# PTD12HN06

**60V/120A N-Channel Advanced Power MOSFET**

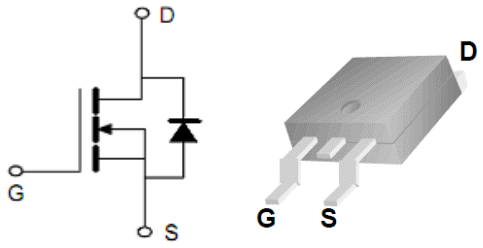
### Features

- Improved dv/dt Capability, High Ruggedness.
- Maximum Junction Temperature Range (150°C)
- 100% Avalanche Tested

| | | |
|---|---|---|
| BVDSS | 60 | V |
| ID | 120 | A |
| RDSON@VGS=10V | 4.3 | mΩ |

### Applications

- Power factor correction（PFC）
- Switched mode power supplies(SMPS)
- Uninterruptible Power Supply（UPS）




**TO-252**

### Order Information

| Product | Package | Marking | Reel Size | Reel | Carton |
|---|---|---|---|---|---|
| PTD12HN06 | TO-252 | PTD12HN06 | 13inch | 2500PCS | 50000PCS |

### Absolute Maximum Ratings

| Symbol | Parameter | | Rating | Unit |
|---|---|---|---|---|
| **Common Ratings (TC=25°C Unless Otherwise Noted)** | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | | 60 | V |
| $V_{GS}$ | Gate-Source Voltage | | ±25 | V |
| $T_J$ | Maximum Junction Temperature | | 150 | °C |
| $T_{STG}$ | Storage Temperature Range | | -55 to 150 | °C |
| $I_S$ | Diode Continuous Forward Current | TC =25°C | 120 | A |
| **Mounted on Large Heat Sink** | | | | |
| $E_{AS}$ | Single Pulse Avalanche Energy (Note1) | | 420 | mJ |
| $I_{DM}$ | Pulse Drain Current Tested (Sillicon Limit) (Note2) | TC =25°C | 480 | A |
| $I_D$ | Continuous Drain current | TC =25°C | 120 | A |
| $P_D$ | Maximum Power Dissipation | TC =25°C | 150 | W |
| $R_{\theta Jc}$ | Thermal Resistance Junction−to−Case (Note3) | | 0.83 | °C/W |
| $R_{\theta JA}$ | Thermal Resistance Junction−to−Ambient (Note3) | | 62.5 | °C/W |

**60V/120A N-Channel Advanced Power MOSFET**

| Symbol | Parameter | Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Static Electrical Characteristics @ TJ = 25°C (unless otherwise stated)** | | | | | | |
| $V_{(BR)DSS}$ | Drain- Source Breakdown Voltage | VGS=0V ID=250μA | 60 | -- | -- | V |
| $I_{DSS}$ | Zero Gate Voltage Drain current | VDS=60V,VGS=0V | -- | -- | 1 | μA |
| $I_{GSS}$ | Gate-Body Leakage Current | VGS=±25V,VDS=0V | -- | -- | ±100 | nA |
| $V_{GS(TH)}$ | Gate Threshold Voltage | VDS=VGS,ID=250μA | 2 | 3 | 4 | V |
| $R_{DS(ON)}$ | Drain-Source On-State Resistance (Note4) | VGS=10V, ID=60A | -- | 4.3 | 5.6 | mΩ |
| **Dynamic Electrical Characteristics @ $T_J$ = 25°C (unless otherwise stated)** (Note5) | | | | | | |
| $C_{iss}$ | Input Capacitance | VDS=30V, VGS=0V, F=1MHz | -- | 3130 | -- | pF |
| $C_{oss}$ | Output Capacitance | | -- | 521 | -- | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | -- | 304 | -- | pF |
| $Q_g$ | Total Gate Charge | VDS=48V, ID=60A, VGS=10V | -- | 76 | -- | nC |
| $Q_{gs}$ | Gate-Source Charge | | -- | 18 | -- | nC |
| $Q_{gd}$ | Gate-Drain Charge | | -- | 31 | -- | nC |
| **Switching Characteristics** (Note5) | | | | | | |
| $t_{d(on)}$ | Turn-on Delay Time | VDD=30V, ID=60A, VGS=10V, RG=5Ω | -- | 21 | -- | nS |
| $t_r$ | Turn-on Rise Time | | -- | 56 | -- | nS |
| $t_{d(off)}$ | Turn-off Delay Time | | -- | 53 | -- | nS |
| $t_f$ | Turn-off Fall Time | | -- | 27 | -- | nS |
| **Source- Drain Diode Characteristics@ TJ = 25°C (unless otherwise stated)** | | | | | | |
| $V_{SD}$ | Forward on voltage | IS=60A,VGS=0V | -- | 0.8 | 1.3 | V |

Note:

1. Limited by TJmax, starting TJ = 25° C, RG = 25Ω, VD =30V, VGS =10V. Part not recommended for use above this value.
2. Repetitive Rating: Pulse width limited by maximum junction temperature.
3. Surface Mounted on FR4 Board, t ≤ 10 sec.
4. Pulse Test: pulse width ≤ 300 us, duty cycle ≤ 2%.
5. Guranteed by design, not subject to production testing.

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## Typical Characteristics

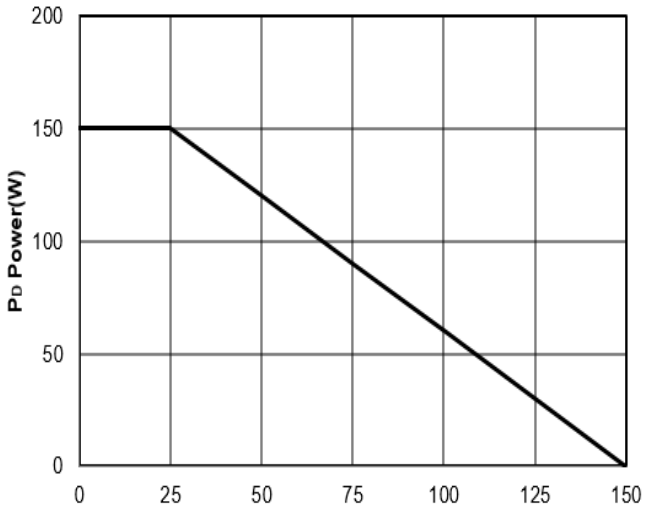


Figure1：$T_J$ Junction Temperature（°C）

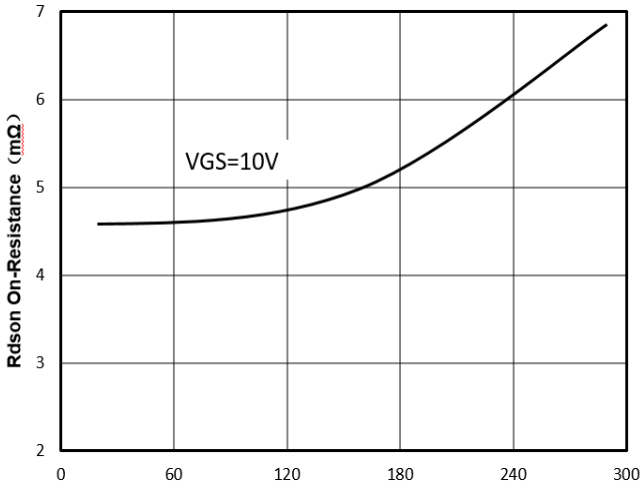


Figure2：$I_D$ Drain Current（A）

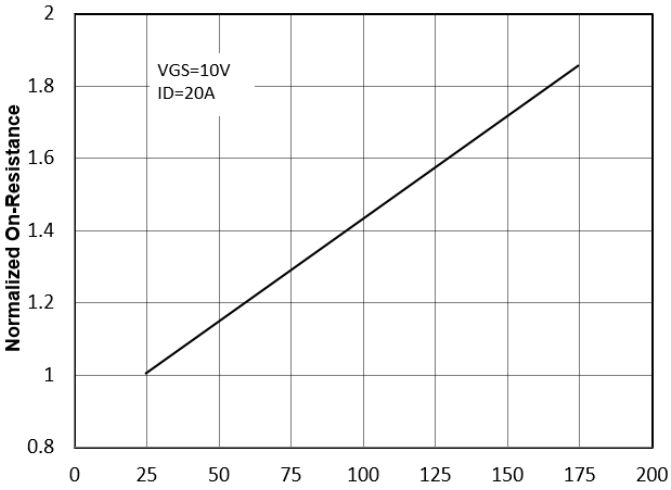


Figure3：$T_J$ Junction Temperature（°C）

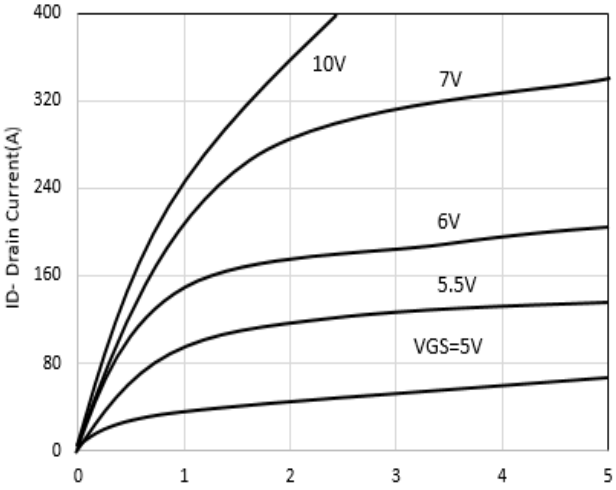


Figure4：$V_{DS}$ Drain-Source Voltage（A）

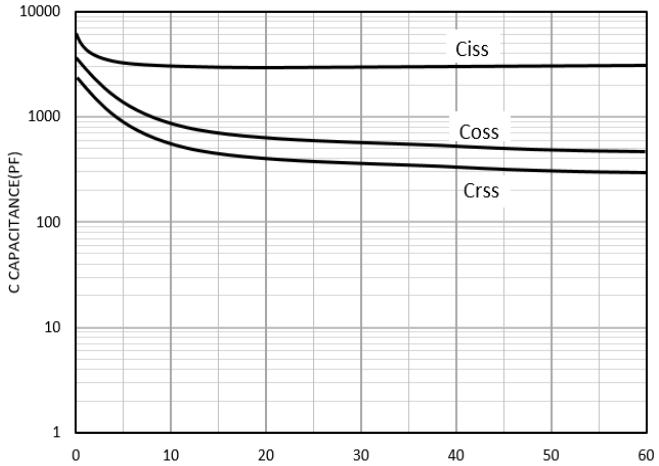


Figure5：$V_{DS}$ Drain-Source Voltage（V）

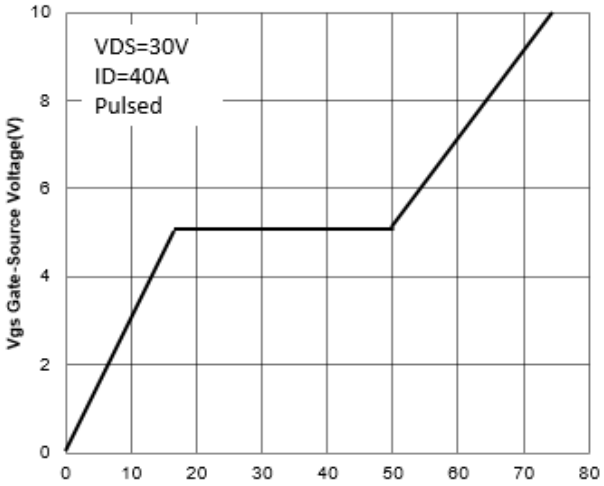


Figure6：Qg Gate Charge（nC）

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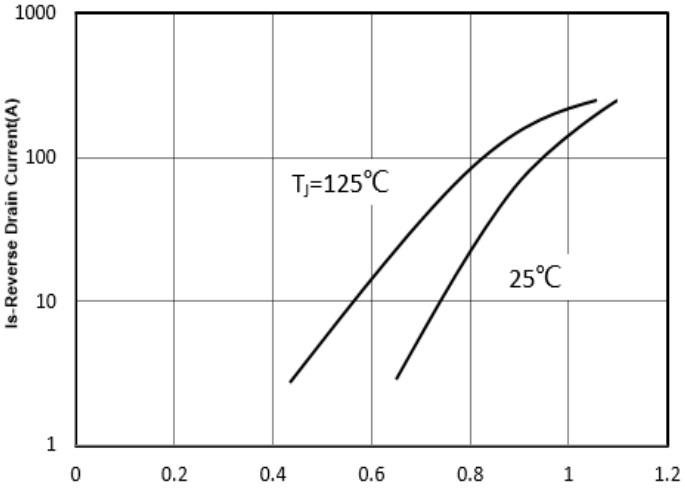


**Figure7：Vsd Source-Drain Voltage（V）**

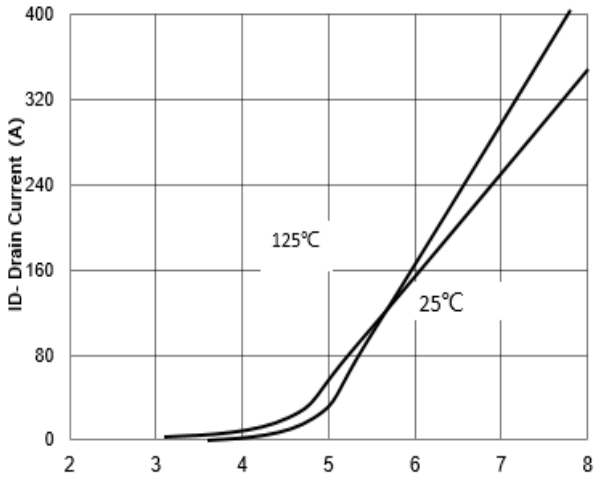


**Figure8：Vgs Gate-Source Voltage（V）**

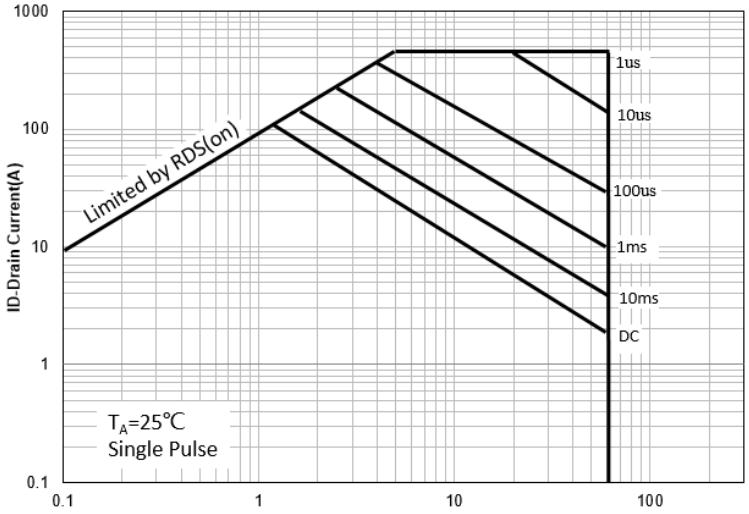


**Figure9：Vds Drain -Source Voltage（V）**

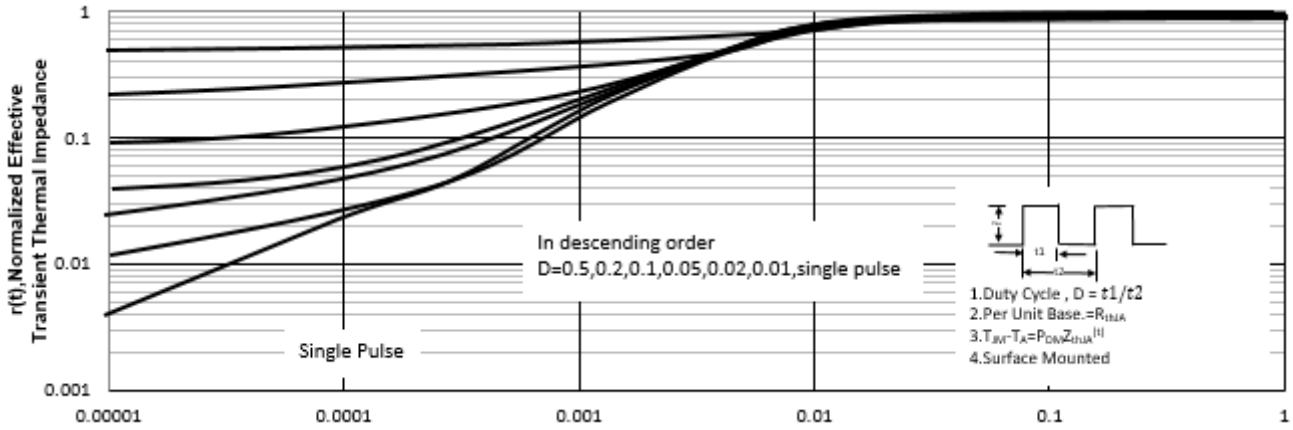


**Figure10：Square Wave Pulse Duration（sec）**

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**Test Circuit and Waveform:**

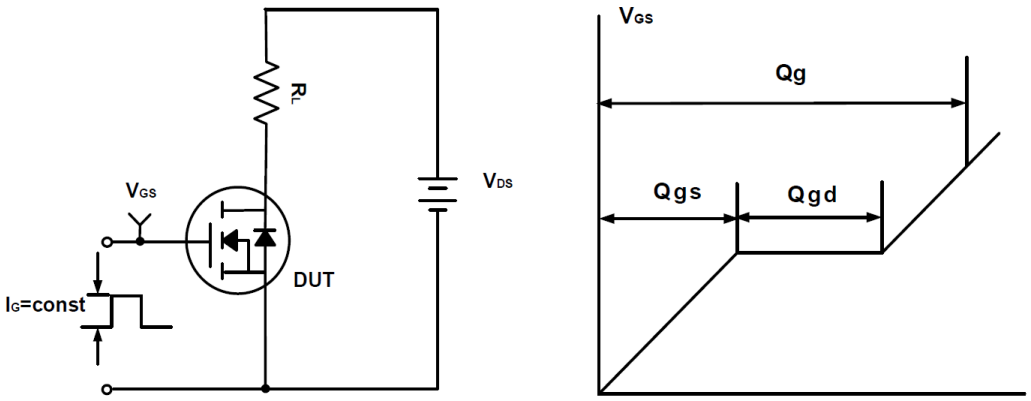


**Figure A Gate Charge Test Circuit &Waveforms**

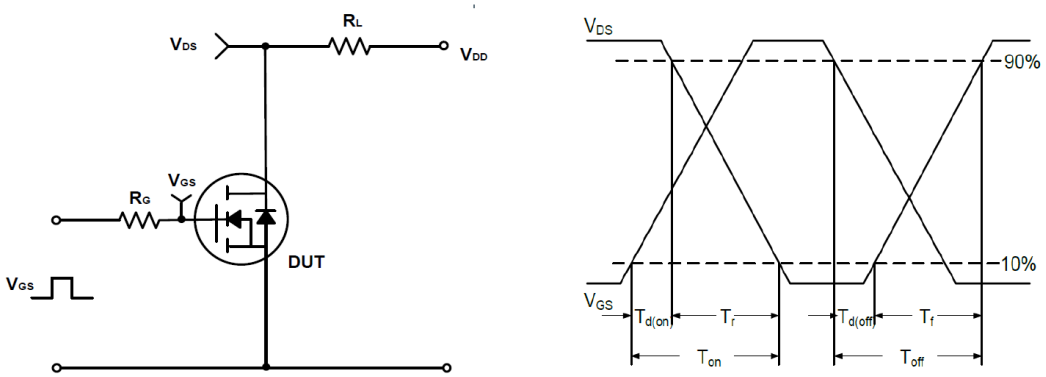


**Figure B Switching Test Circuit & Waveforms**

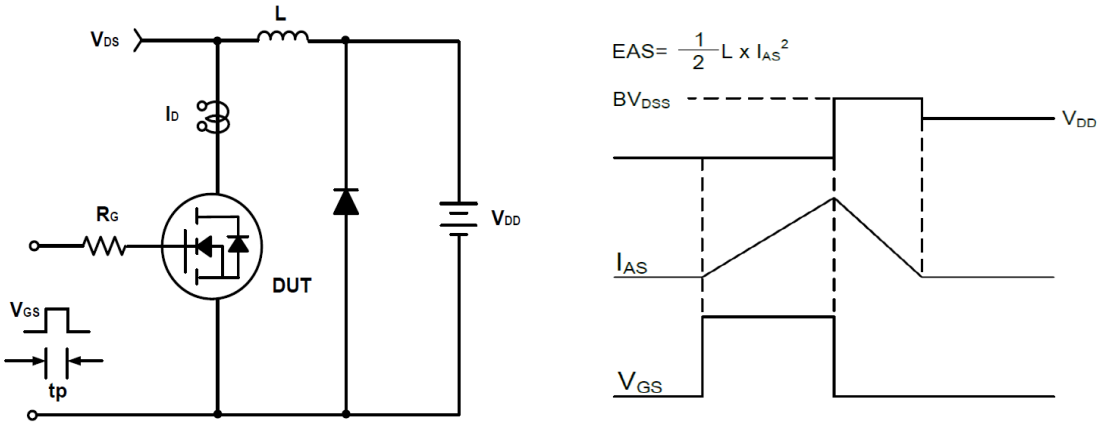


**Figure C Unclamped Inductive Switching Circuit & Waveforms**

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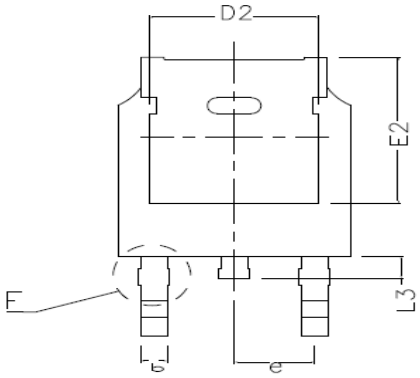
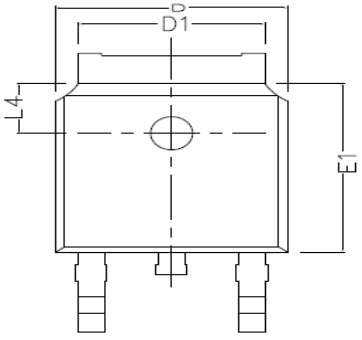
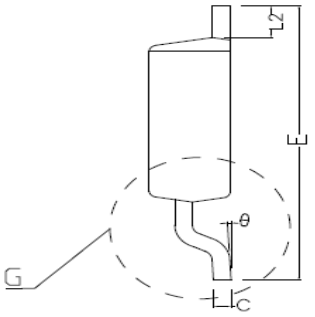
**TO-252 Package Outline Dimensions (Units: mm)**



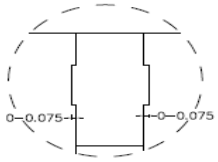
BOTTOM VIEW



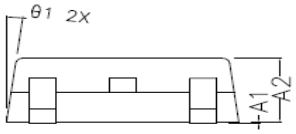
TOP VIEW



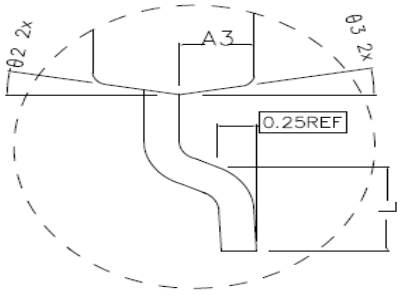
SIDE VIEW



DETAIL F



SIDE VIEW



DETAIL G

| COMMON DIMENSIONS (UNITS OF MEASURE IS mm) | | | |
|---|---|---|---|
| | MIN | NORMAL | MAX |
| A1 | 0.000 | 0.100 | 0.150 |
| A2 | 2.200 | 2.300 | 2.400 |
| A3 | 1.020 | 1.070 | 1.120 |
| b | 0.710 | 0.760 | 0.810 |
| c | 0.460 | 0.508 | 0.550 |
| D | 6.500 | 6.600 | 6.700 |
| D1 | 5.330REF | | |
| D2 | 4.830REF | | |
| E | 9.900 | 10.100 | 10.300 |
| E1 | 6.000 | 6.100 | 6.200 |
| E2 | 5.600REF | | |
| e | 2.286TYPE | | |
| L | 1.400 | 1.550 | 1.700 |
| L2 | 1.10REF | | |
| L3 | 0.80REF | | |
| L4 | 1.80REF | | |
| θ | 0~8° | | |
| θ1 | 7° TYPE | | |
| θ2 | 10° TYPE | | |
| θ3 | 10° TYPE | | |