

N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

Surface-mounted package
Super Trench
T_j max 175°C
Advanced trench cell design
MSL1

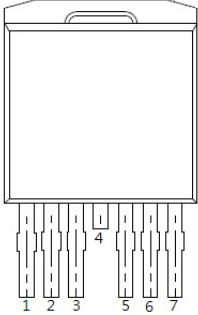
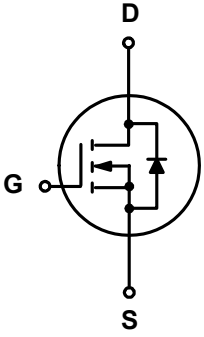
1.2 Applications

E- Tool appliances
BMS appliances
High power inverter system
Inverter appliances

1.3 Quick reference

$BV \geq 85 \text{ V}$
 $P_{\text{tot}} \leq 250 \text{ W}$
 $I_D \leq 220 \text{ A}$
 $R_{\text{DS(ON)}} \leq 2.8\text{m}\Omega @ V_{\text{GS}} = 10 \text{ V}$

2. Pin Description

| Pin | Description | Simplified Outline | Symbol |
|-------|-------------|---------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1 | Gate(G) |  <p>Top View TO-263-7L(D2PAK)</p> |  |
| 2,3 | Source (S) | | |
| 4 | Drain(D) | | |
| 5,6,7 | Source (S) | | |

3. Limiting Values

| Symbol | Parameter | Conditions | Min | Max | Unit |
|----------------------------------|-----------------------------------------|-------------------------------------------------|-----|------|------|
| V _{DS} | Drain-Source Voltage | T _C = 25 °C | 85 | - | V |
| V _{GS} | Gate-Source Voltage | T _C = 25 °C | - | ±20 | V |
| I _D ^{***} | Drain Current (DC) | T _C = 25 °C, V _{GS} = 10 V | - | 220 | A |
| | | T _C = 100 °C, V _{GS} = 10 V | - | 156 | A |
| I _{DM} ^{*,***} | Drain Current (Pulsed) | T _C = 25 °C, V _{GS} = 10 V | - | 800 | A |
| P _{tot} | Drain power dissipation | T _C = 25 °C | - | 250 | W |
| T _{stg} | Storage Temperature | | -55 | 175 | °C |
| T _J | Junction Temperature | | - | 175 | °C |
| I _S | Continuous-Source Current | T _C = 25 °C | - | 220 | A |
| E _{AS} | Single Pulsed Avalanche Energy | V _{DD} =100V , L=0.1mH | - | 805 | mJ |
| R _{θJA} ^{**} | Thermal Resistance- Junction to Ambient | | - | 32 | °C/W |
| R _{θJC} ^{**} | Thermal Resistance- Junction to Case | | - | 0.45 | |

Notes :

- * Pulse width ≤ 300 μs, duty cycle ≤ 2 %
- ** Surface Mounted on minimum footprint pad area.
- *** Limited by bonding wire

4. Ordering Code

| Product Name | Package | Reel Size | Tape width | Quantity | Note |
|--------------|-----------------|-----------|------------|----------|------|
| FDB024N08BL7 | TO263-7(D2-PAK) | | | 800 | |

Note: NHCX defines " Green " as lead-free (RoHS compliant) and halogen free (Br or Cl does not exceed 900 ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500 ppm by weight; Follow IEC 61249-2-21 and IPC / JEDEC J-STD-020C)

5. Electrical Characteristics ($T_A=25^\circ$ Unless Otherwise Noted)

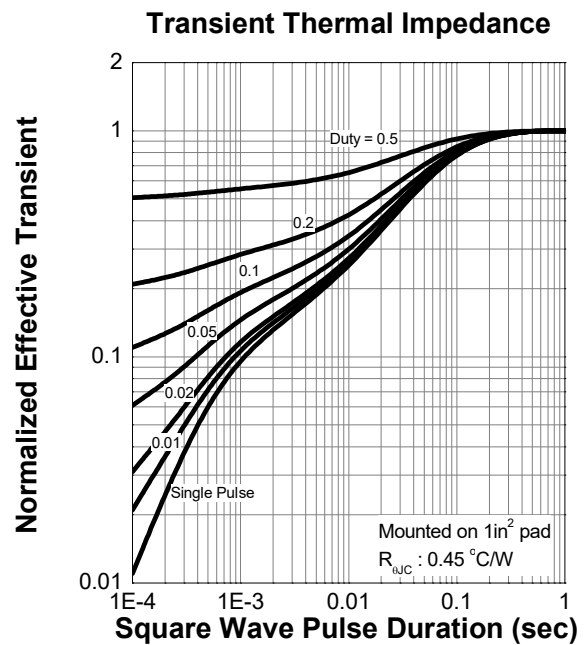
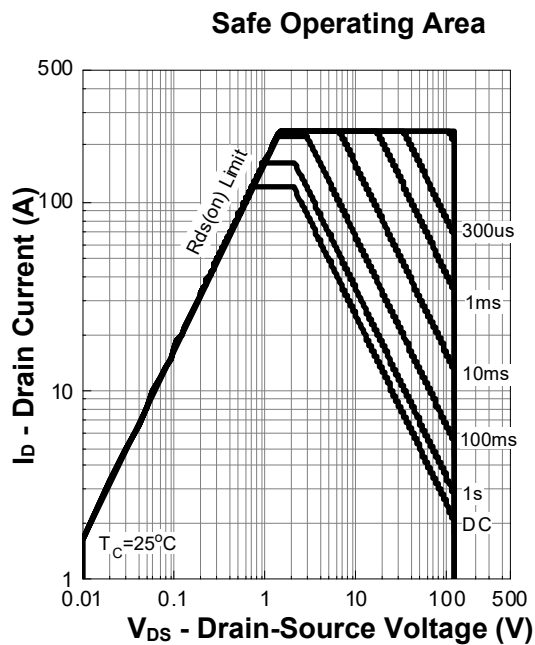
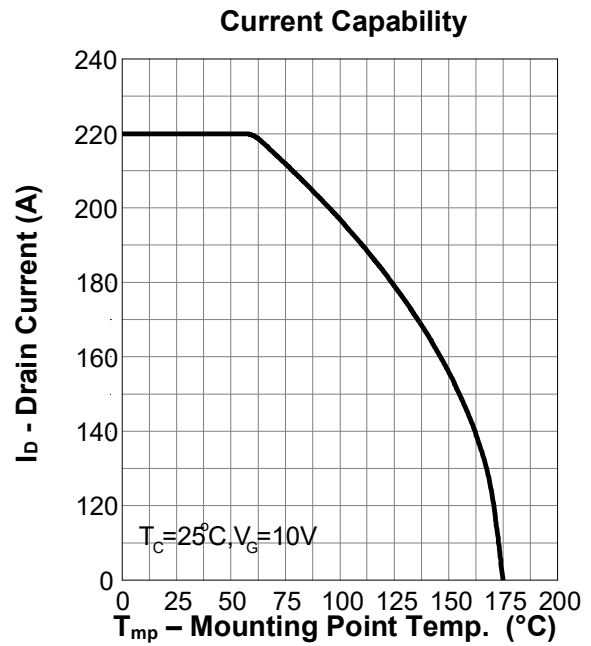
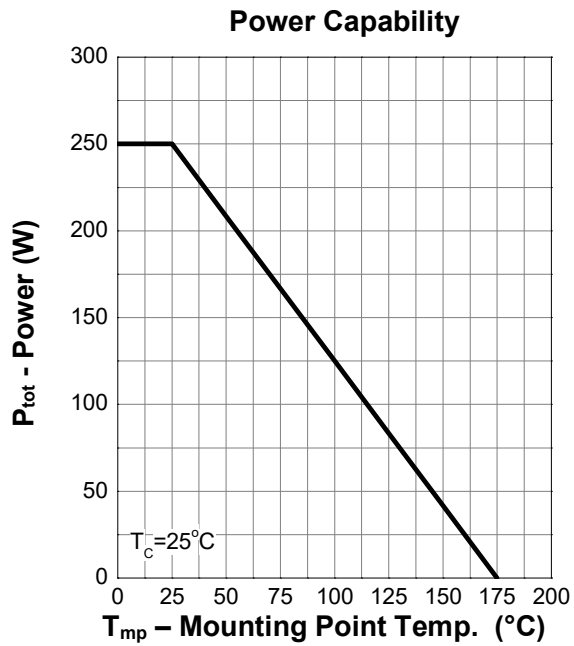
| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|------------------------------------------------|--------------------------------|---------------------------------------------------------------------------------------------------------------------|-----|------|-----------|---------------|
| Static Characteristics | | | | | | |
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS} = 0\text{ V}, I_{DS} = 250\ \mu\text{A}$ | 85 | 95 | - | V |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS} = V_{GS}, I_{DS} = 250\ \mu\text{A}$ | 2 | - | 4 | V |
| I_{DSS} | Drain Leakage Current | $V_{DS} = 85\text{V}, V_{GS} = 0\text{ V}$ | - | - | 1 | μA |
| | | $T_J = 85^\circ\text{C}$ | - | - | 30 | μA |
| I_{GSS} | Gate Leakage Current | $V_{GS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$ | - | - | ± 100 | nA |
| $R_{DS(on)}^a$ | On-State Resistance | $V_{GS} = 10\text{ V}, I_{DS} = 30\text{ A}$ | - | 2.4 | 2.8 | m Ω |
| Diode Characteristics | | | | | | |
| V_{SD}^a | Diode Forward Voltage | $I_{SD} = 30\text{ A}, V_{GS} = 0\text{ V}$ | - | - | 1.2 | V |
| t_{rr} | Reverse Recovery Time | $I_{DS} = 30\text{ A}, V_{GS} = 0\text{ V}$ $di_{SD}/dt = 100\text{ A}/\mu\text{s}$ | - | 78 | - | nS |
| Q_{rr} | Reverse Recovery Charge | | - | 110 | - | nC |
| Dynamic Characteristics^b | | | | | | |
| C_{iss} | Input Capacitance | $V_{GS} = 0\text{ V}, V_{DS} = 40\text{ V}$ Frequency = 1 MHz | - | 6234 | - | pF |
| C_{oss} | Output Capacitance | | - | 1180 | - | |
| C_{riss} | Reverse Transfer Capacitance | | - | 97 | - | |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{DS} = 40\text{ V}, V_{GEN} = 10\text{ V},$ $R_G = 4.5\ \Omega, R_L = 1.3\ \Omega,$ $I_{DS} = 30\text{ A}$ | - | 41 | - | nS |
| t_r | Turn-on Rise Time | | - | 68 | - | |
| $t_{d(off)}$ | Turn-off Delay Time | | - | 76 | - | |
| t_f | Turn-off Fall Time | | - | 44 | - | |
| Gate Charge Characteristics^b | | | | | | |
| Q_g | Total Gate Charge | $V_{DS} = 40\text{ V}, V_{GS} = 10\text{ V},$ $I_{DS} = 30\text{ A}$ | - | 124 | - | nC |
| Q_{gs} | Gate-Source Charge | | - | 31.2 | - | |
| Q_{gd} | Gate-Drain Charge | | - | 39.2 | - | |

Notes :

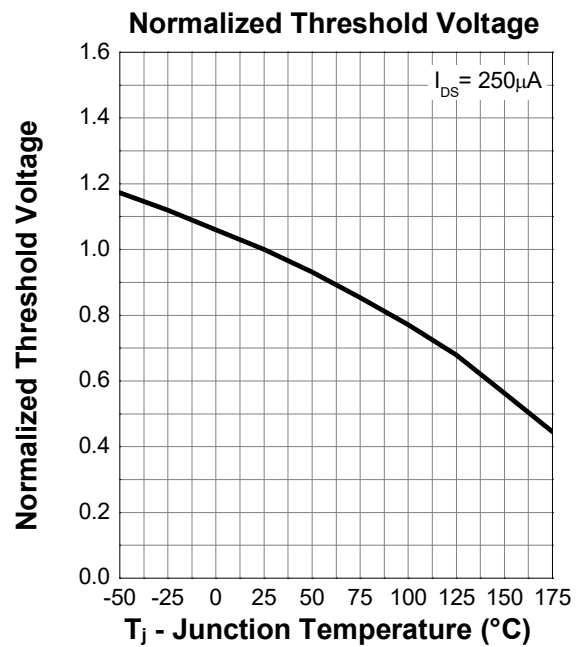
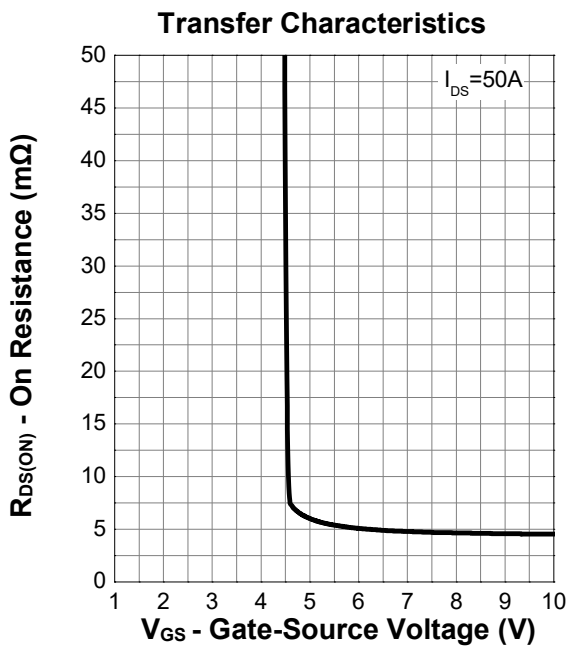
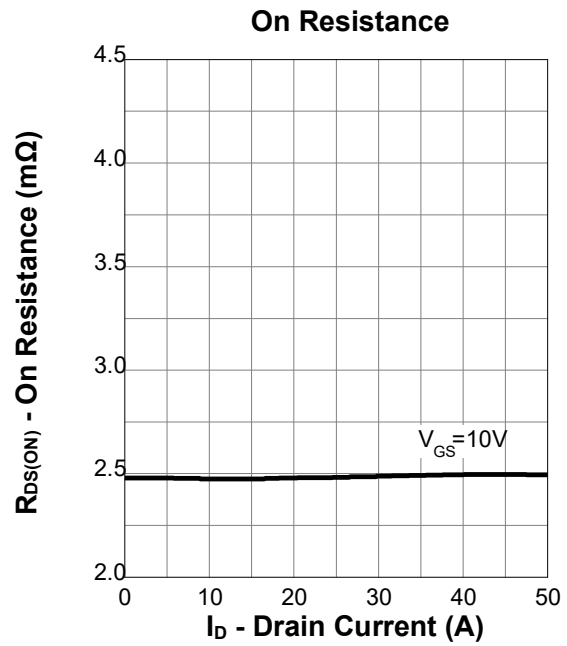
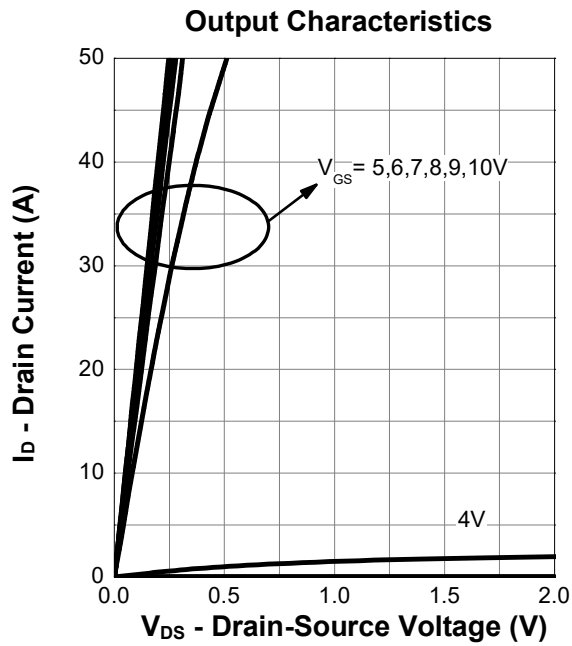
a : Pulse test ; pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$

b : Guaranteed by design, not subject to production testing

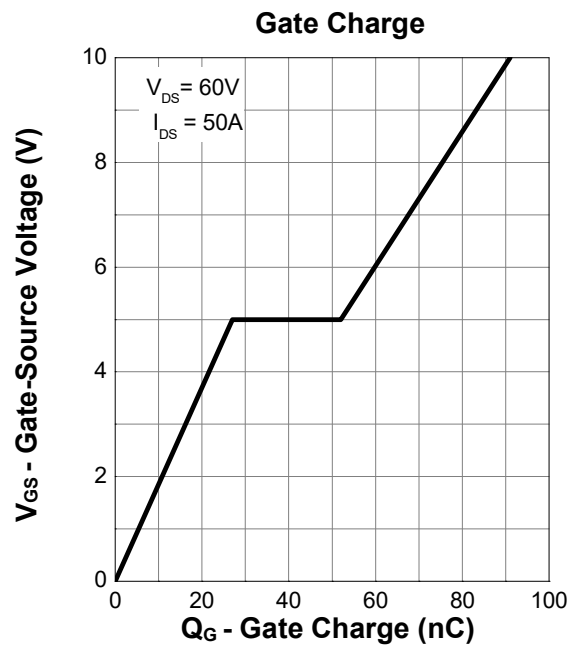
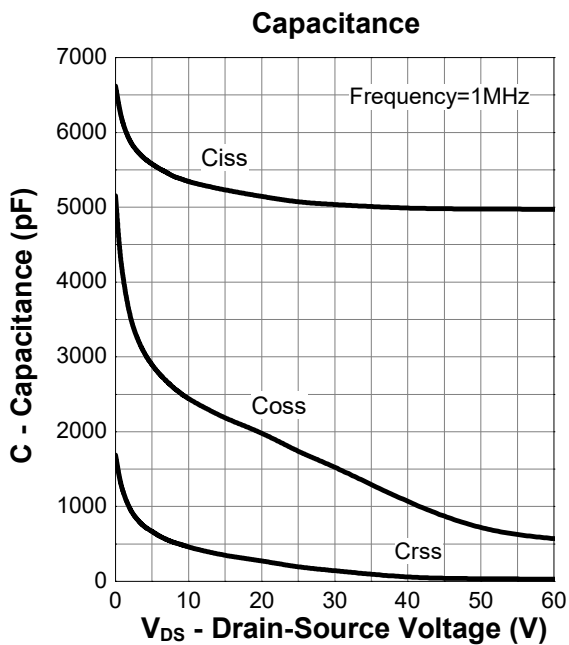
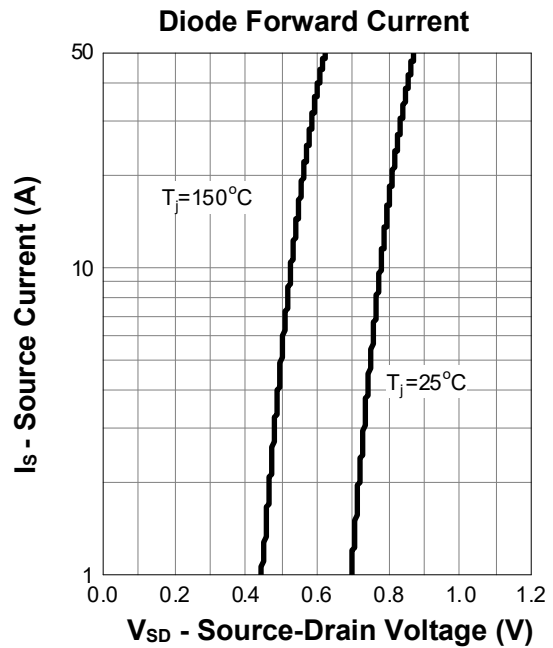
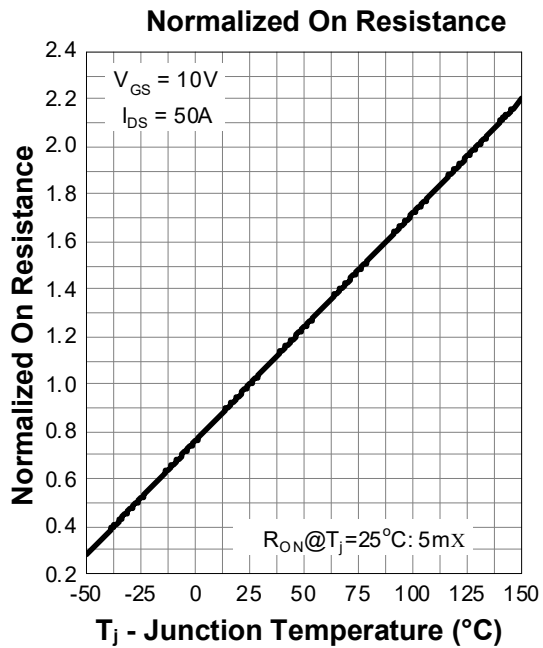
6. Typical Characteristics



6. Typical Characteristics (cont.)

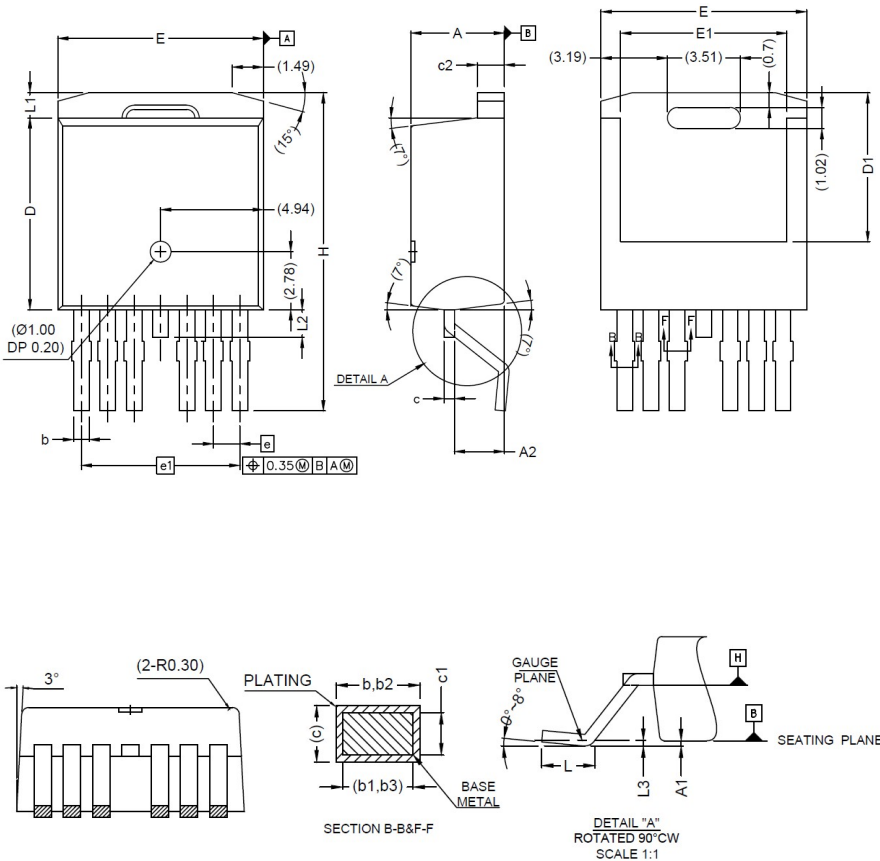


6. Typical Characteristics (cont.)



7. Package Dimensions

TO-263-7L Package



| Symbol | Dimensions In Millimeters | |
|--------|---------------------------|-------|
| | MIN. | MAX. |
| A | 4.30 | 4.70 |
| A1 | - | 0.25 |
| A2 | 2.20 | 2.60 |
| b | 0.65 | 0.85 |
| b1 | 0.65 | 0.80 |
| b2 | 0.80 | 1.00 |
| b3 | 0.80 | 0.95 |
| c | 0.45 | 0.60 |
| c1 | 0.45 | 0.55 |
| c2 | 1.25 | 1.40 |
| D | 9.00 | 9.40 |
| D1 | 6.86 | 7.42 |
| E | 9.68 | 10.08 |
| E1 | 7.70 | 8.30 |
| e | 1.27 BSC | |
| e1 | 7.62 BSC | |
| L | 1.78 | 2.79 |
| L1 | - | 1.60 |
| L2 | - | 1.78 |
| L3 | 0.25BSD | |
| H | 14.61 | 15.88 |

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