



-12V -4.1A P-channel MOSFET

Features

- $V_{DS}=-12V$, $I_D=-4.1A$
- $R_{DS(ON)} < 45\ m\Omega$ @ $V_{GS} = -4.5V$
 $R_{DS(ON)} < 60m\Omega$ @ $V_{GS} = -2.5V$
- High Power and Current Handling Capability
- Lead Free Product is Acquired
- Surface Mount Package

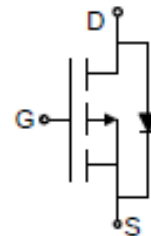
Application

- PWM Applications
- Load Switch for Portable Devices
- Power Management

Package



SOT-23



Absolute Maximum Ratings (T_C=25°C unless otherwise specified)

Symbol	Parameter	Max.	Units
V _{DSS}	Drain-Source Voltage	-12	V
V _{GSS}	Gate-Source Voltage	±8	V
I _D	Continuous Drain Current	T _C = 25°C	-4.1
		T _C = 100°C	-2.6
I _{DM}	Pulsed Drain Current ^{note1}	-16	A
P _D	Power Dissipation	T _C = 25°C	1.7
R _{θJA}	Thermal Resistance, Junction to Ambient	74	°C/W
T _J , T _{STG}	Operating and Storage Temperature Range	-55 to +150	°C

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D = -250\mu A$	-12	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = -8V, V_{GS} = 0V,$	-	-	-1	μA
I_{GSS}	Gate to Body Leakage Current	$V_{DS} = 0V, V_{GS} = \pm 8V$	-	-	± 100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\mu A$	-0.5	-	-0.9	V
$R_{DS(on)}$	Static Drain-Source on-Resistance <small>note2</small>	$V_{GS} = -4.5V, I_D = -4.1A$	-	30	45	m Ω
		$V_{GS} = -2.5V, I_D = -3A$	-	40	60	
g_{FS}	Forward Transconductance	$V_{DS} = -5V, I_D = -4.1A$	6	-	-	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS} = -4V, V_{GS} = 0V,$ $f = 1.0MHz$	-	740	-	pF
C_{oss}	Output Capacitance		-	290	-	pF
C_{rss}	Reverse Transfer Capacitance		-	190	-	pF
Q_g	Total Gate Charge	$V_{DS} = -4V, I_D = -4.1A,$ $V_{GS} = -2.5V$	-	4.5	9	nC
Q_{gs}	Gate-Source Charge		-	1.2	-	nC
Q_{gd}	Gate-Drain("Miller") Charge		-	1.6	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = -4V, I_D = -3.3A,$ $R_G = 1.0\Omega, V_{GEN} = -4.5V,$ $R_L = 1.2\Omega$	-	13	20	ns
t_r	Turn-on Rise Time		-	35	53	ns
$t_{d(off)}$	Turn-off Delay Time		-	32	48	ns
t_f	Turn-off Fall Time		-	10	20	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	-4.1	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-16	A
V_{SD}	Drain to Source Diode Forward Voltage	$V_{GS} = 0V, I_S = -4.1A$	-	-	-1.2	V
t_{rr}	Reverse Recovery Time	$V_{GS} = 0V, I_S = -4.1A,$	-	20	-	ns
Q_{rr}	Reverse Recovery Charge	$di/dt = 100A/\mu s$	-	9	-	nC

Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$



Typical Performance Characteristics

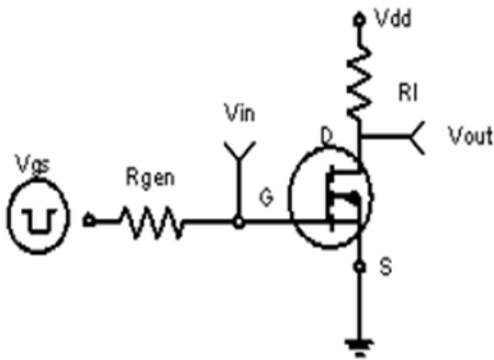


Figure1:Switching Test Circuit

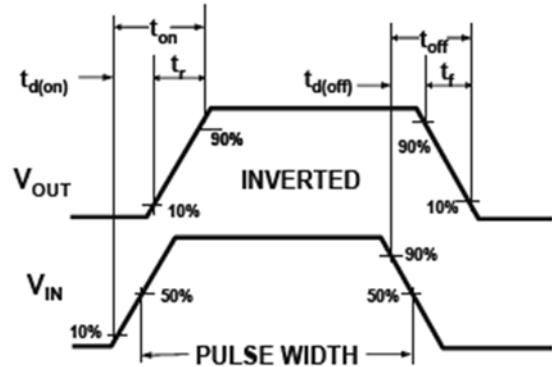
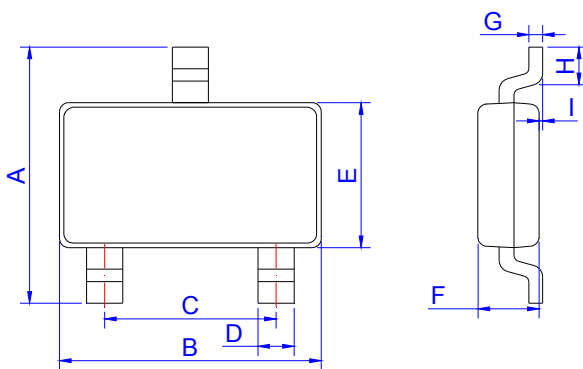


Figure2:Switching Waveforms

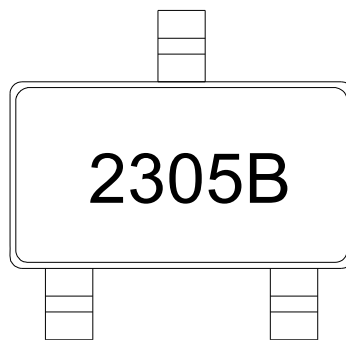
Package Mechanical Data



SOT-23

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.30	2.40	2.50	0.091	0.095	0.098
B	2.80	2.90	3.00	0.110	0.114	0.118
C	1.90 REF			0.075 REF		
D	0.35	0.40	0.45	0.014	0.016	0.018
E	1.20	1.30	1.40	0.047	0.051	0.055
F	0.90	1.00	1.10	0.035	0.039	0.043
G		0.10	0.15		0.004	0.006
H	0.20			0.008		
I	0		0.10	0		0.004

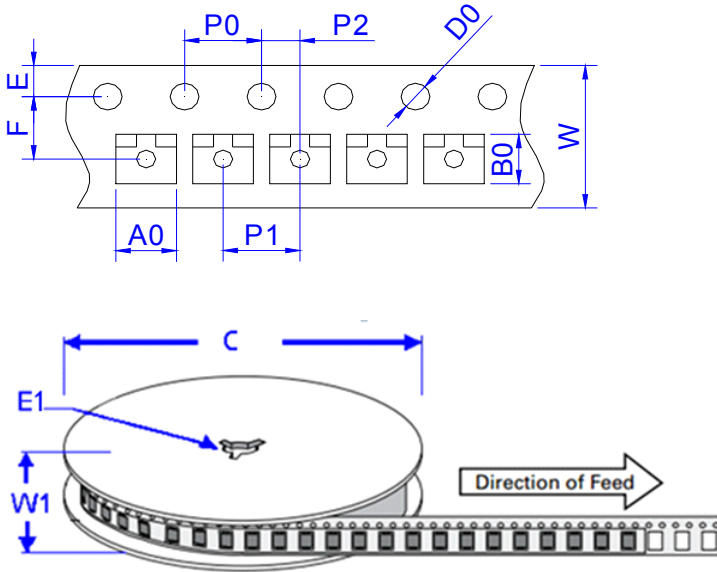
Marking



2305B: Device Code



Package Information-SOT-23



Ref.	Dimensions	
	Millimeters	Inches
A0	3.15 ± 0.3	0.124 ± 0.012
B0	2.77 ± 0.3	0.109 ± 0.012
C	178	7.0
D0	1.50±0.1	0.059 ± 0.004
E	1.75 ± 0.2	0.069 ± 0.008
E1	13.3±0.3	0.524± 0.012
F	3.5 ± 0.2	0.138 ± 0.008
P0	4.00 ± 0.2	0.157 ± 0.008
P1	4.00 ± 0.2	0.157 ± 0.008
P2	2.00 ± 0.2	0.079 ± 0.008
W	8.00 ± 0.2	0.315 ± 0.008
W1	11.5±1.0	0.453 ± 0.039

Ordering Information-SOT-23

OUTLINE	PACKAGE TYPE	QUANTITY REEL	DESCRIPTION
TAPING	SOT-23	3,000pcs	7 inch reel pack