

## Product Summary

| $V_{DS}$ | $R_{DS(ON\_TYP)}$         | $I_{D\_MAX}$ |
|----------|---------------------------|--------------|
| 30V      | $1.1m\Omega @V_{GS}=10V$  | 235A         |
|          | $1.5m\Omega @V_{GS}=4.5V$ |              |

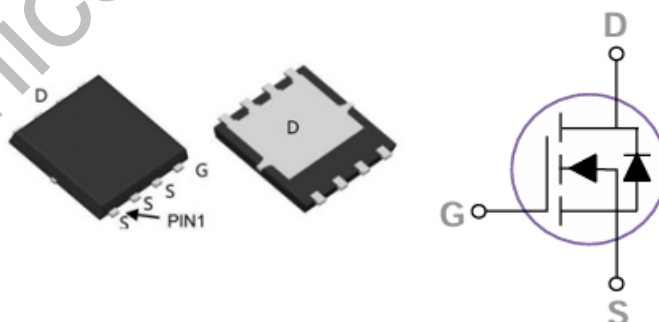
## Features

- Low Gate Charge
- High Power and current handling capability
- Lead free product is acquired

## Applications

- Load switch
- PWM applications
- Power management

## PPAK5X6 Pin Configuration



HALOGEN  
FREE



## Package Marking and Ordering Information

| Orderable Part Number | Package Type | Form         | Quantity (PCS) |
|-----------------------|--------------|--------------|----------------|
| BSC235N03C            | PDFN5*6      | 13"Tape&Reel | 5000           |

### Absolute Maximum Ratings (TC=25°C unless otherwise noted)

| Parameter                                                                            |                         | Symbol          | Value      | Unit               |
|--------------------------------------------------------------------------------------|-------------------------|-----------------|------------|--------------------|
| Drain-source Voltage                                                                 |                         | $V_{DS}$        | 30         | V                  |
| Gate-source Voltage                                                                  |                         | $V_{GS}$        | $\pm 20$   | V                  |
| Continuous Drain Current                                                             | $T_C=25^\circ\text{C}$  | $I_D$           | 235        | A                  |
|                                                                                      | $T_C=100^\circ\text{C}$ |                 | 150        |                    |
| Pulsed Drain Current( $T_C=25^\circ\text{C}$ , $T_p$ Limited By $T_{jmax}$ ) (note1) |                         | $I_{DM}$        | 930        | A                  |
| Maximum Power Dissipation( $T_C=25^\circ\text{C}$ )                                  |                         | $P_D$           | 145        | W                  |
| Avalanche energy , single Pulse( $L=0.5\text{mH}$ ) (note2)                          |                         | $E_{AS}$        | 1120       | mJ                 |
| Thermal Resistance Junction to Case                                                  |                         | $R_{\theta JC}$ | 0.88       | $^\circ\text{C/W}$ |
| Operating Junction And Storage Temperature                                           |                         | $T_j, T_{stg}$  | -55 To 150 | $^\circ\text{C}$   |

\* Drain current limited by maximum junction temperature.

#### Notes:

- 1、 This current is chip limited, which is calculated based on  $R_{thjc}$ .
- 2、 This current is calculated on single pulse with 10 $\mu\text{s}$  Pulse & Duty Cycle = 1%.
- 3、 Defined by design, not subject to production test, EAS condition:  $T_J=25^\circ\text{C}$ ,  $V_{DD}=15\text{V}$ ,  $V_{GS}=10\text{V}$ ,  $L=0.5\text{mH}$ .
- 4、 Device mounted on FR-4 substrate PC board with 2oz copper in 1inch square cooling area.
- 5、 Thermal resistance from junction to soldering point (on the exposed drain pad).
- 6、 Short duration pulse test used to minimize self-heating effect.
- 7、 Defined by design, not subject to production.

### Electrical Characteristic (TC=25°C unless otherwise noted)

| Parameter                          | Symbol       | Value |      |           | Unit       | Test Condition                                                   |
|------------------------------------|--------------|-------|------|-----------|------------|------------------------------------------------------------------|
|                                    |              | Min.  | Typ. | Max.      |            |                                                                  |
| Off Characteristic                 |              |       |      |           |            |                                                                  |
| Drain-source breakdown voltage     | $BV_{DSS}$   | 30    | -    | -         | V          | $V_{GS}=0V, I_D=250\mu A$                                        |
| Zero gate voltage drain current    | $I_{DSS}$    | -     | -    | 1         | $\mu A$    | $V_{DS}=30V, V_{GS}=0V \quad T_J=25^{\circ}C$                    |
|                                    |              | -     | -    | 100       | $\mu A$    | $V_{DS}=30V, \quad V_{GS}=0V \quad T_J=25^{\circ}C$              |
| Gate-source leakage current        | $I_{GSS}$    | -     | -    | $\pm 100$ | nA         | $V_{GS}=\pm 20V, V_{DS}=0V$                                      |
| On Characteristics                 |              |       |      |           |            |                                                                  |
| Gate threshold voltage             | $V_{GS(th)}$ | 1.3   | 1.5  | 2.3       | V          | $V_{DS}=V_{GS}, I_D=250\mu A$                                    |
| Drain-source on-state resistance   | $R_{DS(on)}$ | -     | 1.1  | 1.5       | m $\Omega$ | $V_{GS}=10V, I_D=15A \quad T_J=25^{\circ}C$                      |
|                                    |              |       | 1.5  | 2.0       | m $\Omega$ | $V_{GS}=4.5V, I_D=15A \quad T_J=25^{\circ}C$                     |
| Dynamic Characteristic             |              |       |      |           |            |                                                                  |
| Input Capacitance                  | $C_{iss}$    | -     | 7660 | -         | PF         | $V_{GS}=0V, V_{DS}=15V, f=1.0MHz$                                |
| Output Capacitance                 | $C_{oss}$    | -     | 850  | -         |            |                                                                  |
| Reverse Transfer Capacitance       | $C_{rss}$    | -     | 690  | -         |            |                                                                  |
| Gate Resistance                    | $R_g$        |       | 2.0  |           |            | $V_{GS}=0V, V_{DS}=0V, f=1.0MHz$                                 |
| Switching Characteristics          |              |       |      |           |            |                                                                  |
| Turn-on delay time                 | $t_{d(on)}$  | -     | 4.0  | -         | nS         | $V_{GS}=10V, V_{DS}=15V, R_L=1.6\Omega, R_{GEN}=6\Omega$         |
| Turn-on Rise time                  | $t_r$        | -     | 2.0  | -         |            |                                                                  |
| Turn-off delay time                | $t_{d(off)}$ | -     | 12   | -         |            |                                                                  |
| Turn-off Fall time                 | $t_f$        | -     | 7    | -         |            |                                                                  |
| Gate Total Charge                  | $Q_G$        | -     | 160  | -         | nC         | $V_{GS}=10V, V_{DS}=15V, I_D=25A$                                |
| Gate-Source Charge                 | $Q_{gs}$     | -     | 40   | -         |            |                                                                  |
| Gate-Drain Charge                  | $Q_{gd}$     | -     | 31   | -         |            |                                                                  |
| Drain-Source Diode Characteristics |              |       |      |           |            |                                                                  |
| Body Diode Forward Voltage         | $V_{SD}$     | -     | -    | 1.2       | V          | $V_{GS}=0V, I_{SD}=2.0A, T_J=25^{\circ}C$                        |
| Body Diode Forward Current         | $I_S$        | -     | -    | 235       | A          | -                                                                |
| Body Diode Reverse Recovery Time   | $T_{rr}$     | -     | 40   | -         | ns         | $T_J=25^{\circ}C, \quad I_{SD}=20A, V_{GS}=0V, dI/dt=100A/\mu s$ |
| Body Diode Reverse Recovery Charge | $Q_{rr}$     | -     | 36   | -         | nC         |                                                                  |

### TYPICAL CHARACTERISTICS

Figure 1. Output Characteristics

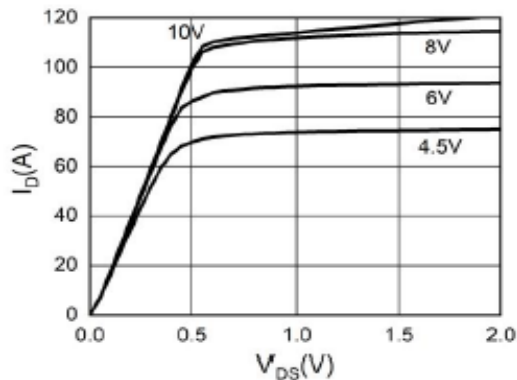


Figure 2. Transfer Characteristics

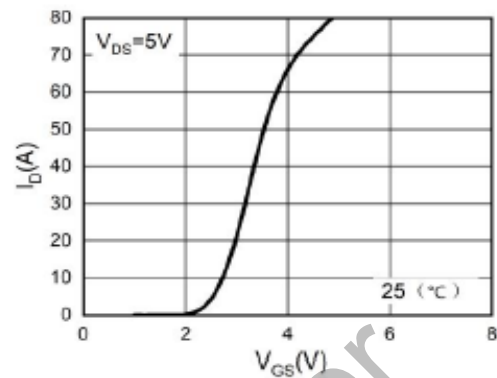


Figure 3. Power Dissipation

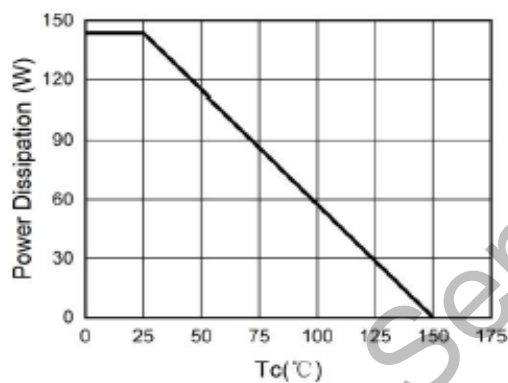


Figure 4. Drain Current

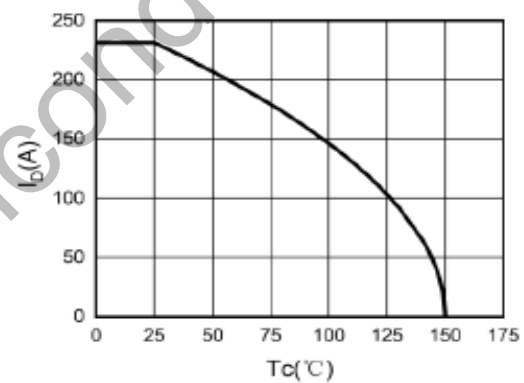


Figure 5.  $BV_{DSS}$  vs Junction Temperature

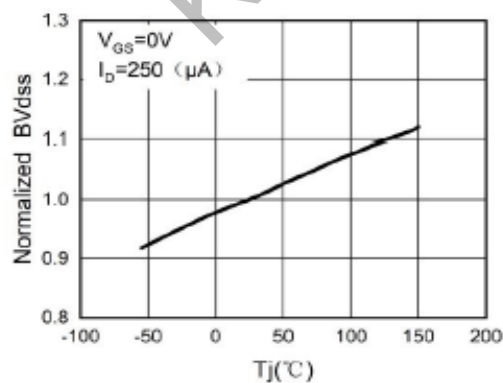
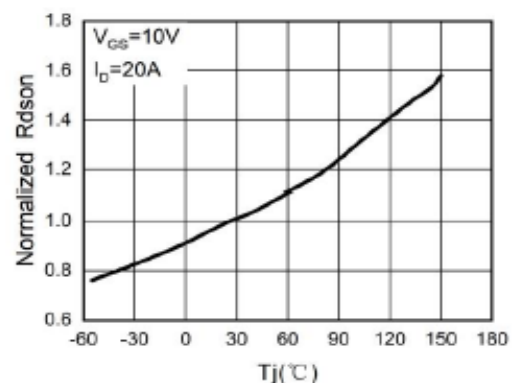
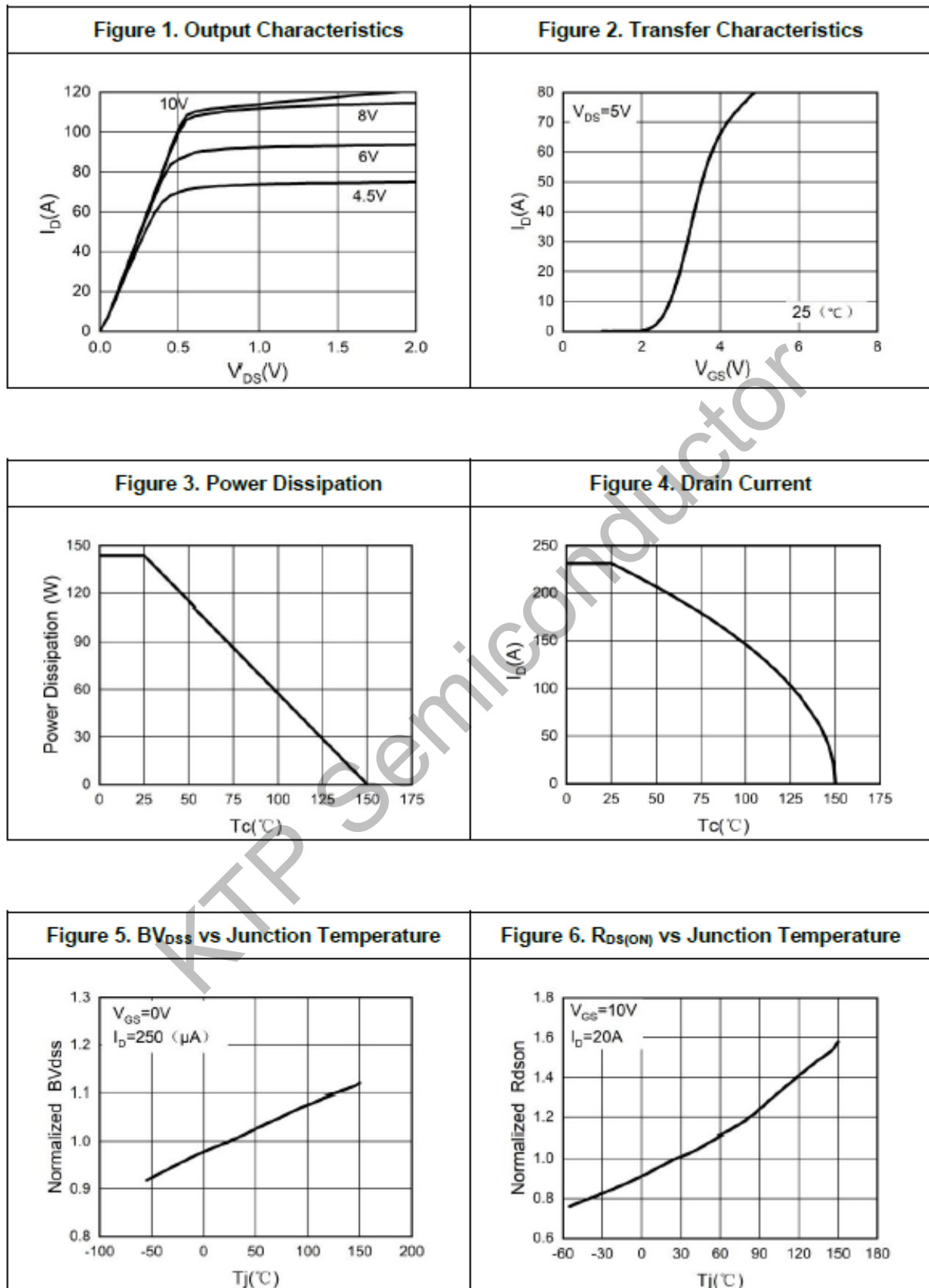


Figure 6.  $R_{DS(ON)}$  vs Junction Temperature



### TYPICAL CHARACTERISTICS



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Figure 7. Gate Charge Waveforms

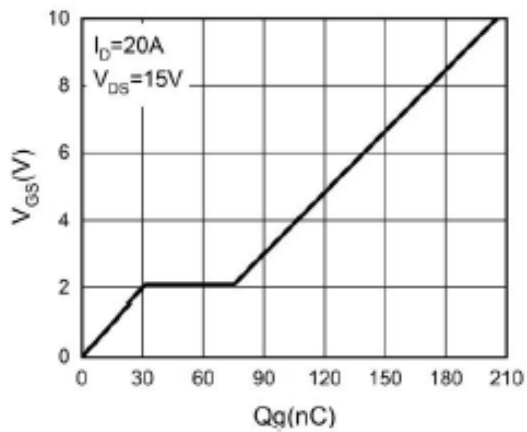


Figure 8. Capacitance

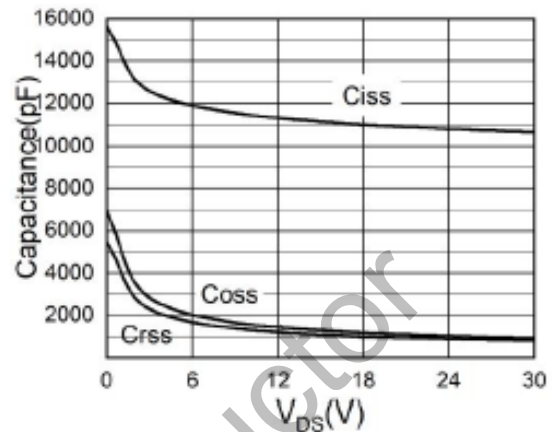


Figure 9. Body-Diode Characteristics

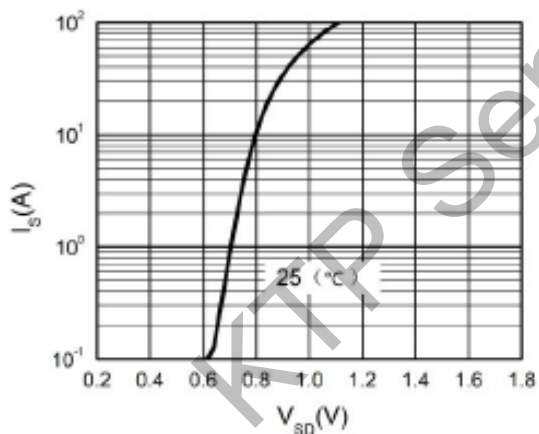
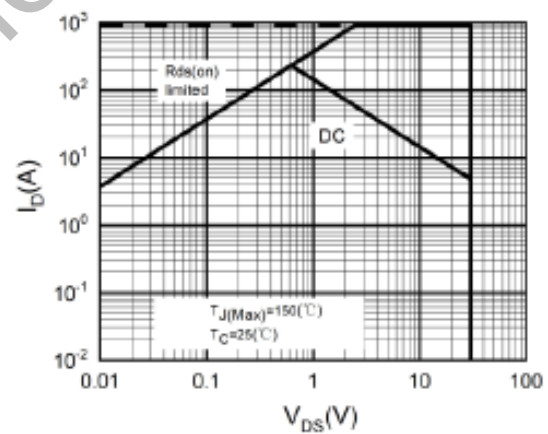
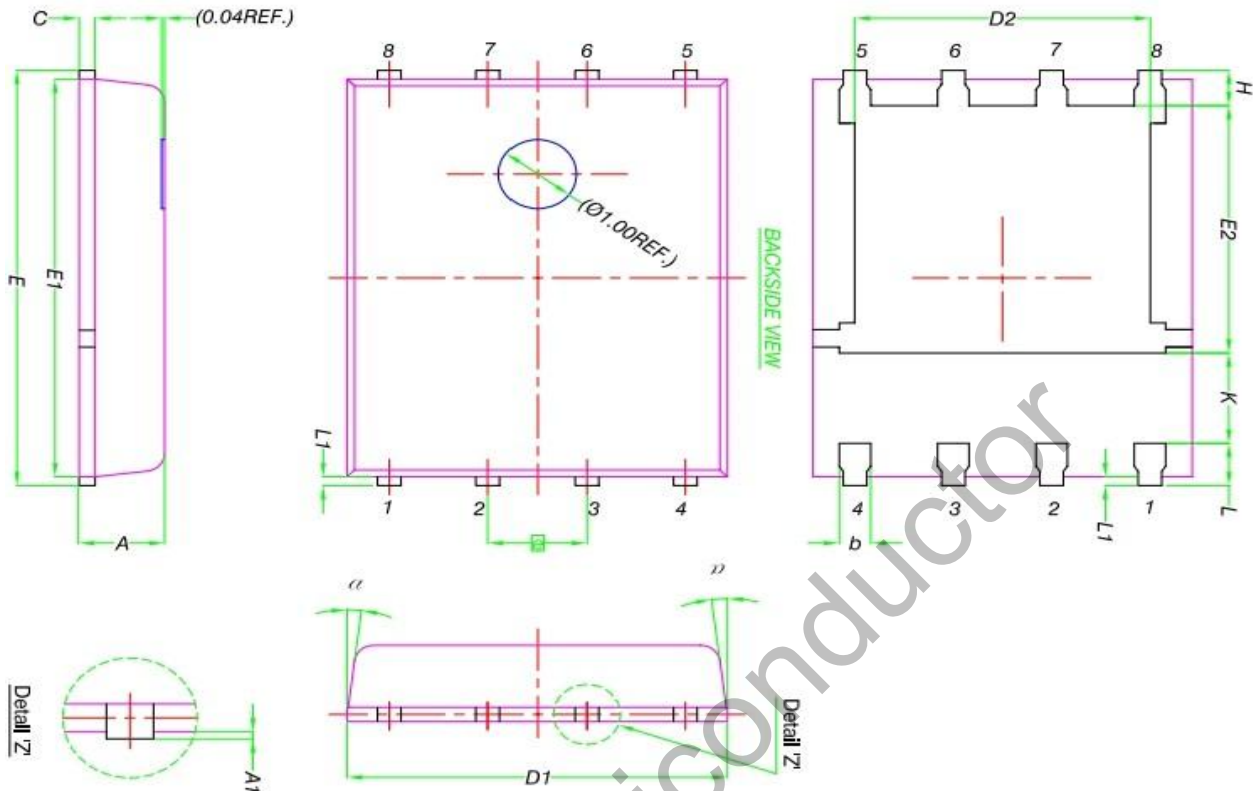


Figure 10. Maximum Safe Operating Area



### Package Information

PDFN5\*6-8L



| DIM.                                                                                | MILLIMETERS |      |      |
|-------------------------------------------------------------------------------------|-------------|------|------|
|                                                                                     | MIN.        | NOM. | MAX. |
| A                                                                                   | 0.90        | 1.00 | 1.10 |
| A1                                                                                  | 0           | -    | 0.05 |
| b                                                                                   | 0.33        | 0.41 | 0.51 |
| C                                                                                   | 0.20        | 0.25 | 0.30 |
| D1                                                                                  | 4.80        | 4.90 | 5.00 |
| D2                                                                                  | 3.61        | 3.81 | 3.96 |
| E                                                                                   | 5.90        | 6.00 | 6.10 |
| E1                                                                                  | 5.70        | 5.75 | 5.80 |
| E2                                                                                  | 3.38        | 3.58 | 3.78 |
|  | 1.27 BSC    |      |      |
| H                                                                                   | 0.41        | 0.51 | 0.61 |
| K                                                                                   | 1.10        | -    | -    |
| L                                                                                   | 0.51        | 0.61 | 0.71 |
| L1                                                                                  | 0.06        | 0.13 | 0.20 |
| $\alpha$                                                                            | 0°          | -    | 12°  |

