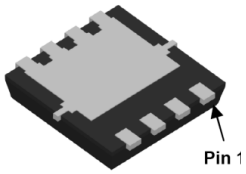
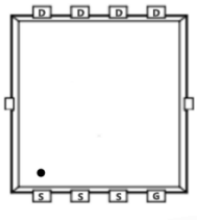
## Main Product Characteristics:

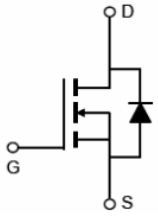
| | |
|---|---|
| $V_{DSS}$ | 30V |
| $R_{DS}$(on) | 3.5mΩ (typ.) |
| $I_D$ | 70A |




PDFN 3*3-8L




Pin Assignment




Schematic Diagram

## Features and Benefits:

- Advanced MOSFET process technology
- Special designed for PWM, load switching and general purpose applications
- Ultra low on-resistance with low gate charge
- Fast switching and reverse body recovery
- 150℃ operating temperature

## Description:

It utilizes the latest processing techniques to achieve the high cell density and reduces the on-resistance with high repetitive avalanche rating. These features combine to make this design an extremely efficient and reliable device for use in power switching application and a wide variety of other applications.

## Absolute max Rating:

| Symbol | Parameter | Max. | Units |
|---|---|---|---|
| $I_D$ @ $T_C$ = 25°C | Continuous Drain Current, $V_{GS}$ @ 10V ① | 70 | A |
| $I_{DM}$ | Pulsed Drain Current ② | 160 | |
| $P_D$ @$T_C$ = 25°C | Power Dissipation ③ | 59 | W |
| $V_{DS}$ | Drain-Source Voltage | 30 | V |
| $V_{GS}$ | Gate-to-Source Voltage | ± 20 | V |
| $E_{AS}$ | Single Pulse Avalanche Energy @L=0.1mH | 115.2 | mJ |
| $I_{AS}$ | Avalanche Current @L=0.1mH | 48 | A |
| $T_J$ $T_{STG}$ | Operating Junction and Storage Temperature Range | -55 to +150 | °C |

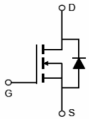
## Thermal Resistance

| Symbol | Characterizes | Typ. | Max. | Units |
|---|---|---|---|---|
| $R_{\theta JC}$ | Junction-to-case ③ | — | 2.1 | ℃/W |
| $R_{\theta JA}$ | Junction-to-ambient (t ≤ 10s) ④ | — | 62 | ℃/W |

## Electrical Characterizes @$T_A$=25℃ unless otherwise specified

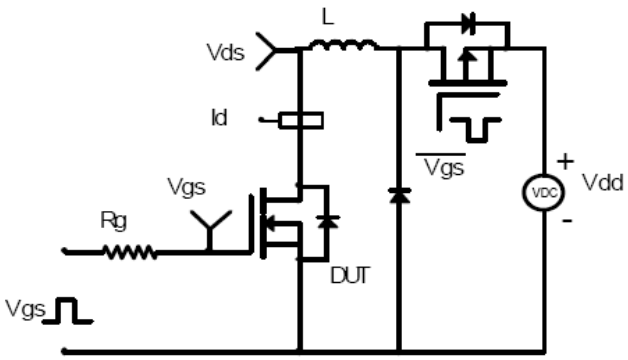
| Symbol | Parameter | Min. | Typ. | Max. | Units | Conditions |
|---|---|---|---|---|---|---|
| $V_{(BR)DSS}$ | Drain-to-Source breakdown voltage | 30 | — | — | V | $V_{GS}$ = 0V, $I_D$ = 250μA |
| $R_{DS(on)}$ | Static Drain-to-Source on-resistance | — | 3.5 | 5.5 | mΩ | $V_{GS}$=10V,$I_D$ =30A |
| | | — | 6.5 | 8.5 | | $V_{GS}$=4.5V,$I_D$ =15A |
| $V_{GS(th)}$ | Gate threshold voltage | 1 | — | 2.5 | V | $V_{DS}$ = $V_{GS}$, $I_D$ =250μA |
| $I_{DSS}$ | Drain-to-Source leakage current | — | — | 1 | μA | $V_{DS}$ =24V,$V_{GS}$ = 0V |
| $I_{GSS}$ | Gate-to-Source forward leakage | — | — | 100 | nA | $V_{GS}$ =20V |
| | | — | — | -100 | | $V_{GS}$ = -20V |
| $Q_g$ | Total gate charge | — | 19.5 | — | nC | $I_D$ = 15A, |
| $Q_{gs}$ | Gate-to-Source charge | — | 7.5 | — | | $V_{DS}$=15V, |
| $Q_{gd}$ | Gate-to-Drain("Miller") charge | — | 7.1 | — | | $V_{GS}$ = 4.5V |
| $t_{d(on)}$ | Turn-on delay time | — | 7.5 | — | ns | $V_{GS}$=10V, $V_{DS}$=15V, $R_{GEN}$=3.3Ω $I_D$ = 15A |
| $t_r$ | Rise time | — | 14.8 | — | | |
| $t_{d(off)}$ | Turn-Off delay time | — | 37.1 | — | | |
| $t_f$ | Fall time | — | 10.4 | — | | |
| $C_{iss}$ | Input capacitance | — | 2290 | — | pF | $V_{GS}$ = 0V $V_{DS}$ = 15V $f$ = 1MHz |
| $C_{oss}$ | Output capacitance | — | 265 | — | | |
| $C_{rss}$ | Reverse transfer capacitance | — | 209 | — | | |

## Source-Drain Ratings and Characteristics

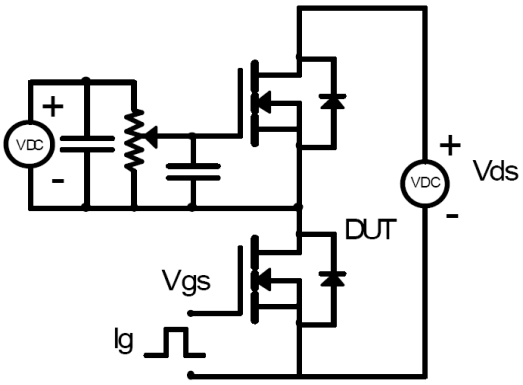
| Symbol | Parameter | Min. | Typ. | Max. | Units | Conditions |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current (Body Diode) | — | — | 80 | A | MOSFET symbol showing the integral reverse p-n junction diode.  |
| $I_{SM}$ | Pulsed Source Current (Body Diode) | — | — | 160 | A | |
| $V_{sd}$ | Diode Forward Voltage | — | — | 1 | V | $I_S$=1A, $V_{GS}$=0V |
| $t_{rr}$ | Reverse Recovery Time | — | 14 | — | nS | $T_J$ = 25°C, $I_F$ =30A, di/dt = 100A/μs |
| $Q_{rr}$ | Reverse Recovery Charge | — | 5 | — | nC | |

## Test circuits and Waveforms

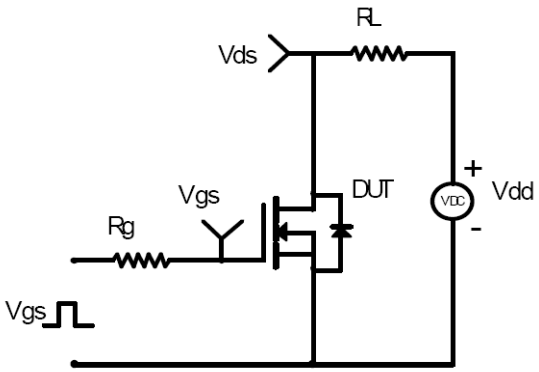
**EAS Test Circuit:**



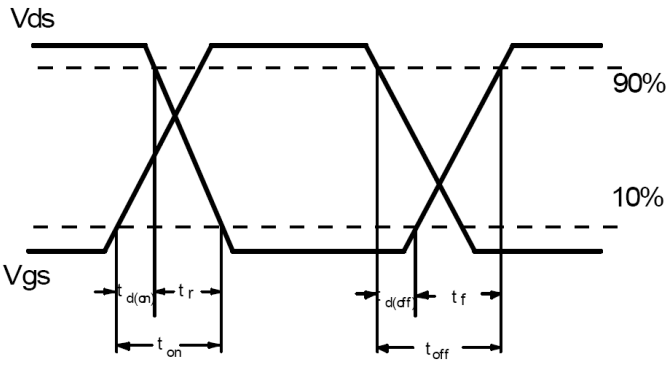

**Gate charge test circuit:**




**Switching Time Test Circuit:**




**Switching Waveforms:**




## Notes:

①Calculated continuous current based on maximum allowable junction temperature.

②Repetitive rating; pulse width limited by max.junction temperature.

③The power dissipation PD is based on max. junction temperature, using junction-to-case thermal resistance.

④The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with TA =25°C

## Typical electrical and thermal characteristics

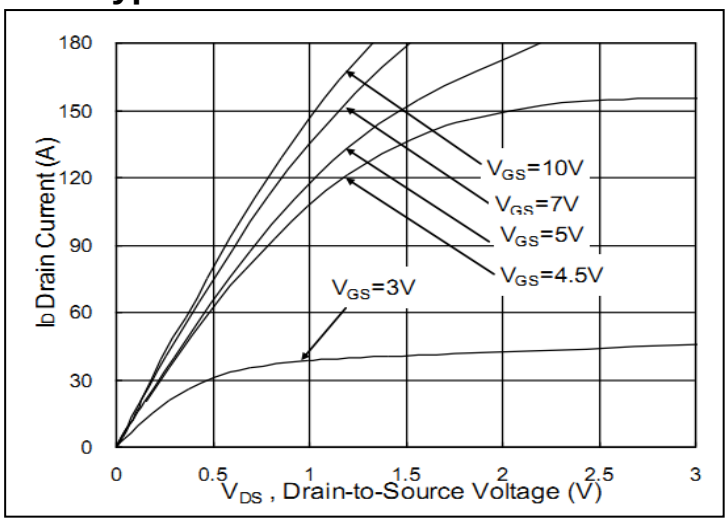



Figure 1: Typical Output Characteristics

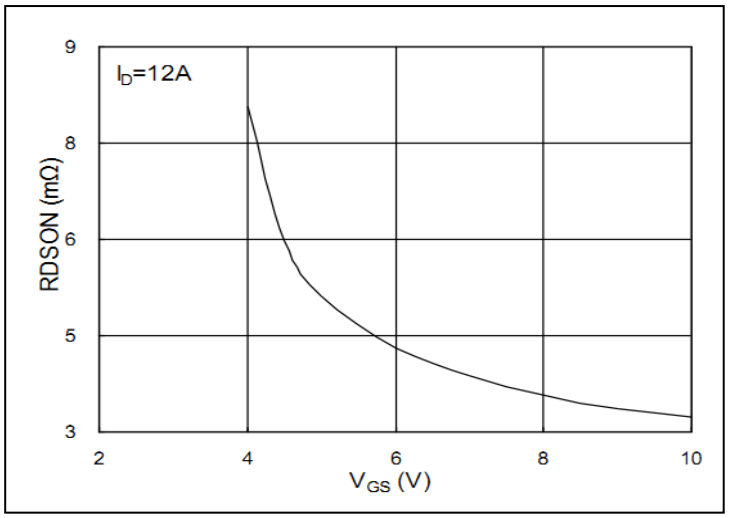



Figure 2: On-Resistance vs. G-S Voltage

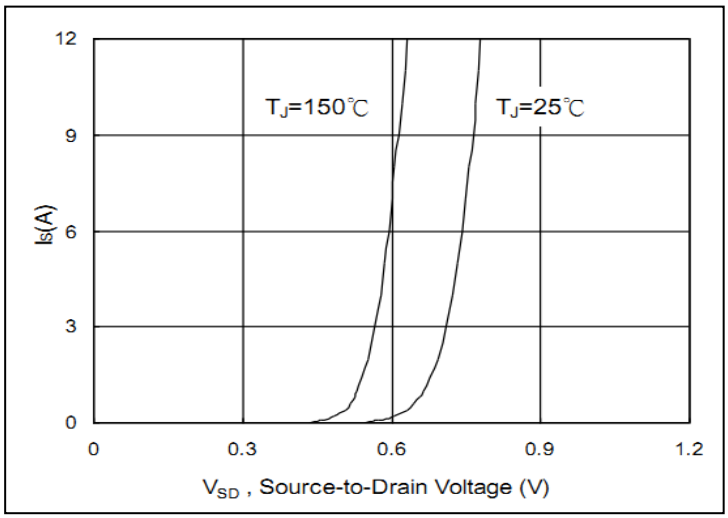



Figure 3: Forward Characteristics of Reverse

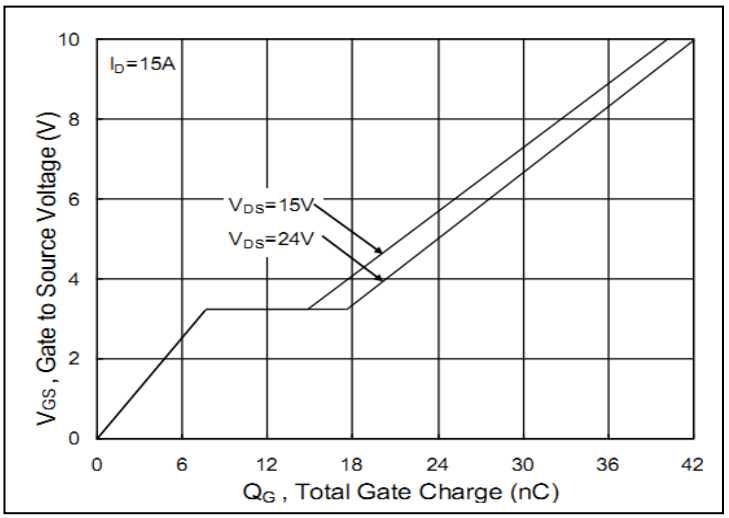



Figure 4: Gate Charge

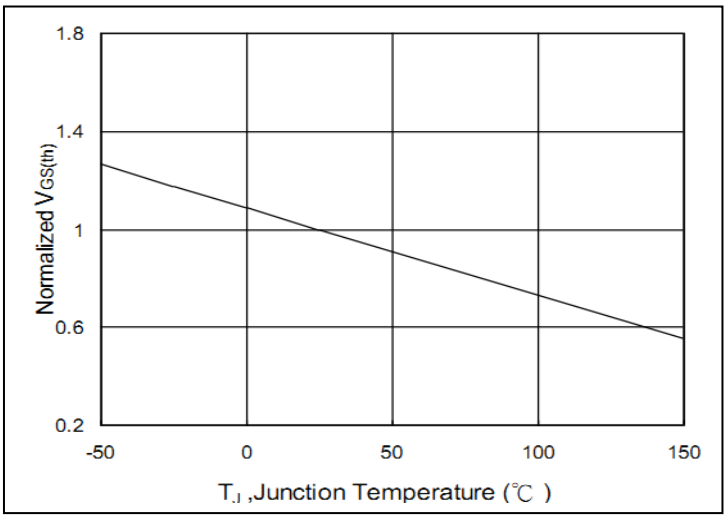



Figure 5: Normalized $V_{GS}$(th) vs. Case Temperature

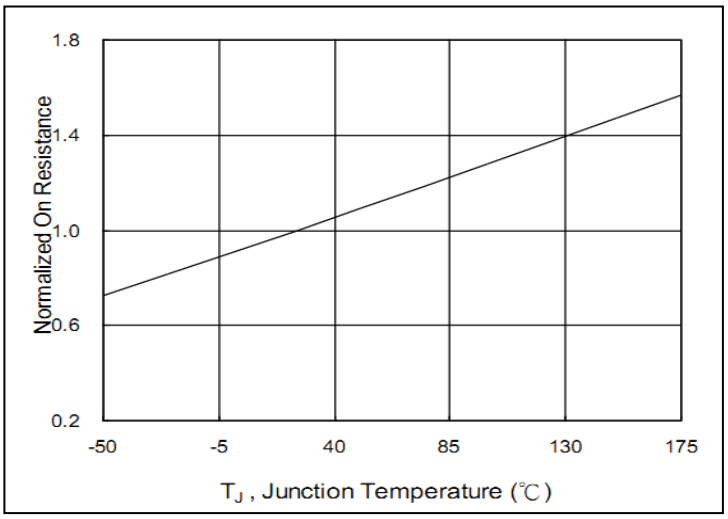



Figure 6: Normalized On-Resistance vs. Case Temperature

## Typical electrical and thermal characteristics

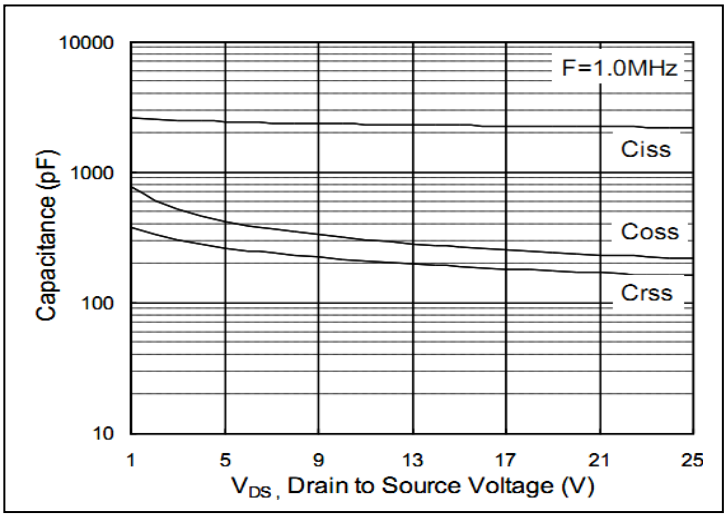



Figure 7: Capacitance

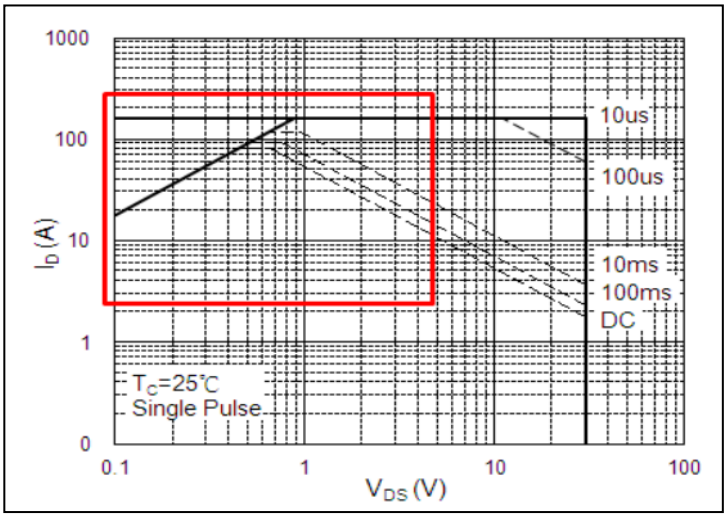



Figure 8: Safe Operation Area

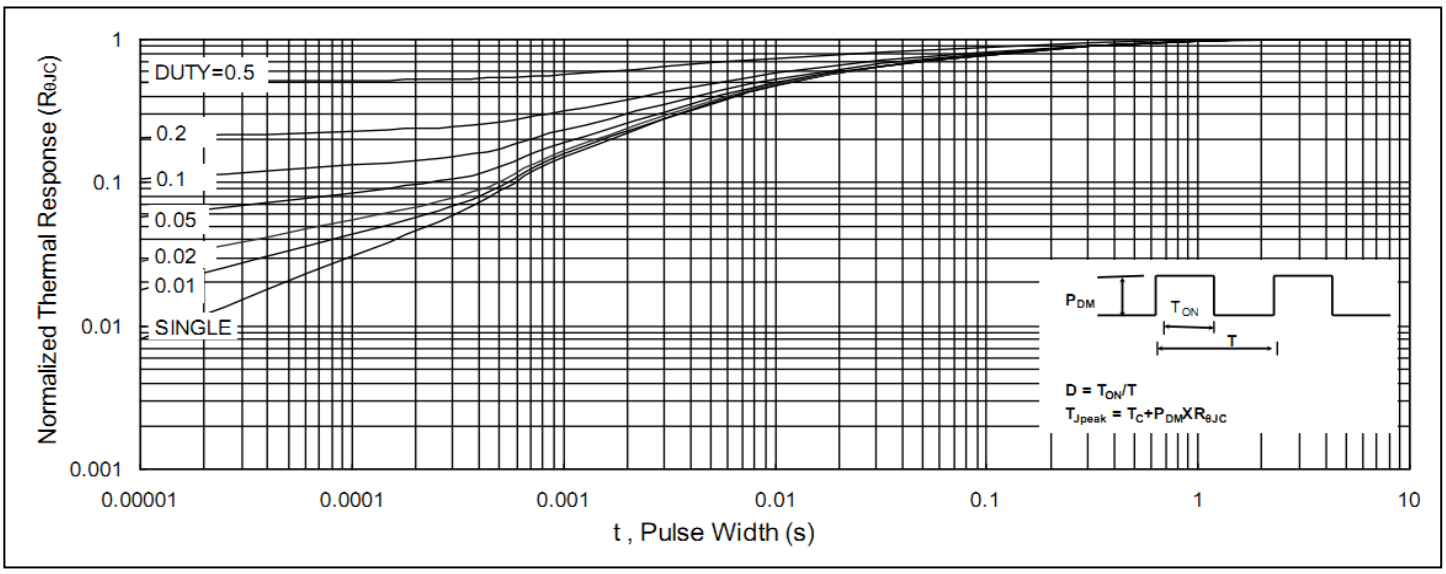
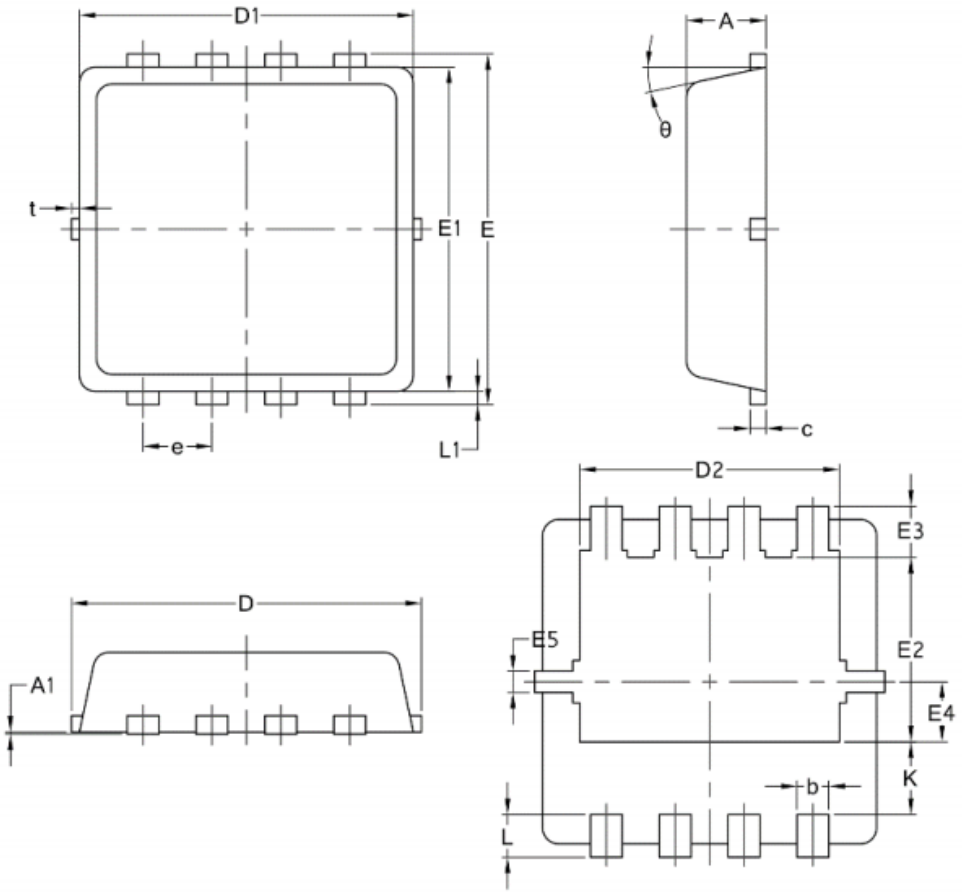



Figure 9: Transient Thermal Impedance

## Mechanical Data：




| Symbol | Common | | |
|---|---|---|---|
| | mm | | |
| | Mim | Nom | Max |
| A | 0.70 | 0.75 | 0.85 |
| A1 | / | / | 0.05 |
| b | 0.20 | 0.30 | 0.40 |
| c | 0.10 | 0.152 | 0.25 |
| D | 3.15 | 3.30 | 3.45 |
| D1 | 3.00 | 3.15 | 3.25 |
| D2 | 2.29 | 2.45 | 2.65 |
| E | 3.15 | 3.30 | 3.45 |
| E1 | 2.90 | 3.05 | 3.20 |
| E2 | 1.54 | 1.74 | 1.94 |
| E3 | 0.28 | 0.48 | 0.65 |
| E4 | 0.37 | 0.57 | 0.77 |
| E5 | 0.10 | 0.20 | 0.30 |
| e | 0.60 | 0.65 | 0.70 |
| K | 0.59 | 0.69 | 0.89 |
| L | 0.30 | 0.40 | 0.50 |
| L1 | 0.06 | 0.125 | 0.20 |
| t | 0 | 0.075 | 0.13 |
| Φ | 10 | 12 | 14 |

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