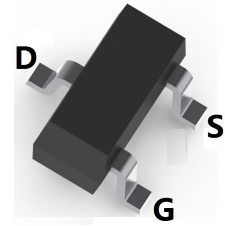
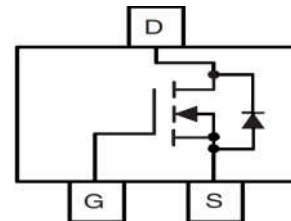


**N-CHANNEL POWER MOSFET**
**FEATURES**

- $V_{DS}$  max: 30V
- $V_{GS}$  max:  $\pm 12V$
- $R_{DS(on)}$  max:  $29m\Omega$  @ $V_{GS}=4.5V$   
 $R_{DS(on)}$  max:  $37m\Omega$  @ $V_{GS}=2.5V$


**SOT-23**

**Equivalent circuit**
**MECHANICAL DATA**

- Case: SOT-23
- Case material: Molded plastic. UL flammability
- Classification rating: 94V-0
- Terminal: Lead free plating, solderable per MIL-STD-202, method 208
- Weight: 0.008 grams (approximate)

**MAXIMUM RATINGS** ( $T_A = 25^\circ C$  unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-source voltage	$V_{DS}$	30	V
Continuous drain current @ $V_{GS}=10V$	$I_D$	5.0	A
Continuous drain current @ $V_{GS}=10V, T_A=70^\circ C$		4.0	
Pulsed drain current	$I_{DM}$	25	
Maximum power dissipation	$P_D$	1.3	W
Maximum power dissipation @ $T_A=70^\circ C$		0.8	
Linear derating factor		0.01	W/ $^\circ C$
Gate-to-source voltage	$V_{GS}$	$\pm 12$	V
Junction and storage temperature range	$T_J, T_{STG}$	-55 ~+ 150	$^\circ C$
Thermal resistance from junction-to-ambient (note 1)	$R_{\theta JA}$	100	$^\circ C/W$
Thermal resistance from junction-to-ambient ( $t < 10s$ )		99	

**N-CHANNEL POWER MOSFET**
**ELECTRICAL CHARACTERISTICS** ( $T_A=25^{\circ}\text{C}$  unless otherwise specified)

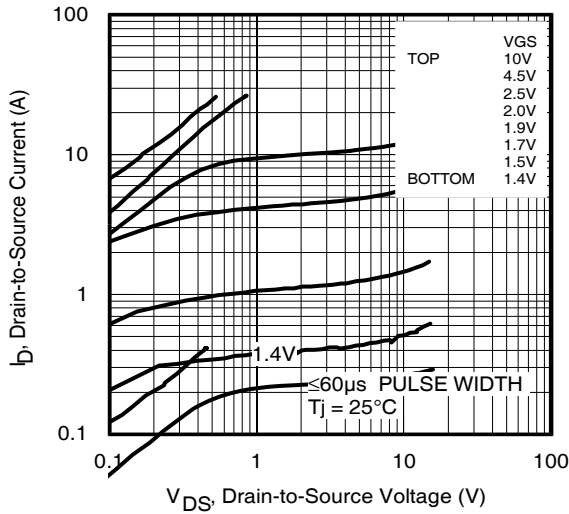
Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Drain-to-source breakdown voltage	$V_{(BR)DSS}$	30			V	$V_{GS}=0V, I_D=250\mu A$
Breakdown voltage temp. coefficient	$\Delta V_{(BR)DSS}/\Delta T_J$		0.02		V/ $^{\circ}\text{C}$	Reference to $25^{\circ}\text{C}, I_D=1\text{mA}$
Static drain-to-source on-resistance (note 2)	$R_{DS(on)}$		22	29	m $\Omega$	$V_{GS}=4.5V, I_D=5.0A$
			27	37		$V_{GS}=2.5V, I_D=4.0A$
Gate threshold voltage	$V_{GS(th)}$	0.5	0.8	1.1	V	$V_{DS}=V_{GS}, I_D=10\mu A$
Drain-to-source leakage current	$I_{DSS}$			1.0	$\mu A$	$V_{DS}=24V, V_{GS}=0V$
				150		$V_{DS}=24V, V_{GS}=0V, T_J=125^{\circ}\text{C}$
Gate-to-source forward leakage	$I_{GSS}$			100	nA	$V_{GS}=12V$
Gate-to-source reverse leakage				-100		$V_{GS}=-12V$
Internal gate resistance	$R_G$		1.7		$\Omega$	
Forward transconductance	$g_{fs}$	19			S	$V_{DS}=10V, I_D=5.0A$
Total gate charge	$Q_g$		6.8		nC	$I_D=5.0A, V_{DS}=15V, V_{GS}=4.5V$ (note 2)
Gate-to-source charge	$Q_{gs}$		0.3			
Gate-to-drain ("Miller") charge	$Q_{gd}$		2.4			
Turn-on delay time	$t_{d(on)}$		4.2		ns	$V_{DD}=15V, I_D=1.0A, R_G=6.8\Omega$ $V_{GS}=4.5V$ (note 2)
Rise time	$t_r$		5.6			
Turn-off delay time	$t_{d(off)}$		22			
Fall time	$t_f$		9.1			
Input capacitance	$C_{iss}$		650		pF	$V_{GS}=0V, V_{DS}=25V$ $f=1.0\text{MHz}$
Output capacitance	$C_{oss}$		65			
Reverse transfer capacitance	$C_{rss}$		46			
Continuous source current (body diode)	$I_S$			1.3	A	Equivalent circuit is showing the integral reverse p-n junction diode
Pulsed source current (body diode, note 1)	$I_{SM}$			25		
Diode forward voltage (note 2)	$V_{SD}$			1.2	V	$T_J=25^{\circ}\text{C}, I_S=5.0A, V_{GS}=0V$
Reverse recovery time (note 2)	$t_{rr}$		10	15	ns	$T_J=25^{\circ}\text{C}, V_R=15V, I_F=1.3A$
Reverse recovery charge (note 2)	$Q_{rr}$		3.8	5.7	nC	$di/dt=100A/\mu s$

**Notes :**

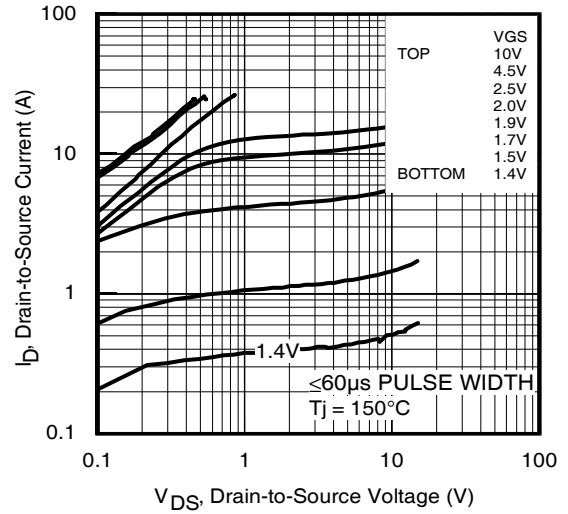
- 1.Repetitive rating; pulse width limited by max. junction temperature.
- 2.Pulse width  $\leq 400\mu s$ ; duty cycle  $\leq 2\%$ .
- 3.Surface mounted on 1 in<sup>2</sup> Cu board

**N-CHANNEL POWER MOSFET**

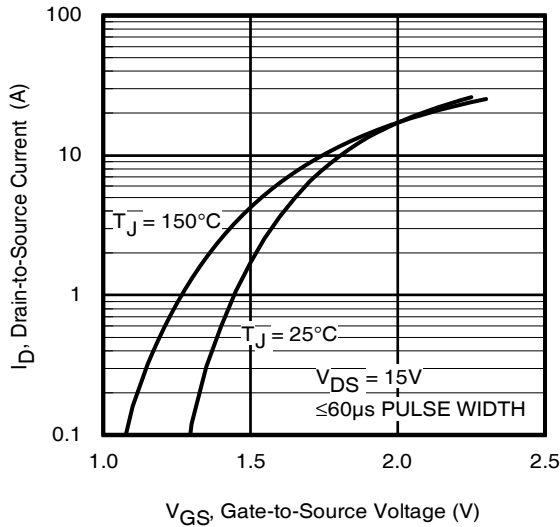
**TYPICAL CHARACTERISTICS**



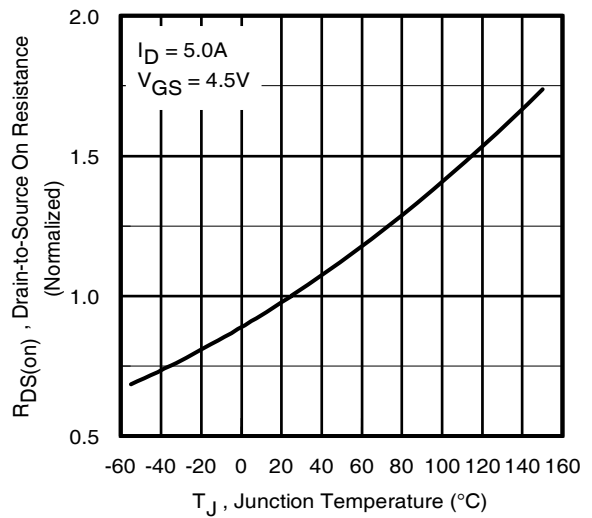
**Fig 1. Typical Output Characteristics**



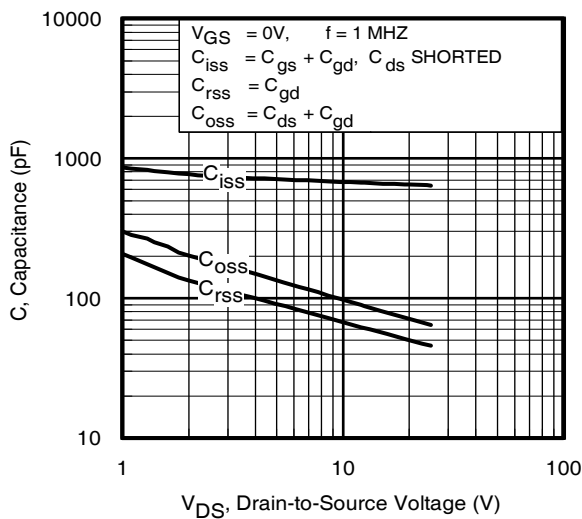
**Fig 2. Typical Output Characteristics**



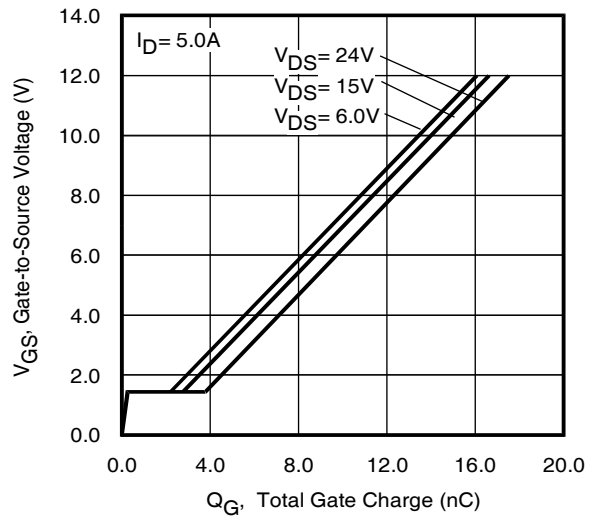
**Fig 3. Typical Transfer Characteristics**



**Fig 4. Normalized On-Resistance Vs. Temperature**



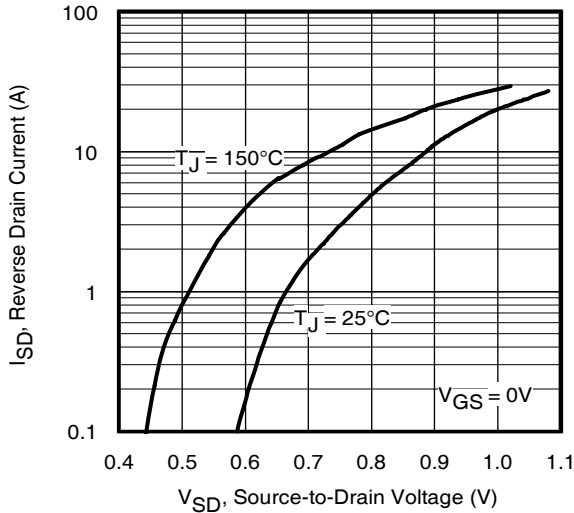
**Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage**



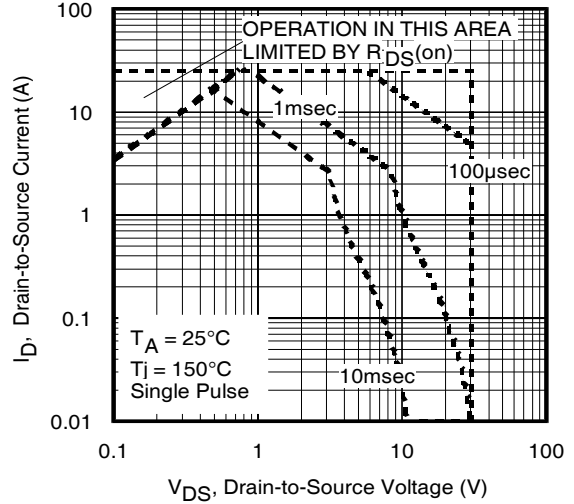
**Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage**

**N-CHANNEL POWER MOSFET**

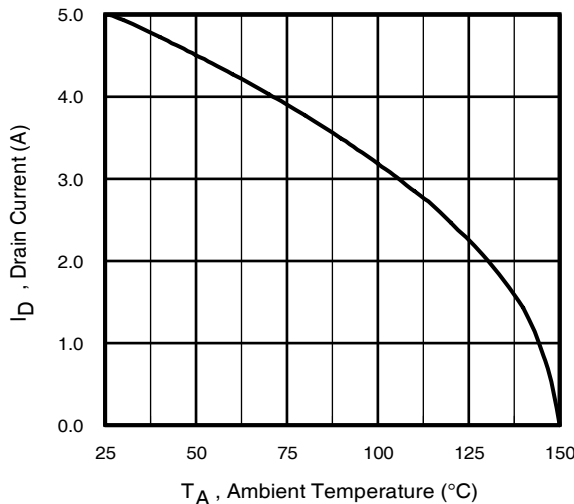
**TYPICAL CHARACTERISTICS (continued)**



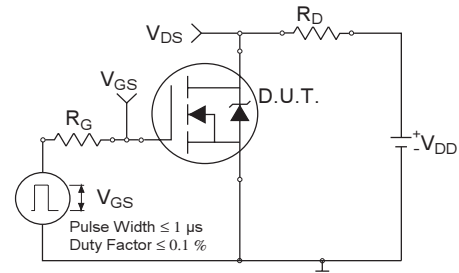
**Fig 7. Typical Source-Drain Diode Forward Voltage**



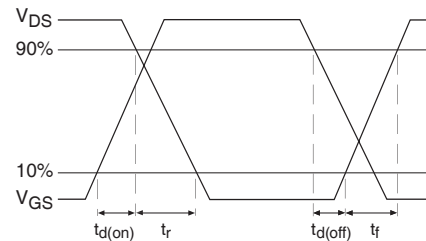
**Fig 8. Maximum Safe Operating Area**



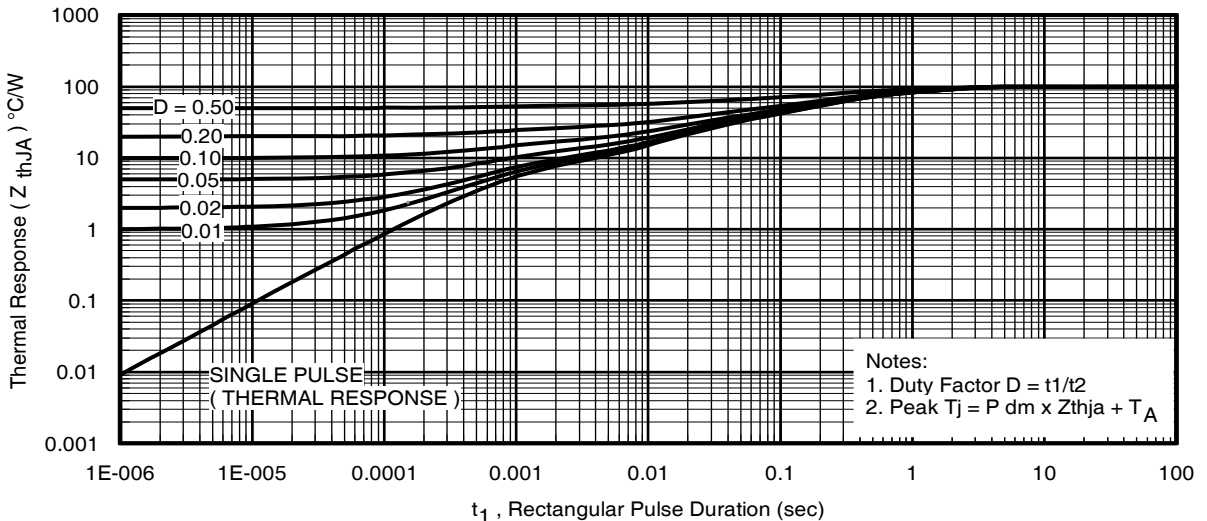
**Fig 9. Maximum Drain Current Vs. Ambient Temperature**



**Fig 10a. Switching Time Test Circuit**



**Fig 10b. Switching Time Waveforms**

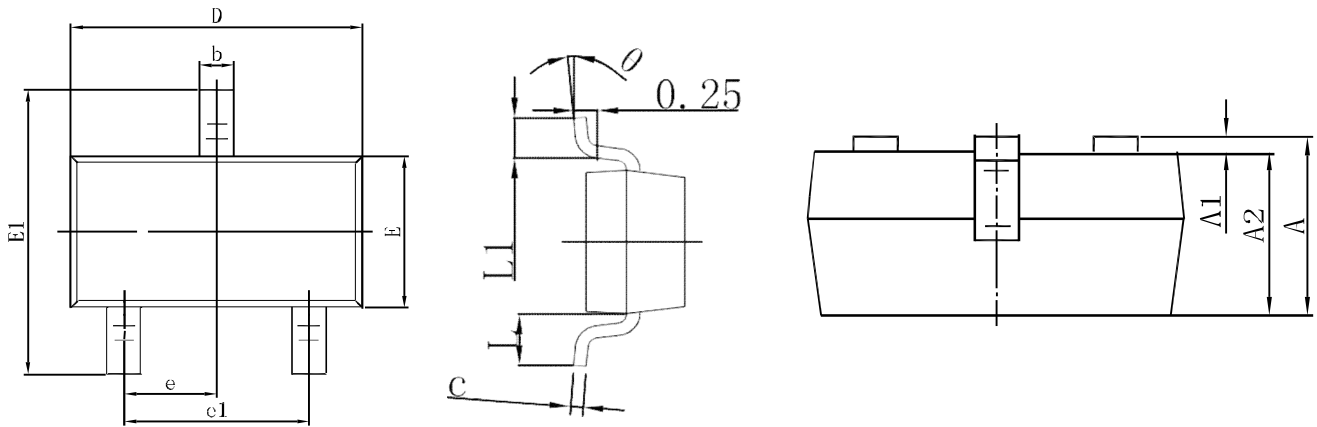


**Fig 11. Typical Effective Transient Thermal Impedance, Junction-to-Ambient**

Notes:  
1. Duty Factor  $D = t_1/t_2$   
2. Peak  $T_j = P_{dm} \times Z_{thja} + T_A$

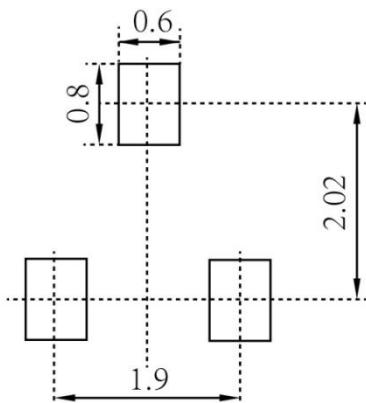
**N-CHANNEL POWER MOSFET**

**SOT-23 PACKAGE OUTLINE DIMENSIONS**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

**SOT-23 SUGGESTED PAD LAYOUT**



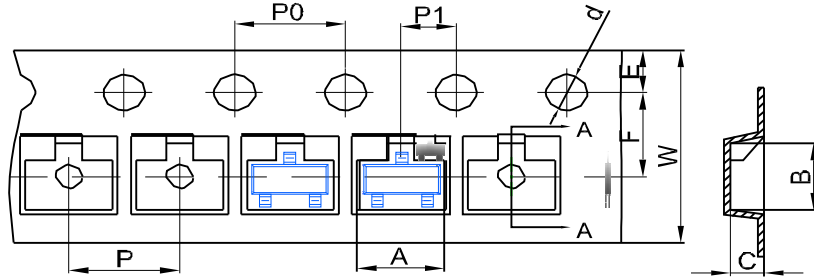
**Note:**

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

**N-CHANNEL POWER MOSFET**

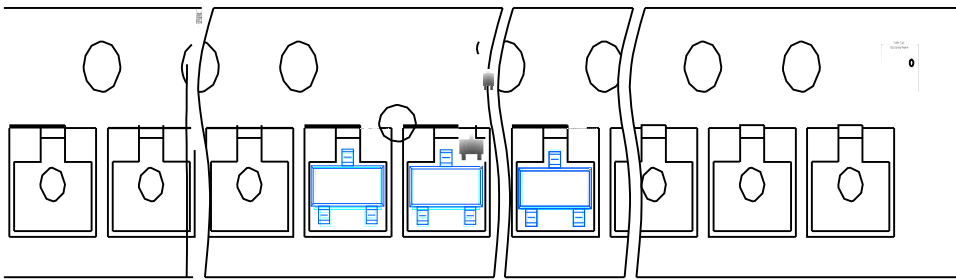
**SOT-23 TAPE AND REEL**

**SOT-23 Embossed Carrier Tape**

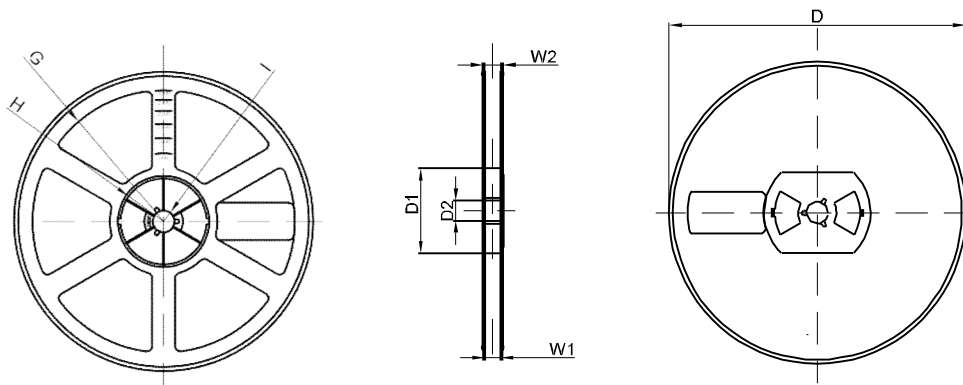


DIMENSIONS ARE IN MILLIMETER										
TYPE	A	B	C	d	E	F	P0	P	P1	W
SOT-23	3.15	2.77	1.22	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00
TOLERANCE	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1

**SOT-23 Tape Leader and Trailer**



**SOT-23 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