

## Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

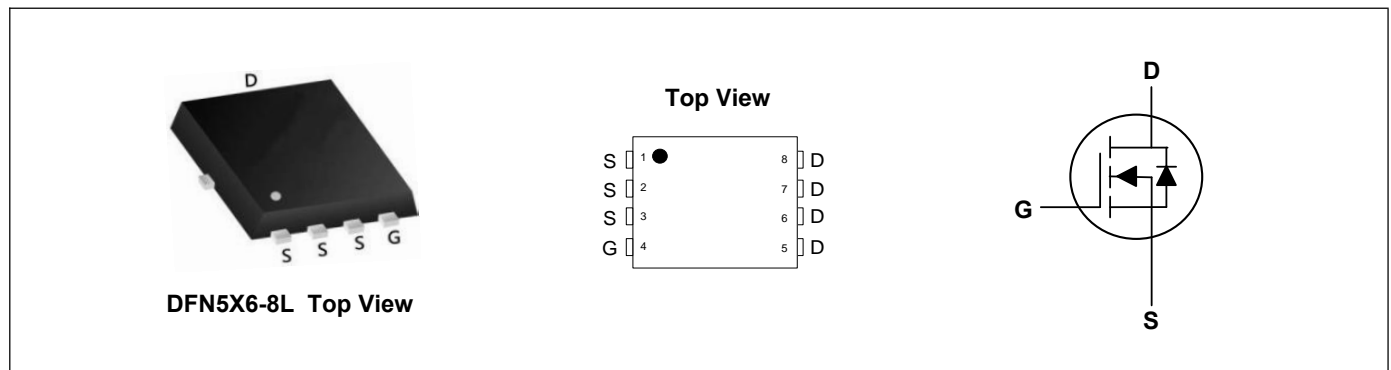
## Applications

- High Frequency Point-of-Load, Synchronous Buck Converter
- Networking DC-DC Power System
- Load Switch

## Product Summary



|                                  |     |            |
|----------------------------------|-----|------------|
| $V_{DS}$                         | 60  | V          |
| $I_D$                            | 142 | A          |
| $R_{DS(ON)}$ (at $V_{GS}=10V$ )  | 2.6 | m $\Omega$ |
| $R_{DS(ON)}$ (at $V_{GS}=4.5V$ ) | 4.5 | m $\Omega$ |



## Absolute Maximum Ratings ( $T_C=25^\circ\text{C}$ , unless otherwise noted)

| Parameter                                  | Symbol                      | Rating     | Units            |
|--|-----------------------------|------------|------------------|
| Drain-Source Voltage                       | $V_{DS}$                    | 60         | V                |
| Gate-Source Voltage                        | $V_{GS}$                    | $\pm 20$   | V                |
| Continuous Drain Current <sup>1</sup>      | $I_D@T_C=25^\circ\text{C}$  | 142        | A                |
| Continuous Drain Current <sup>1</sup>      | $I_D@T_C=100^\circ\text{C}$ | 100        | A                |
| Pulsed Drain Current <sup>2</sup>          | $I_{DM}$                    | 142        | A                |
| Single Pulse Avalanche Energy <sup>3</sup> | EAS                         | 45         | mJ               |
| Avalanche Current                          | $I_{AS}$                    | 30         | A                |
| Total Power Dissipation <sup>4</sup>       | $P_D@T_C=25^\circ\text{C}$  | 96         | W                |
| Total Power Dissipation <sup>4</sup>       | $P_D@T_C=100^\circ\text{C}$ | 39         | W                |
| Storage Temperature Range                  | $T_{STG}$                   | -55 to 150 | $^\circ\text{C}$ |
| Operating Junction Temperature Range       | $T_J$                       | -55 to 150 | $^\circ\text{C}$ |

## Thermal Characteristics

| Parameter  | Symbol          | Typ | Max | Unit               |
|--|-----------------|-----|-----|--------------------|
| Thermal Resistance Junction-Ambient <sup>1</sup> | $R_{\theta JA}$ | --- | 50  | $^\circ\text{C/W}$ |
| Thermal Resistance Junction-Case <sup>1</sup>    | $R_{\theta JC}$ | --- | 1.3 | $^\circ\text{C/W}$ |

**Electrical Characteristics (T<sub>J</sub>=25°C, unless otherwise noted)**

| Parameter                                      | Symbol              | Conditions   | Min | Typ  | Max  | Unit |
|--|---------------------|--|-----|------|------|------|
| Drain-Source Breakdown Voltage                 | BV <sub>DSS</sub>   | V <sub>GS</sub> =0V, I <sub>D</sub> =250uA   | 60  | ---  | ---  | V    |
| Static Drain-Source On-Resistance <sup>2</sup> | R <sub>DS(ON)</sub> | V <sub>GS</sub> =10V, I <sub>D</sub> =20A  | --- | 2.2  | 2.6  | mΩ   |
|  |                     | V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A   | --- | 3.5  | 4.5  | mΩ   |
| Gate Threshold Voltage                         | V <sub>GS(th)</sub> | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA                           | 1.0 | 2.0  | 3.0  | V    |
| Drain-Source Leakage Current                   | I <sub>DSS</sub>    | V <sub>DS</sub> =48V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C                    | --- | ---  | 1    | uA   |
| Gate-Source Leakage Current                    | I <sub>GSS</sub>    | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V   | --- | ---  | ±100 | nA   |
| Forward Transconductance                       | g <sub>fs</sub>     | V <sub>DS</sub> =5V, I <sub>D</sub> =20A   | --- | 50   | ---  | S    |
| Gate Resistance                                | R <sub>g</sub>      | V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, f=1MHz                                   | --- | 1.7  | ---  | Ω    |
| Total Gate Charge                              | Q <sub>g</sub>      | V <sub>DS</sub> =15V, V <sub>GS</sub> =10V, I <sub>D</sub> =20A                    | --- | 76   | ---  | nC   |
| Gate-Source Charge                             | Q <sub>gs</sub>     |  | --- | 13   | ---  |      |
| Gate-Drain Charge                              | Q <sub>gd</sub>     |  | --- | 17   | ---  |      |
| Turn-On Delay Time                             | T <sub>d(on)</sub>  | V <sub>DD</sub> =30V, V <sub>GS</sub> =10V, R <sub>G</sub> =6Ω, I <sub>D</sub> =1A | --- | 14   | ---  | ns   |
| Rise Time                                      | T <sub>r</sub>      |  | --- | 35   | ---  |      |
| Turn-Off Delay Time                            | T <sub>d(off)</sub> |  | --- | 70   | ---  |      |
| Fall Time                                      | T <sub>f</sub>      |  | --- | 45   | ---  |      |
| Input Capacitance                              | C <sub>iss</sub>    | V <sub>DS</sub> =30V, V <sub>GS</sub> =0V, f=1MHz                                  | --- | 4635 | ---  | pF   |
| Output Capacitance                             | C <sub>oss</sub>    |  | --- | 1710 | ---  |      |
| Reverse Transfer Capacitance                   | C <sub>rss</sub>    |  | --- | 80   | ---  |      |

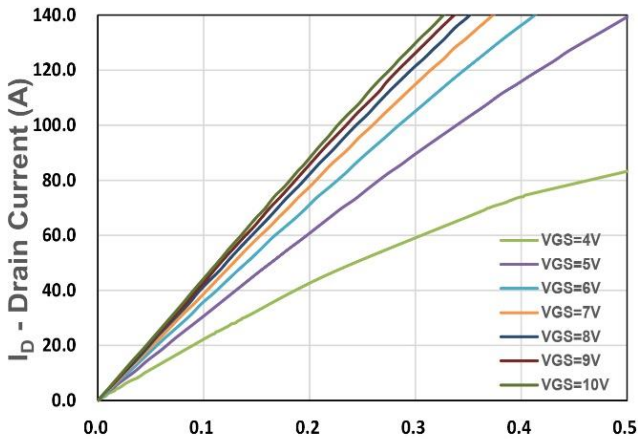
**Drain-Source Diode Characteristics**

| Parameter                          | Symbol          | Conditions   | Min | Typ | Max | Unit |
|------------------------------------|-----------------|--|-----|-----|-----|------|
| Diode Forward Voltage <sup>2</sup> | V <sub>SD</sub> | V <sub>GS</sub> =0V, I <sub>S</sub> =20A, T <sub>J</sub> =25°C | --- | 0.8 | 1.1 | V    |
| Reverse Recovery Time              | t <sub>rr</sub> | I <sub>F</sub> =20A, di/dt=100A/μs, T <sub>J</sub> =25°C       | --- | 27  | --- | nS   |
| Reverse Recovery Charge            | Q <sub>rr</sub> |  | --- | 21  | --- | nC   |

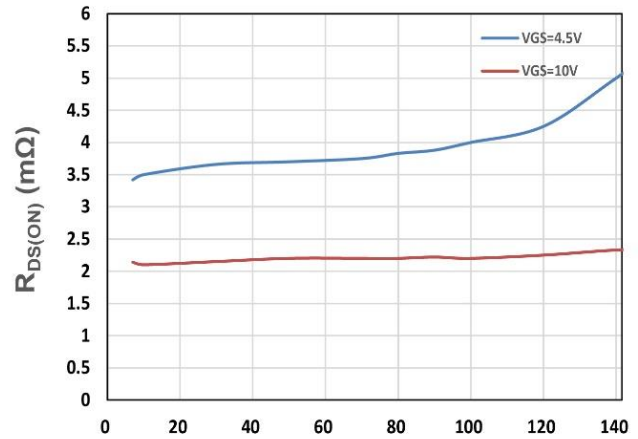
**Note:**

- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2.The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
- 3.The EAS data shows Max. rating. The test condition is V<sub>DD</sub>=50V, V<sub>GS</sub>=10V, L=0.1mH
- 4.The power dissipation is limited by 150°C junction temperature

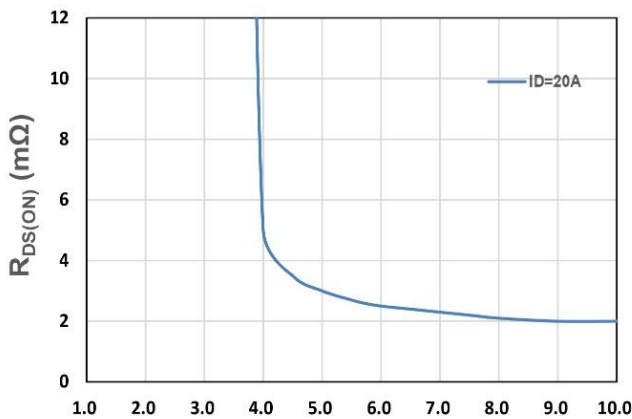
**Typical Characteristics**



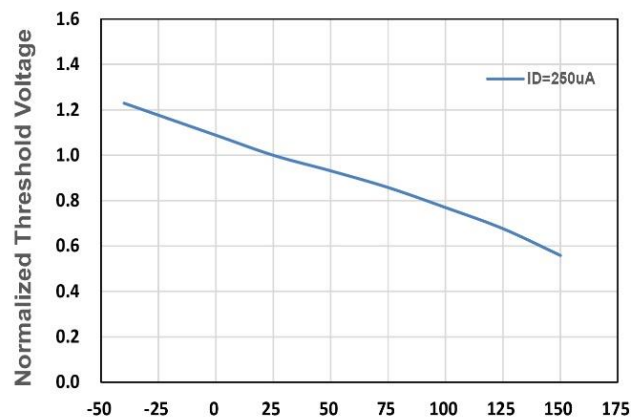
**V<sub>DS</sub> - Drain - Source Voltage (V)**  
Figure 1. Output Characteristics



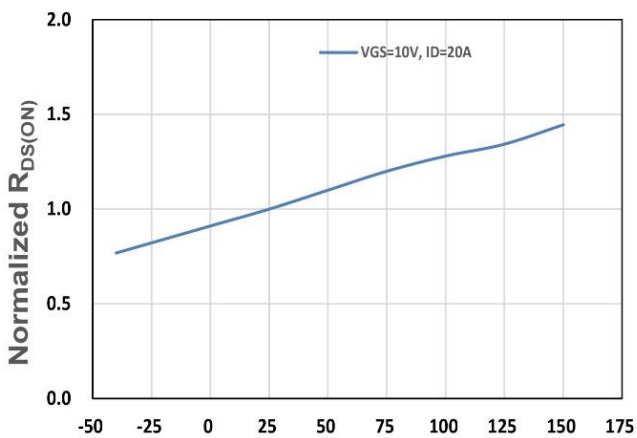
**I<sub>D</sub> - Drain Current (A)**  
Figure 2. On-Resistance vs. I<sub>D</sub>



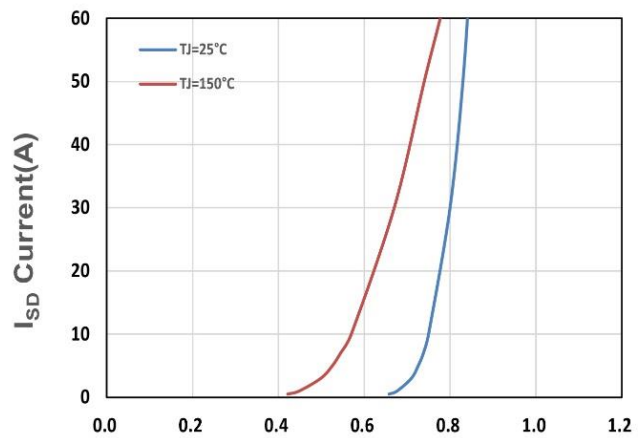
**V<sub>GS</sub> - Gate - Source Voltage (V)**  
Figure 3. On-Resistance vs. VGS



**T<sub>j</sub>, Junction Temperature(°C)**  
Figure 4. Gate Threshold Voltage



**T<sub>j</sub>, Junction Temperature(°C)**  
Figure 5. Drain-Source On Resistance



**V<sub>SD</sub>, Source-Drain Voltage(V)**  
Figure 6. Source-Drain Diode Forward

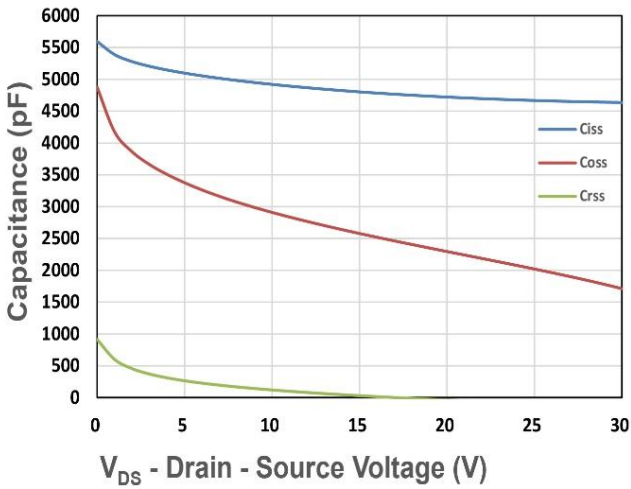


Figure 7. Capacitance

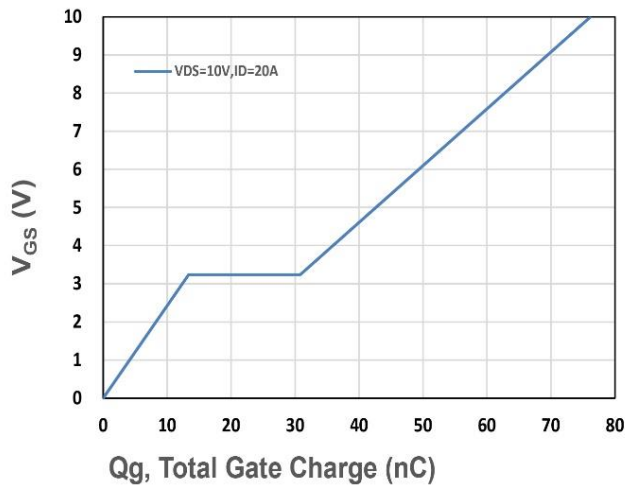


Figure 8. Gate Charge Characteristics

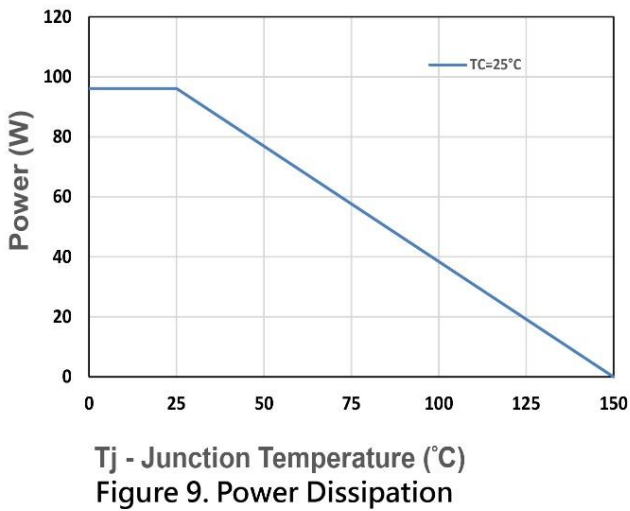


Figure 9. Power Dissipation

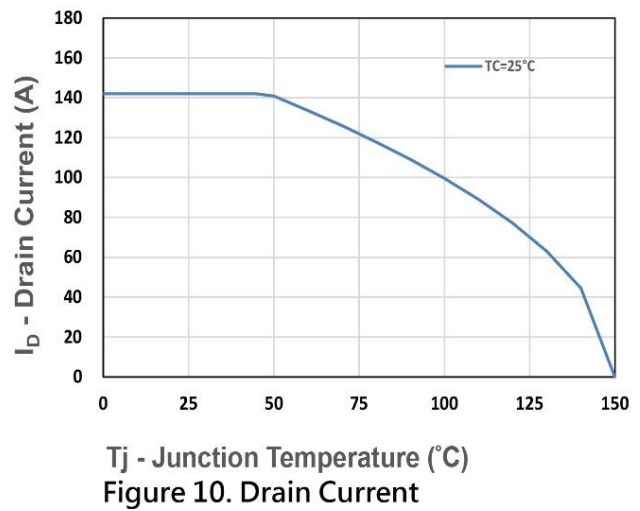


Figure 10. Drain Current

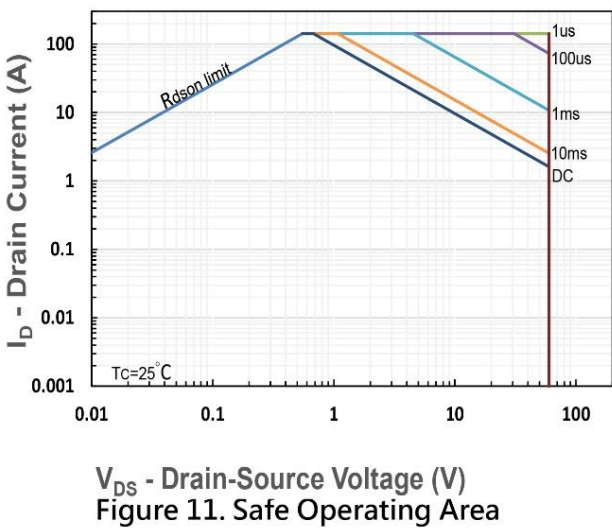


Figure 11. Safe Operating Area

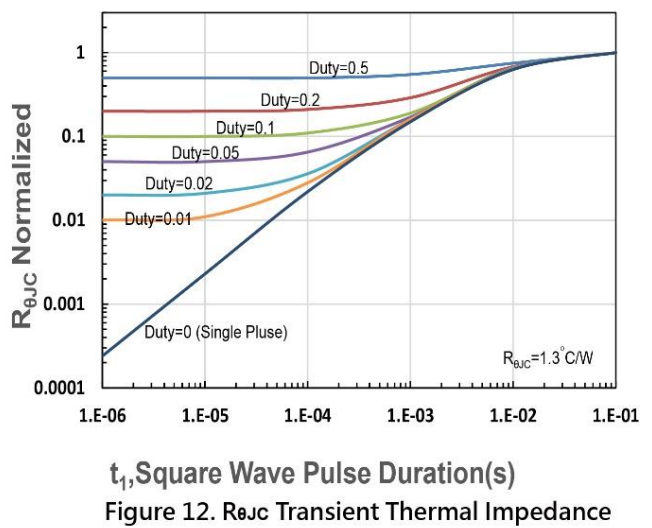
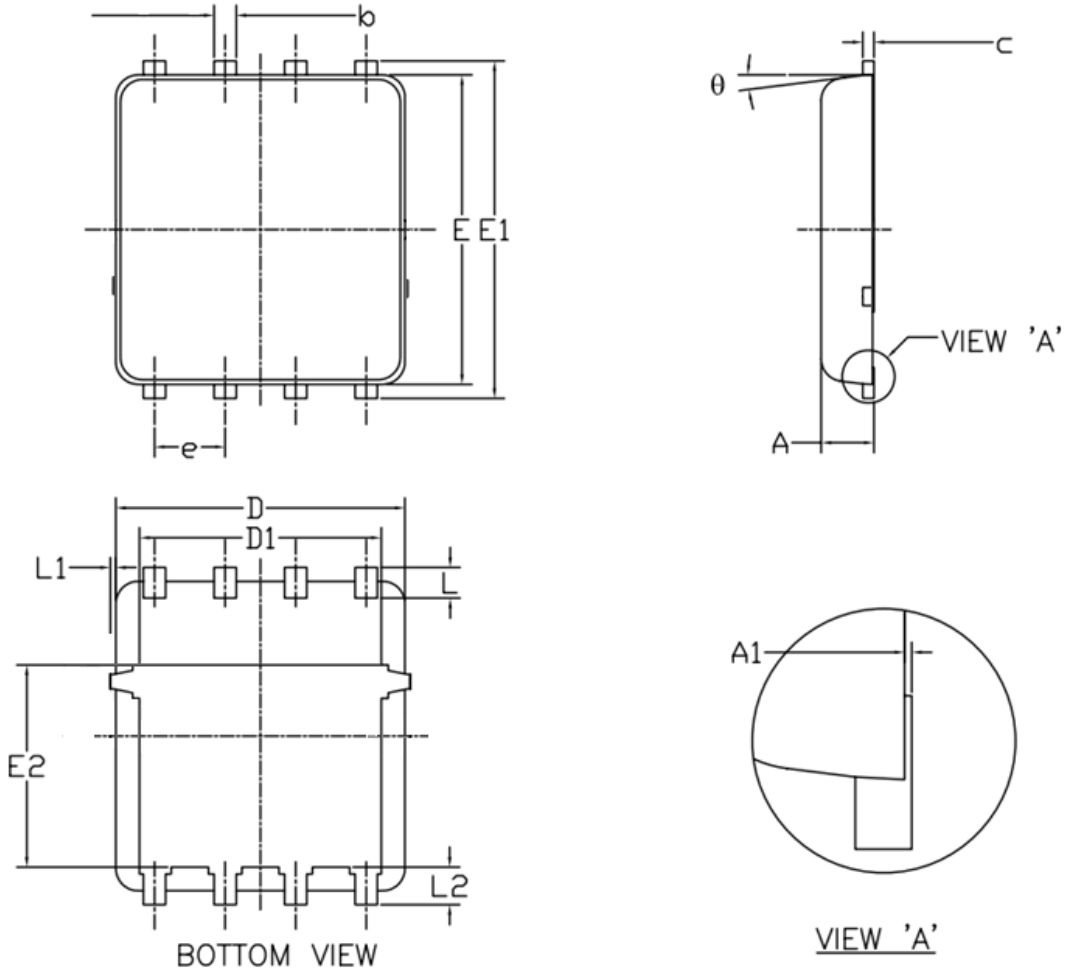


Figure 12.  $R_{\theta JC}$  Transient Thermal Impedance

**DFN5X6-8L Package Outline Dimensions**



| Symbol    | Dimensions (unit:mm) |      |      | Symbol                     | Dimensions (unit:mm) |      |      |
|-----------|----------------------|------|------|----------------------------|----------------------|------|------|
|           | Min                  | Typ  | Max  |                            | Min                  | Typ  | Max  |
| <b>A</b>  | 0.90                 | 1.00 | 1.20 | <b>E1</b>                  | 5.90                 | 6.10 | 6.35 |
| <b>A1</b> | 0.00                 | --   | 0.05 | <b>E2</b>                  | 3.38                 | 3.58 | 3.92 |
| <b>b</b>  | 0.30                 | 0.40 | 0.51 | <b>e</b>                   | 1.27 BSC             |      |      |
| <b>c</b>  | 0.20                 | 0.25 | 0.33 | <b>L</b>                   | 0.51                 | 0.61 | 0.71 |
| <b>D</b>  | 4.80                 | 4.90 | 5.40 | <b>L1</b>                  | --                   | --   | 0.15 |
| <b>D1</b> | 3.61                 | 4.00 | 4.25 | <b>L2</b>                  | 0.41                 | 0.51 | 0.61 |
| <b>E</b>  | 5.65                 | 5.80 | 6.06 | <b><math>\theta</math></b> | 0°                   | --   | 12°  |