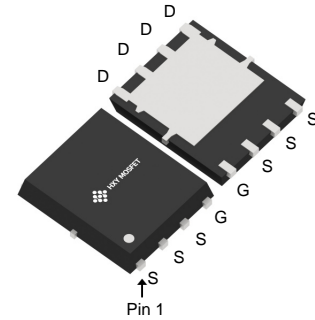




Description

The RS1G120MNTB uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.



DFN5X6-8L

General Features

$V_{DS} = 40V$ $I_D = 40A$

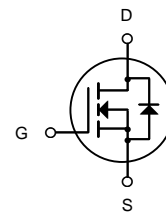
$R_{DS(ON)} < 14m\Omega$ $V_{GS}=10V$

Application

Battery protection

Load switch

Uninterruptible power supply



N-Channel MOSFET

Ordering Information

| Product ID | Pack | Brand | Qty(PCS) |
|-------------|-----------|------------|----------|
| RS1G120MNTB | DFN5X6-8L | HXY MOSFET | 5000 |

Absolute Maximum Ratings ($T_c=25^\circ C$ unless otherwise noted)

| Symbol | Parameter | Rating | Units |
|-----------------------|--|------------|------------|
| V_{DS} | Drain-Source Voltage | 40 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | V |
| $I_D@T_c=25^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 40 | A |
| $I_D@T_c=100^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 28 | A |
| I_{DM} | Pulsed Drain Current ² | 160 | A |
| EAS | Single Pulse Avalanche Energy ³ | 50 | mJ |
| T_{STG} | Storage Temperature Range | -55 to 175 | $^\circ C$ |
| T_J | Operating Junction Temperature Range | -55 to 175 | $^\circ C$ |



Electrical Characteristics (T_c=25°C unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---------------------|---|-----|------|------|------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} =0V, I _D =250μA | 40 | - | - | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =40V, V _{GS} =0V | - | - | 1 | μA |
| Gate-Body Leakage Current | I _{GSS} | V _{GS} =±20V, V _{DS} =0V | - | - | ±100 | nA |
| On Characteristics (Note 3) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =250μA | 1 | 1.6 | 2.5 | V |
| Drain-Source On-State Resistance | R _{DS(ON)} | V _{GS} =10V, I _D =30A | - | 11 | 14 | mΩ |
| Forward Transconductance | g _{FS} | V _{DS} =5V, I _D =20A | 30 | - | - | S |
| Dynamic Characteristics (Note4) | | | | | | |
| Input Capacitance | C _{iss} | V _{DS} =25V, V _{GS} =0V, F=1.0MHz | - | 1540 | - | PF |
| Output Capacitance | C _{oss} | | - | 171 | - | PF |
| Reverse Transfer Capacitance | C _{rss} | | - | 115 | - | PF |
| Switching Characteristics (Note 4) | | | | | | |
| Turn-on Delay Time | t _{d(on)} | V _{DD} =20V, I _D =20A, R _L =1Ω V _{GS} =10V, R _{GEN} =3Ω | - | 5.0 | - | nS |
| Turn-on Rise Time | t _r | | - | 24 | - | nS |
| Turn-Off Delay Time | t _{d(off)} | | - | 38 | - | nS |
| Turn-Off Fall Time | t _f | | - | 12 | - | nS |
| Total Gate Charge | Q _g | V _{DS} =30V, I _D =30A, V _{GS} =10V | - | 24 | - | nC |
| Gate-Source Charge | Q _{gs} | | - | 5.9 | - | nC |
| Gate-Drain Charge | Q _{gd} | | - | 3.6 | - | nC |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage (Note 3) | V _{SD} | V _{GS} =0V, I _S =30A | - | - | 1.2 | V |
| Diode Forward Current (Note 2) | I _S | | - | - | 48 | A |
| Reverse Recovery Time | t _{rr} | T _J = 25°C, I _F =30A di/dt = 100A/μs (Note3) | - | 9 | | nS |
| Reverse Recovery Charge | Q _{rr} | | - | 15 | | nC |
| Forward Turn-On Time | t _{on} | Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD) | | | | |

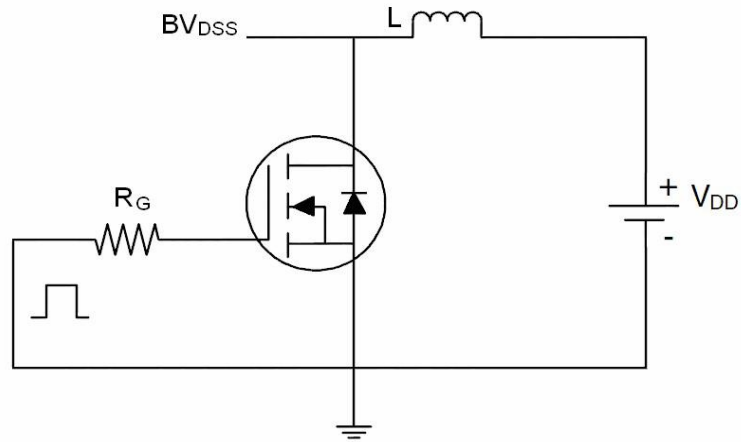
Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. E_{AS} condition: T_J=25°C, V_{DD}=30V, V_G=10V, L=0.5mH, R_g=25Ω

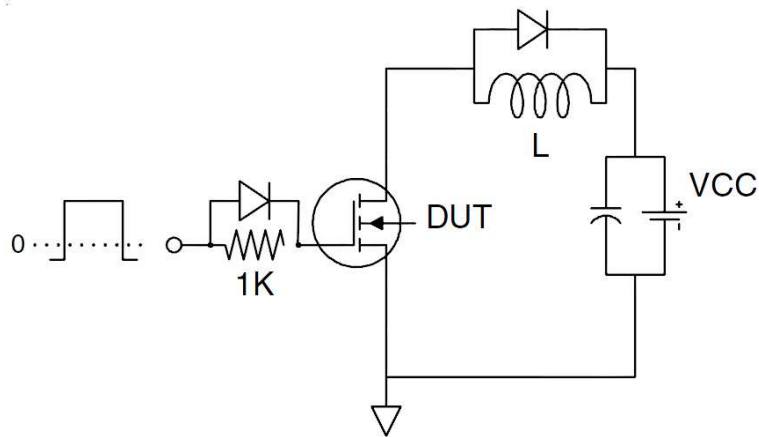


Test circuit

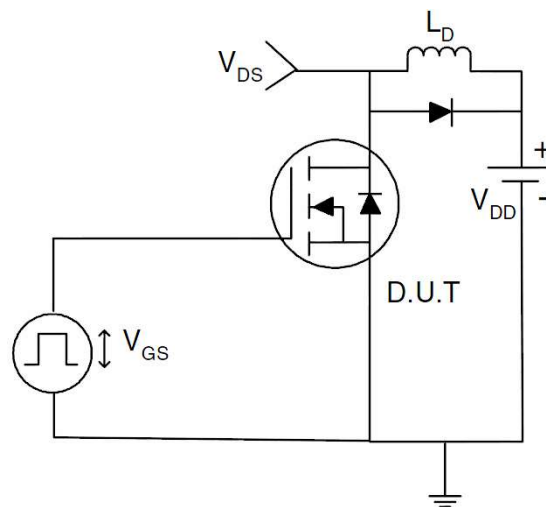
1) E_{AS} test Circuits



2) Gate charge test Circuit

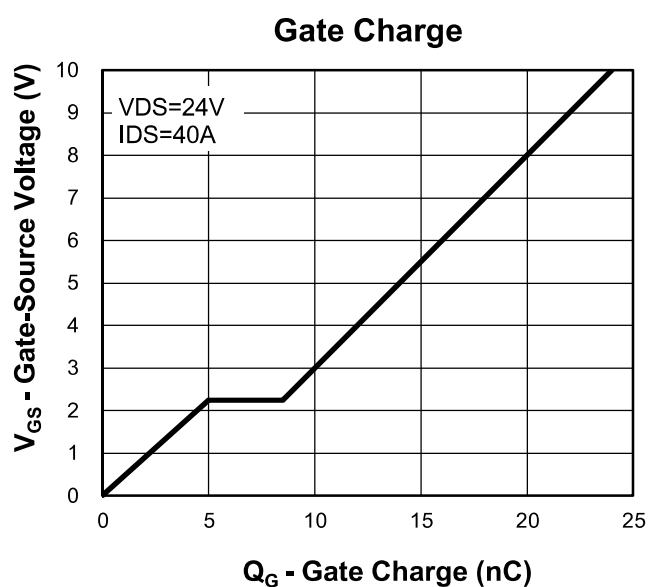
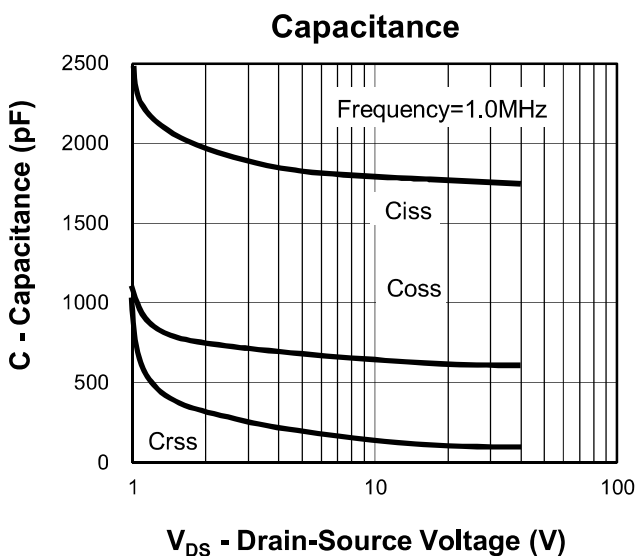
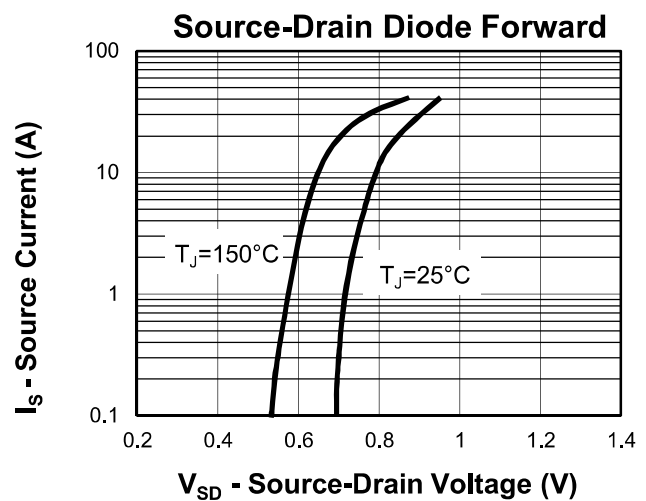
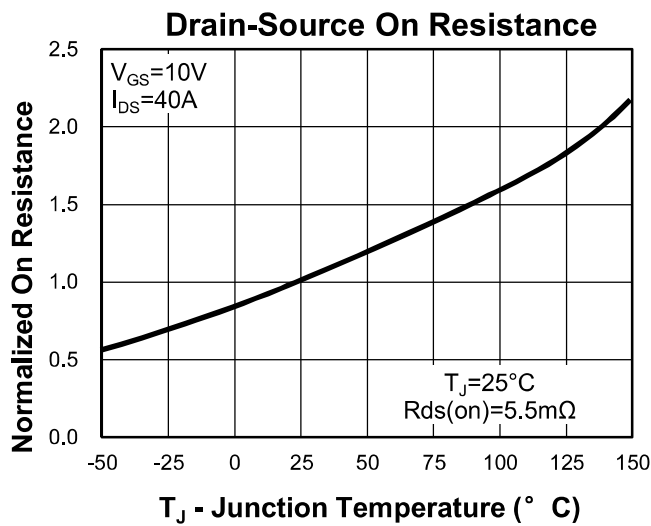
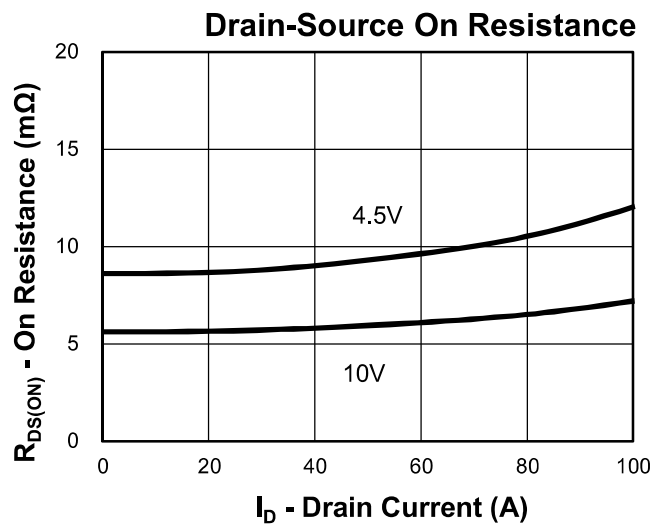
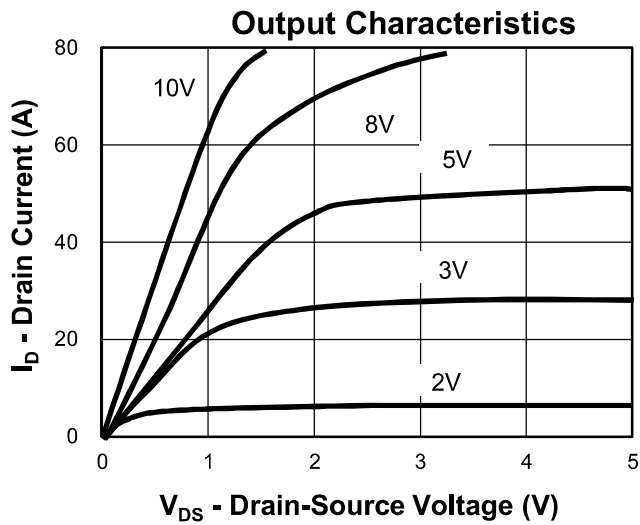


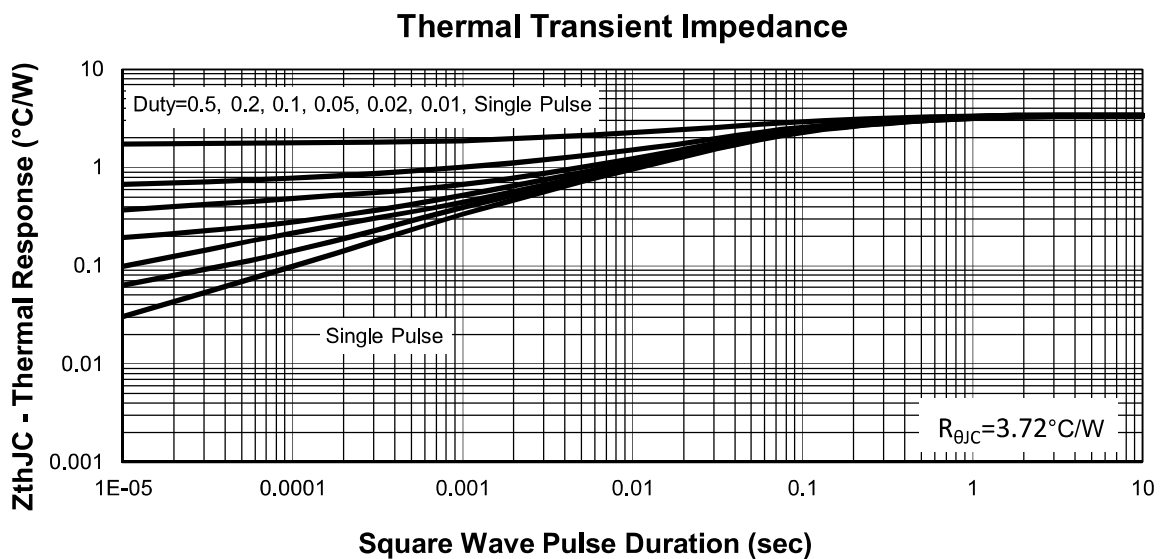
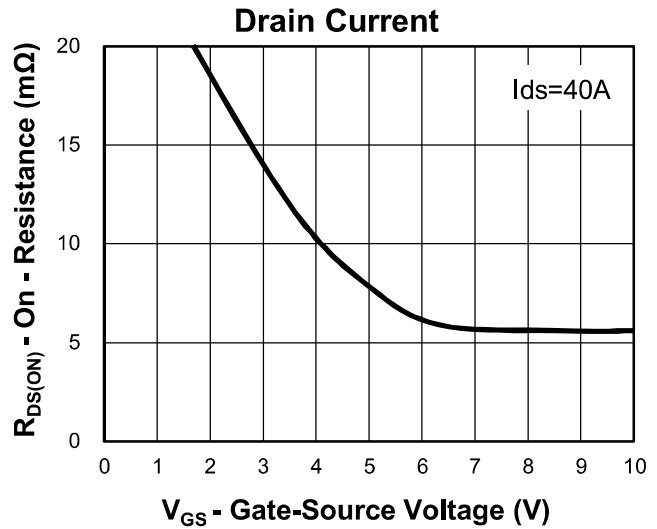
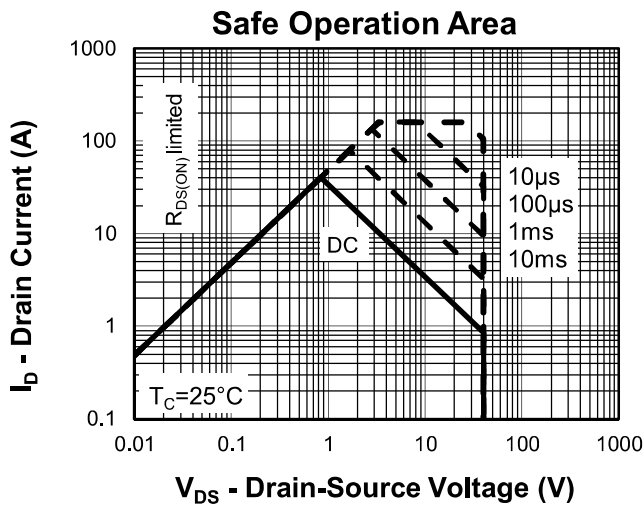
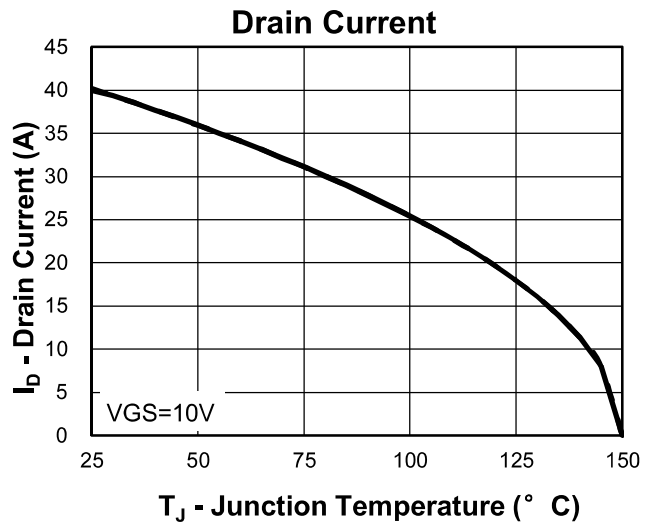
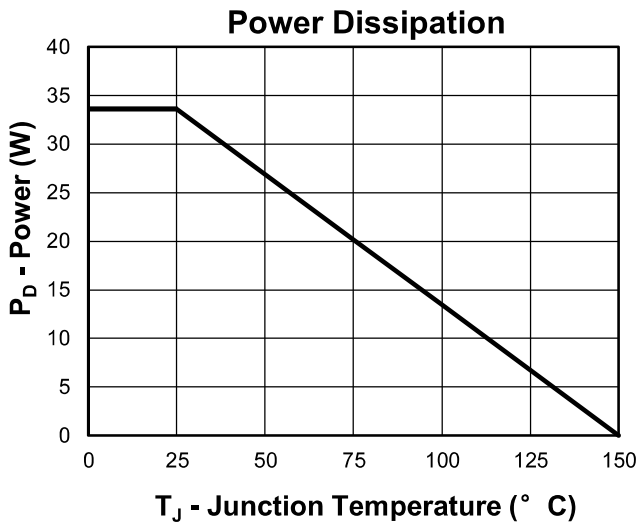
3) Switch Time Test Circuit





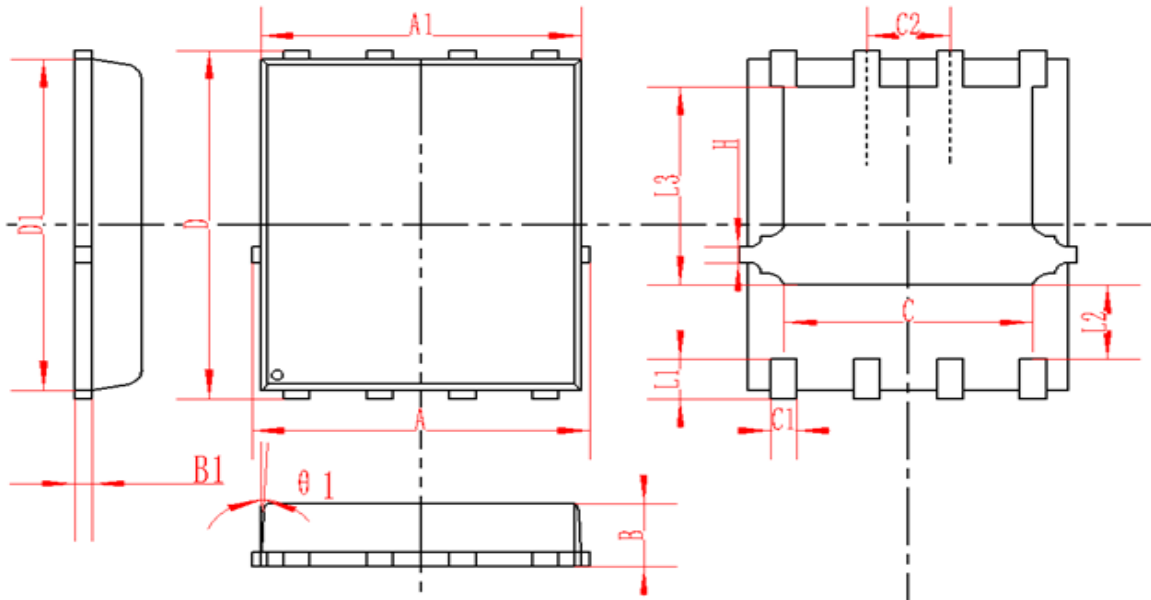
Typical Performance Characteristics







DFN5X6-8L Package Information



| SYMBOL | MM | | | INCH | | |
|--------|----------|------|-------|----------|-------|-------|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 4.95 | 5 | 5.05 | 0.195 | 0.197 | 0.199 |
| A1 | 4.82 | 4.9 | 4.98 | 0.190 | 0.193 | 0.196 |
| D | 5.98 | 6 | 6.02 | 0.235 | 0.236 | 0.237 |
| D1 | 5.67 | 5.75 | 5.83 | 0.223 | 0.226 | 0.230 |
| B | 0.9 | 0.95 | 1 | 0.035 | 0.037 | 0.039 |
| B1 | 0.254REF | | | 0.010REF | | |
| C | 3.95 | 4 | 4.05 | 0.156 | 0.157 | 0.159 |
| C1 | 0.35 | 0.4 | 0.45 | 0.014 | 0.016 | 0.018 |
| C2 | 1.27TYP | | | 0.5TYP | | |
| θ1 | 8° | 10° | 12° | 8° | 10° | 12° |
| L1 | 0.63 | 0.64 | 0.65 | 0.025 | 0.025 | 0.026 |
| L2 | 1.2 | 1.3 | 1.4 | 0.047 | 0.051 | 0.055 |
| L3 | 3.415 | 3.42 | 3.425 | 0.134 | 0.135 | 0.135 |
| H | 0.24 | 0.25 | 0.26 | 0.009 | 0.010 | 0.010 |



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