



CE65H080TOCI

CoreGaN 650V GaN HEMT

Description

The CE65H080TOCI Series 650V, 80mΩ gallium nitride (GaN) FETs are normally-off devices.

Coreenergy GaN FETs offer better efficiency through lower gate charge, faster switching speeds, and lower dynamic on-resistance, delivering significant advantages over traditional silicon (Si) devices.

Coreenergy is a leading-edge wide band gap supplier with world-class innovation .

Application

- Adapter
- Renewable energy
- Telecom and data-com
- Servo motors
- Industrial
- Automotive

General Features

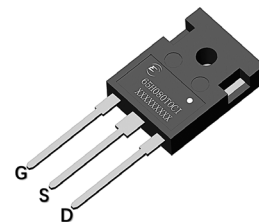
Easy to drive—compatible with standard gate drivers
 Low conduction and switching losses
 RoHS compliant and Halogen-free

Benefits

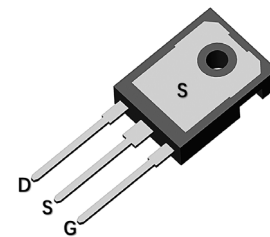
Increased efficiency through fast switching
 Increased power density
 Reduced system size and weight

Ordering Information

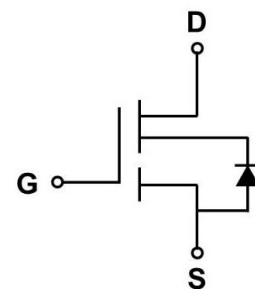
| Part Number | Package | Package Configuration |
|--------------|---------|-----------------------|
| CE65H080TOCI | TO247 | Source |



Top



Bottom



Circuit Symbol

Features

| BV_{DSS} | $R_{DS(on)}$ | I_{DS} | Q_G |
|------------|--------------|----------|---------|
| 650V | 80mΩ | 26A | 10.9 nC |



Absolute Maximum Ratings

$T_c=25^\circ\text{C}$ unless otherwise stated

| Symbol | Parameter | Limit value | Unit | |
|---------------|--|-------------|------------------|------------------|
| V_{DSS} | Drain to source voltage ($T_J = -55^\circ\text{C}$ to 150°C) | 650 | | |
| $V_{(TR)DSS}$ | Drain to source voltage-transient ^a | 800 | V | |
| V_{GSS} | Gate to source voltage | -20~+20 | | |
| I_D | Continuous drain current @ $T_c=25^\circ\text{C}$ ^b | 26 | A | |
| | Continuous drain current @ $T_c=125^\circ\text{C}$ ^b | 11.7 | | |
| I_{DM} | Pulse drain current (pulse width: 10 μs) | 75 | A | |
| P_D | Maximum power dissipation @ $T_c=25^\circ\text{C}$ | 113 | W | |
| T_c | Operating temperature | Case | -55~150 | $^\circ\text{C}$ |
| T_J | | Junction | -55~150 | $^\circ\text{C}$ |
| T_S | Storage temperature | -55~150 | $^\circ\text{C}$ | |

a. In off-state, spike duty cycle $D < 0.01$, spike duration $< 1\mu\text{s}$

b. For increased stability at high current operation



Thermal Resistance

| Symbol | Parameter | Limit value | Unit |
|-----------------|------------------|-------------|-------------------------------|
| $R_{\theta JC}$ | Junction-to-case | 1.1 | $^{\circ}\text{C} / \text{W}$ |



Electrical Parameters

$T_J=25^\circ\text{C}$ unless otherwise stated

| Symbol | Parameter | Min | Typ | Max | Unit | Test Conditions |
|---------------------------------------|--|-----|------|-----------|----------------------|---|
| Forward Device Characteristics | | | | | | |
| $V_{(BL)DSS}$ | Drain-source voltage | 650 | - | - | V | $V_{GS}=0V$ |
| $V_{GS(th)}$ | Gate threshold voltage | 3 | 4 | 5 | V | $V_{DS}=1V, I_{DS}=1mA$ |
| $\Delta V_{GS(th)}/T_J$ | Gate threshold voltage temperature coefficient | - | -7 | - | mV/ $^\circ\text{C}$ | |
| $R_{DS(on)}$ | Drain-source on-Resistance | - | 80 | 100 | m Ω | $V_{GS}=10V, I_D=1A, T_J=25^\circ\text{C}$ |
| | | - | 180 | - | | $V_{GS}=10V, I_D=1A, T_J=150^\circ\text{C}$ |
| I_{DSS} | Drain-to-source leakage current | - | 6 | 12 | μA | $V_{DS}=650V, V_{GS}=0V, T_J=25^\circ\text{C}$ |
| | | - | 10 | 100 | | $V_{DS}=650V, V_{GS}=0V, T_J=150^\circ\text{C}$ |
| I_{GSS} | Gate-to-source forward leakage current | - | - | ± 100 | nA | $V_{GS}=\pm 20V$ |
| C_{ISS} | Input capacitance | - | 729 | - | pF | $V_{GS}=0V, V_{DS}=400V, f=1\text{MHz}$ |
| C_{OSS} | Output capacitance | - | 75 | - | | |
| C_{RSS} | Reverse capacitance | - | 0.2 | - | | |
| Q_G | Total gate charge | - | 10.9 | - | nC | $V_{DS}=400V, V_{GS}=0V \text{ to } 10V, I_D=1A$ |
| Q_{GS} | Gate-source charge | - | 3.2 | - | | |
| Q_{GD} | Gate-drain charge | - | 3.4 | - | | |
| Q_{OSS} | Output charge | - | 101 | - | nC | $V_{GS}=0V, V_{DS}=0V \text{ to } 400V, f=1\text{MHz}$ |
| $t_{D(on)}$ | Turn-on delay | - | 9 | - | ns | $V_{DS}=400V, V_{GS}=0V \text{ to } 10V, I_D=2.1A,$ $R_{G-on(ext)}=6.8\Omega, R_{G-off(ext)}=2.2\Omega,$ $L=250\mu\text{H}$ |
| t_R | Rise time | - | 4 | - | | |
| $t_{D(off)}$ | Turn-off delay | - | 22 | - | | |
| t_F | Fall time | - | 7 | - | | |



Electrical Parameters

$T_j=25^\circ\text{C}$ unless otherwise stated

| Symbol | Parameter | Min | Typ | Max | Unit | Test Conditions |
|---------------------------------------|------------------------------|-----|-----|-----|------|---|
| Reverse Device Characteristics | | | | | | |
| V_{SD} | Source-Drain reverse voltage | - | 1.9 | - | V | $V_{GS}=0\text{V}$, $I_{SD}=15\text{A}$ |
| t_{RR} | Reverse recovery time | - | 52 | - | ns | $I_F=10\text{A}$, $V_{DD}=400\text{V}$, $dI_F/dt=165\text{A}/\mu\text{s}$ |
| Q_{RR} | Reverse recovery charge | - | 40 | - | nC | |



Typical Characteristics

$T_j=25^\circ\text{C}$ unless otherwise stated

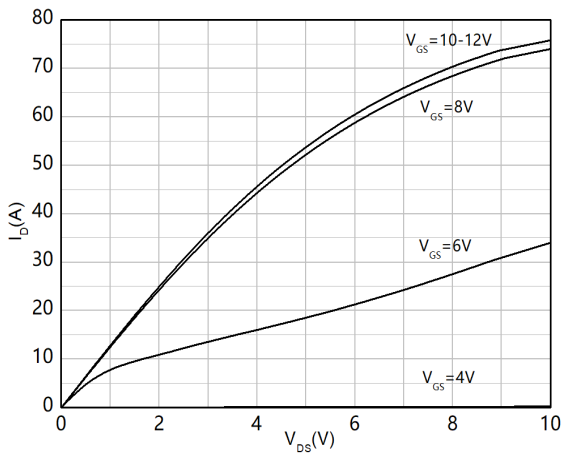


Figure 1. Typical Output Characteristics $T_j=25^\circ\text{C}$

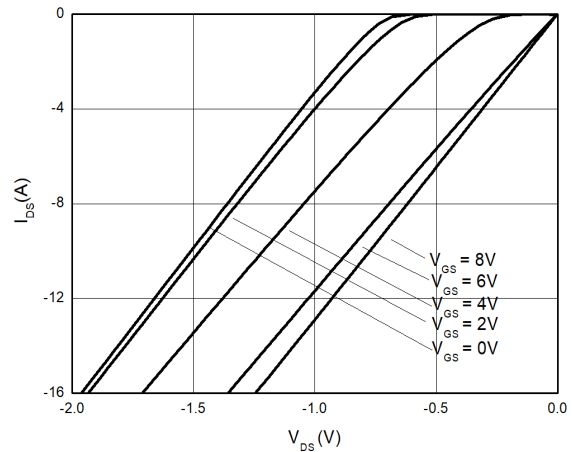


Figure 2. Channel Reverse Characteristics $T_j=25^\circ\text{C}$

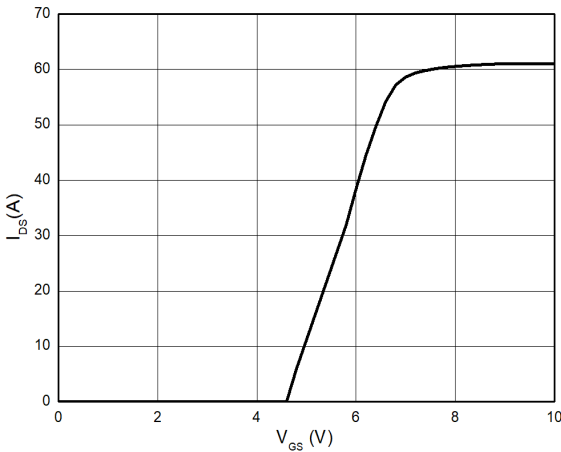


Figure 3. Typical Transfer Characteristics ($V_{DS}=10\text{V}$)

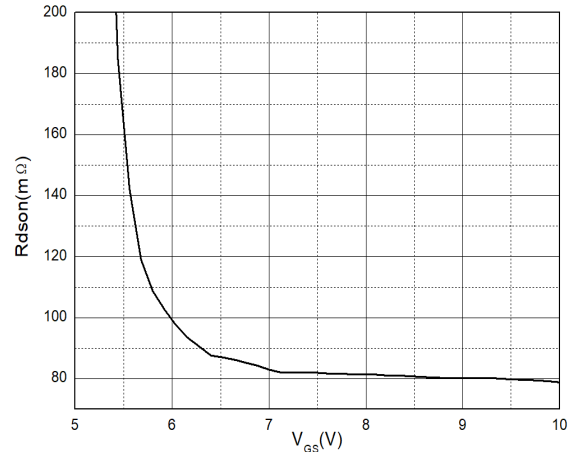


Figure 4. Typical On-state Resistance $T_j=25^\circ\text{C}$ ($I_D=1\text{A}$)



Typical Characteristics

$T_j = 25^\circ\text{C}$ unless otherwise stated

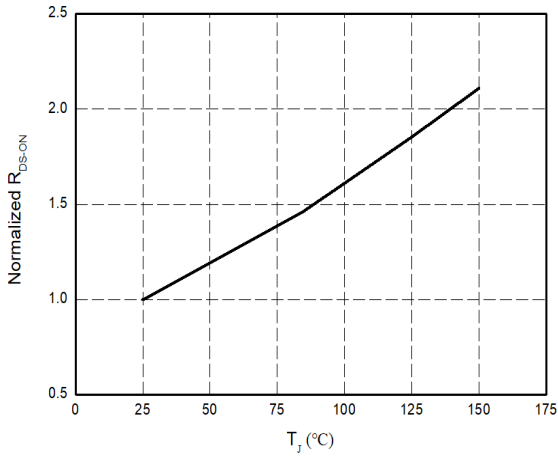


Figure 5. Normalized On-resistance

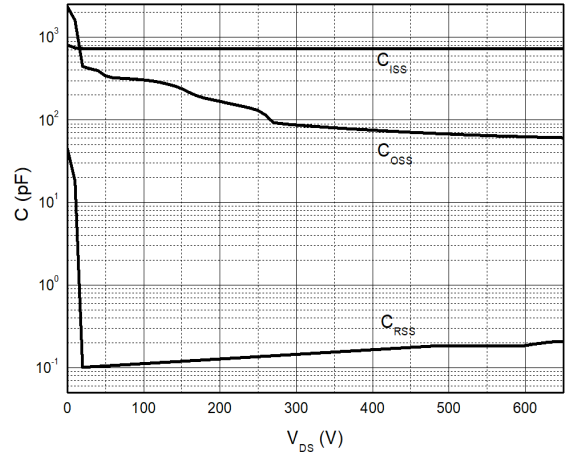


Figure 6. Typical Capacitance (f=1MHz)

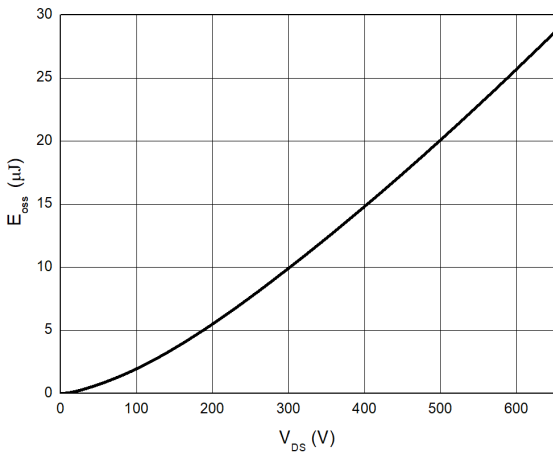


Figure 7. Typical C_{OSS} Stored Energy

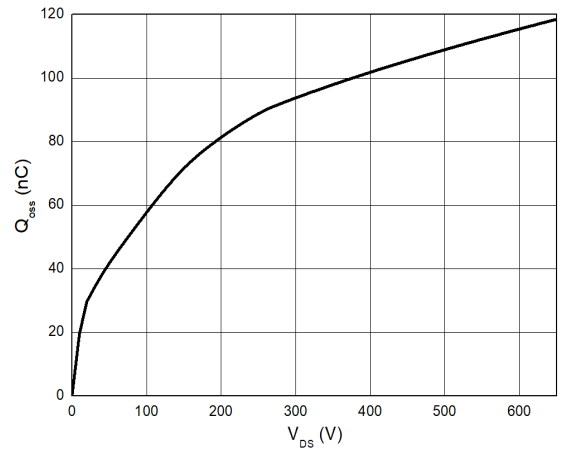


Figure 8. Typical Q_{OSS}



Typical Characteristics

$T_j=25^\circ\text{C}$ unless otherwise stated

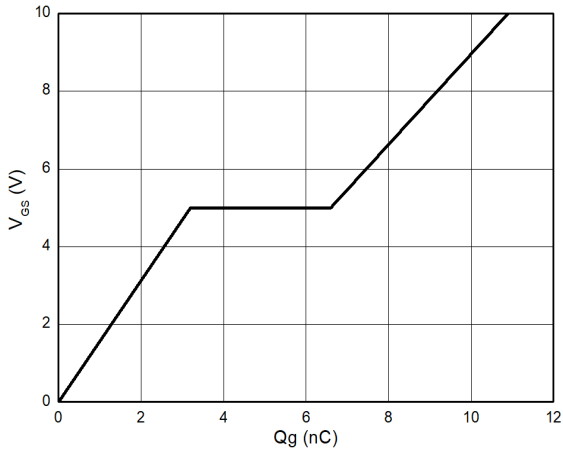


Figure 9. Typical Gate Charge ($V_{DS}=400\text{V}$, $I_D=1\text{A}$)

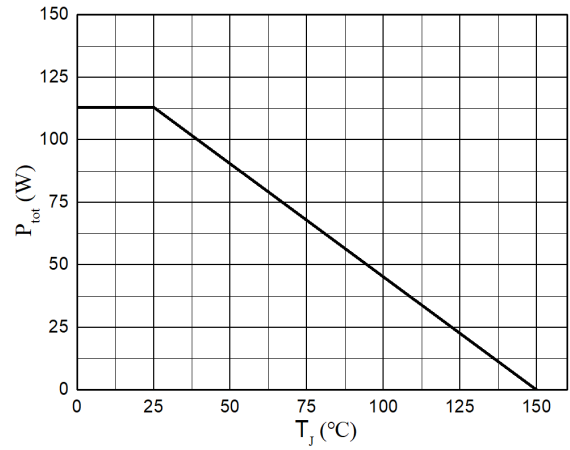


Figure 10. Power Dissipation

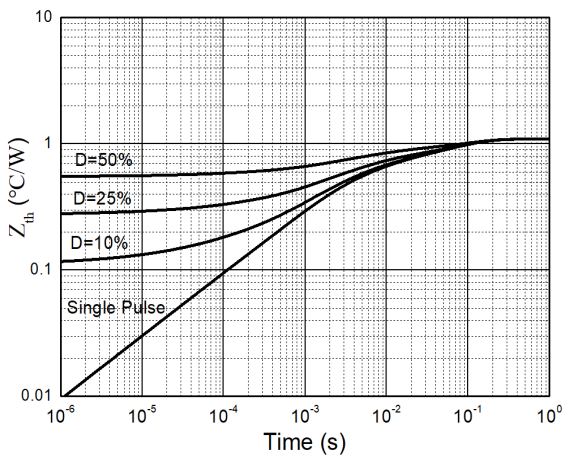


Figure 11. Transient Thermal Resistance

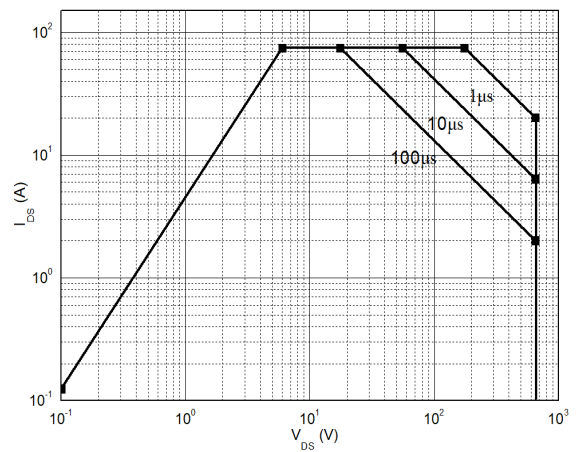


Figure 12. Safe Operating Area $T_J=25^\circ\text{C}$

Typical Characteristics

$T_j=25^\circ\text{C}$ unless otherwise stated

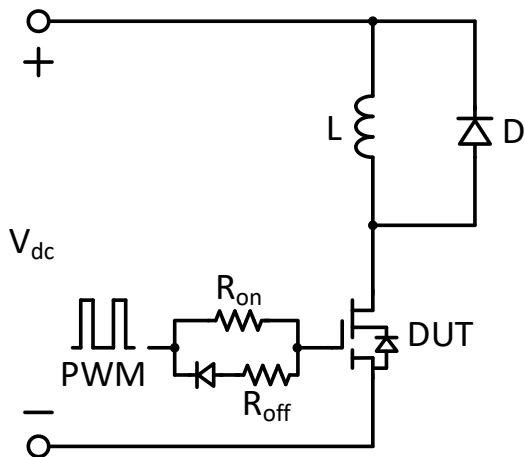


Figure 13. Switching times with inductive load

$V_{DS}=400\text{V}$, $V_{GS}=0\text{V}$ to 10V , $I_D=2.1\text{A}$,
 $R_{G-on(ext)}=6.8\Omega$, $R_{G-off(ext)}=2.2\Omega$, $L=250\mu\text{H}$

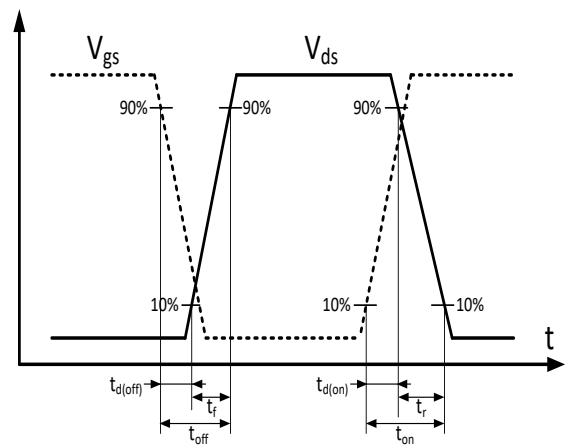
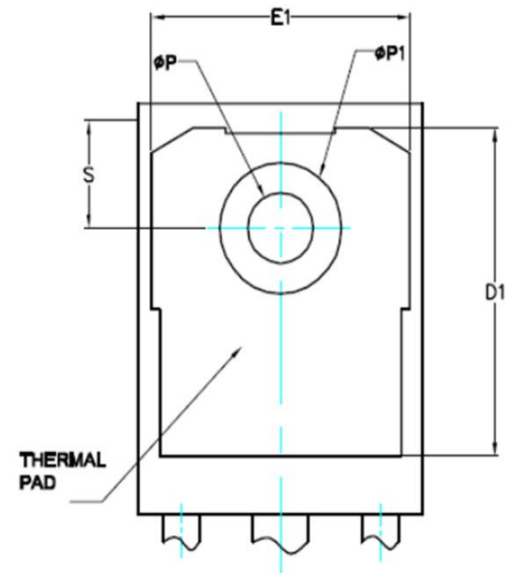
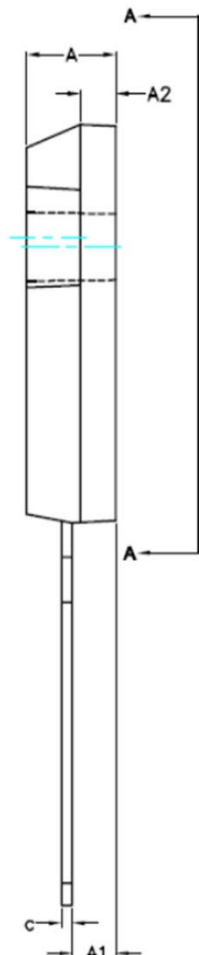
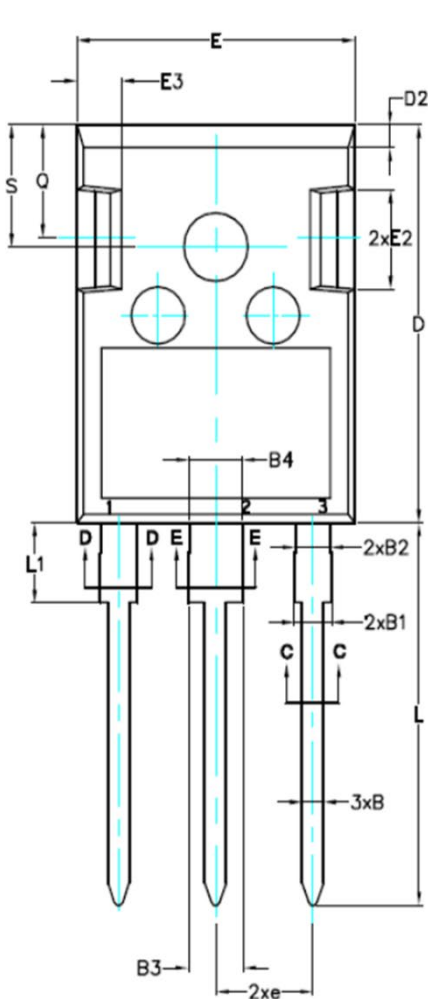


Figure 14. Switching times with waveform

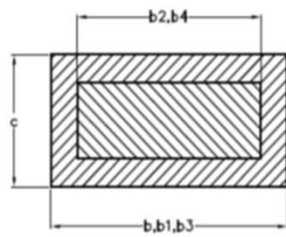
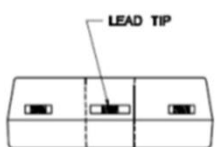


CE65H080TOCI

TO247-3L



VIEW A-A



SECTION C-C, D-D, E-E

| SYMBOLS | DIMENSIONS | | | |
|---------|------------|-------|----------|-------|
| | mm | | inch | |
| | MIN. | MAX. | MIN. | MAX. |
| A | 4.85 | 5.15 | 0.191 | 0.203 |
| A1 | 2.25 | 2.55 | 0.088 | 0.100 |
| A2 | 1.85 | 2.15 | 0.073 | 0.085 |
| B | 1.04 | 1.33 | 0.041 | 0.052 |
| B1 | 1.90 | 2.35 | 0.075 | 0.093 |
| B2 | 1.90 | 2.15 | 0.075 | 0.085 |
| B3 | 2.90 | 3.35 | 0.114 | 0.132 |
| B4 | 2.90 | 3.15 | 0.114 | 0.124 |
| c | 0.55 | 0.68 | 0.022 | 0.027 |
| D | 20.8 | 21.10 | 0.819 | 0.831 |
| D1 | 16.25 | 17.65 | 0.640 | 0.695 |
| D2 | 0.95 | 1.35 | 0.037 | 0.053 |
| E | 15.70 | 16.10 | 0.618 | 0.634 |
| E1 | 13.50 | 14.20 | 0.531 | 0.559 |
| E2 | 3.80 | 5.00 | 0.150 | 0.197 |
| E3 | 1.00 | 2.6 | 0.039 | 0.102 |
| e | 5.46BSC | | 0.215BSC | |
| L | 19.80 | 20.3 | 0.779 | 0.799 |
| L1 | 4.00 | 4.50 | 0.157 | 0.177 |
| phi P | 3.50 | 3.70 | 0.138 | 0.145 |
| phi P1 | — | 7.19 | — | 0.291 |
| Q | 5.40 | 6.00 | 0.212 | 0.236 |
| S | 6.2BSC | | 0.244BSC | |



Revision history

Major changes since the last revision

| Revision | Date | Description of changes |
|----------|------------|------------------------|
| 1.0 | 2024-07-20 | Initial release |