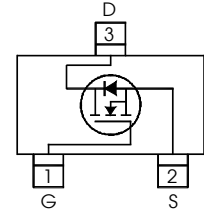
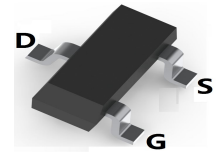


N-CHANNEL POWER MOSFET
FEATURES

- Ultra low on-resistance: $V_{DS}=20V, R_{DS(ON)}=0.25\Omega @ V_{GS}=4.5V, I_D=1.2A$
- Surface Mount device


MECHANICAL DATA

- Case: SOT-23
- Case Material: Molded Plastic. UL flammability
- Classification Rating: 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Weight: 0.008 grams (approximate)

Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D @ T_A = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 4.5V$	1.2	A
$I_D @ T_A = 70^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 4.5V$	0.95	
I_{DM}	Pulsed Drain Current ①	7.4	
$P_D @ T_A = 25^\circ\text{C}$	Power Dissipation	540	mW
	Linear Derating Factor	4.3	mW/°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	°C

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient ④	—	230	°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	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.024	—	V/°C	Reference to $25^\circ\text{C}, I_D = 1mA$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.25 0.35	Ω	$V_{GS} = 4.5V, I_D = 0.93A$ ③ $V_{GS} = 2.7V, I_D = 0.47A$ ③
$V_{GS(th)}$	Gate Threshold Voltage	0.70	—	—	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
g_{fs}	Forward Transconductance	1.3	—	—	S	$V_{DS} = 10V, I_D = 0.47A$
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	nA	$V_{GS} = 12V$
Q_g	Total Gate Charge	—	2.6	3.9	nC	$I_D = 0.93A$
Q_{gs}	Gate-to-Source Charge	—	0.41	0.62	nC	$V_{DS} = 16V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	1.1	1.7	nC	$V_{GS} = 4.5V$, See Fig. 6 and 9 ③
$t_{d(on)}$	Turn-On Delay Time	—	2.5	—	ns	$V_{DD} = 10V$
t_r	Rise Time	—	9.5	—		$I_D = 0.93A$
$t_{d(off)}$	Turn-Off Delay Time	—	9.7	—		$R_G = 6.2\Omega$
t_f	Fall Time	—	4.8	—		$R_D = 11\Omega$, See Fig. 10 ③
C_{iss}	Input Capacitance	—	110	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	51	—		$V_{DS} = 15V$
C_{rss}	Reverse Transfer Capacitance	—	25	—		$f = 1.0MHz$, 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	—	—	7.4		
V_{SD}	Diode Forward Voltage	—	—	1.2	V	$T_J = 25^\circ\text{C}, I_S = 0.93A, V_{GS} = 0V$ ③
t_{rr}	Reverse Recovery Time	—	25	38	ns	$T_J = 25^\circ\text{C}, I_F = 0.93A$
Q_{rr}	Reverse Recovery Charge	—	16	24	nC	$di/dt = 100A/\mu s$ ③

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

② $I_{SD} \leq 0.93A, di/dt \leq 90A/\mu s, V_{DD} \leq V_{(BR)DSS}, T_J \leq 150^\circ\text{C}$

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

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

N-CHANNEL POWER MOSFET

Typical Characteristics

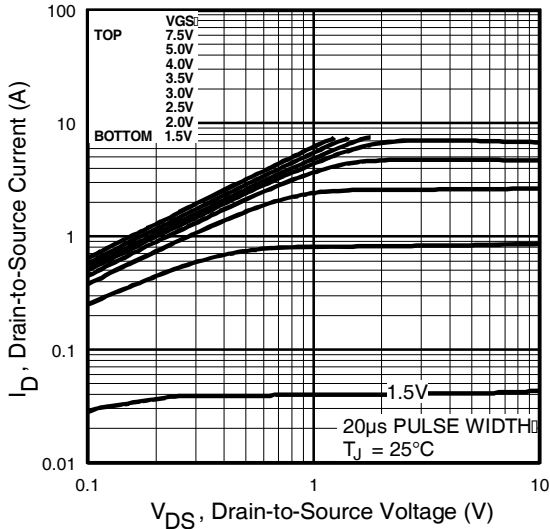


Fig 1. Typical Output Characteristics

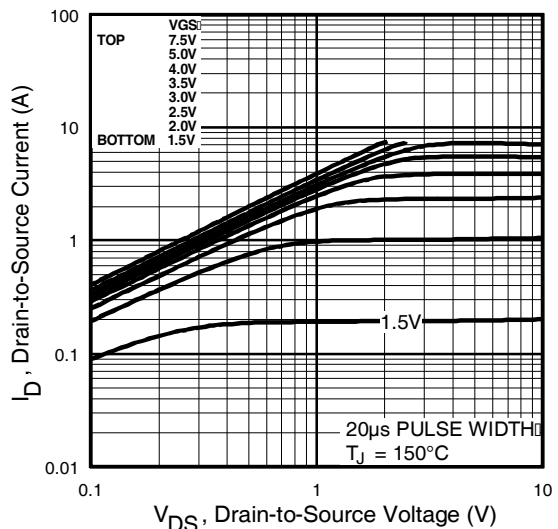


Fig 2. Typical Output Characteristics

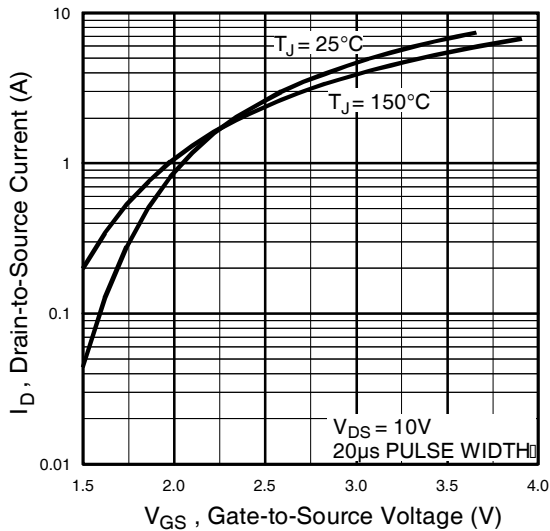


Fig 3. Typical Transfer Characteristics

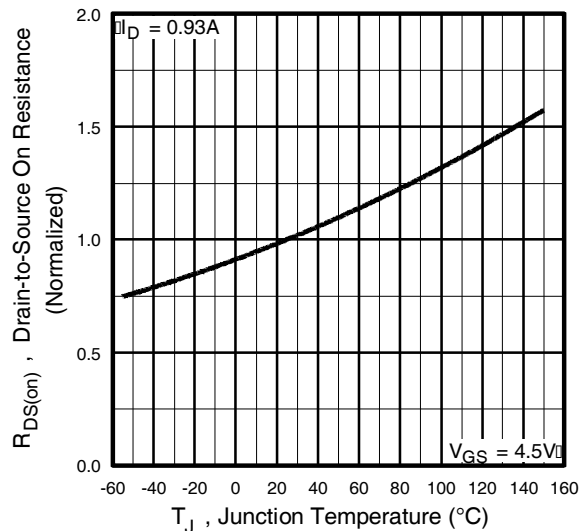


Fig 4. Normalized On-Resistance Vs. Temperature

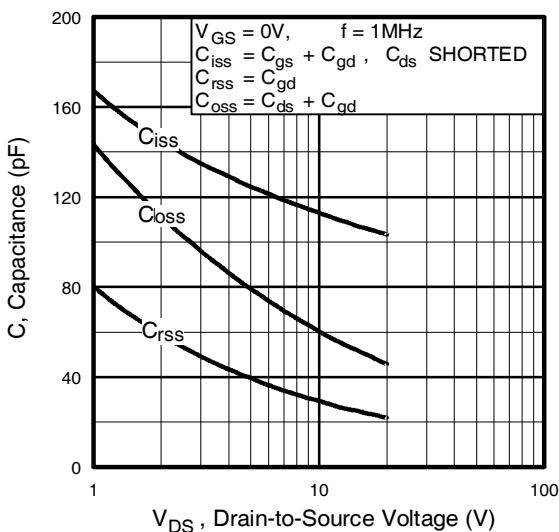


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

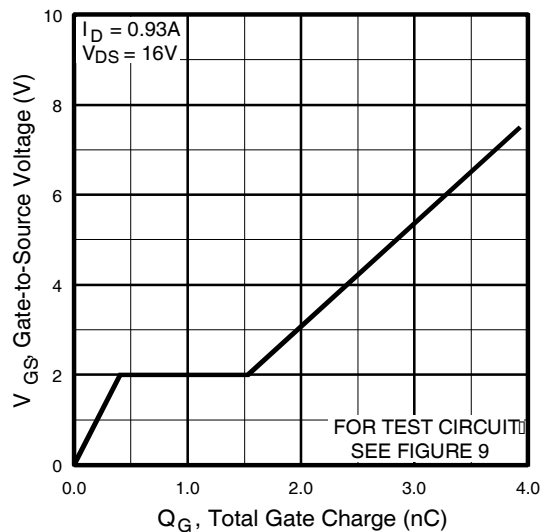


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

N-CHANNEL POWER MOSFET

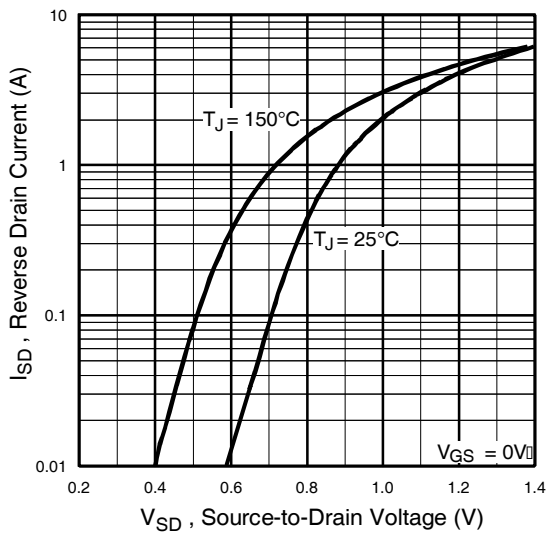


Fig 7. Typical Source-Drain Diode Forward Voltage

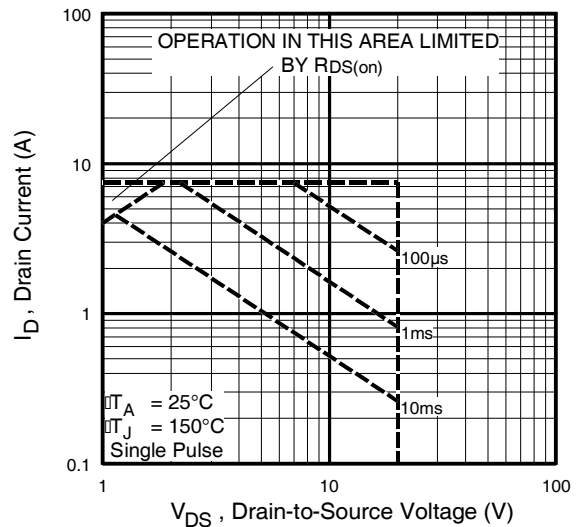


Fig 8. Maximum Safe Operating Area

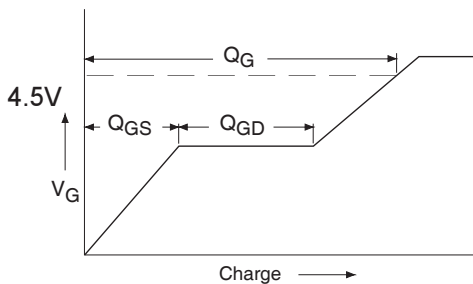


Fig 9a. Basic Gate Charge Waveform

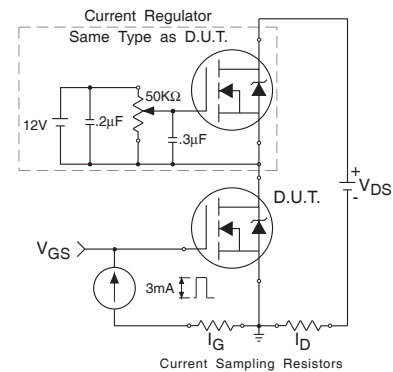


Fig 9b. Gate Charge Test Circuit

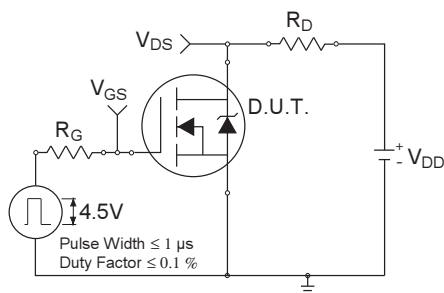


Fig 10a. Switching Time Test Circuit

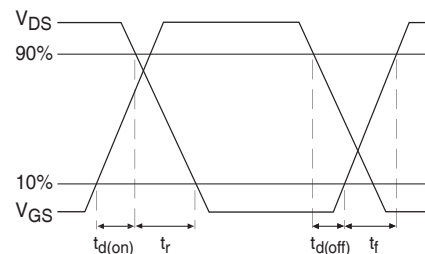


Fig 10b. Switching Time Waveforms

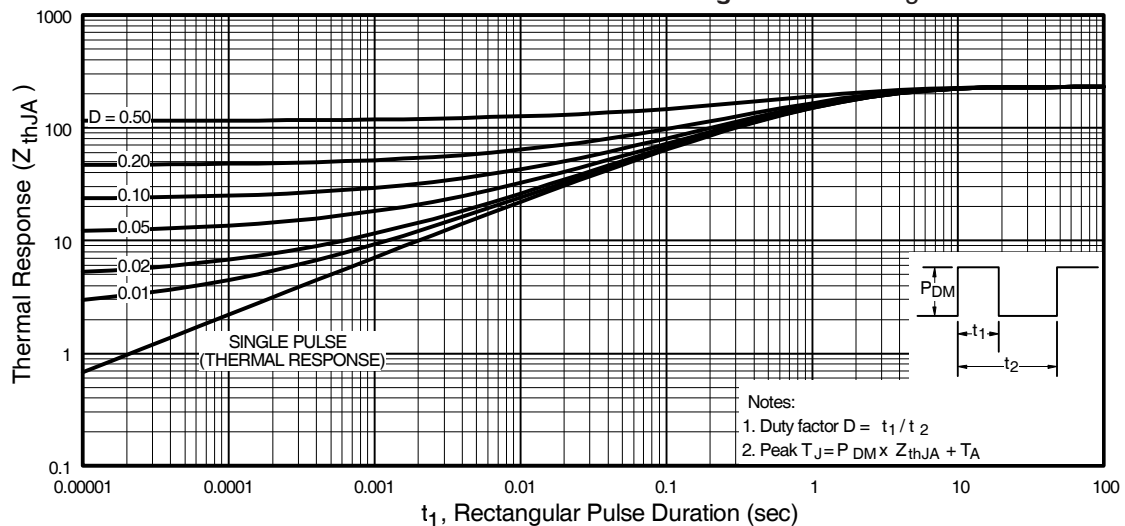
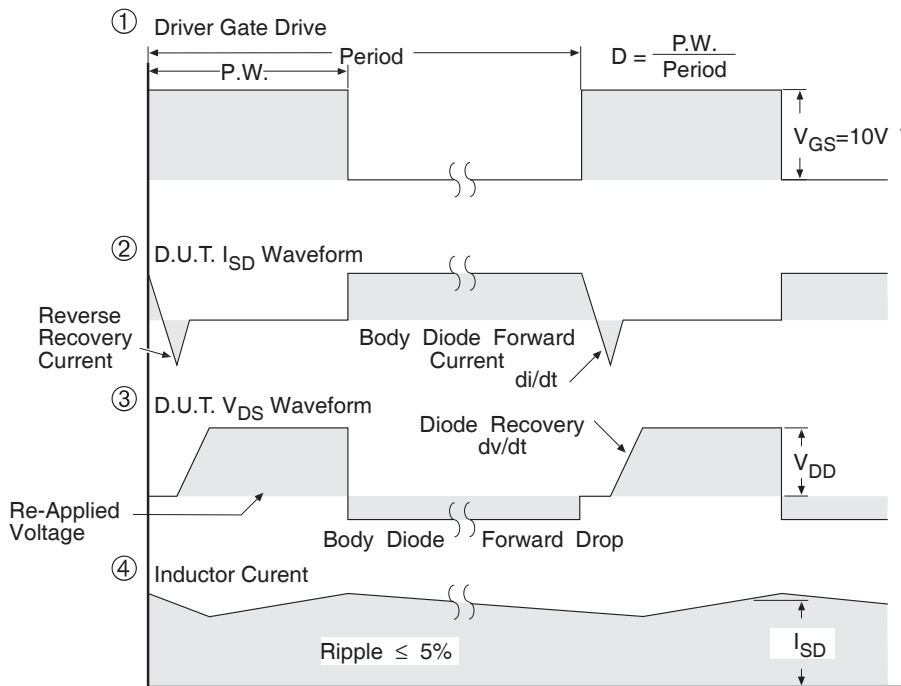
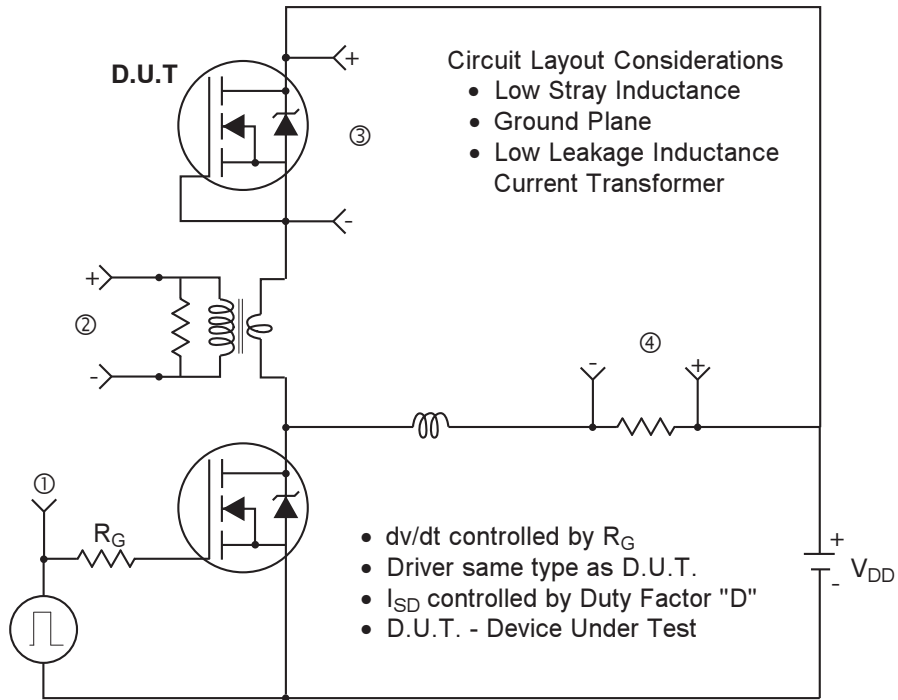


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

N-CHANNEL POWER MOSFET

Peak Diode Recovery dv/dt Test Circuit

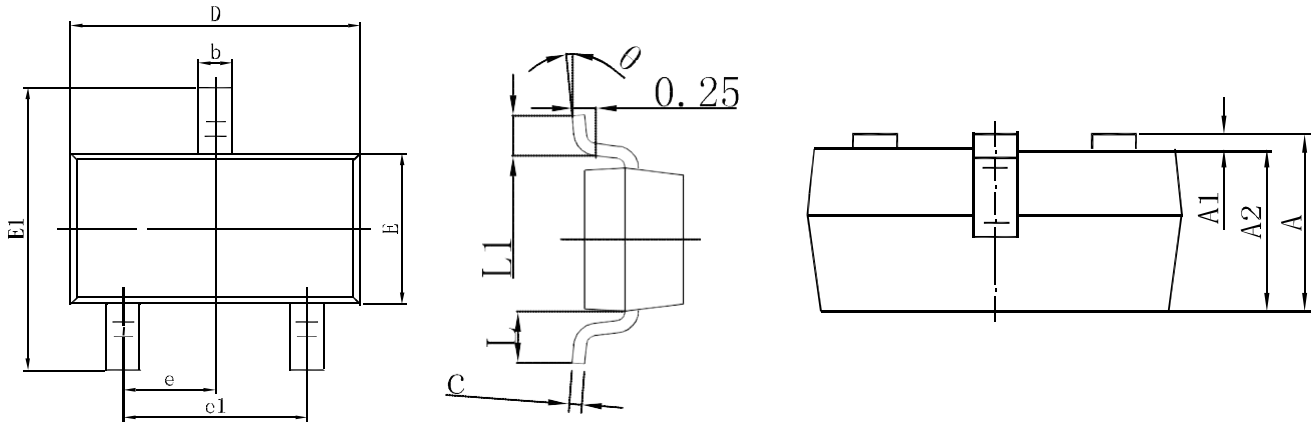


* $V_{GS} = 5V$ for Logic Level Devices

Fig 12. For N-Channel HEXFETS

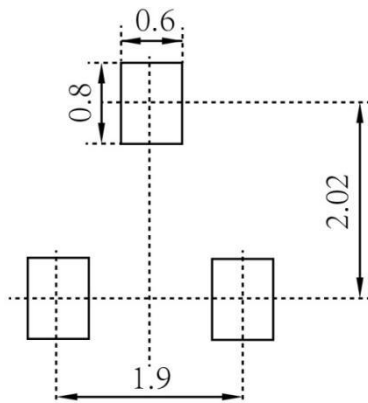
N-CHANNEL POWER MOSFET

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



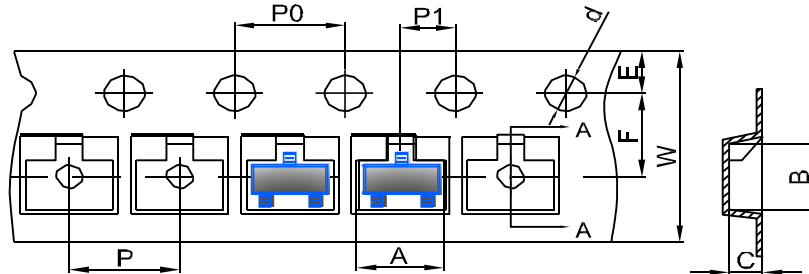
Note:

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

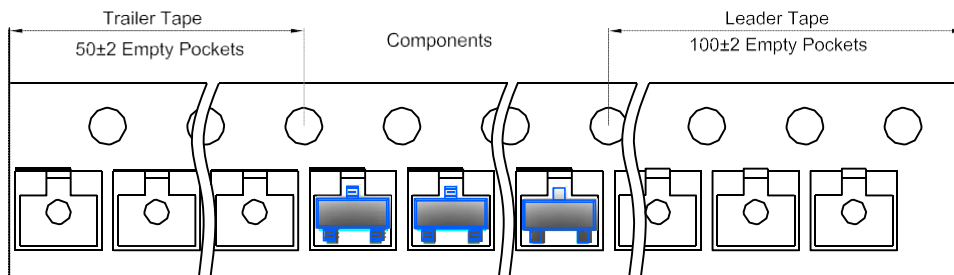
SOT-23 Tape and Reel

SOT-23 Embossed Carrier Tape

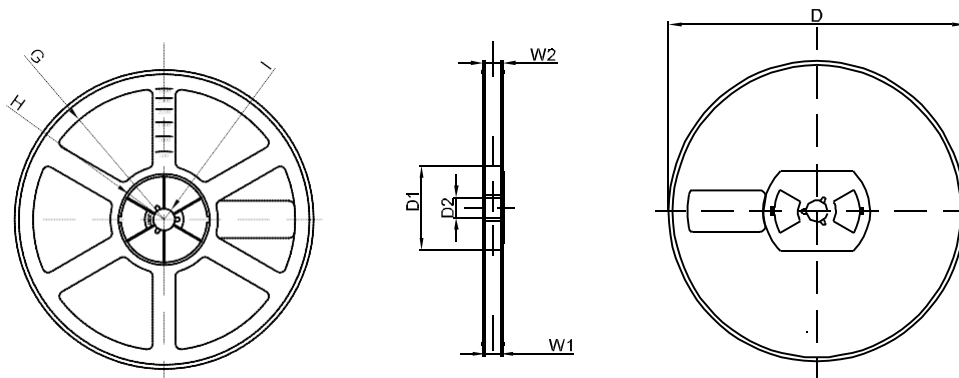


DIMENSIONS ARE IN MILLIMETER										
TYPE	A	B	C	d	E	F	P0	P	P1	W
SOT-23	3.15	2.77	1.22	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00
TOLERANCE	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1

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