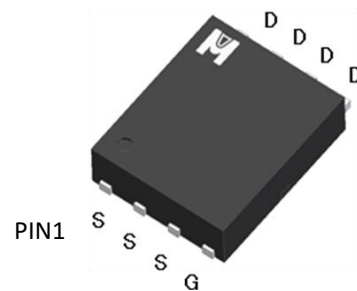
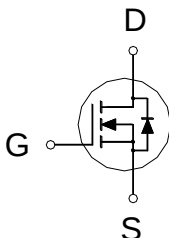


N-Channel Logic Level Enhancement Mode Field Effect Transistor

Product Summary:

|                     |             |
|---------------------|-------------|
| $BV_{DSS}$          | 30V         |
| $R_{DS(on)} (MAX.)$ | 7m $\Omega$ |
| $I_D$               | 50A         |



N Channel MOSFET

UIS, Rg 100% Tested

RoHS & Halogen Free & TSCA Compliant



ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$  Unless Otherwise Noted)

| PARAMETERS/TEST CONDITIONS                     |                                                             | SYMBOL         | LIMITS     | UNIT             |
|------------------------------------------------|-------------------------------------------------------------|----------------|------------|------------------|
| Gate-Source Voltage                            |                                                             | $V_{GS}$       | $\pm 20$   | V                |
| Continuous Drain Current                       | $T_C = 25^\circ\text{C}$                                    | $I_D$          | 50         | A                |
|                                                | $T_C = 100^\circ\text{C}$                                   |                | 35         |                  |
| Pulsed Drain Current <sup>1</sup>              |                                                             | $I_{DM}$       | 140        |                  |
| Avalanche Current                              |                                                             | $I_{AS}$       | 37.5       | mJ               |
| Avalanche Energy                               | $L = 0.1\text{mH}$ , $I_{AS}=37.5\text{A}$ , $R_G=25\Omega$ | $E_{AS}$       | 70         |                  |
| Repetitive Avalanche Energy <sup>2</sup>       | $L = 0.05\text{mH}$                                         | $E_{AR}$       | 15         |                  |
| Power Dissipation                              | $T_C = 25^\circ\text{C}$                                    | $P_D$          | 50         | W                |
|                                                | $T_C = 100^\circ\text{C}$                                   |                | 20         |                  |
| Operating Junction & Storage Temperature Range |                                                             | $T_j, T_{stg}$ | -55 to 150 | $^\circ\text{C}$ |

100% UIS testing in condition of  $V_D=25\text{V}$ ,  $L=0.1\text{mH}$ ,  $V_G=10\text{V}$ ,  $I_L=22\text{A}$ , Rated  $V_{DS}=30\text{V}$  N-CH

THERMAL RESISTANCE RATINGS

| THERMAL RESISTANCE               | SYMBOL          | TYPICAL | MAXIMUM | UNIT                        |
|----------------------------------|-----------------|---------|---------|-----------------------------|
| Junction-to-Case                 | $R_{\theta JC}$ |         | 2.5     | $^\circ\text{C} / \text{W}$ |
| Junction-to-Ambient <sup>3</sup> | $R_{\theta JA}$ |         | 50      |                             |



<sup>1</sup>Pulse width limited by maximum junction temperature.

<sup>2</sup>Duty cycle < 1%

<sup>3</sup>The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz.

Copper, in a still air environment with  $T_A = 25^\circ\text{C}$ .

<sup>4</sup>Guarantee by Engineering test

ELECTRICAL CHARACTERISTICS ( $T_J = 25\text{ }^{\circ}\text{C}$ , Unless Otherwise Noted)

| PARAMETER                                                               | SYMBOL             | TEST CONDITIONS                                            | LIMITS |      |           | UNIT    |
|-------------------------------------------------------------------------|--------------------|------------------------------------------------------------|--------|------|-----------|---------|
|                                                                         |                    |                                                            | MIN    | TYP  | MAX       |         |
| STATIC                                                                  |                    |                                                            |        |      |           |         |
| Drain-Source Breakdown Voltage                                          | $V_{(BR)DSS}$      | $V_{GS} = 0V, I_D = 250\mu A$                              | 30     |      |           | V       |
| Gate Threshold Voltage                                                  | $V_{GS(th)}$       | $V_{DS} = V_{GS}, I_D = 250\mu A$                          | 1.0    | 1.7  | 3.0       |         |
| Gate-Body Leakage                                                       | $I_{GSS}$          | $V_{DS} = 0V, V_{GS} = \pm 20V$                            |        |      | $\pm 100$ | nA      |
| Zero Gate Voltage Drain Current                                         | $I_{DSS}$          | $V_{DS} = 24V, V_{GS} = 0V$                                |        |      | 1         | $\mu A$ |
|                                                                         |                    | $V_{DS} = 20V, V_{GS} = 0V, T_J = 125\text{ }^{\circ}C$    |        |      | 25        |         |
| On-State Drain Current <sup>1</sup>                                     | $I_{D(ON)}$        | $V_{DS} = 10V, V_{GS} = 10V$                               | 50     |      |           | A       |
| Drain-Source On-State Resistance <sup>1</sup>                           | $R_{DS(ON)}$       | $V_{GS} = 10V, I_D = 25A$                                  |        | 5.5  | 7         | mΩ      |
|                                                                         |                    | $V_{GS} = 4.5V, I_D = 20A$                                 |        | 6.5  | 9         |         |
| Forward Transconductance <sup>1</sup>                                   | $g_{fs}$           | $V_{DS} = 5V, I_D = 20A$                                   |        | 18   |           | S       |
| DYNAMIC                                                                 |                    |                                                            |        |      |           |         |
| Input Capacitance                                                       | $C_{iss}$          | $V_{GS} = 0V, V_{DS} = 15V, f = 1MHz$                      |        | 1014 |           | pF      |
| Output Capacitance                                                      | $C_{oss}$          |                                                            |        | 163  |           |         |
| Reverse Transfer Capacitance                                            | $C_{rss}$          |                                                            |        | 93   |           |         |
| Gate Resistance                                                         | $R_g$              | $V_{GS} = 15mV, V_{DS} = 0V, f = 1MHz$                     |        | 2.2  |           | Ω       |
| Total Gate Charge <sup>1,2</sup>                                        | $Q_g(V_{GS}=10V)$  | $V_{DS} = 15V, V_{GS} = 10V,$<br>$I_D = 25A$               |        | 15   |           | nC      |
|                                                                         | $Q_g(V_{GS}=4.5V)$ |                                                            |        | 8.5  |           |         |
| Gate-Source Charge <sup>1,2</sup>                                       | $Q_{gs}$           |                                                            |        | 3.3  |           |         |
| Gate-Drain Charge <sup>1,2</sup>                                        | $Q_{gd}$           |                                                            |        | 3.5  |           |         |
| Turn-On Delay Time <sup>1,2</sup>                                       | $t_{d(on)}$        | $V_{DS} = 15V,$<br>$I_D = 5A, V_{GS} = 10V, R_G = 3\Omega$ |        | 5.3  |           | nS      |
| Rise Time <sup>1,2</sup>                                                | $t_r$              |                                                            |        | 8.2  |           |         |
| Turn-Off Delay Time <sup>1,2</sup>                                      | $t_{d(off)}$       |                                                            |        | 21.2 |           |         |
| Fall Time <sup>1,2</sup>                                                | $t_f$              |                                                            |        | 13   |           |         |
| SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T <sub>c</sub> = 25 °C) |                    |                                                            |        |      |           |         |
| Continuous Current                                                      | $I_S$              |                                                            |        |      | 50        | A       |
| Pulsed Current <sup>3</sup>                                             | $I_{SM}$           |                                                            |        |      | 140       |         |
| Forward Voltage <sup>1</sup>                                            | $V_{SD}$           | $I_F = I_S, V_{GS} = 0V$                                   |        |      | 1.3       | V       |
| Reverse Recovery Time                                                   | $t_{rr}$           | $I_F = I_S, dI_F/dt = 100A / \mu S$                        |        | 20   |           | nS      |
| Peak Reverse Recovery Current                                           | $I_{RM(REC)}$      |                                                            |        | 180  |           | A       |
| Reverse Recovery Charge                                                 | $Q_{rr}$           |                                                            |        | 11   |           | nC      |

<sup>1</sup>Pulse test : Pulse Width  $\leq 300 \mu\text{sec}$ , Duty Cycle  $\leq 2\%$ .

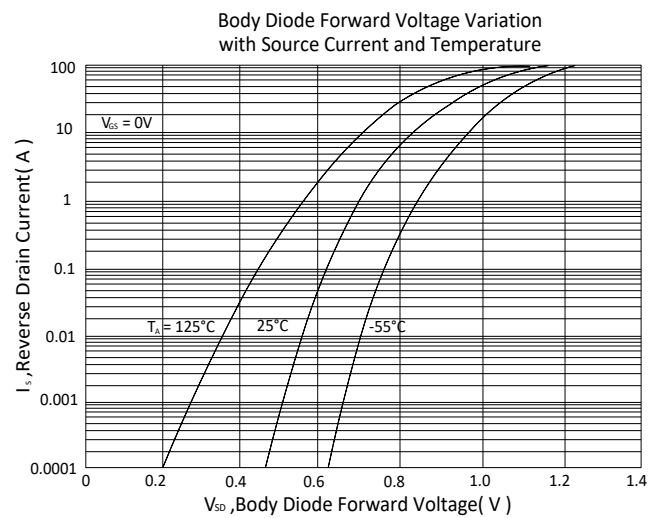
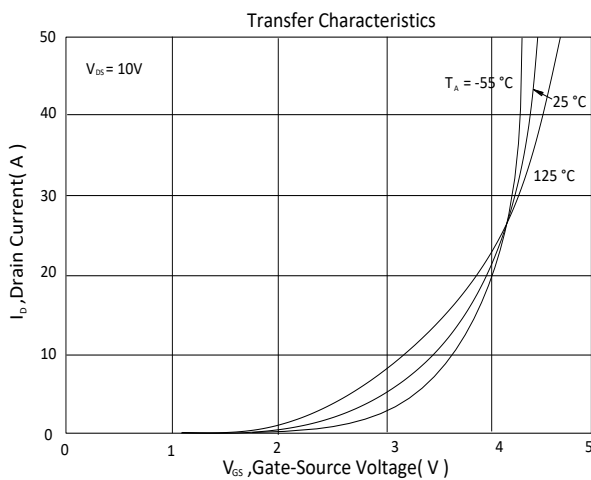
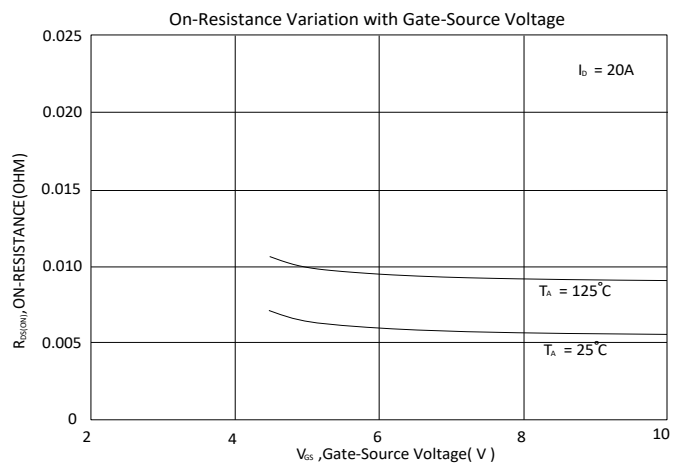
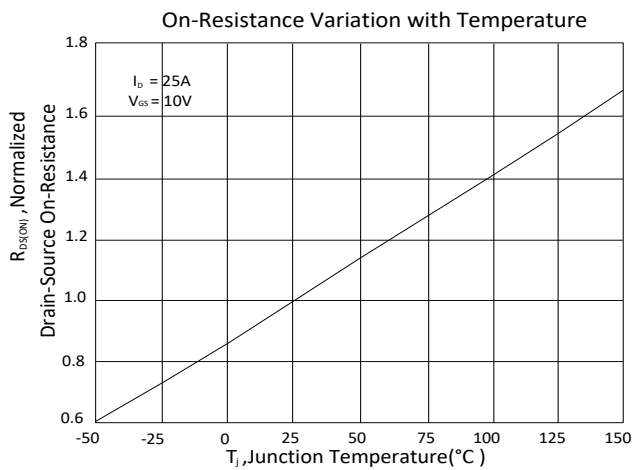
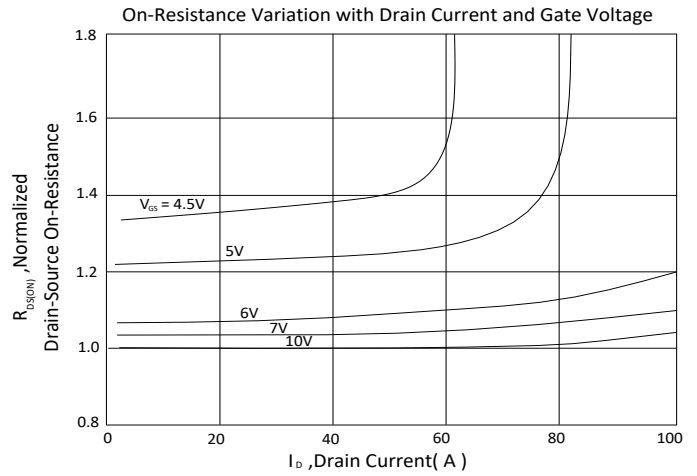
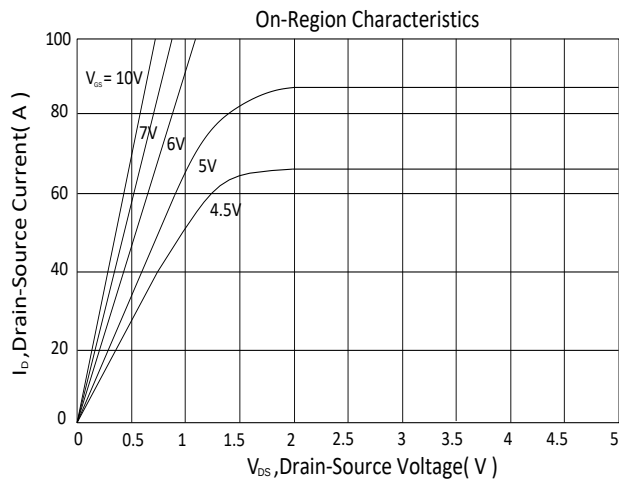
<sup>2</sup>Independent of operating temperature.

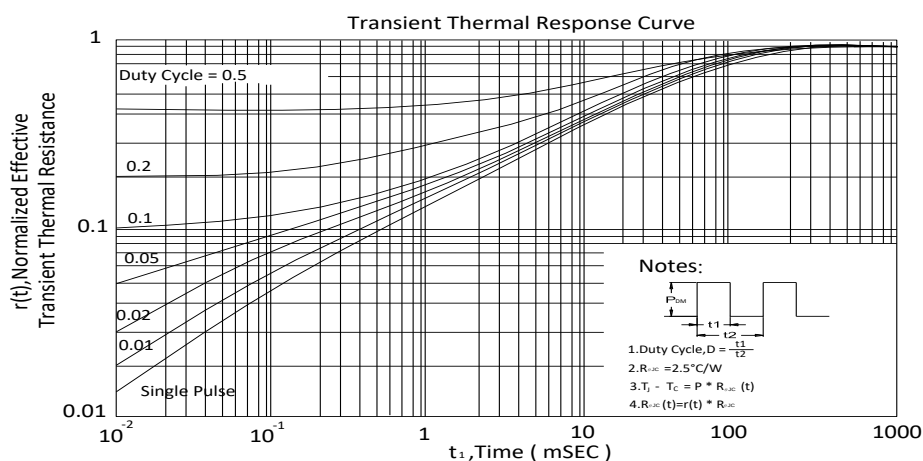
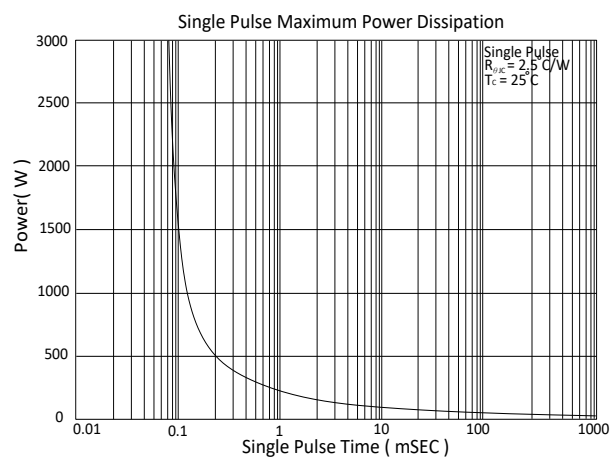
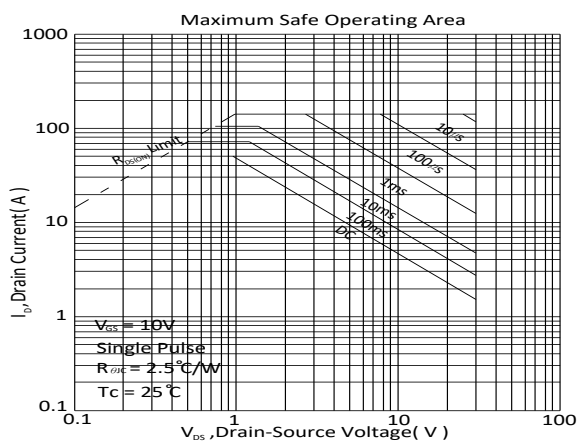
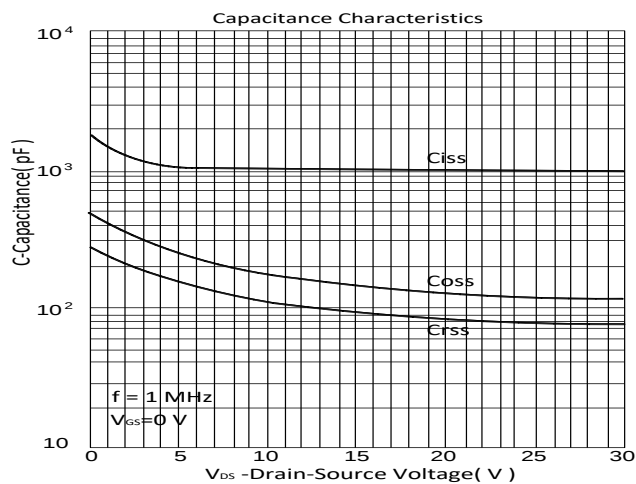
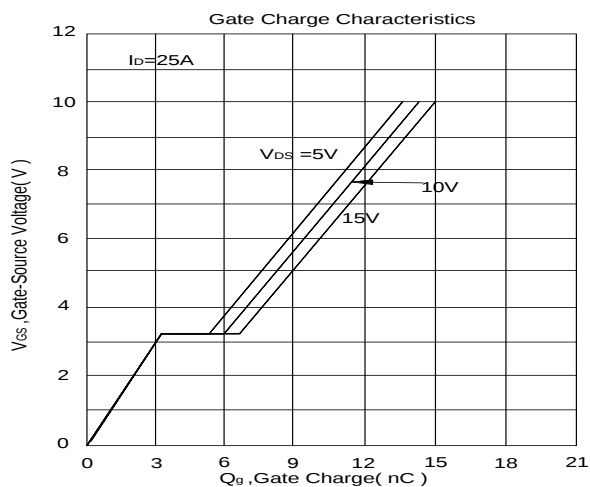
<sup>3</sup>Pulse width limited by maximum junction temperature.

EMC will review datasheet by quarter, and update new version.



## TYPICAL CHARACTERISTICS





## Ordering & Marking Information:

Device Name: EMB07N03HR for EDFN5X6



→ B07N03R: Device Name

→ ABCDEFG: Date Code

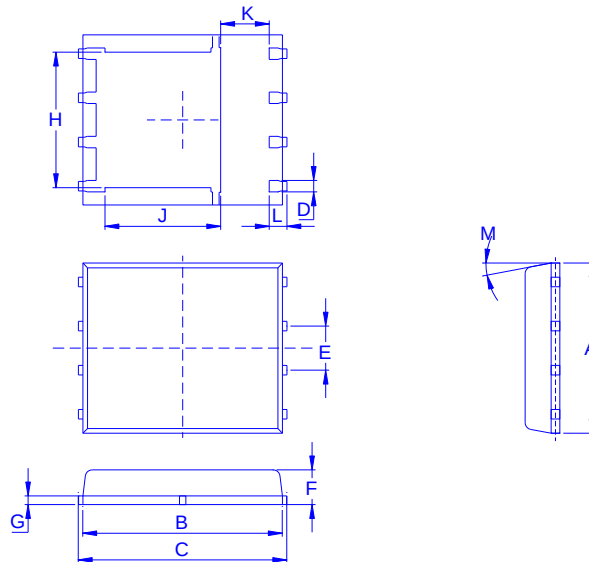
A: Assembly House

B: Year(A:2008 B:2009 C:2010....)

C: Month(A:01 B:02 C:03 D:04 E:05 F:06 G:07 H:08 I:09 J:10 K:11 L:12)

DEFG: Serial No.

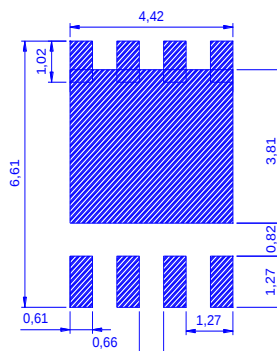
## Outline Drawing



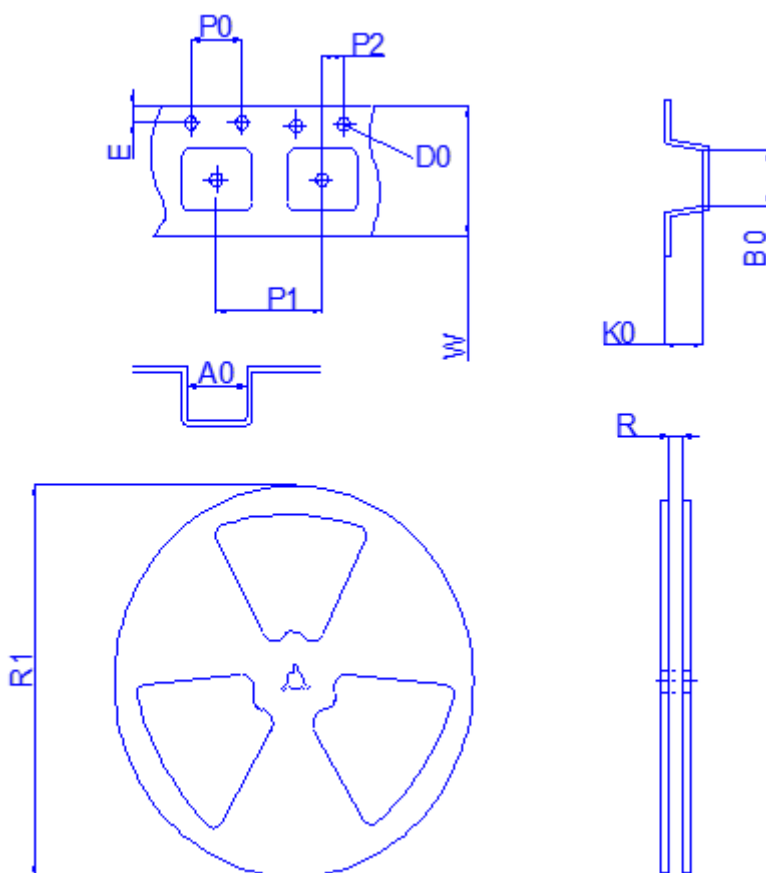
Dimension in mm

| Dimension | A   | B    | C    | D    | E    | F    | G    | H    | J    | K    | L    | M   |
|-----------|-----|------|------|------|------|------|------|------|------|------|------|-----|
| Min       | 4.8 | 5.55 | 5.9  | 0.3  | 1.17 | 0.85 | 0.15 | 3.61 | 3.18 | 1    | 0.38 | 0°  |
| Typ.      | 4.9 | 5.7  | 6    | 0.4  | 1.27 | 0.95 | 0.2  | 3.87 | 3.44 | 1.2  | 0.4  |     |
| Max       | 5.4 | 5.85 | 6.15 | 0.51 | 1.37 | 1.17 | 0.34 | 4.31 | 3.78 | 1.39 | 0.71 | 12° |

## Recommended minimum pads



◆ Tape&Reel Information:2500pcs/Reel(Dimension in millimeter)



|                    |                       |
|--------------------|-----------------------|
| Package            | EDFN5X6               |
| Reel               | 13"                   |
| Device orientation | <p>FEED DIRECTION</p> |

Dimension in mm

| Dimension | Carrier tape |     |     |     |     |     |     |     |     | Reel |     |
|-----------|--------------|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|
|           | A0           | B0  | D0  | E   | K0  | P0  | P1  | P2  | W   | R    | R1  |
| Typ.      | 6.4          | 5.3 | 1.5 | 1.8 | 1.6 | 4   | 8   | 2   | 12  | 12.4 | 330 |
| ±         | 0.2          | 0.2 | 0.1 | 0.1 | 0.6 | 0.1 | 0.1 | 0.1 | 0.3 | 2    | 2   |