

## -20V P-Channel Mosfet

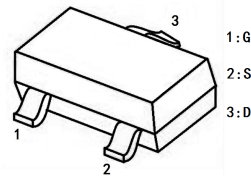
### FEATURES

- $R_{DS(ON)}=35m\Omega(Typ.) @V_{GS}=-4.5V$
- $R_{DS(ON)}=38m\Omega(Typ.) @V_{GS}=-2.5V$
- $R_{DS(ON)}=50m\Omega(Typ.) @V_{GS}=-1.8V$

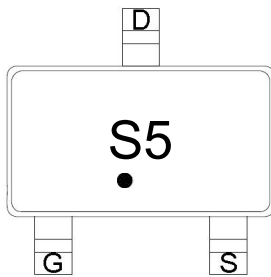
### APPLICATIONS

- Load Switch for Portable Devices
- DC/DC Converter

### SOT-23

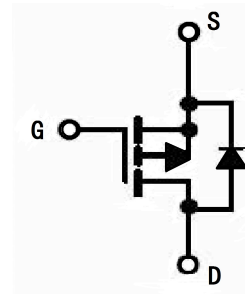


### MARKING



S5: Device Code

### P-CHANNEL MOSFET



### Maximum ratings ( $T_a=25^{\circ}C$ unless otherwise noted)

Symbol	Parameter	Value	Unit
$V_{DS}$	Drain-Source Voltage	-20	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	
$I_D$	Continuous Drain Current	-4.1	A
$I_{DM}$	Pulsed Drain Current	-16	
$P_D$	Maximum Power Dissipation	0.83	W
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient( $t \leq 5s$ )	150	$^{\circ}C/W$
$T_J$	Junction Temperature	150	$^{\circ}C$
$T_{stg}$	Storage Temperature	-55 ~ +150	

**MOSFET ELECTRICAL CHARACTERISTICS  $T_a=25\text{ }^\circ\text{C}$  unless otherwise specified**

Symbol	Parameter	Test Condition	Min	Typ	Max	Units
<b>Static</b>						
$V_{(BR)DSS}$	Drain-source breakdown voltage	$V_{GS} = 0V, I_D = -250\mu A$	-20	-21.5		V
$V_{GS(th)}$	Gate-source threshold voltage	$V_{DS} = V_{GS}, I_D = -250\mu A$	-0.4	-0.7	-1	
$I_{GSS}$	Gate-source leakage	$V_{DS} = 0V, V_{GS} = \pm 10V$			$\pm 100$	nA
$I_{DSS}$	Zero gate voltage drain current	$V_{DS} = -16V, V_{GS} = 0V$			-1	$\mu A$
$R_{DS(on)}$	Drain-source on-state resistance <small>note1</small>	$V_{GS} = -4.5V, I_D = -3.5A$		35	45	m $\Omega$
		$V_{GS} = -2.5V, I_D = -3A$		38	70	
		$V_{GS} = -1.8V, I_D = -2A$		50	90	
$V_{SD}$	Body diode voltage	$I_S = -3.3A$		-0.9	-1.2	V
<b>Dynamic</b> <small>note2</small>						
$C_{iss}$	Input capacitance	$V_{DS} = -4V, V_{GS} = 0V, f = 1MHz$		740		pF
$C_{oss}$	Output capacitance			290		
$C_{rss}$	Reverse transfer capacitance			190		
$Q_g$	Total gate charge	$V_{DS} = -4V, V_{GS} = -2.5V$ $I_D = -4.1A$		4.5	9	nC
$Q_{gs}$	Gate-source charge			1.2		
$Q_{gd}$	Gate-drain charge			1.6		
$t_{d(on)}$	Turn-on delay time	$V_{DS} = -4V,$ $R_L = 1.2\Omega, I_D = -3.3A,$ $V_{GEN} = -4.5V, R_G = 1\Omega$		13	20	nS
$t_r$	Rise time			35	53	
$t_{d(off)}$	Turn-off delay time			32	48	
$t_f$	Fall time			10	20	

Notes: 1. Pulse Test : Pulse Width < 300 $\mu s$ , Duty Cycle  $\leq 2\%$ .

2 . Guaranteed by design, not subject to production testing.

Typical Performance Characteristics

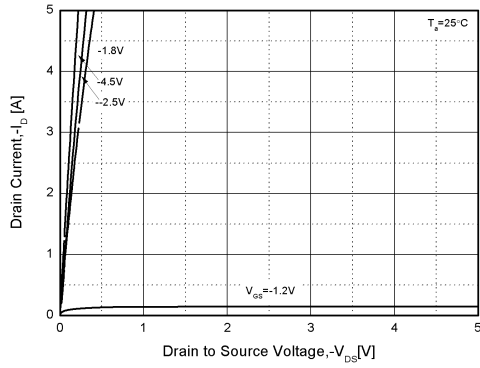


Figure1. Output Characteristics

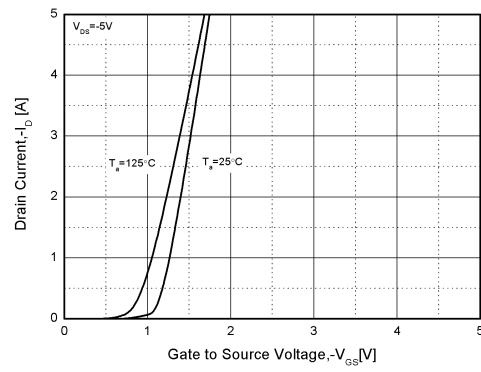


Figure2. Transfer Characteristics

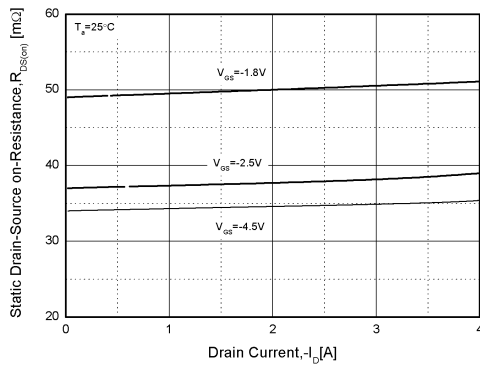


Figure3. Rdson-Drain Current

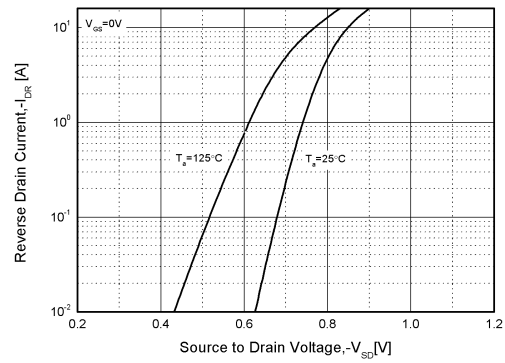


Figure4. Typical Source-Drain Diode Forward Voltage

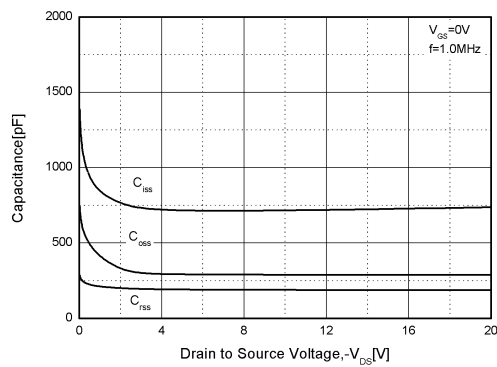


Figure5. Capacitance Characteristics

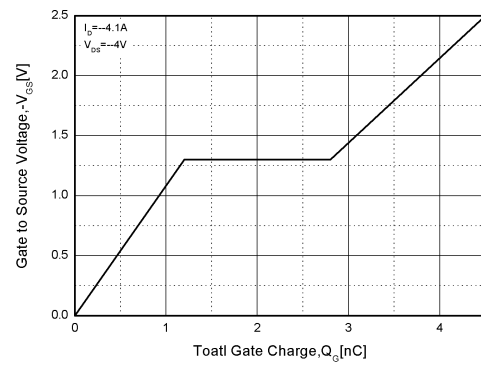


Figure6. Gate Charge

Typical Performance Characteristics (cont.)

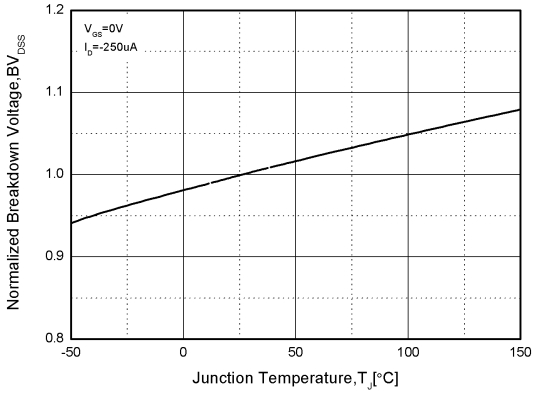


Figure7. Normalized Breakdown Voltage vs. Temperature

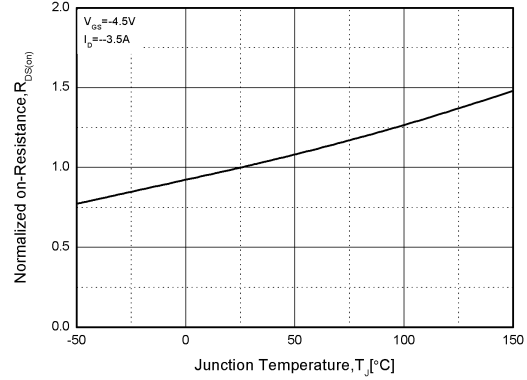


Figure8. Normalized on Resistance vs. Temperature

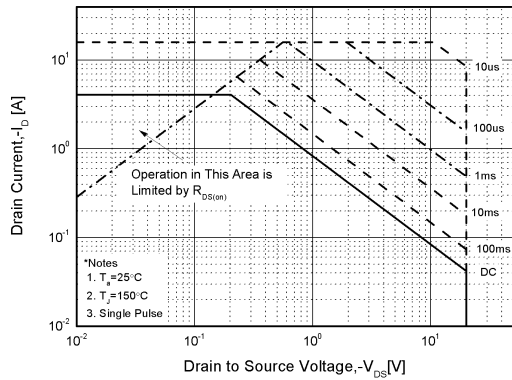


Figure9. Safe Operation Area

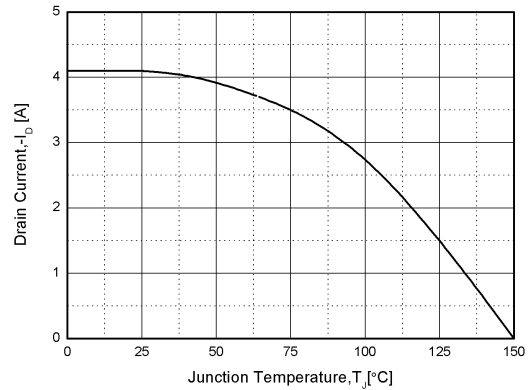
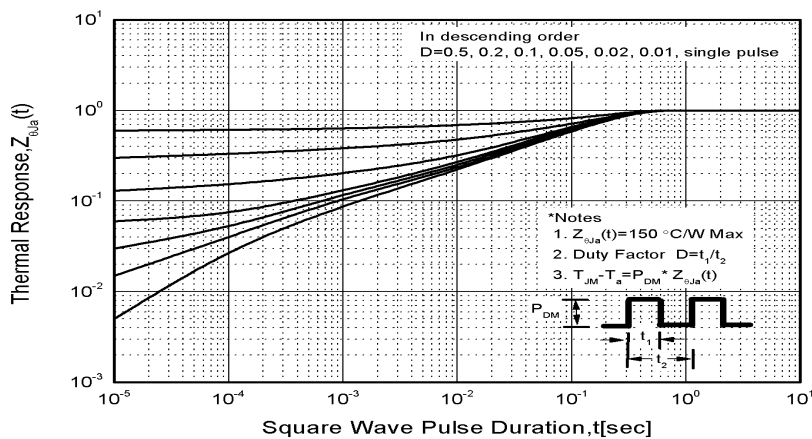
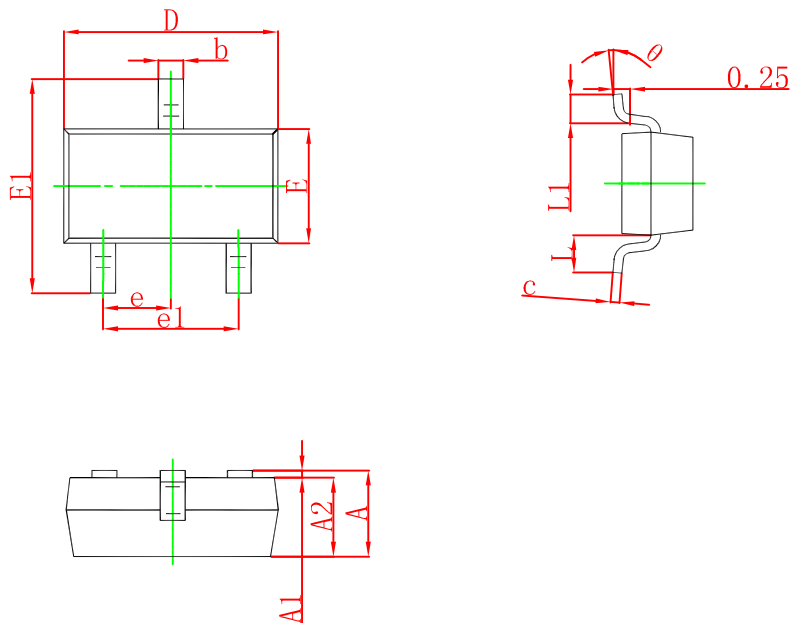


Figure10. Drain Current vs. Case Temperature

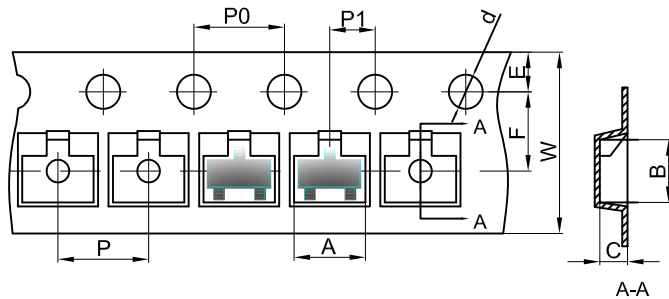


**SOT-23 Package Outline Dimensions**



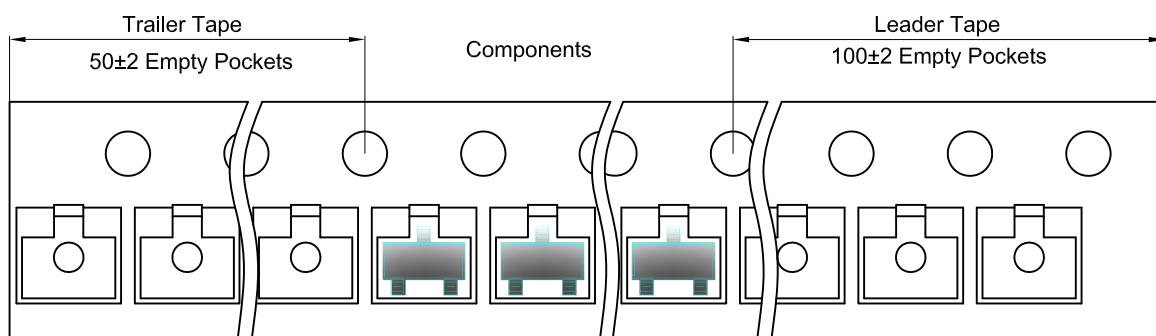
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 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 Embossed Carrier Tape

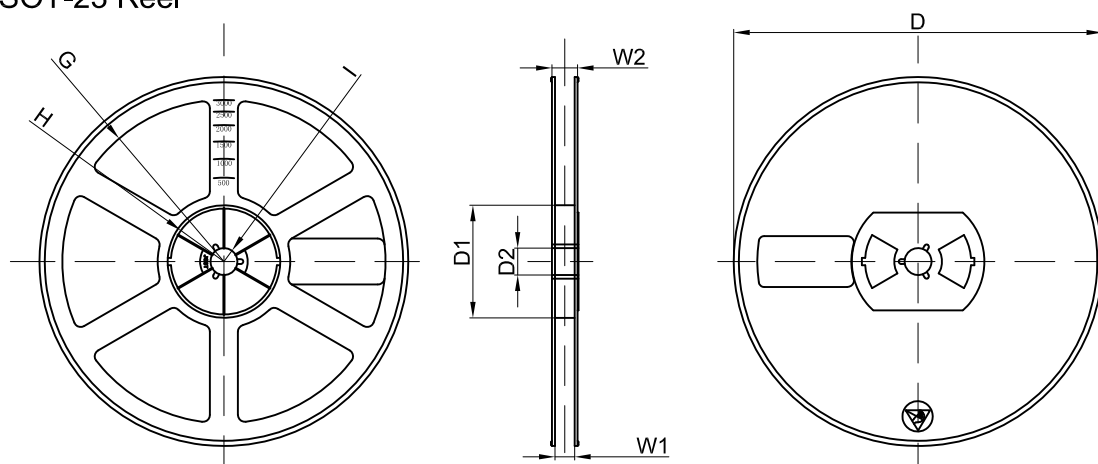


Dimensions are in millimeter										
Pkg type	A	B	C	d	E	F	P0	P	P1	W
SOT-23	3.15	2.77	1.22	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00

## 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	Ø178.00	54.40	13.00	R78.00	R25.60	R6.50	9.50	12.30

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
3000 pcs	7 inch	45,000 pcs	203×203×195	180,000 pcs	438×438×220	

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