

### Main Product Characteristics

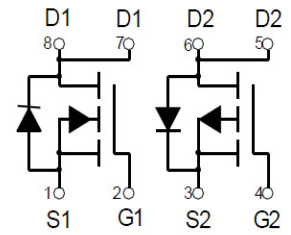
|                 |            |           |
|-----------------|------------|-----------|
| $V_{(BR)DSS}$   | -40V       | 40V       |
| $R_{DS(on)MAX}$ | 35mΩ@-10V  | 19mΩ@10V  |
|                 | 45mΩ@-4.5V | 29mΩ@4.5V |
| $I_D$           | -7A        | 8A        |



SOP-8



Marking and Pin Assignment



Schematic Diagram

### Features and Benefits

- Advanced MOSFET process technology
- Ideal for battery operated systems, load switching, power converters and other general purpose applications
- Low on-resistance with low gate charge
- Fast switching and reverse body recovery



### Description

The SSFQ4614 utilizes the latest techniques to achieve high cell density and low on-resistance. These features make this device extremely efficient and reliable for use in high efficiency switch mode power supply and a wide variety of other applications.

### Absolute Maximum Ratings ( $T_A=25^{\circ}C$ unless otherwise specified)

| Parameter  | Symbol          | Value       | Unit |
|--|-----------------|-------------|------|
| <b>N-Channel MOSFET</b>  |                 |             |      |
| Drain-Source Voltage   | $V_{DS}$        | 40          | V    |
| Gate-Source Voltage  | $V_{GS}$        | ±20         | V    |
| Continuous Drain Current <sup>1</sup>                            | $I_D$           | 8           | A    |
| Pulsed Drain Current (tp=10us)                                   | $I_{DM}$        | 32          | A    |
| Continuous Source-Drain Diode Current                            | $I_S$           | 8           | A    |
| <b>P-Channel MOSFET</b>  |                 |             |      |
| Drain-Source Voltage   | $V_{DS}$        | -40         | V    |
| Gate-Source Voltage  | $V_{GS}$        | ±20         | V    |
| Continuous Drain Current <sup>1</sup>                            | $I_D$           | -7          | A    |
| Pulsed Drain Current (tp=10us)                                   | $I_{DM}$        | -28         | A    |
| Continuous Source-Drain Diode Current                            | $I_S$           | -7          | A    |
| <b>Temperature and Thermal Resistance</b>                        |                 |             |      |
| Power Dissipation  | $P_D$           | 2           | W    |
| Thermal Resistance from Junction to Ambient <sup>1</sup>         | $R_{\theta JA}$ | 62.5        | °C/W |
| Junction Temperature   | $T_J$           | 150         | °C   |
| Storage Temperature  | $T_{STG}$       | -55 to +150 | °C   |
| Lead Temperature for Soldering Purposes(1/8" from case for 10 s) | $T_L$           | 260         | °C   |

### N-Channel Electrical Characteristics ( $T_A=25^\circ\text{C}$ unless otherwise specified)

| Parameter                                    | Symbol        | Test Condition   | Min | Typ | Max       | Unit       |
|--|---------------|--|-----|-----|-----------|------------|
| <b>Static Characteristics</b>                |               |  |     |     |           |            |
| Drain-Source Breakdown Voltage               | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 250\mu A$                                      | 40  | --- | ---       | V          |
| Zero Gate Voltage Drain Current              | $I_{DSS}$     | $V_{DS} = 40V, V_{GS} = 0V$  | --- | --- | 1         | $\mu A$    |
| Gate-Body Leakage Current                    | $I_{GSS}$     | $V_{GS} = \pm 20V, V_{DS} = 0V$                                    | --- | --- | $\pm 100$ | nA         |
| Gate Threshold Voltage <sup>2</sup>          | $V_{GS(th)}$  | $V_{DS} = V_{GS}, I_D = 250\mu A$                                  | 1   | 1.5 | 2         | V          |
| Drain-Source On-Resistance <sup>2</sup>      | $R_{DS(on)}$  | $V_{GS} = 10V, I_D = 8A$   | --- | 16  | 19        | m $\Omega$ |
|  |               | $V_{GS} = 4.5V, I_D = 4A$  | --- | 24  | 29        | m $\Omega$ |
| Forward Transconductance <sup>2</sup>        | $g_{FS}$      | $V_{DS} = 5V, I_D = 8A$  | --- | 10  | ---       | S          |
| Diode Forward Voltage                        | $V_{SD}$      | $I_S = 8A, V_{GS} = 0V$  | --- | --- | 1.2       | V          |
| <b>Dynamic Characteristics</b>               |               |  |     |     |           |            |
| Input Capacitance                            | $C_{iss}$     | $V_{DS} = 20V, V_{GS} = 0V, f = 1MHz$                              | --- | 415 | ---       | pF         |
| Output Capacitance                           | $C_{oss}$     |  | --- | 112 | ---       | pF         |
| Reverse Transfer Capacitance                 | $C_{rss}$     |  | --- | 11  | ---       | pF         |
| <b>Switching Characteristics<sup>3</sup></b> |               |  |     |     |           |            |
| Turn-On Delay Time                           | $t_{d(on)}$   | $V_{GEN} = 10V, V_{DD} = 20V,$<br>$R_G = 3\Omega, R_L = 2.5\Omega$ | --- | 4   | ---       | ns         |
| Turn-On Rise Time                            | $t_r$         |  | --- | 3   | ---       | ns         |
| Turn-Off Delay Time                          | $t_{d(off)}$  |  | --- | 15  | ---       | ns         |
| Turn-Off Fall Time                           | $t_f$         |  | --- | 2   | ---       | ns         |
| Total Gate Charge                            | $Q_g$         | $V_{DS} = 20V, I_D = 8A,$<br>$V_{GS} = 10V$                        | --- | 12  | ---       | nC         |
| Gate-Source Charge                           | $Q_{gs}$      |  | --- | 3.2 | ---       | nC         |
| Gate-Drain Charge                            | $Q_{gd}$      |  | --- | 3.1 | ---       | nC         |

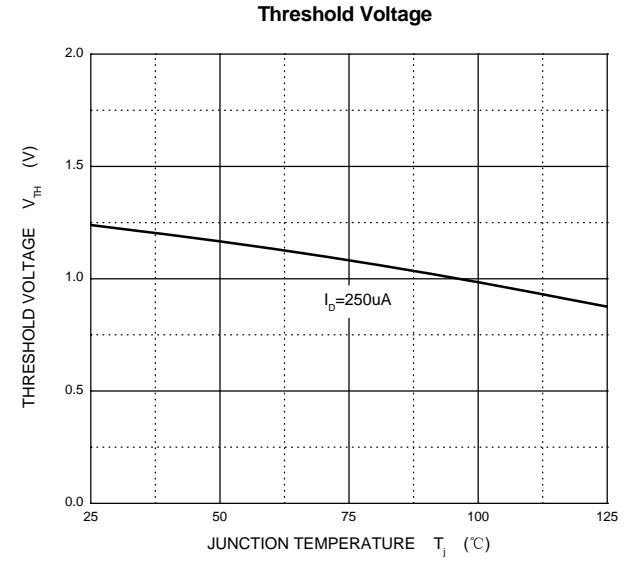
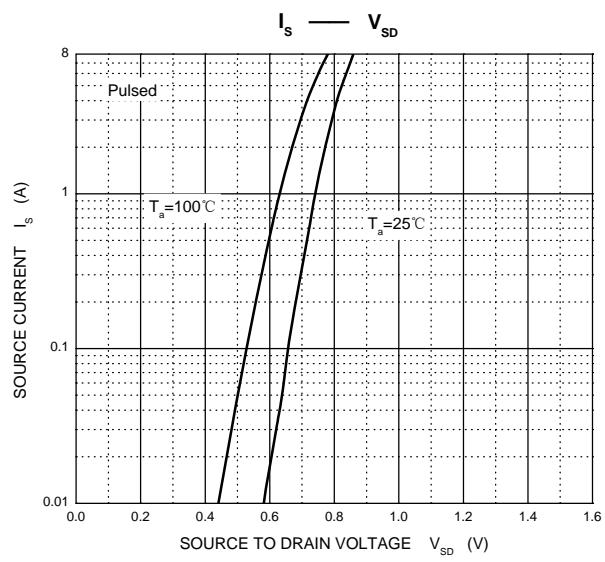
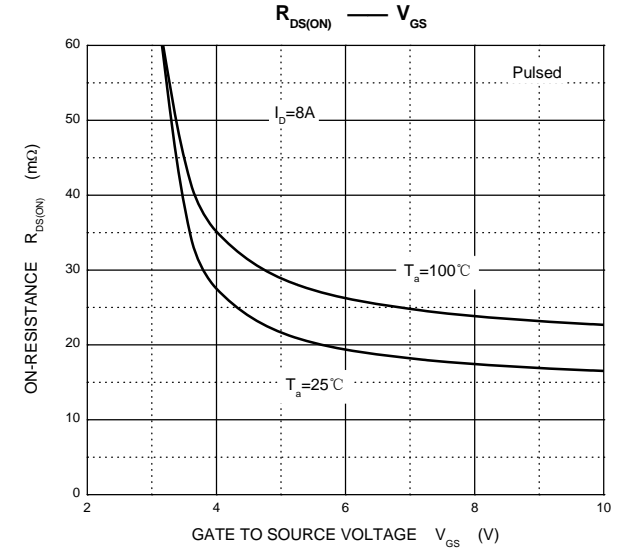
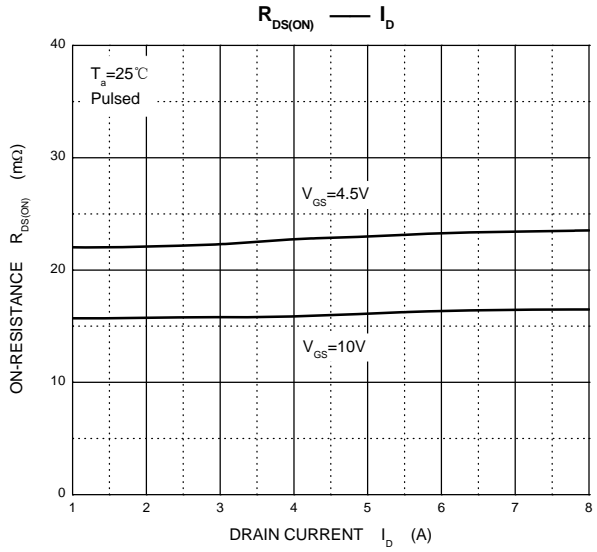
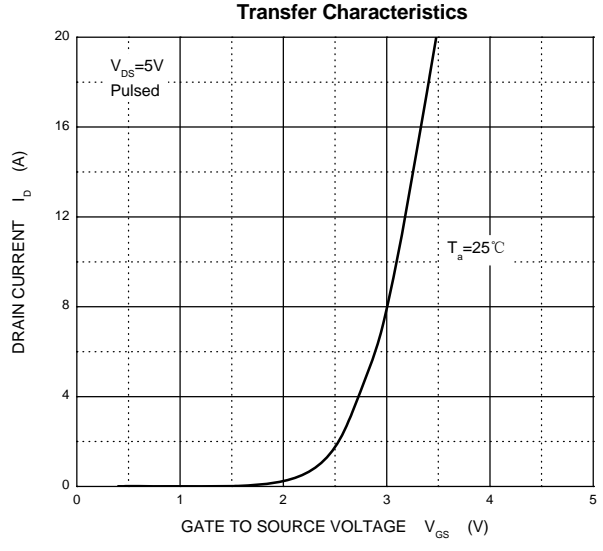
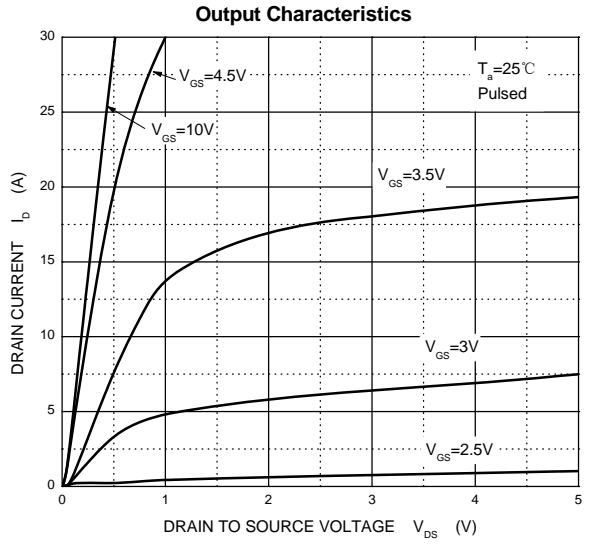
### P-Channel Electrical Characteristics ( $T_A=25^\circ\text{C}$ unless otherwise specified)

| Parameter                                    | Symbol        | Test Condition  | Min | Typ  | Max       | Unit       |
|--|---------------|---|-----|------|-----------|------------|
| <b>Static Characteristics</b>                |               |   |     |      |           |            |
| Drain-Source Breakdown Voltage               | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = -250\mu A$  | -40 | ---  | ---       | V          |
| Zero Gate Voltage Drain Current              | $I_{DSS}$     | $V_{DS} = -40V, V_{GS} = 0V$  | --- | ---  | -1        | $\mu$      |
| Gate-Body Leakage Current                    | $I_{GSS}$     | $V_{GS} = \pm 20V, V_{DS} = 0V$   | --- | ---  | $\pm 100$ | nA         |
| Gate Threshold Voltage <sup>2</sup>          | $V_{GS(th)}$  | $V_{DS} = V_{GS}, I_D = -250\mu A$  | -1  | -1.5 | -2        | V          |
| Drain-Source On-Resistance <sup>2</sup>      | $R_{DS(on)}$  | $V_{GS} = -10V, I_D = -8A$  | --- | 30   | 35        | m $\Omega$ |
|  |               | $V_{GS} = -4.5V, I_D = -4A$   | --- | 40   | 45        | m $\Omega$ |
| Forward Transconductance <sup>2</sup>        | $g_{FS}$      | $V_{DS} = -5V, I_D = -8A$   | --- | 16   | ---       | S          |
| Diode Forward Voltage                        | $V_{SD}$      | $I_S = -10A, V_{GS} = 0V$   | --- | ---  | -1.2      | V          |
| <b>Dynamic Characteristics</b>               |               |   |     |      |           |            |
| Input Capacitance                            | $C_{iss}$     | $V_{DS} = -20V, V_{GS} = 0V, f = 1MHz$                                    | --- | 520  | ---       | pF         |
| Output Capacitance                           | $C_{oss}$     |   | --- | 100  | ---       | pF         |
| Reverse Transfer Capacitance                 | $C_{rss}$     |   | --- | 65   | ---       | pF         |
| <b>Switching Characteristics<sup>3</sup></b> |               |   |     |      |           |            |
| Turn-On Delay Time                           | $t_{d(on)}$   | $V_{GEN} = -10V, V_{DD} = -20V,$<br>$R_G = 6\Omega,$<br>$R_L = 2.3\Omega$ | --- | 7.5  | ---       | ns         |
| Turn-On Rise Time                            | $t_r$         |   | --- | 5.5  | ---       | ns         |
| Turn-Off Delay Time                          | $t_{d(off)}$  |   | --- | 19   | ---       | ns         |
| Turn-Off Fall Time                           | $t_f$         |   | --- | 7    | ---       | ns         |
| Total Gate Charge                            | $Q_g$         | $V_{DS} = -20V, I_D = -8A,$<br>$V_{GS} = -10V$                            | --- | 13   | ---       | nC         |
| Gate-Source Charge                           | $Q_{gs}$      |   | --- | 3.8  | ---       | nC         |
| Gate-Drain Charge                            | $Q_{gd}$      |   | --- | 3.1  | ---       | nC         |

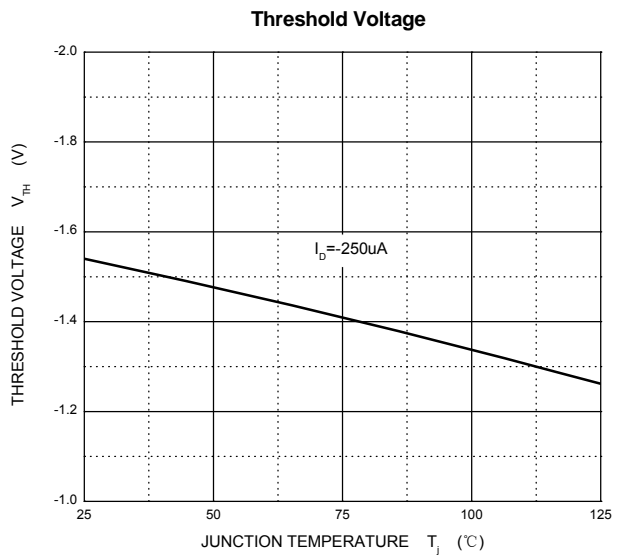
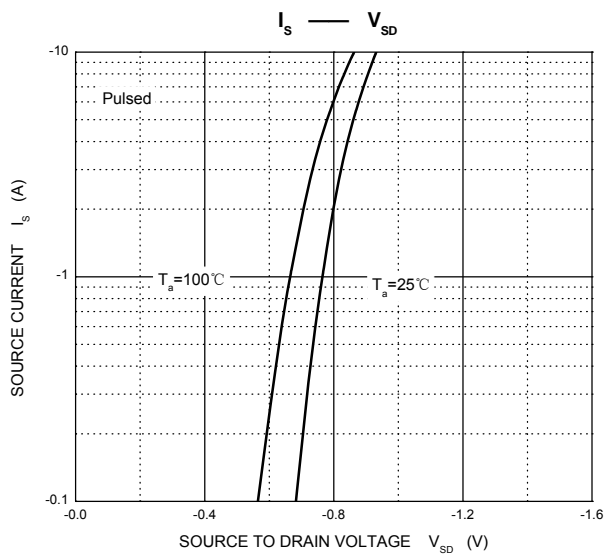
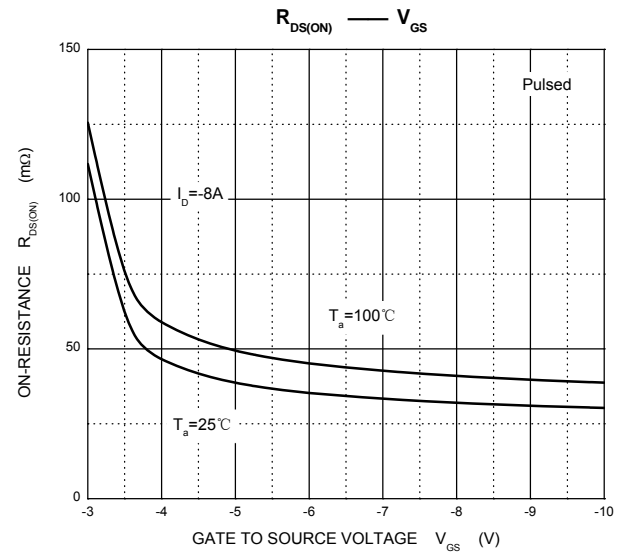
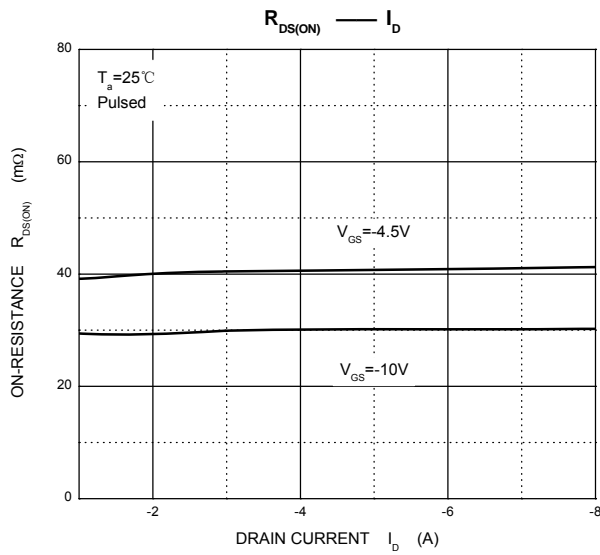
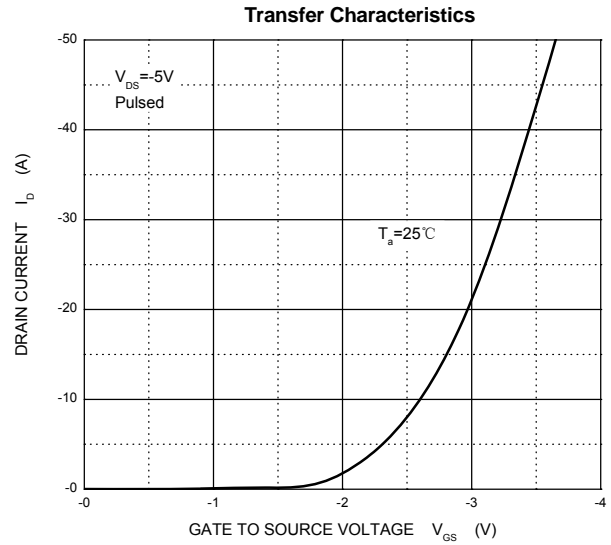
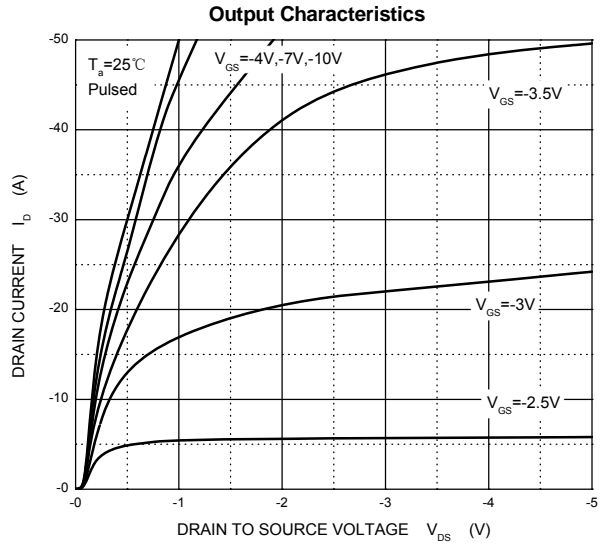
**Notes :**

1. Surface mounted on FR4 board using the minimum recommended pad size.
2. Pulse Test : Pulse width=300 $\mu$ s, duty cycle $\leq$ 2%.
3. Switching characteristics are independent of operating junction temperature.

### N-Channel Typical Electrical and Thermal Characteristic Curves

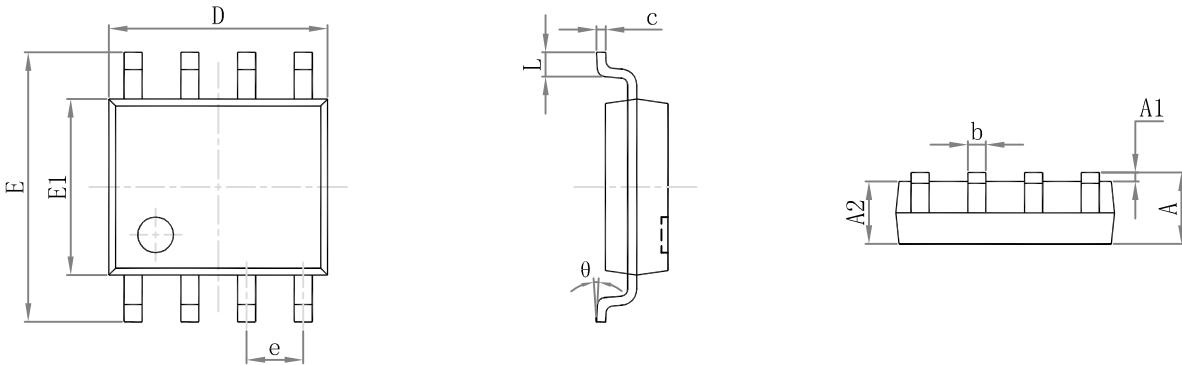


### P-Channel Typical Electrical and Thermal Characteristic Curves



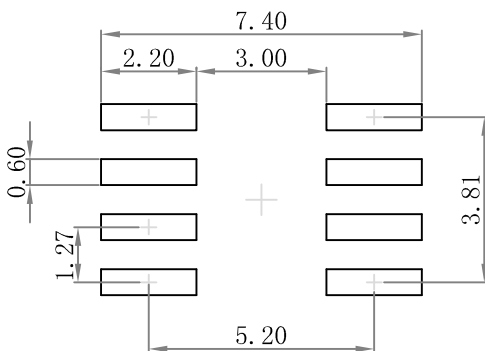
### Package Outline Dimensions

### SOP-8



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 1.350                     | 1.750 | 0.053                | 0.069 |
| A1     | 0.100                     | 0.250 | 0.004                | 0.010 |
| A2     | 1.350                     | 1.550 | 0.053                | 0.061 |
| b      | 0.330                     | 0.510 | 0.013                | 0.020 |
| c      | 0.170                     | 0.250 | 0.007                | 0.010 |
| D      | 4.800                     | 5.000 | 0.189                | 0.197 |
| e      | 1.270 (BSC)               |       | 0.050 (BSC)          |       |
| E      | 5.800                     | 6.200 | 0.228                | 0.244 |
| E1     | 3.800                     | 4.000 | 0.150                | 0.157 |
| L      | 0.400                     | 1.270 | 0.016                | 0.050 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |

### Suggested Pad Layout



**Note:**

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.