

### General Description

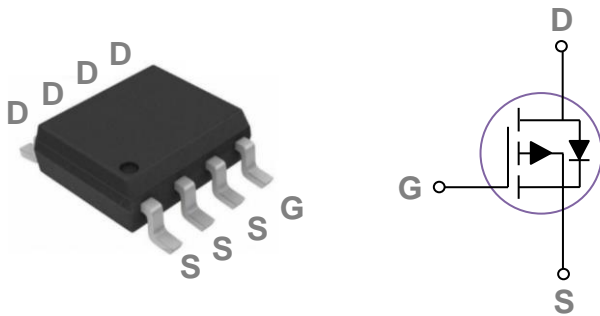
These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

|       |        |      |
|-------|--------|------|
| BVDSS | RDSON  | ID   |
| -30V  | 10.8mΩ | -10A |

### Features

- -30V,-10A,  $R_{DS(ON)} = 10.8m\Omega @ V_{GS} = -10V$
- Fast switching
- Green Device Available
- Suit for -4.5V Gate Drive Applications

### SOP8 Pin Configuration



### Applications

- MB / VGA / Vcore
- POL Applications
- Load Switch
- LED Application

### Absolute Maximum Ratings $T_c=25^\circ\text{C}$ unless otherwise noted

| Symbol    | Parameter   | Rating     | Units               |
|-----------|---|------------|---------------------|
| $V_{DS}$  | Drain-Source Voltage                                  | -30        | V                   |
| $V_{GS}$  | Gate-Source Voltage                                   | $\pm 20$   | V                   |
| $I_D$     | Drain Current – Continuous ( $T_A=25^\circ\text{C}$ ) | -10        | A                   |
|           | Drain Current – Continuous ( $T_A=70^\circ\text{C}$ ) | -8         | A                   |
| $I_{DM}$  | Drain Current – Pulsed <sup>1</sup>                   | -40        | A                   |
| EAS       | Single Pulse Avalanche Energy <sup>2</sup>            | 125        | mJ                  |
| IAS       | Single Pulse Avalanche Current <sup>2</sup>           | -50        | A                   |
| $P_D$     | Power Dissipation ( $T_A=25^\circ\text{C}$ )          | 2          | W                   |
|           | Power Dissipation – Derate above $25^\circ\text{C}$   | 0.016      | W/ $^\circ\text{C}$ |
| $T_{STG}$ | Storage Temperature Range                             | -55 to 150 | $^\circ\text{C}$    |
| $T_J$     | Operating Junction Temperature Range                  | -55 to 150 | $^\circ\text{C}$    |

### Thermal Characteristics

| Symbol          | Parameter                              | Typ. | Max. | Unit                      |
|-----------------|--|------|------|---------------------------|
| $R_{\theta JA}$ | Thermal Resistance Junction to ambient | ---  | 62.5 | $^\circ\text{C}/\text{W}$ |

**Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**
**Off Characteristics**

| Symbol            | Parameter                      | Conditions  | Min. | Typ. | Max. | Unit |
|-------------------|--------------------------------|---|------|------|------|------|
| BV <sub>DSS</sub> | Drain-Source Breakdown Voltage | V <sub>GS</sub> =0V, I <sub>D</sub> =-250μA                       | -30  | ---  | ---  | V    |
| I <sub>DSS</sub>  | Drain-Source Leakage Current   | V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C  | ---  | ---  | -1   | μA   |
|                   |                                | V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C | ---  | ---  | -10  | μA   |
| I <sub>GSS</sub>  | Gate-Source Leakage Current    | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V                        | ---  | ---  | ±100 | nA   |

**On Characteristics**

|                     |                                   |   |      |      |      |    |
|---------------------|-----------------------------------|---|------|------|------|----|
| R <sub>DS(ON)</sub> | Static Drain-Source On-Resistance | V <sub>GS</sub> =-10V, I <sub>D</sub> =-15A               | ---  | 9    | 10.8 | mΩ |
|                     |                                   | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-10A              | ---  | 14   | 18   | mΩ |
| V <sub>GS(th)</sub> | Gate Threshold Voltage            | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =-250μA | -1.2 | -1.6 | -2.5 | V  |
| g <sub>fs</sub>     | Forward Transconductance          | V <sub>DS</sub> =-10V, I <sub>D</sub> =-3A                | ---  | 11   | ---  | S  |

**Dynamic and switching Characteristics**

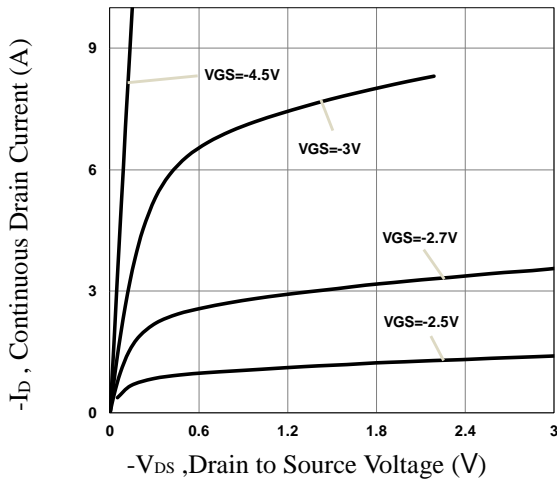
|                     |                                     |   |     |      |      |    |
|---------------------|-------------------------------------|---|-----|------|------|----|
| Q <sub>g</sub>      | Total Gate Charge <sup>3, 4</sup>   | V <sub>DS</sub> =-15V, V <sub>GS</sub> =-10V, I <sub>D</sub> =-5A                       | --- | 34   | 50   | nC |
| Q <sub>gs</sub>     | Gate-Source Charge <sup>3, 4</sup>  |   | --- | 5.2  | 7.8  |    |
| Q <sub>gd</sub>     | Gate-Drain Charge <sup>3, 4</sup>   |   | --- | 7.9  | 12   |    |
| T <sub>d(on)</sub>  | Turn-On Delay Time <sup>3, 4</sup>  | V <sub>DD</sub> =-15V, V <sub>GS</sub> =-10V, R <sub>G</sub> =6Ω<br>I <sub>D</sub> =-5A | --- | 20   | 30   | ns |
| T <sub>r</sub>      | Rise Time <sup>3, 4</sup>           |   | --- | 15   | 22   |    |
| T <sub>d(off)</sub> | Turn-Off Delay Time <sup>3, 4</sup> |   | --- | 40   | 60   |    |
| T <sub>f</sub>      | Fall Time <sup>3, 4</sup>           |   | --- | 30   | 45   |    |
| C <sub>iss</sub>    | Input Capacitance                   | V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, F=1MHz                                      | --- | 2020 | 3000 | pF |
| C <sub>oss</sub>    | Output Capacitance                  |   | --- | 305  | 460  |    |
| C <sub>rss</sub>    | Reverse Transfer Capacitance        |   | --- | 245  | 370  |    |

**Drain-Source Diode Characteristics and Maximum Ratings**

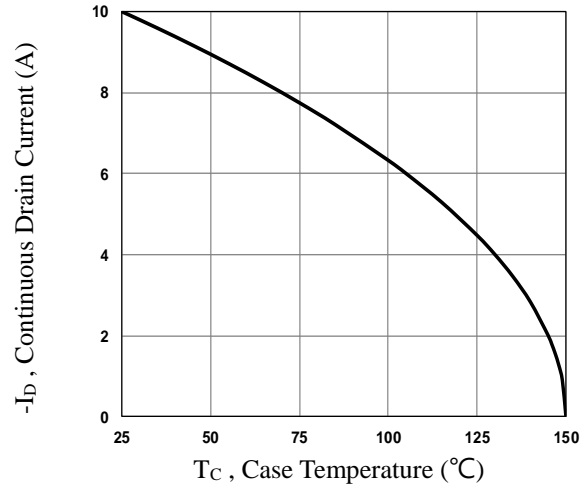
| Symbol          | Parameter                 | Conditions   | Min. | Typ. | Max. | Unit |
|-----------------|---------------------------|--|------|------|------|------|
| I <sub>S</sub>  | Continuous Source Current | V <sub>G</sub> =V <sub>D</sub> =0V, Force Current              | ---  | ---  | -10  | A    |
| I <sub>SM</sub> | Pulsed Source Current     |  | ---  | ---  | -20  | A    |
| V <sub>SD</sub> | Diode Forward Voltage     | V <sub>GS</sub> =0V, I <sub>S</sub> =-1A, T <sub>J</sub> =25°C | ---  | ---  | -1   | V    |
| t <sub>rr</sub> | Reverse Recovery Time     | V <sub>R</sub> =-30V, I <sub>R</sub> =-10A                     | ---  | 80   | ---  | ns   |
| Q <sub>rr</sub> | Reverse Recovery Charge   | di/dt=100A/μs, T <sub>J</sub> =25°C                            | ---  | 170  | ---  | nC   |

Note :

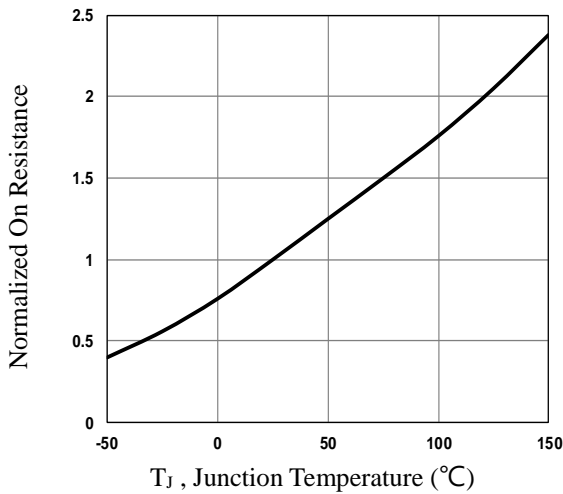
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V<sub>DD</sub>=-25V, V<sub>GS</sub>=-10V, L=0.1mH, I<sub>AS</sub>=-50A., R<sub>G</sub>=25Ω, Starting T<sub>J</sub>=25°C.
3. The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%.
4. Essentially independent of operating temperature.



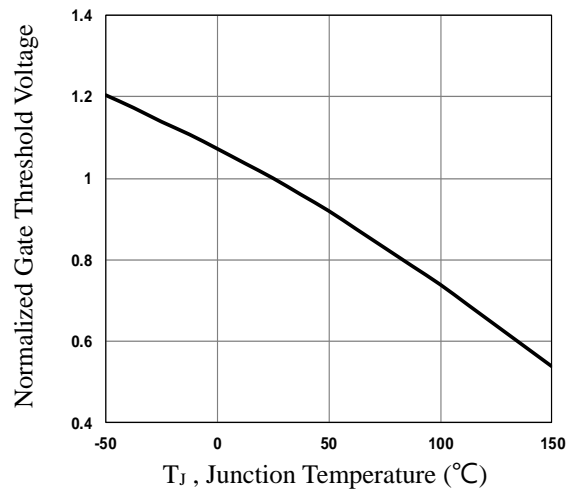
**Fig.1 Typical Output Characteristics**



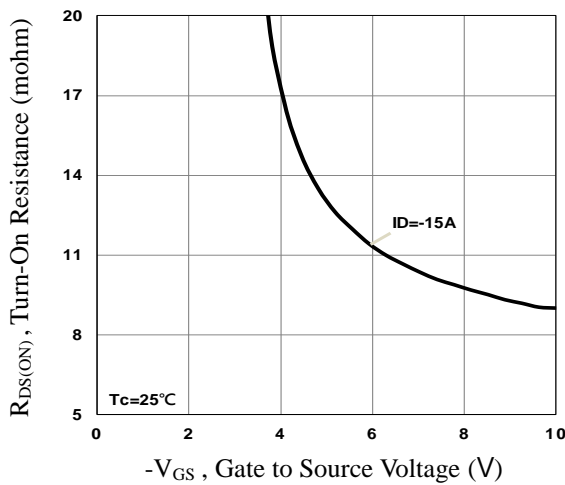
**Fig.2 Continuous Drain Current vs. T<sub>c</sub>**



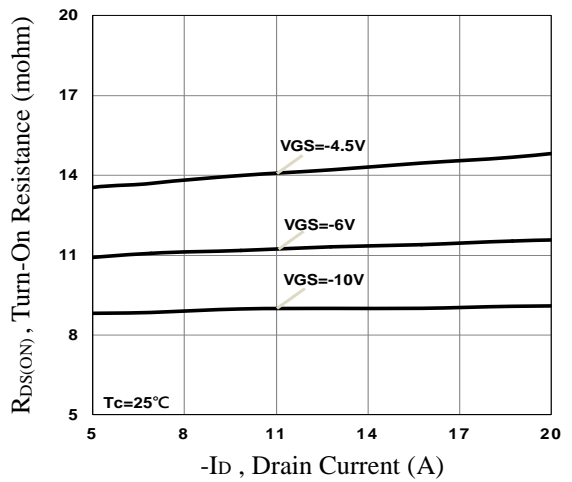
**Fig.3 Normalized R<sub>DS(on)</sub> vs. T<sub>J</sub>**



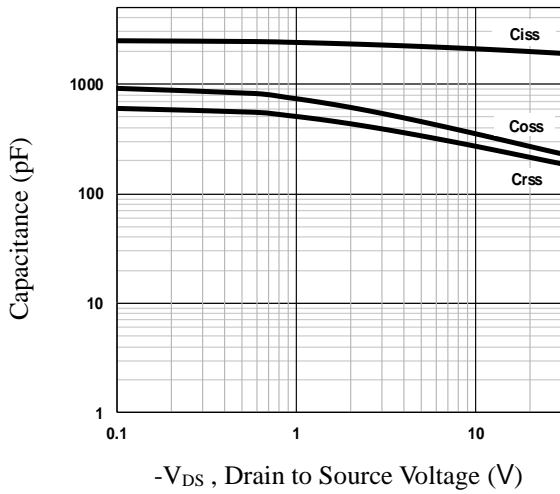
**Fig.4 Normalized V<sub>th</sub> vs. T<sub>J</sub>**



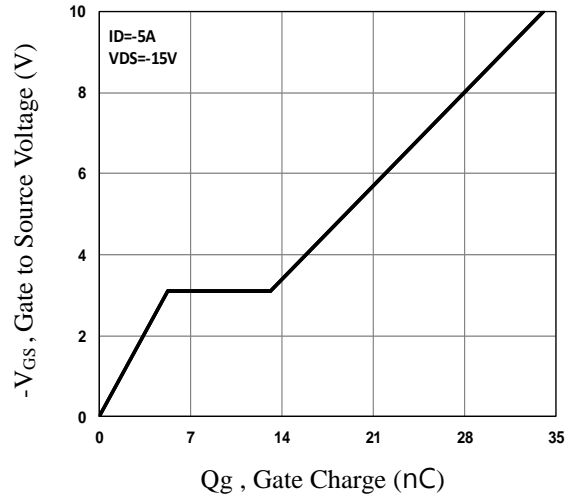
**Fig.5 Turn-On Resistance vs. V<sub>GS</sub>**



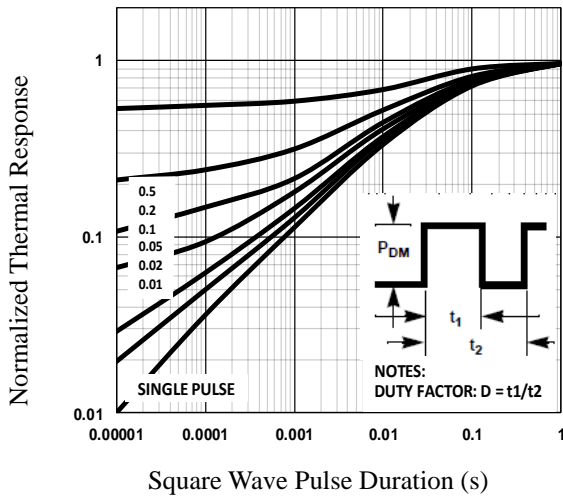
**Fig.6 Turn-On Resistance vs. I<sub>D</sub>**



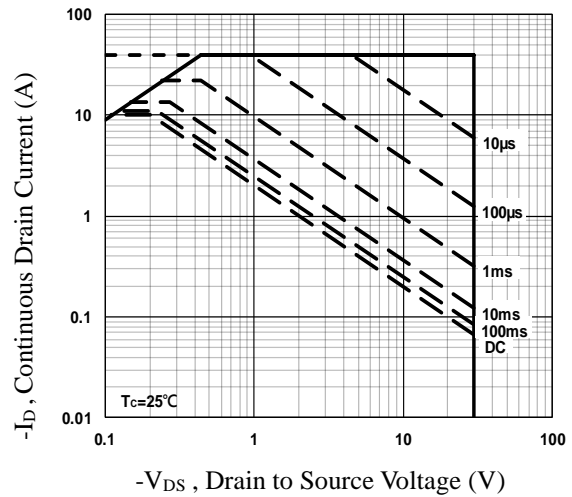
**Fig.7 Capacitance Characteristics**



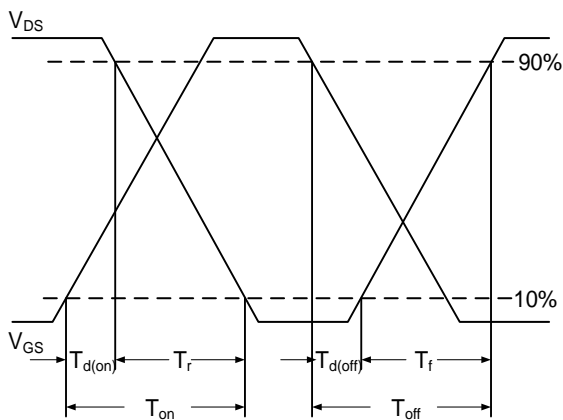
**Fig.8 Gate Charge Characteristics**



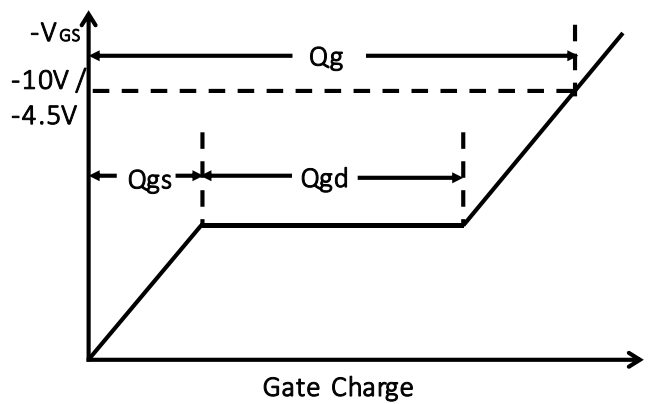
**Fig.9 Normalized Transient Impedance**



**Fig.10 Maximum Safe Operation Area**

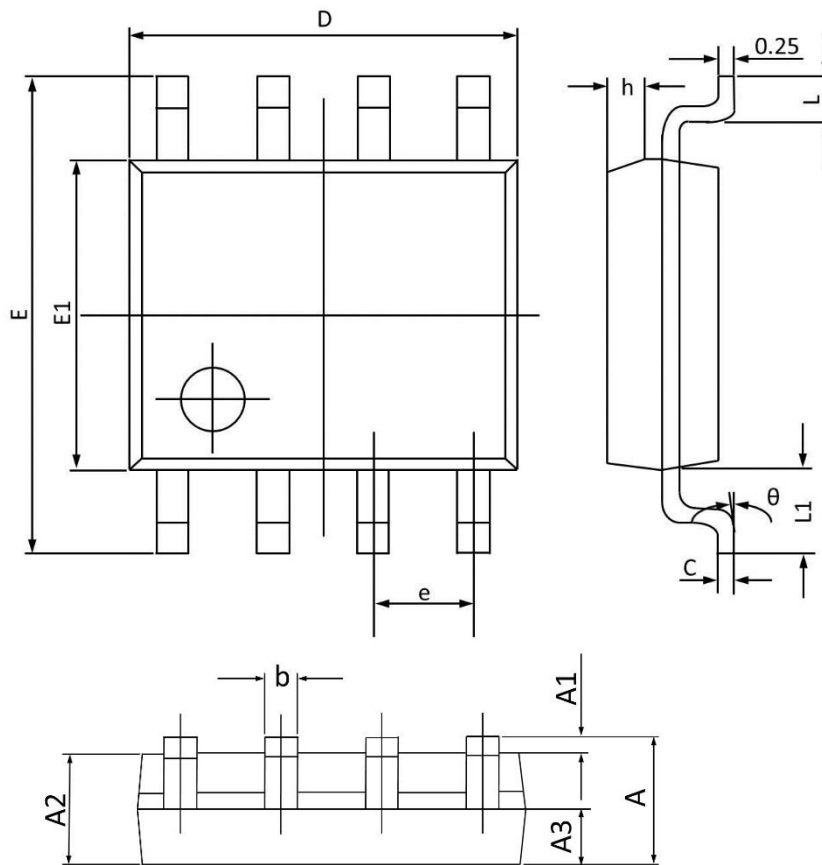


**Fig.11 Switching Time Waveform**



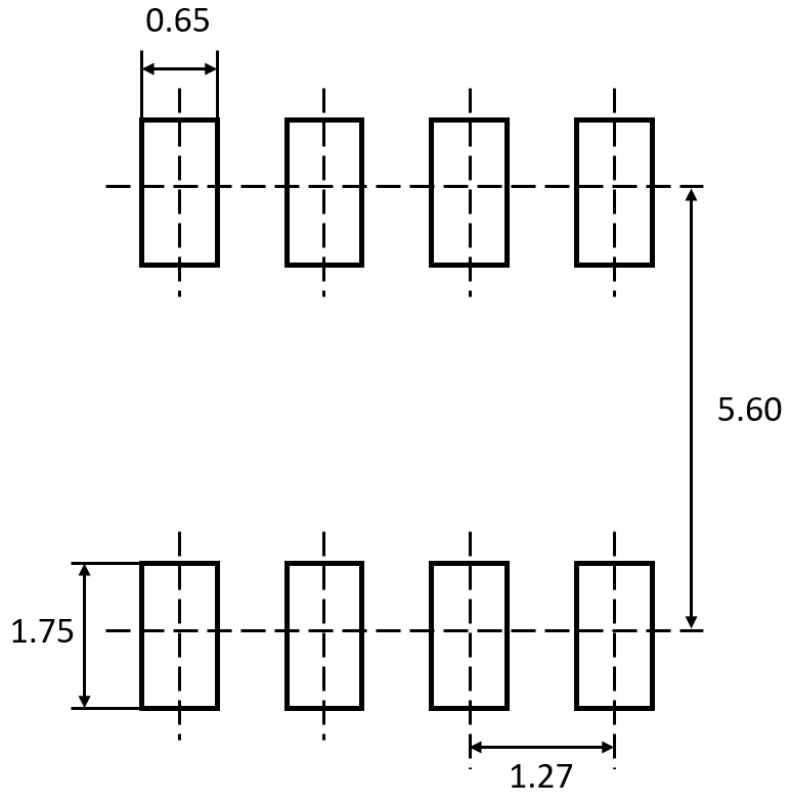
**Fig.12 Gate Charge Waveform**

## SOP8 PACKAGE INFORMATION



| Symbol   | Dimensions In Millimeters |       | Dimensions In Inches |       |
|----------|---------------------------|-------|----------------------|-------|
|          | Min                       | Max   | Min                  | Max   |
| A        | 1.350                     | 1.800 | 0.053                | 0.069 |
| A1       | 0.050                     | 0.250 | 0.002                | 0.010 |
| A2       | 1.250                     | 1.650 | 0.049                | 0.065 |
| A3       | 0.500                     | 0.700 | 0.020                | 0.028 |
| b        | 0.300                     | 0.510 | 0.012                | 0.020 |
| c        | 0.150                     | 0.260 | 0.006                | 0.010 |
| D        | 4.700                     | 5.100 | 0.185                | 0.201 |
| E        | 5.800                     | 6.200 | 0.228                | 0.244 |
| E1       | 3.700                     | 4.100 | 0.146                | 0.161 |
| e        | 1.270(BSC)                |       | 0.050(BSC)           |       |
| h        | 0.250                     | 0.500 | 0.010                | 0.020 |
| L        | 0.400                     | 1.000 | 0.016                | 0.039 |
| L1       | 1.050(BSC)                |       | 0.041(BSC)           |       |
| $\theta$ | 0°                        | 8°    | 0°                   | 8°    |

## SOP8 RECOMMENDED LAND PATTERN



unit : mm