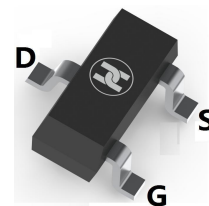
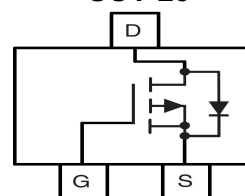


P-Channel Power MOSFET
FEATURES

- Generation V Technology
- Ultra Low On-Resistance
- Low Profile (<1.1mm)
- Fast Switching

MECHANICAL DATA

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

MARKING:1C7A

SOT-23

Absolute Maximum Ratings($T_A = 25^\circ\text{C}$ unless otherwise noted)

	Parameter	Max.	Units
I_D @ $T_A = 25^\circ\text{C}$	Continuous Drain Current, V_{GS} @ -4.5V	-0.78	A
I_D @ $T_A = 70^\circ\text{C}$	Continuous Drain Current, V_{GS} @ -4.5V	-0.62	
I_{DM}	Pulsed Drain Current ①	-4.9	
P_D @ $T_A = 25^\circ\text{C}$	Power Dissipation	540	mW
	Linear Derating Factor	4.3	mW/ $^\circ\text{C}$
V_{GS}	Gate-to-Source Voltage	± 12	V
dv/dt	Peak Diode Recovery dv/dt ②	-5.0	V/ns
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to +150	$^\circ\text{C}$
$R_{\theta JA}$	Maximum Junction-to-Ambient ④	230	$^\circ\text{C/W}$

Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	-20	—	—	V	$V_{GS} = 0V, I_D = -250\mu\text{A}$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	-4.9	—	mV/ $^\circ\text{C}$	Reference to $25^\circ\text{C}, I_D = -1\text{mA}$
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	—	—	0.60 0.90	Ω	$V_{GS} = -4.5V, I_D = -0.61A$ ③ $V_{GS} = -2.7V, I_D = -0.31A$ ③
$V_{GS(th)}$	Gate Threshold Voltage	-0.70	—	-1.5	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
g_{fs}	Forward Transconductance	0.56	—	—	S	$V_{DS} = -10V, I_D = -0.31A$
I_{DSS}	Drain-to-Source Leakage Current	—	—	-1.0 -25	μA	$V_{DS} = -16V, V_{GS} = 0V$ $V_{DS} = -16V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	-100	nA	$V_{GS} = -12V$
	Gate-to-Source Reverse Leakage	—	—	100		$V_{GS} = 12V$
Q_g	Total Gate Charge	—	2.4	3.6	nC	$I_D = -0.61A$
Q_{gs}	Gate-to-Source Charge	—	0.56	0.84		$V_{DS} = -16V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	1.0	1.5		$V_{GS} = -4.5V$, See Fig. 6 and 9 ③
$t_{d(on)}$	Turn-On Delay Time	—	13	—	ns	$V_{DD} = -10V$
t_r	Rise Time	—	18	—		$I_D = -0.61A$
$t_{d(off)}$	Turn-Off Delay Time	—	22	—		$R_G = 6.2\Omega$
t_f	Fall Time	—	22	—		$R_D = 16\Omega$, See Fig. 10 ③
C_{iss}	Input Capacitance	—	97	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	53	—		$V_{DS} = -15V$
C_{rss}	Reverse Transfer Capacitance	—	28	—		$f = 1.0\text{MHz}$, See Fig. 5

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	-0.54	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	-4.9		
V_{SD}	Diode Forward Voltage	—	—	-1.2	V	$T_J = 25^\circ\text{C}, I_S = -0.61A, V_{GS} = 0V$ ③
t_{rr}	Reverse Recovery Time	—	35	53	ns	$T_J = 25^\circ\text{C}, I_F = -0.61A$
Q_{rr}	Reverse Recovery Charge	—	26	39	nC	$di/dt = 100A/\mu\text{s}$ ③

Notes: ① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)

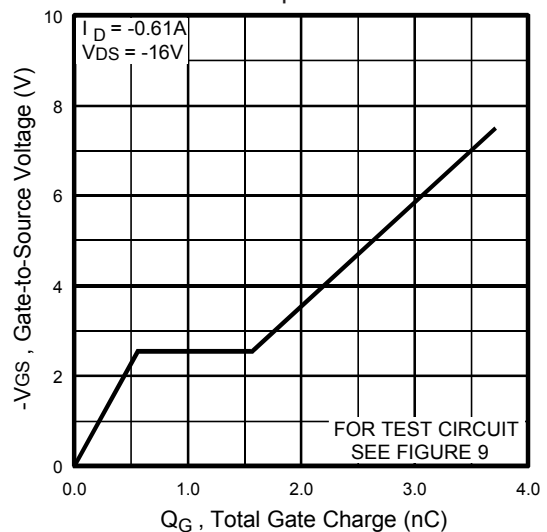
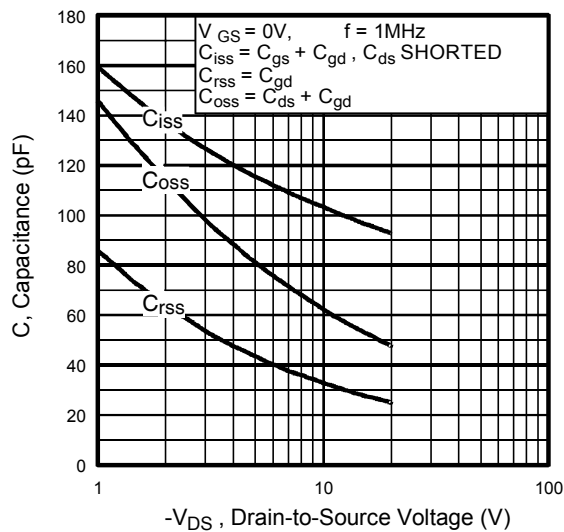
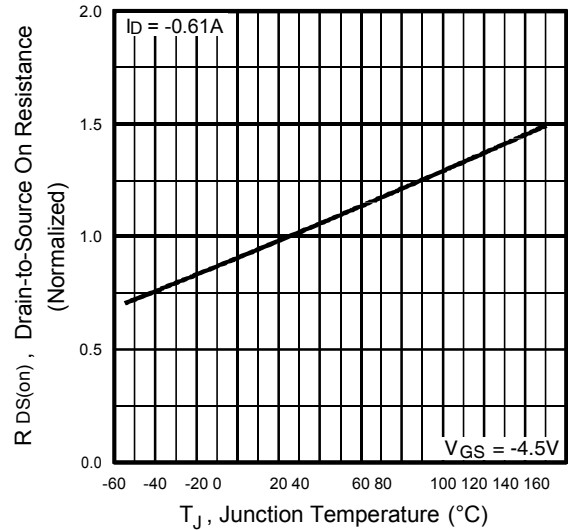
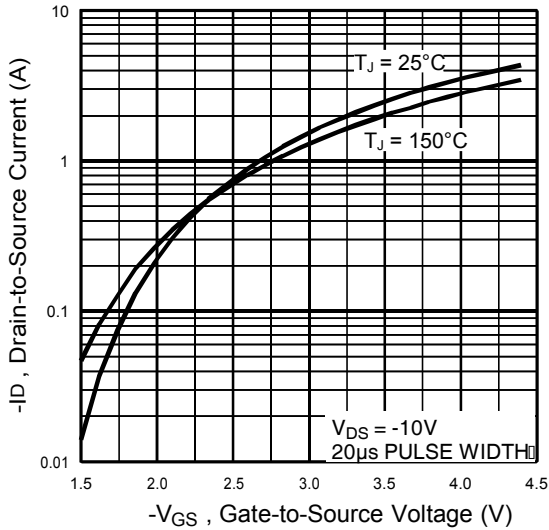
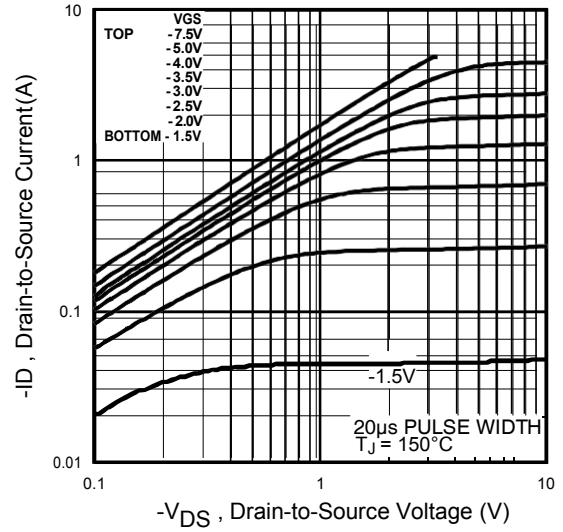
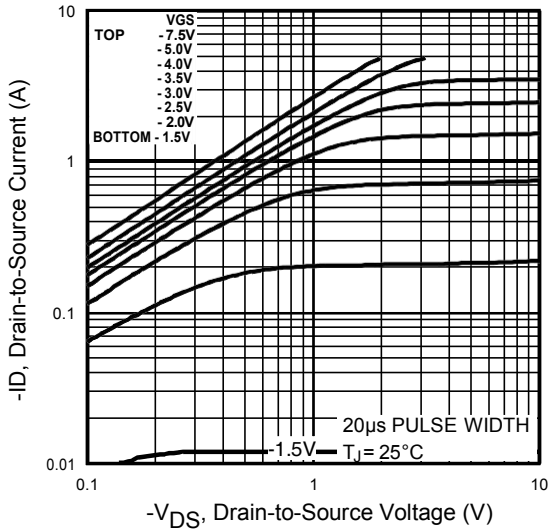
② $I_{SD} \leq -0.61A, di/dt \leq 76A/\mu\text{s}, V_{DD} \leq V_{(BR)DSS}, T_J \leq 150^\circ\text{C}$

③ Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.

④ Surface mounted on FR-4 board, $t \leq 5\text{sec}$.

P-Channel Power MOSFET

Typical Characteristics



P-Channel Power MOSFET

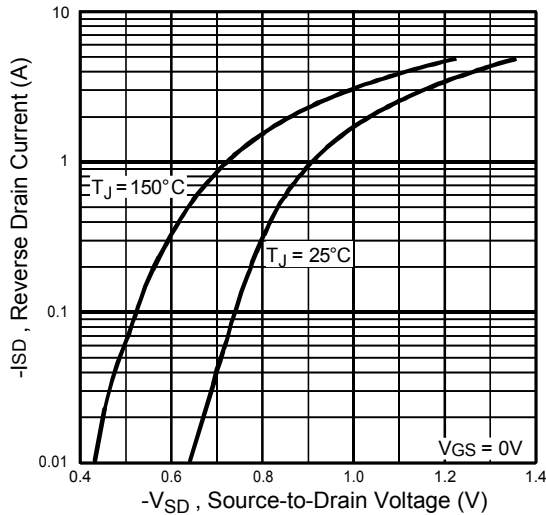


Fig 7. Typical Source-Drain Diode Forward Voltage

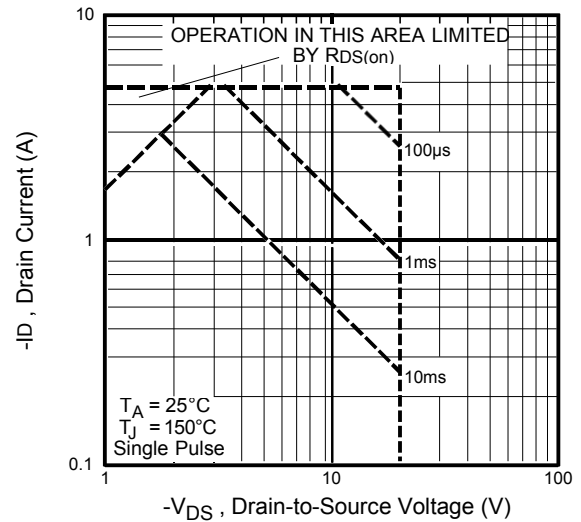


Fig 8. Maximum Safe Operating Area

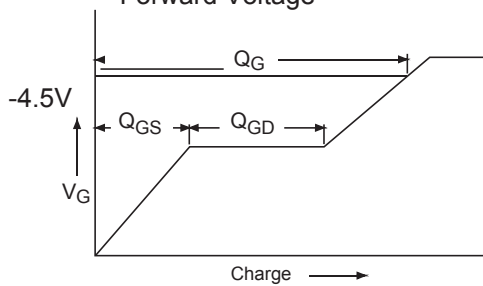


Fig 9a. Basic Gate Charge Waveform

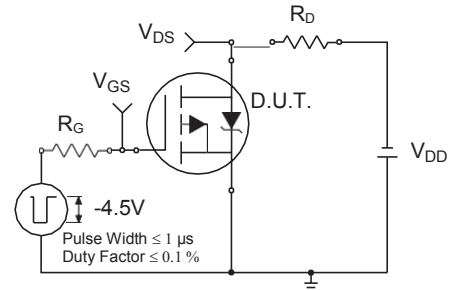


Fig 10a. Switching Time Test Circuit

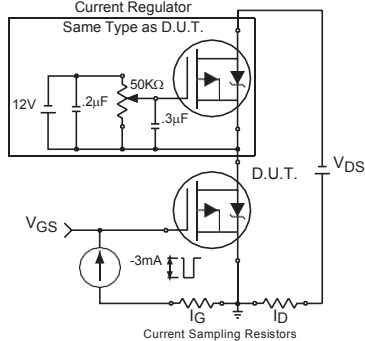


Fig 9b. Gate Charge Test Circuit

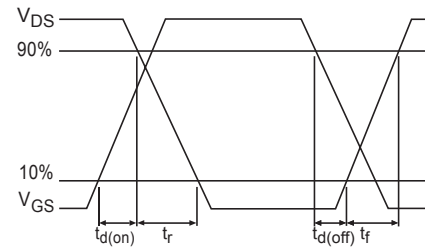


Fig 10b. Switching Time Waveforms

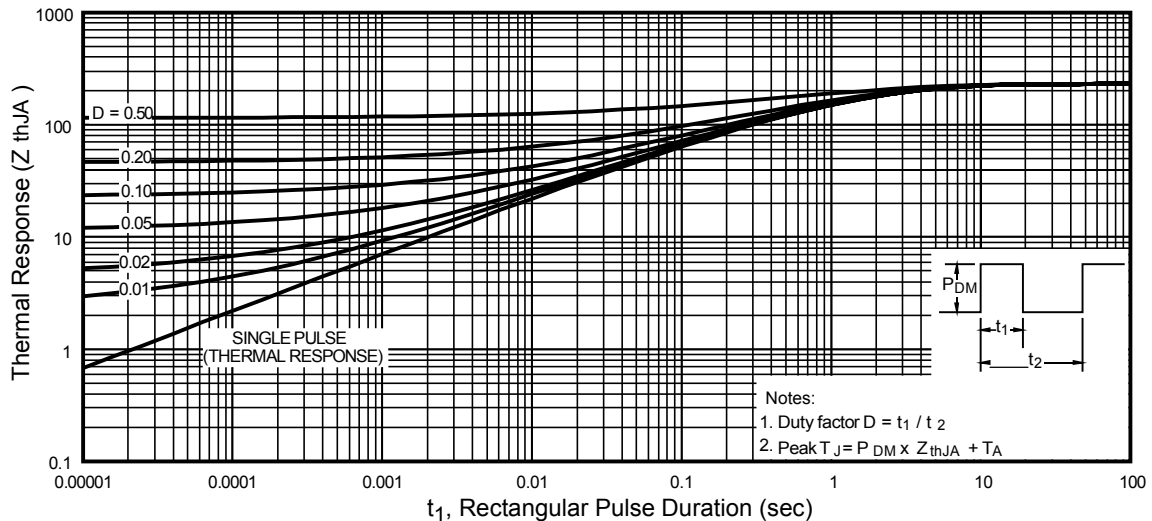
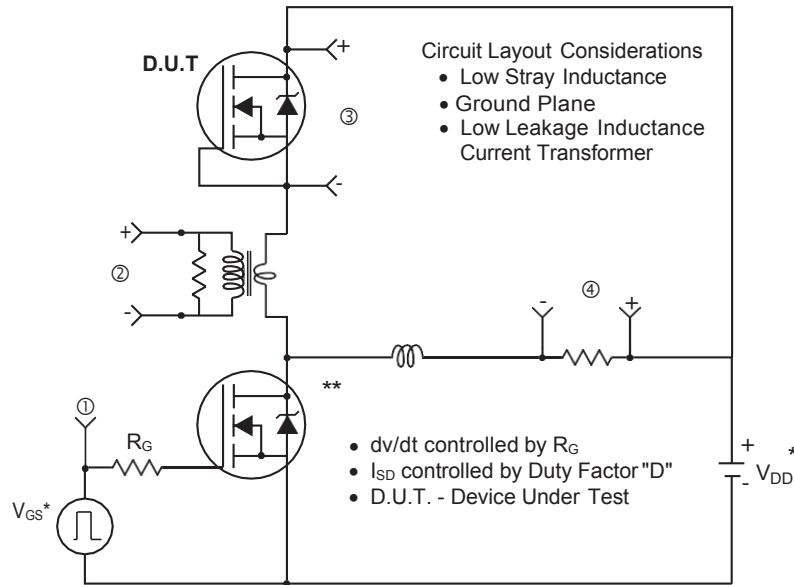


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

Peak Diode Recovery dv/dt Test Circuit



* Reverse Polarity for P-Channel

** Use P-Channel Driver for P-Channel Measurements

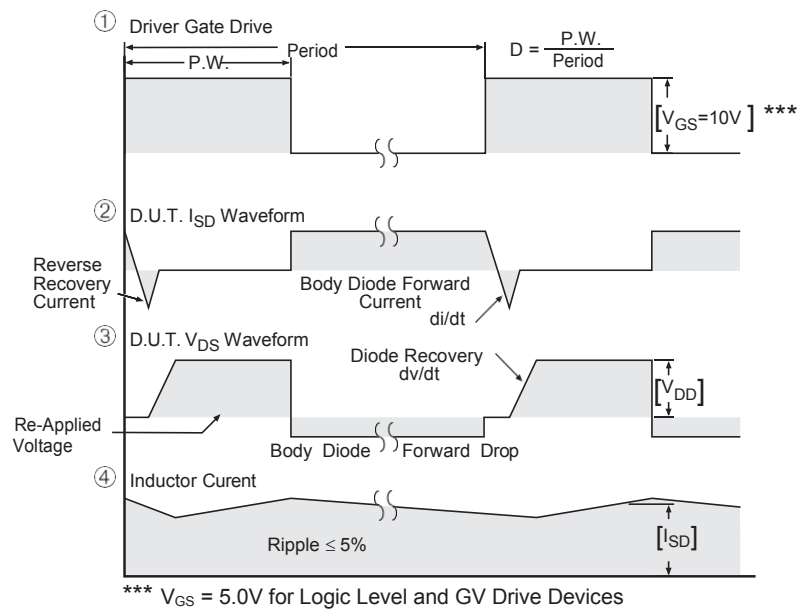
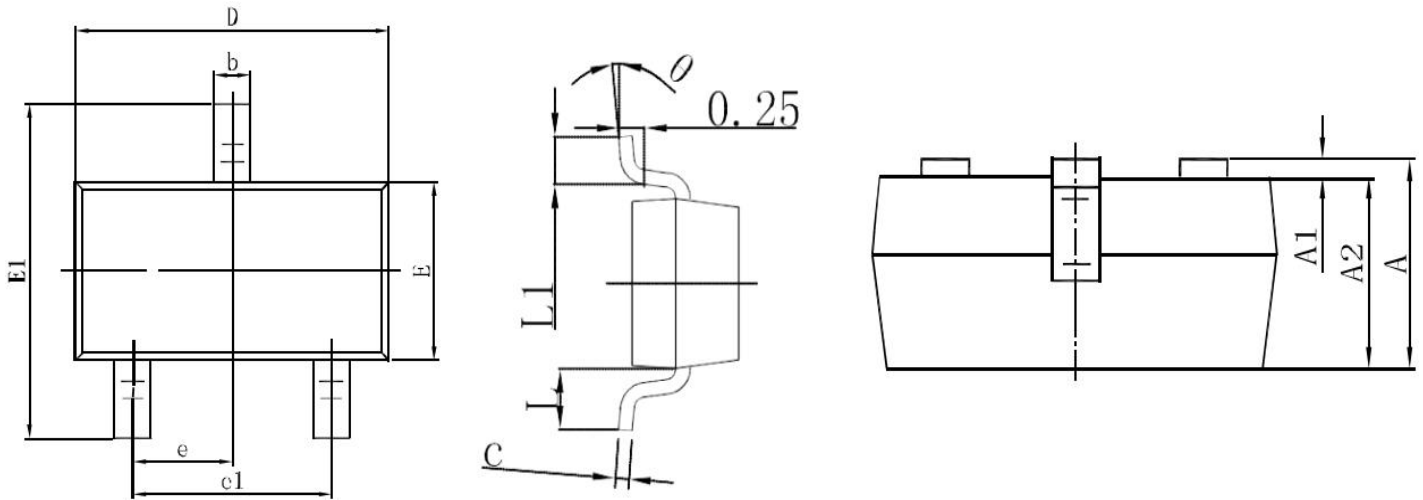


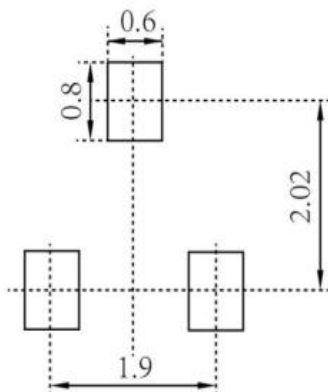
Fig 13. For P-Channel HEXFETS

SOT-23 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.354	0.453
A1	0.000	0.100	0.000	0.039
A2	0.900	1.050	0.354	0.413
b	0.300	0.500	0.118	0.197
c	0.080	1.150	0.031	0.453
D	2.900	3.100	1.142	1.220
E	1.200	1.400	0.472	0.551
E1	2.250	2.550	0.886	1.004
e	0.95REF		0.374REF	
e1	1.800	2.000	0.709	0.787
L	0.55REF		0.215REF	
L1	0.300	0.500	0.118	0.197

SOT-23 Suggested Pad Layout

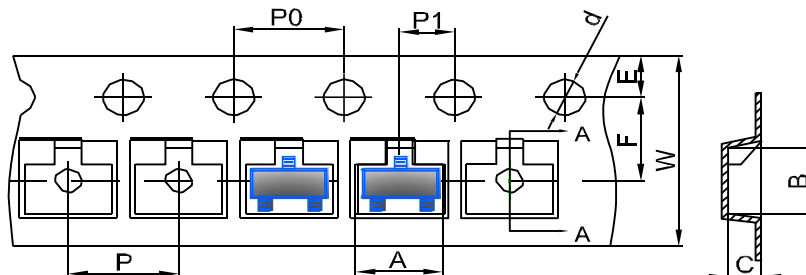


Note:

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

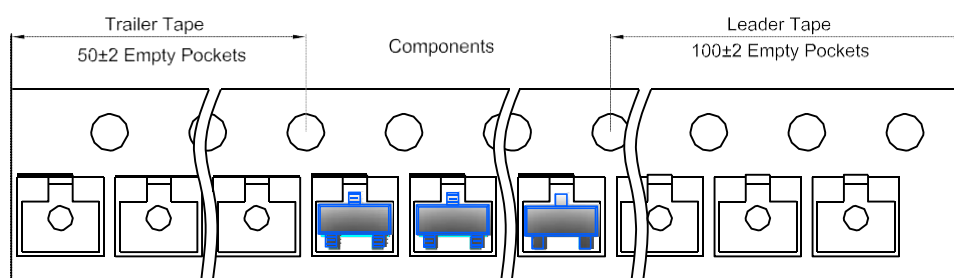
SOT-23 Tape and Reel

SOT-23 Embossed Carrier Tape

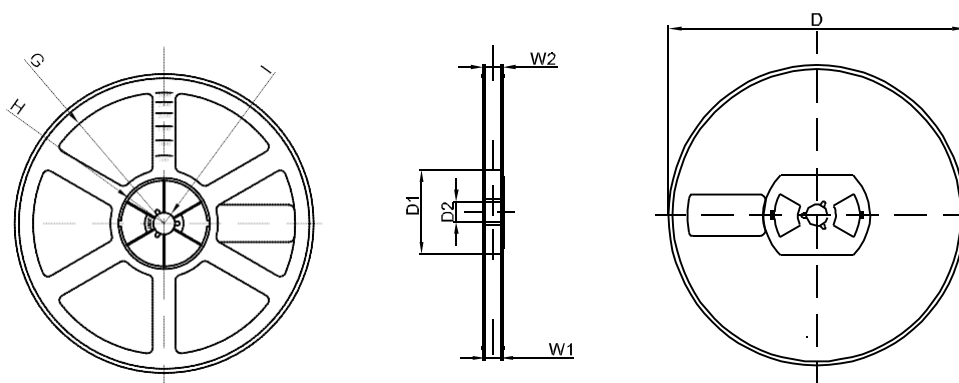


DIMENSIONS ARE IN MILLIMETER										
TYPE	A	B	C	d	E	F	P0	P	P1	W
SOT-23	3.15	2.77	1.22	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00
TOLERANCE	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1

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