

General Description

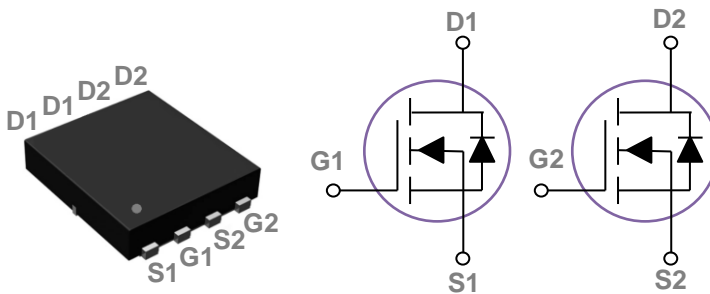
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

| | | |
|-------|-------|-----|
| BVDSS | RDSON | ID |
| 100V | 18mΩ | 35A |

Features

- 100V,35A, $R_{DS(ON)} = 18m\Omega @ V_{GS} = 10V$
- Improved dv/dt capability
- Fast switching
- Green Device Available

PPAK5x6 Dual Pin Configuration



Applications

- Networking
- Load Switch
- LED applications

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

| Symbol | Parameter | Rating | Units |
|-----------|--|------------|---------------------|
| V_{DS} | Drain-Source Voltage | 100 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | V |
| I_D | Drain Current – Continuous ($T_c=25^\circ\text{C}$) | 35 | A |
| | Drain Current – Continuous ($T_c=100^\circ\text{C}$) | 22 | A |
| I_{DM} | Drain Current – Pulsed ¹ | 140 | A |
| EAS | Single Pulse Avalanche Energy ² | 72 | mJ |
| IAS | Single Pulse Avalanche Current ² | 38 | A |
| P_D | Power Dissipation ($T_c=25^\circ\text{C}$) | 56 | W |
| | Power Dissipation – Derate above 25°C | 0.44 | 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 | $^\circ\text{C}/\text{W}$ |
| $R_{\theta JC}$ | Thermal Resistance Junction to Case | --- | 2.25 | $^\circ\text{C}/\text{W}$ |

Electrical Characteristics ($T_J=25\text{ }^\circ\text{C}$, unless otherwise noted)
Off Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|------------|--------------------------------|---|------|------|-----------|---------|
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=250\mu A$ | 100 | --- | --- | V |
| I_{DSS} | Drain-Source Leakage Current | $V_{DS}=80V, V_{GS}=0V, T_J=25^\circ C$ | --- | --- | 1 | μA |
| | | $V_{DS}=80V, V_{GS}=0V, T_J=85^\circ C$ | --- | --- | 10 | μA |
| I_{GSS} | Gate-Source Leakage Current | $V_{GS}=\pm 20V, V_{DS}=0V$ | --- | --- | ± 100 | nA |

On Characteristics

| | | | | | | |
|--------------|-----------------------------------|-------------------------------|-----|-----|-----|------------|
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS}=10V, I_D=12A$ | --- | 15 | 18 | m Ω |
| | | $V_{GS}=4.5V, I_D=8A$ | --- | 19 | 25 | m Ω |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}=V_{DS}, I_D=250\mu A$ | 1.2 | 1.6 | 2.5 | V |

Dynamic and switching Characteristics³

| | | | | | | |
|--------------|------------------------------|--|-----|------|------|----------|
| Q_g | Total Gate Charge | $V_{DS}=50V, V_{GS}=10V, I_D=20A$ | --- | 14.5 | 22 | nC |
| Q_{gs} | Gate-Source Charge | | --- | 1.5 | 3 | |
| Q_{gd} | Gate-Drain Charge | | --- | 4.8 | 7.5 | |
| $T_{d(on)}$ | Turn-On Delay Time | $V_{DD}=50V, V_{GS}=10V, R_G=6\Omega, I_D=20A$ | --- | 4.8 | 7.2 | ns |
| T_r | Rise Time | | --- | 12.5 | 19 | |
| $T_{d(off)}$ | Turn-Off Delay Time | | --- | 27.6 | 42 | |
| T_f | Fall Time | | --- | 8.2 | 13 | |
| C_{iss} | Input Capacitance | $V_{DS}=50V, V_{GS}=0V, F=1MHz$ | --- | 850 | 1300 | pF |
| C_{oss} | Output Capacitance | | --- | 190 | 285 | |
| C_{rss} | Reverse Transfer Capacitance | | --- | 6.5 | 10 | |
| R_g | Gate resistance | $V_{GS}=0V, V_{DS}=0V, F=1MHz$ | --- | 0.9 | --- | Ω |

Guaranteed Avalanche Energy

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|--------|-------------------------------|-----------------------------------|------|------|------|------|
| EAS | Single Pulse Avalanche Energy | $V_{DD}=50V, L=0.1mH, I_{AS}=18A$ | 16 | --- | --- | mJ |

Drain-Source Diode Characteristics and Maximum Ratings

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|----------|---------------------------|-------------------------------------|------|------|------|------|
| I_S | Continuous Source Current | $V_G=V_D=0V, \text{Force Current}$ | --- | --- | 35 | A |
| I_{SM} | Pulsed Source Current | | --- | --- | 70 | A |
| V_{SD} | Diode Forward Voltage | $V_{GS}=0V, I_S=1A, T_J=25^\circ C$ | --- | --- | 1 | V |
| t_{rr} | Reverse Recovery Time | $V_R=100V, I_S=10A$ | --- | 140 | --- | ns |
| Q_{rr} | Reverse Recovery Charge | $di/dt=100A/\mu s, T_J=25^\circ C$ | --- | 180 | --- | nC |

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD}=50V, V_{GS}=10V, L=0.1mH, I_{AS}=38A, R_G=25\Omega, \text{Starting } T_J=25^\circ C$.
3. Essentially independent of operating temperature.

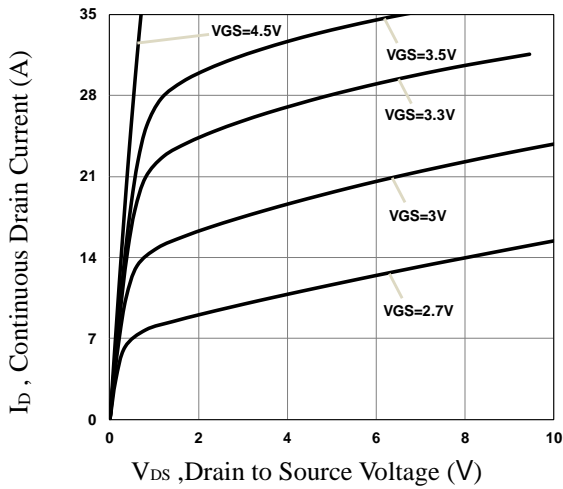


Fig.1 Typical Output Characteristics

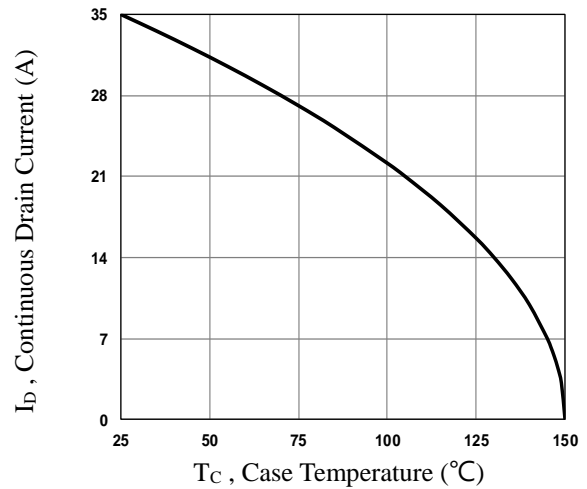


Fig.2 Continuous Drain Current vs. T_c

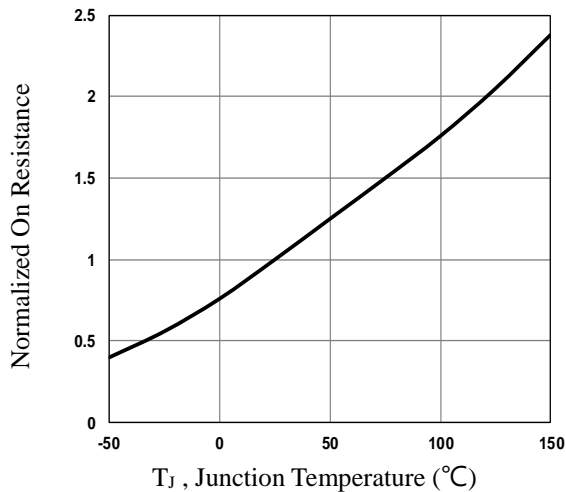


Fig.3 Normalized $R_{DS(on)}$ vs. T_J

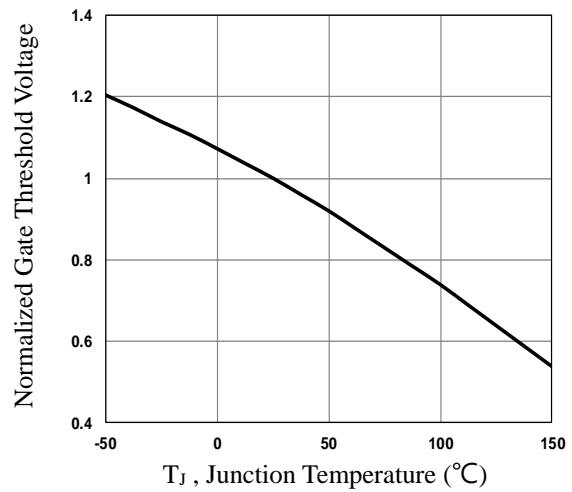


Fig.4 Normalized V_{th} vs. T_J

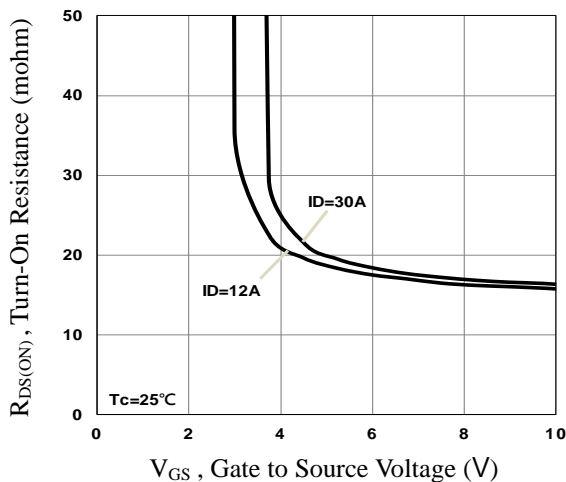


Fig.5 Turn-On Resistance vs. V_{GS}

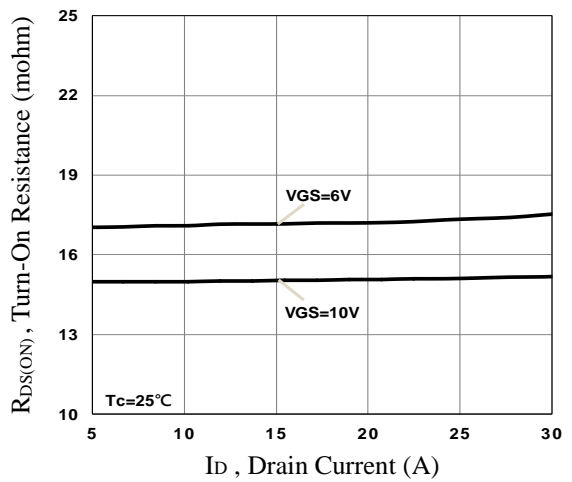


Fig.6 Turn-On Resistance vs. I_D

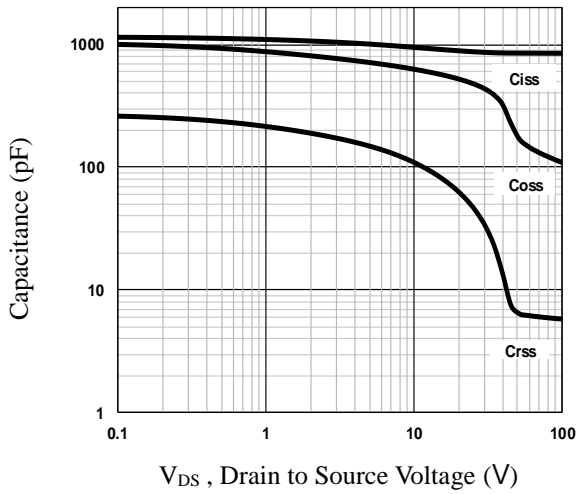


Fig.7 Capacitance Characteristics

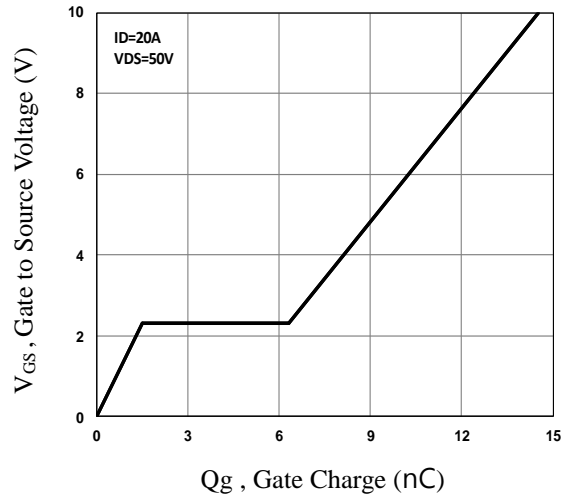


Fig.8 Gate Charge Characteristics

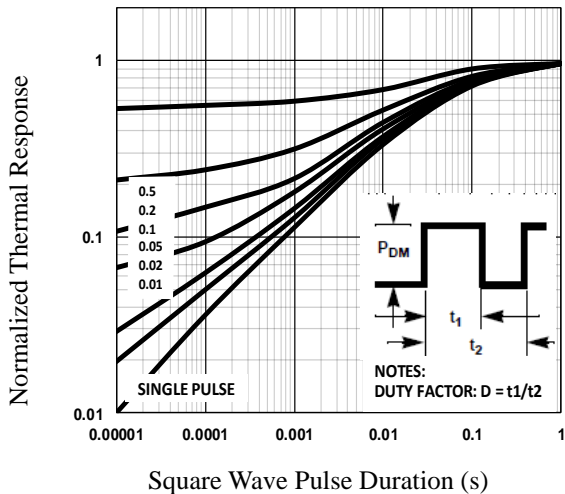


Fig.9 Normalized Transient Impedance

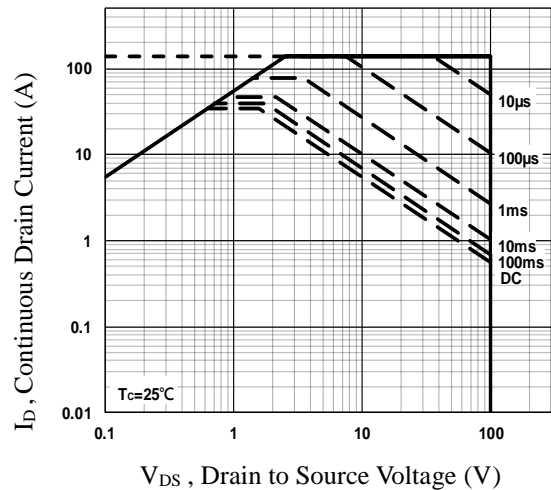


Fig.10 Maximum Safe Operation Area

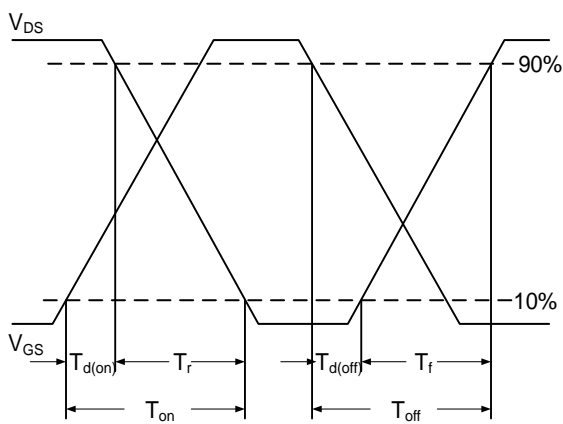


Fig.11 Switching Time Waveform

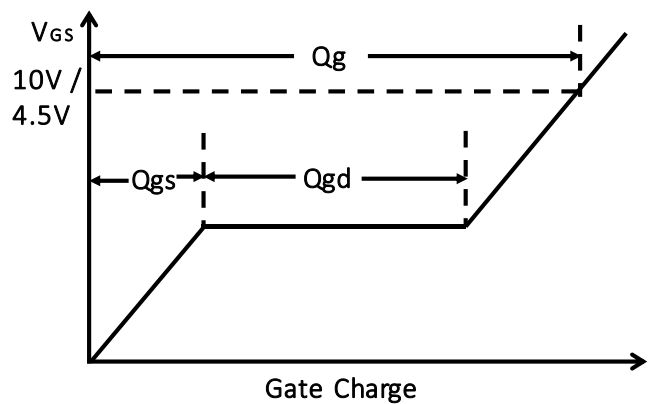
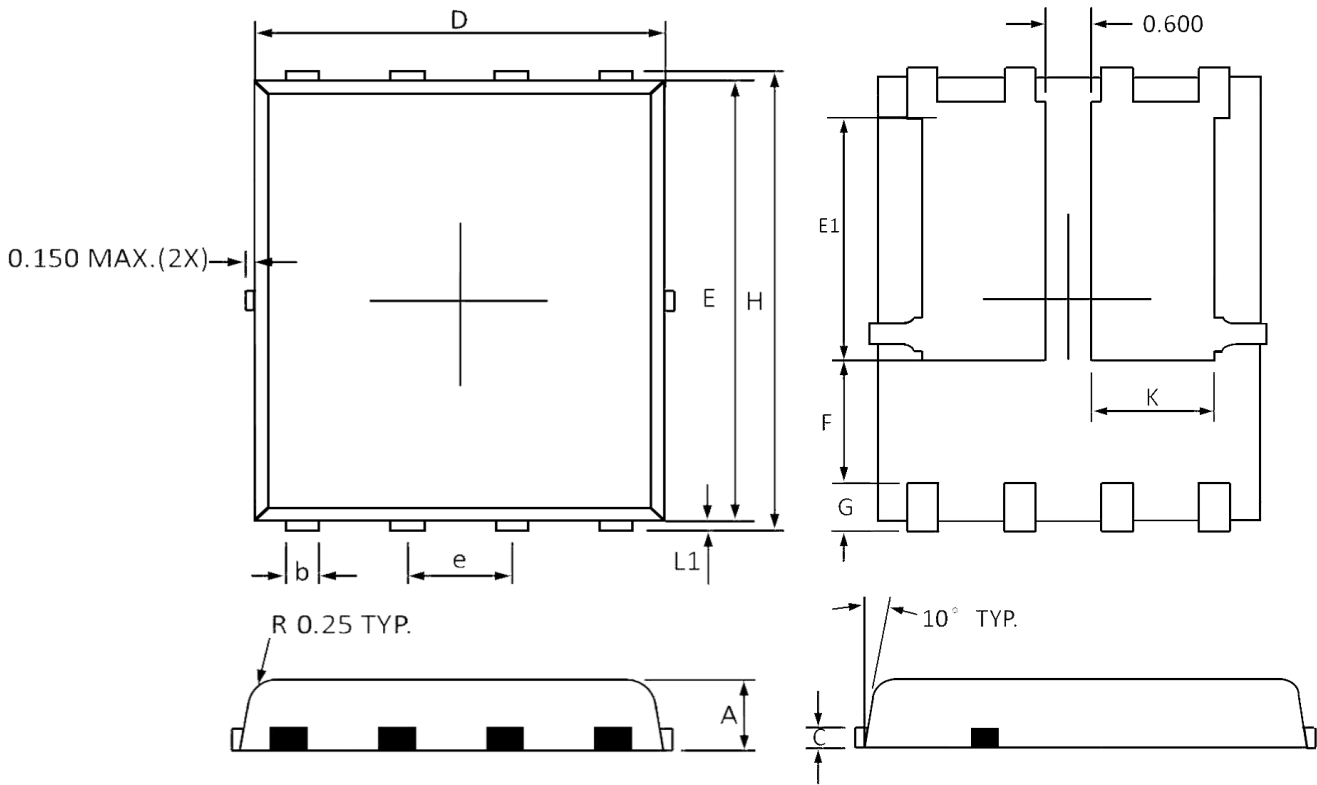


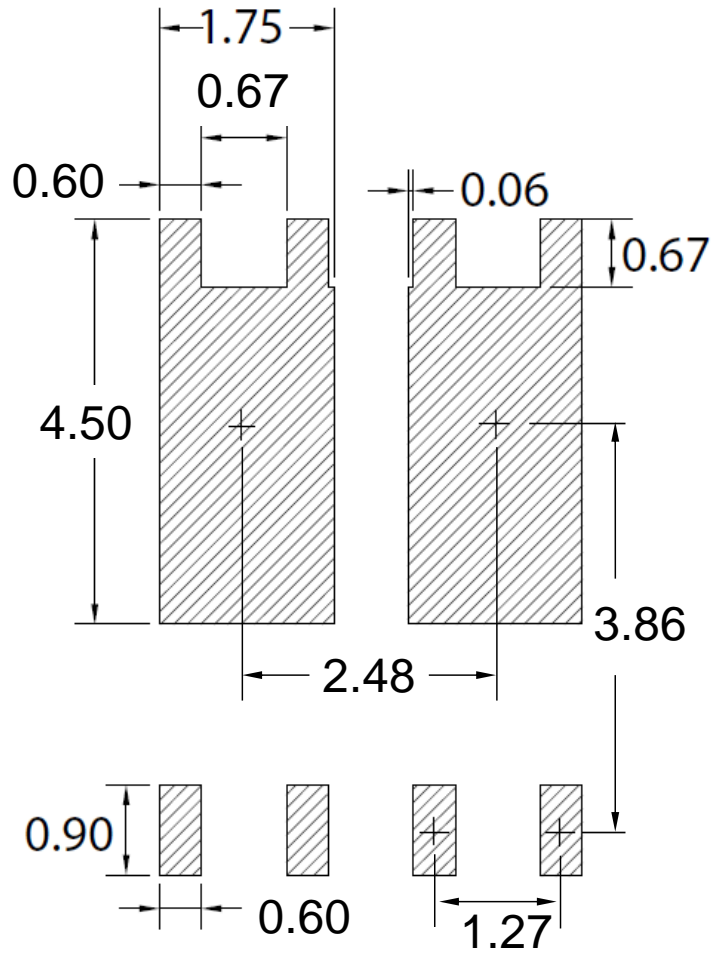
Fig.12 Gate Charge Waveform

PPAK5x6 Dual PACKAGE INFORMATION



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 0.800 | 1.200 | 0.031 | 0.047 |
| b | 0.300 | 0.510 | 0.012 | 0.020 |
| C | 0.250 Ref | | 0.010 Ref | |
| D | 4.800 | 5.400 | 0.189 | 0.213 |
| E | 5.450 | 5.960 | 0.215 | 0.235 |
| E1 | 3.200 | 3.800 | 0.126 | 0.150 |
| e | 1.27 BSC | | 0.050 BSC | |
| F | 1.000 | 1.900 | 0.039 | 0.075 |
| G | 0.380 | 0.800 | 0.015 | 0.031 |
| H | 5.850 | 6.300 | 0.230 | 0.248 |
| L1 | 0.050 | 0.250 | 0.002 | 0.010 |
| K | 1.500 | 1.900 | 0.059 | 0.074 |

PPAK5X6 Dual RECOMMENDED LAND PATTERN



unit : mm