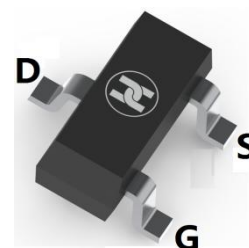
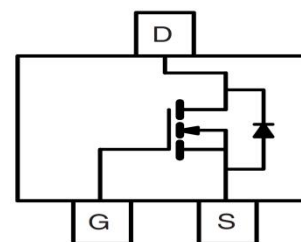


**HIGH VOLTAGE MOSFET (N-CHANNEL)**
**FEATURES**

- Low on-resistance:  $V_{DS}=100V, R_{DS(ON)}=115m\Omega @ V_{GS}=10V, I_D=3A$
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Surface Mount device


**SOT-23-3L**

**MECHANICAL DATA**

- Case: SOT-23-3L
- Case Material: Molded Plastic. UL flammability
- Classification Rating: 94V-0
- Weight: 0.008 grams (approximate)
- Marking: 5N10

**MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$  unless otherwise noted)**

| Parameter                                   | Symbol          | Value      | Unit               |
|---|-----------------|------------|--------------------|
| Drain-source voltage                        | $V_{DS}$        | 100        | V                  |
| Gate-source voltage                         | $V_{GS}$        | $\pm 20$   | V                  |
| Continuous drain current                    | $I_D$           | 5          | A                  |
| Pulsed drain current (Note 1)               | $I_{DM}$        | 20         | A                  |
| Power dissipation                           | $P_D$           | 3          | W                  |
| Thermal resistance from Junction to ambient | $R_{\theta JA}$ | 42         | $^\circ\text{C/W}$ |
| Junction temperature                        | $T_J$           | 150        | $^\circ\text{C}$   |
| Storage temperature                         | $T_{STG}$       | -55 ~ +150 | $^\circ\text{C}$   |

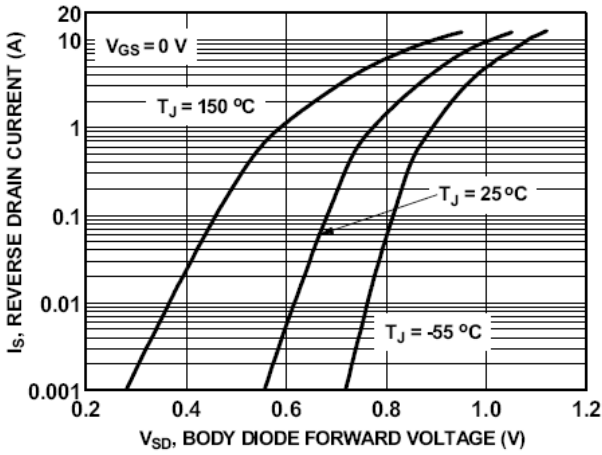
**ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$  unless otherwise specified)**

| Parameter                           | Symbol        | Min | Typ  | Max       | Unit      | Conditions  |
|-------------------------------------|---------------|-----|------|-----------|-----------|---|
| <b>STATIC CHARACTERISTICS</b>       |               |     |      |           |           |   |
| Drain-Source breakdown voltage      | $V_{(BR)DSS}$ | 100 |      |           | V         | $V_{GS}=0V, I_D=250\mu A$                           |
| Zero gate voltage drain current     | $I_{DSS}$     |     |      | 1         | $\mu A$   | $V_{DS}=100V, V_{GS}=0V$                            |
| Gate-body leakage current           | $I_{GSS}$     |     |      | $\pm 100$ | nA        | $V_{DS}=0V, V_{GS}=\pm 20V$                         |
| Gate-threshold voltage (note 1)     | $V_{GS(th)}$  | 1.2 | 1.8  | 2.5       | V         | $V_{DS}=V_{GS}, I_D=250\mu A$                       |
| Drain-source on-resistance (note 1) | $R_{DS(ON)}$  |     | 95   | 115       | $m\Omega$ | $V_{GS}=10V, I_D=3A$                                |
|                                     |               |     | 115  | 150       | $m\Omega$ | $V_{GS}=4.5V, I_D=3A$                               |
| Diode forward voltage (note 1)      | $V_{SD}$      |     | 0.7  | 1.2       | V         | $I_S=3A, V_{GS}=0V$                                 |
| <b>DYNAMIC CHARACTERISTICS</b>      |               |     |      |           |           |   |
| Input capacitance                   | $C_{iss}$     |     | 690  |           | pF        | $V_{DS}=25V, V_{GS}=0V, f=1MHz$                     |
| Output capacitance                  | $C_{oss}$     |     | 120  |           | pF        |   |
| Reverse transfer capacitance        | $C_{rss}$     |     | 90   |           | pF        |   |
| Gate Resistance                     | $R_g$         |     | 2    |           | $\Omega$  | $V_{DS}=0V, V_{GS}=0V, f=1MHz$                      |
| Total gate charge                   | $Q_g$         |     | 5    |           | nC        | $V_{DD}=30V, V_{GS}=4.5V, I_D=3A$                   |
|                                     |               |     | 15.5 |           | nC        |   |
| Gate-source charge                  | $Q_{gs}$      |     | 3.2  |           | nC        | $V_{DD}=30V, V_{GS}=10V, I_D=3A$                    |
| Gate-drain charge                   | $Q_{gd}$      |     | 4.7  |           | nC        |   |
| Turn-on delay time                  | $t_{d(on)}$   |     | 11   |           | nS        | $V_{DS}=30V, V_{GS}=10V, R_{GEN}=2.5\Omega, I_D=2A$ |
| Turn-on rise time                   | $t_r$         |     | 8    |           | nS        |   |
| Turn-off delay time                 | $t_{d(off)}$  |     | 35   |           | nS        |   |
| Turn-off fall time                  | $t_f$         |     | 9    |           | nS        |   |

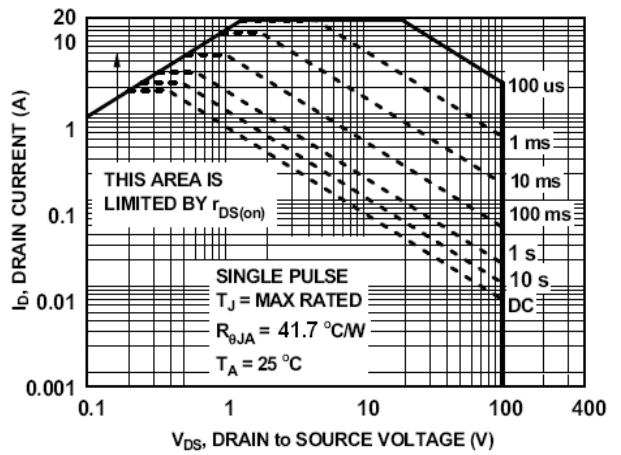
Note:1. Pulse test ; Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$  .

**HIGH VOLTAGE MOSFET (N-CHANNEL)**  
**Typical Characteristics**

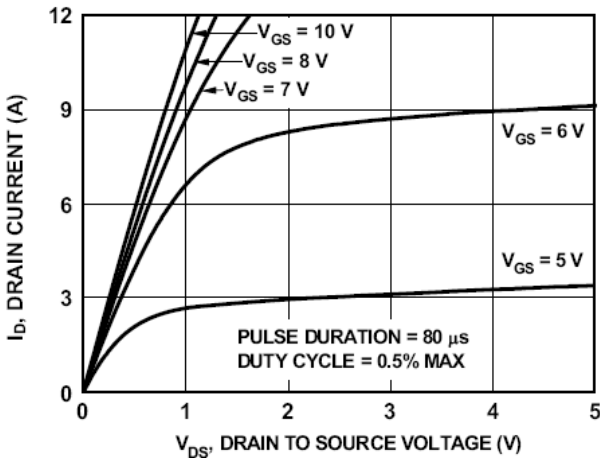
**Figure1. Source-Drain Diode Forward Voltage**



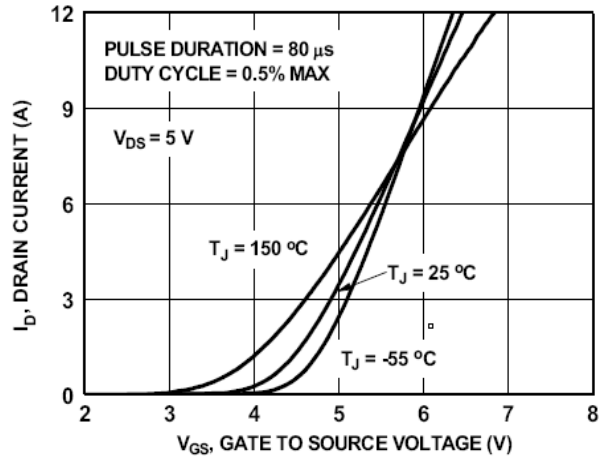
**Figure2. Safe operating area**



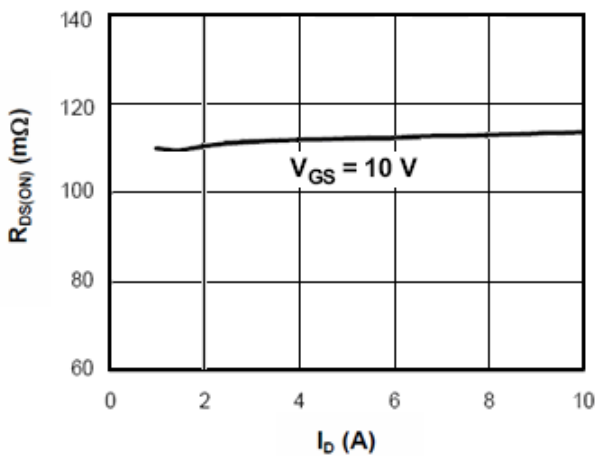
**Figure3. Output characteristics**



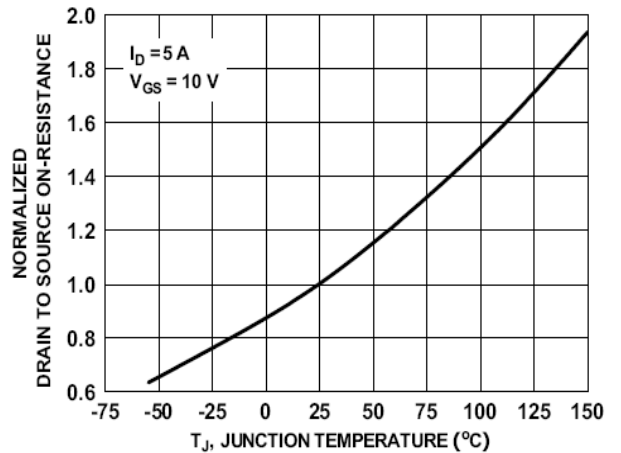
**Figure4. Transfer characteristics**



**Figure5. Static drain-source on resistance**

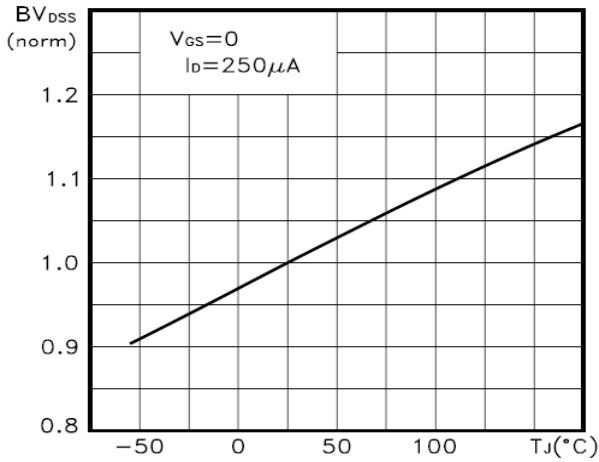


**Figure6.  $R_{DS(ON)}$  vs Junction Temperature**

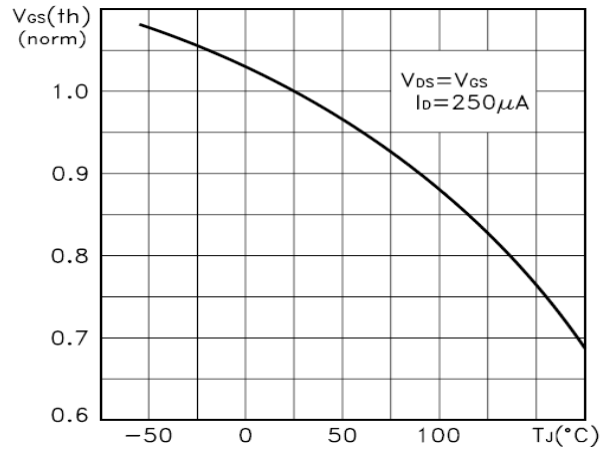


**HIGH VOLTAGE MOSFET (N-CHANNEL)**

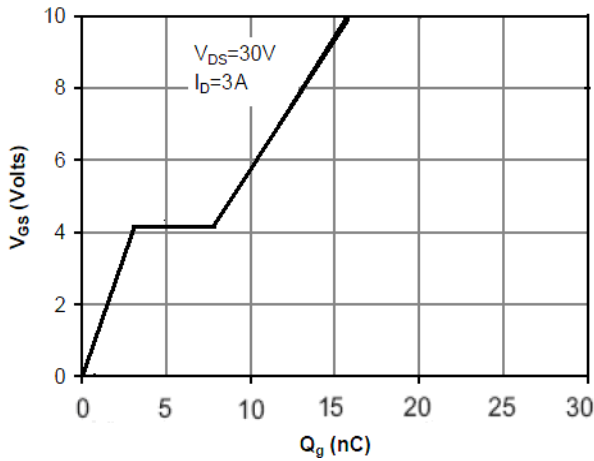
**Figure7.  $BV_{DSS}$  vs Junction Temperature**



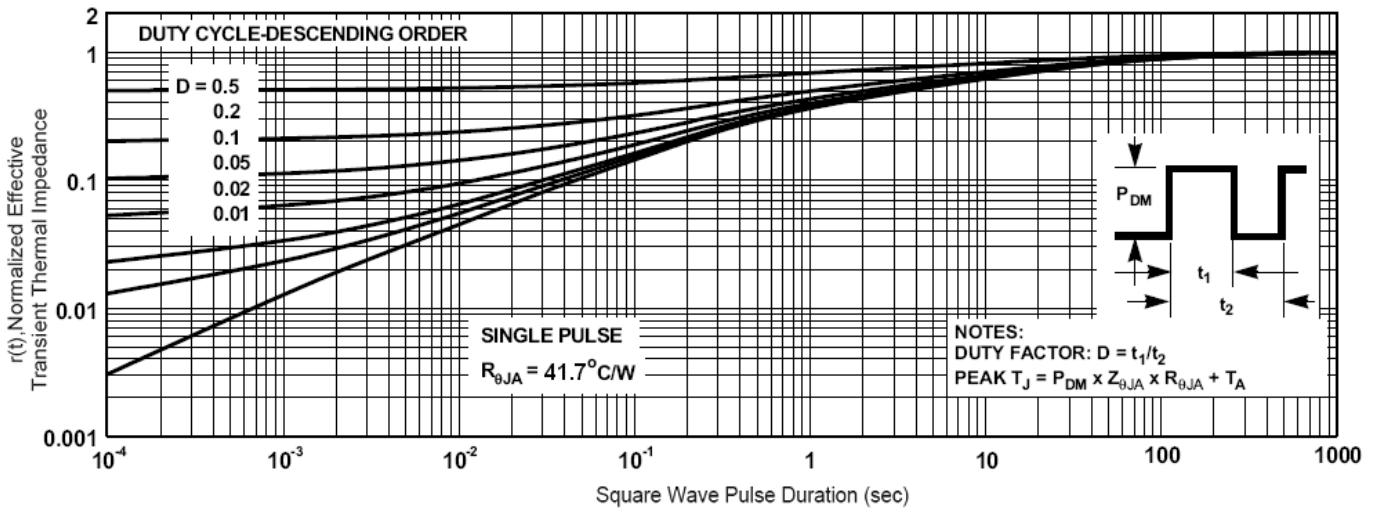
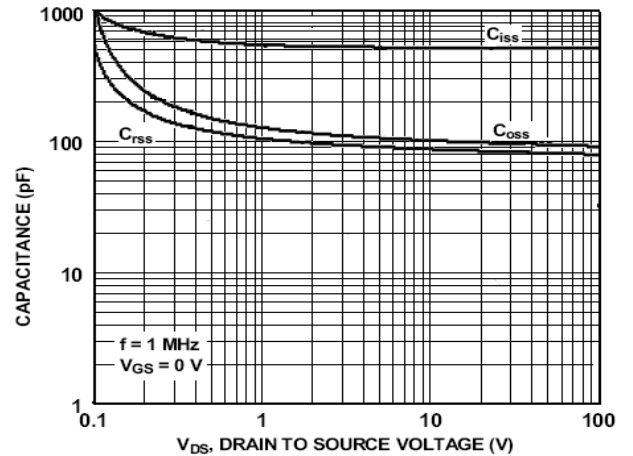
**Figure8.  $V_{GS(th)}$  vs Junction Temperature**



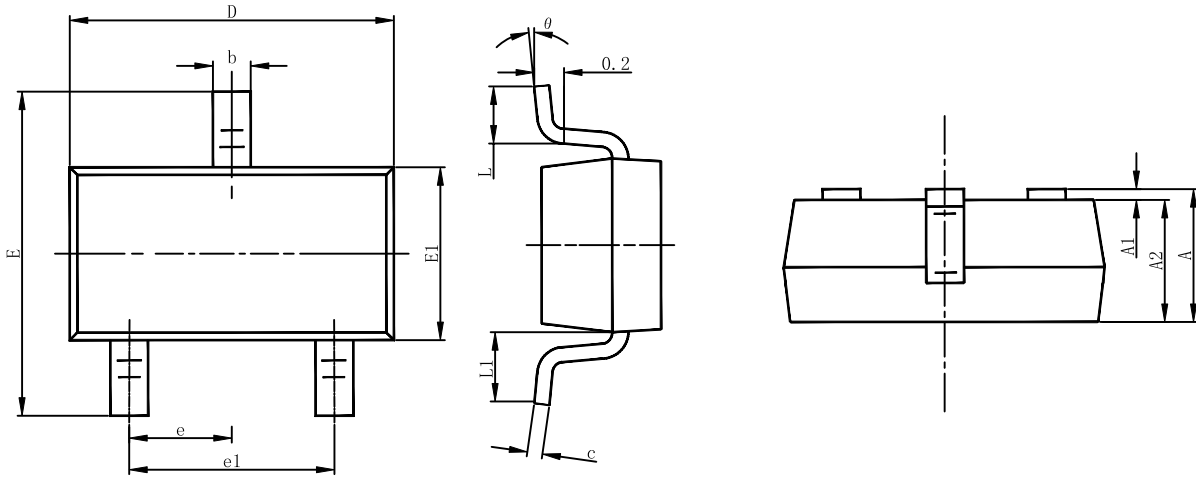
**Figure9. Gate charge waveforms**



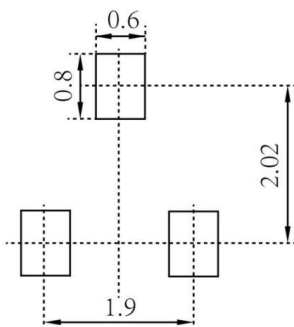
**Figure10. Capacitance**



**Figure11. Normalized Maximum Transient Thermal Impedance**

**HIGH VOLTAGE MOSFET (N-CHANNEL)**
**SOT-23-3L PACKAGE OUTLINE DIMENSIONS**


| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 1.050                     | 1.250 | 0.041                | 0.049 |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 1.050                     | 1.150 | 0.041                | 0.045 |
| b      | 0.300                     | 0.500 | 0.012                | 0.020 |
| c      | 0.100                     | 0.200 | 0.004                | 0.008 |
| D      | 2.820                     | 3.020 | 0.111                | 0.119 |
| E1     | 1.500                     | 1.700 | 0.059                | 0.067 |
| E      | 2.650                     | 2.950 | 0.104                | 0.116 |
| e      | 0.950(BSC)                |       | 0.037(BSC)           |       |
| e1     | 1.800                     | 2.000 | 0.071                | 0.079 |
| L      | 0.300                     | 0.600 | 0.012                | 0.024 |
| L1     | 0.600REF.                 |       | 0.024REF.            |       |
| θ      | 0°                        | 8°    | 0°                   | 8°    |

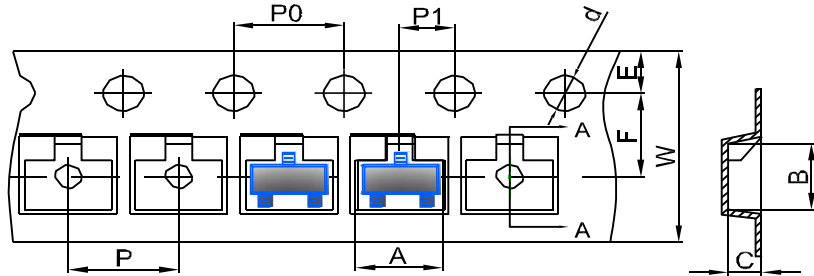
**SOT-23-3L Suggested Pad Layout**

**Note:**

1. Controlling dimension: in millimeters
2. General tolerance:  $\pm 0.05\text{mm}$
3. The pad layout is for reference purposes only

HIGH VOLTAGE MOSFET (N-CHANNEL)

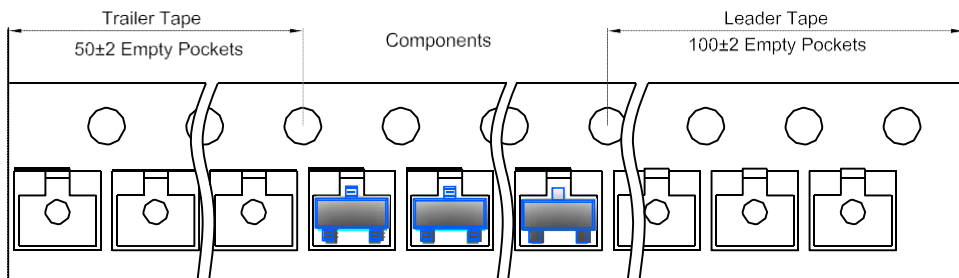
SOT-23-3L Tape and Reel

SOT-23-3L Embossed Carrier Tape

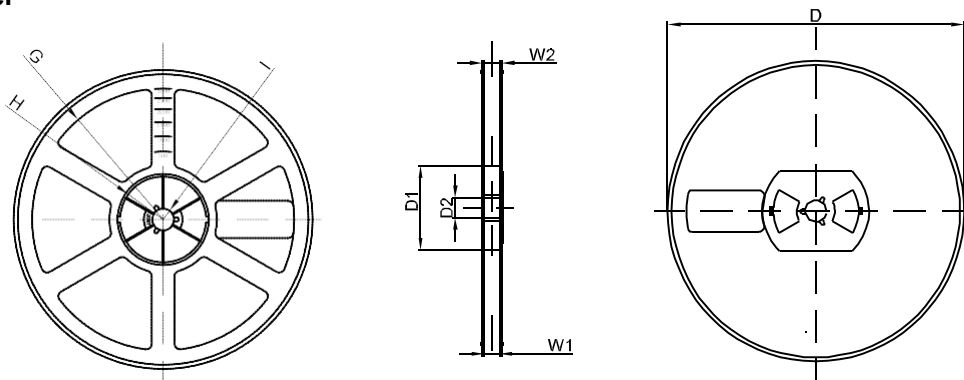


| DIMENSIONS ARE IN MILLIMETER |      |      |      |       |      |      |      |      |      |      |
|------------------------------|------|------|------|-------|------|------|------|------|------|------|
| TYPE                         | A    | B    | C    | d     | E    | F    | P0   | P    | P1   | W    |
| SOT-23-3L                    | 3.15 | 2.77 | 1.22 | Ø1.50 | 1.75 | 3.50 | 4.00 | 4.00 | 2.00 | 8.00 |
| TOLERANCE                    | ±0.1 | ±0.1 | ±0.1 | ±0.1  | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 |

SOT-23-3L Tape Leader and Trailer



SOT-23-3L Reel



| DIMENSIONS ARE IN MILLIMETER |      |       |       |     |        |       |      |       |
|------------------------------|------|-------|-------|-----|--------|-------|------|-------|
| REEL OPTION                  | D    | D1    | D2    | G   | H      | I     | W1   | W2    |
| 7" DIA                       | Ø178 | 54.40 | 13.00 | R78 | R25.60 | R6.50 | 9.50 | 12.30 |
| TOLERANCE                    | ±2   | ±1    | ±1    | ±1  | ±1     | ±1    | ±1   | ±1    |