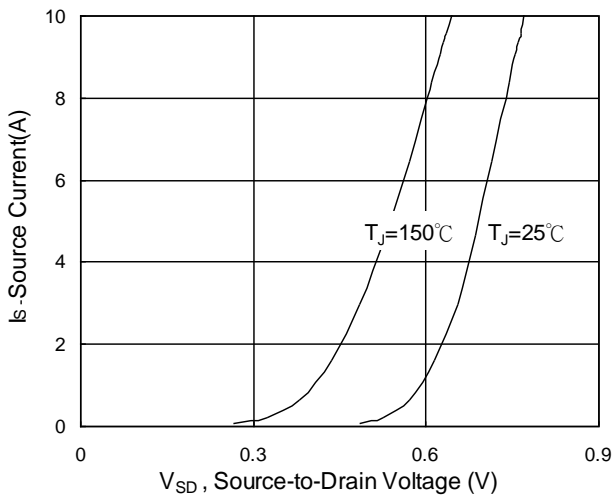
**Typical Characteristics**



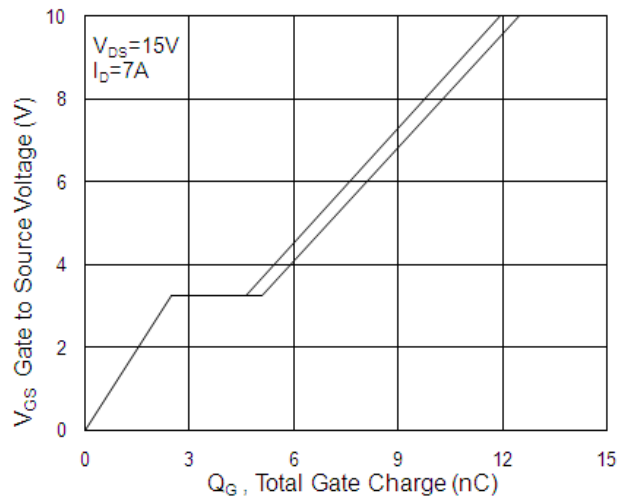
**Fig.1 Typical Output Characteristics**



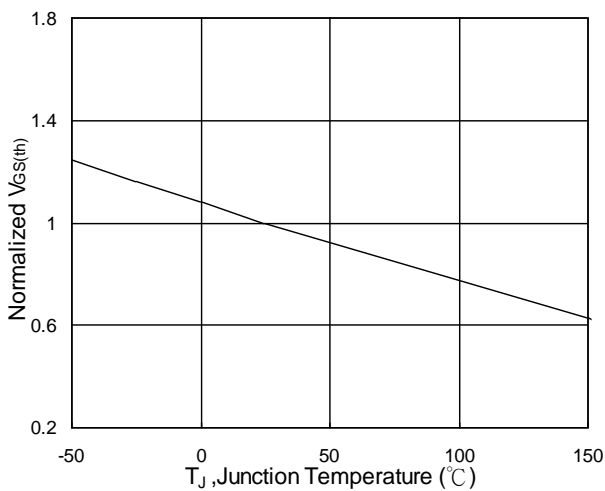
**Fig.2 On-Resistance vs. G-S Voltage**



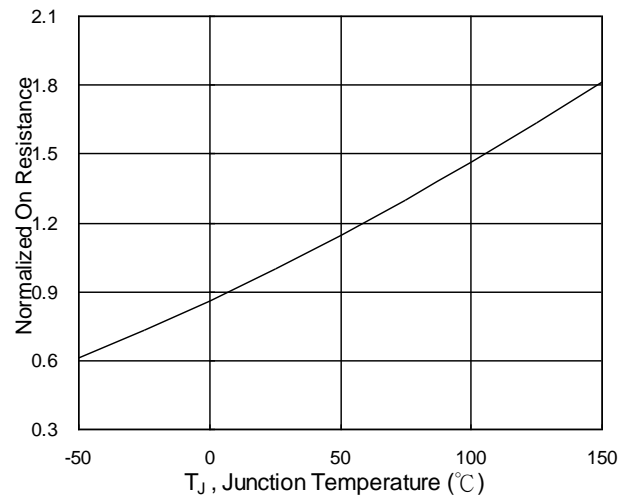
**Fig.3 Forward Characteristics Of Reverse**



**Fig.4 Gate-Charge Characteristics**



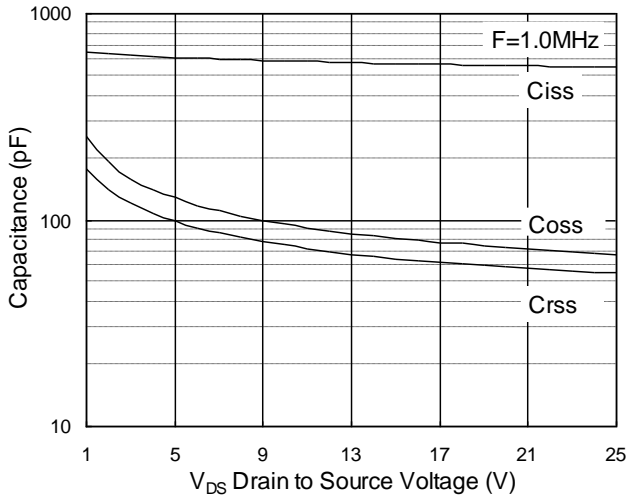
**Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$**



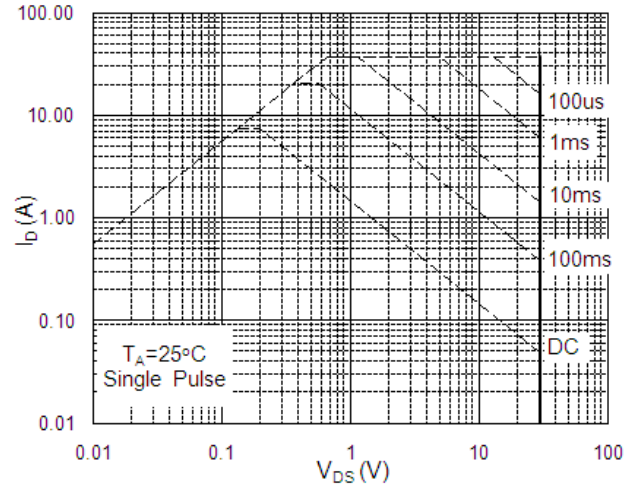
**Fig.6 Normalized  $R_{DS(on)}$  vs.  $T_J$**



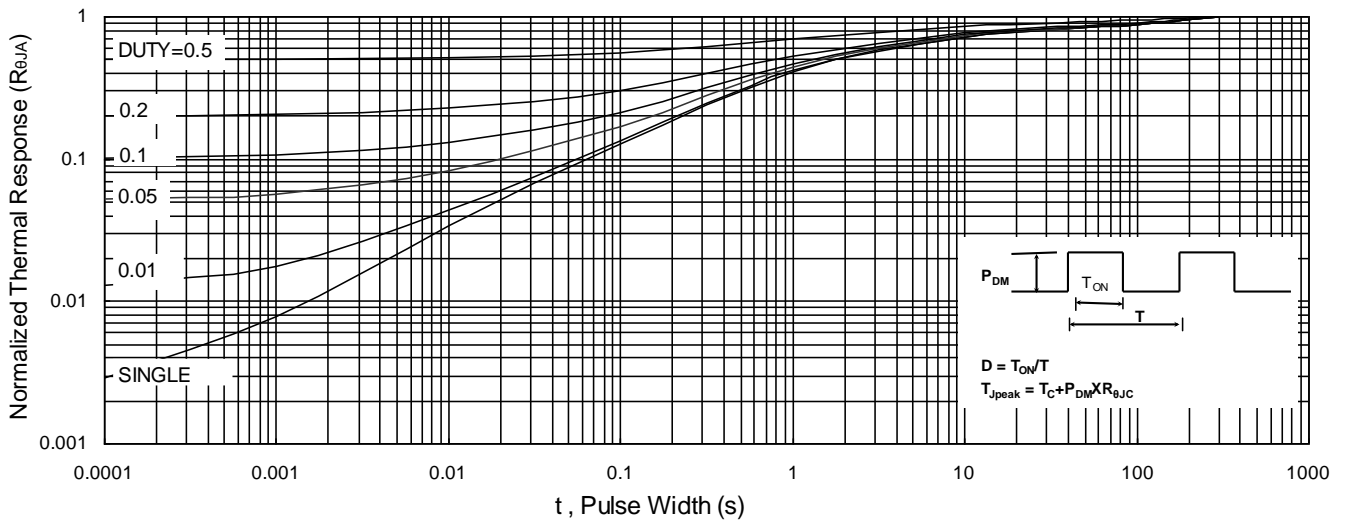
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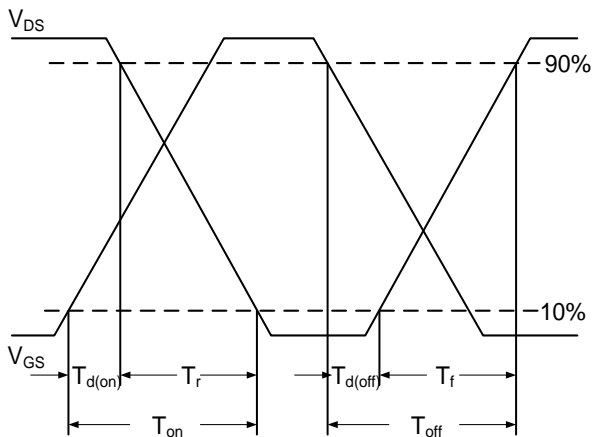
**Fig.7 Capacitance**



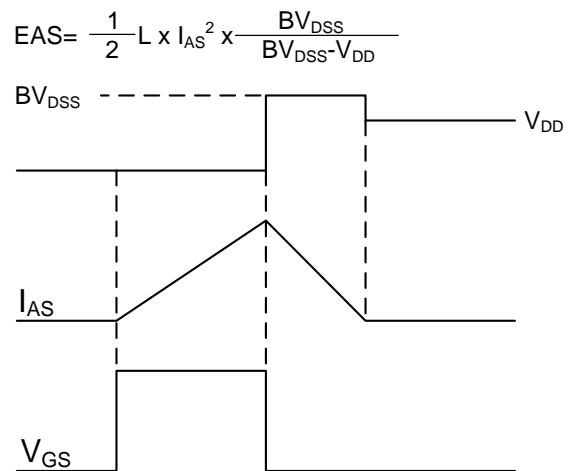
**Fig.8 Safe Operating Area**



**Fig.9 Normalized Maximum Transient Thermal Impedance**



**Fig.10 Switching Time Waveform**

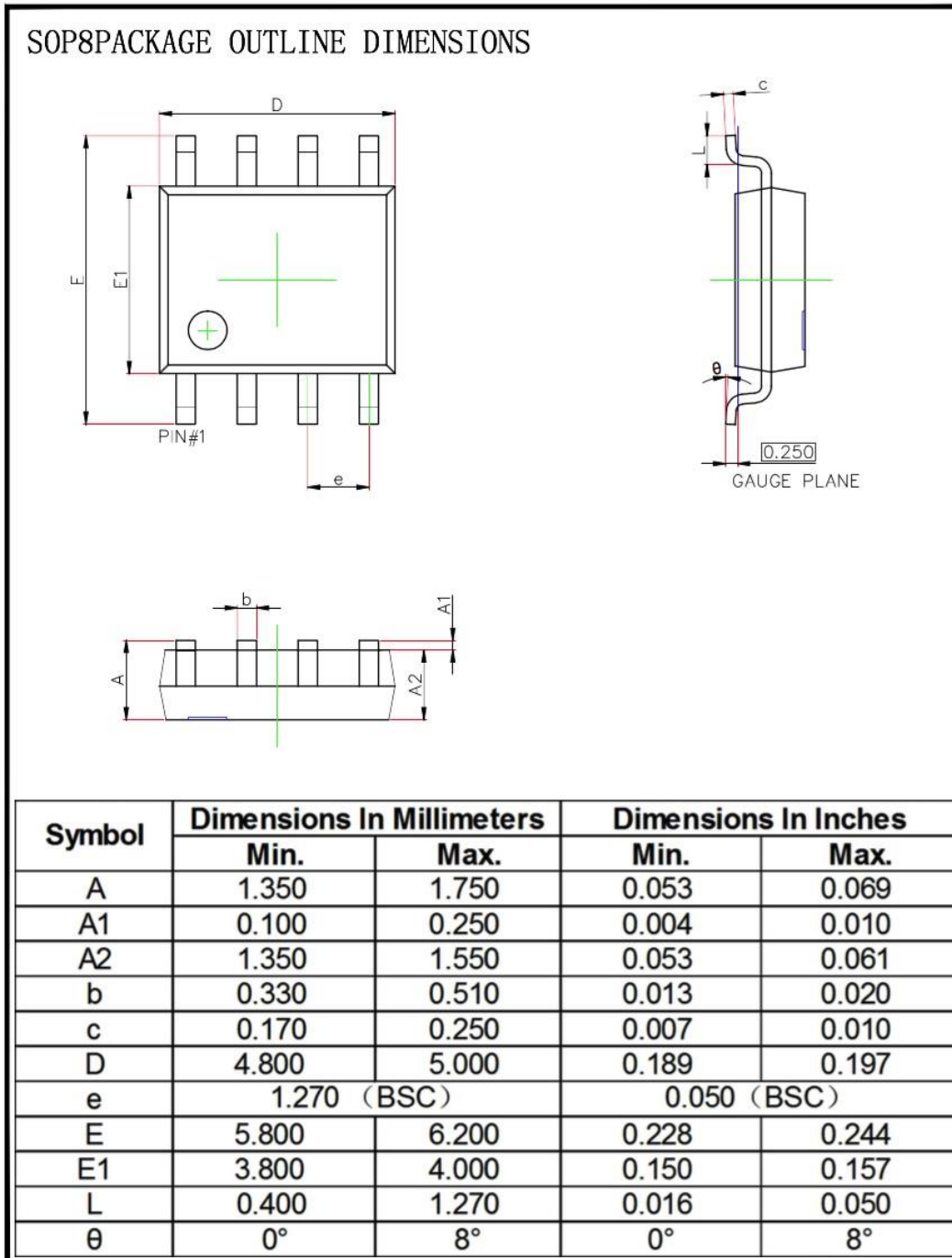


**Fig.11 Unclamped Inductive Switching**



## Ordering Information

| Part Number | Package code | Packaging      |
|-------------|--------------|----------------|
| HSM3202     | SOP-8        | 4000/Tape&Reel |



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