

## -20V P-Channel Mosfet

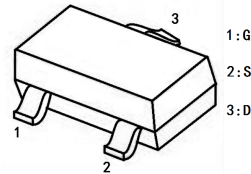
### FEATURES

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

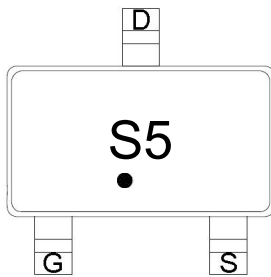
### APPLICATIONS

- Load Switch for Portable Devices
- DC/DC Converter

### SOT-23

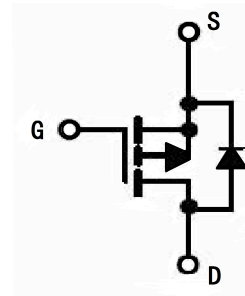


### MARKING



S5: Device Code

### P-CHANNEL MOSFET



### Maximum ratings (Ta=25°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

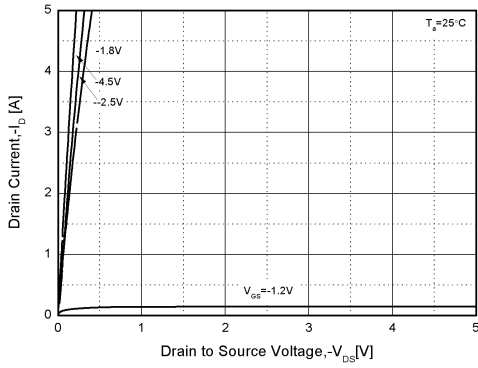


Figure1. Output Characteristics

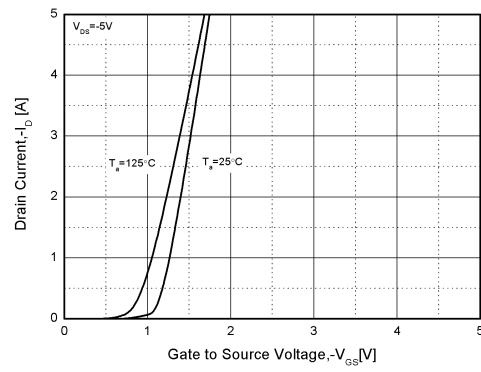


Figure2. Transfer Characteristics

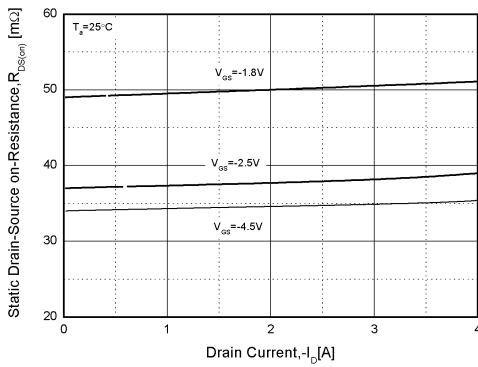


Figure3. Rdson-Drain Current

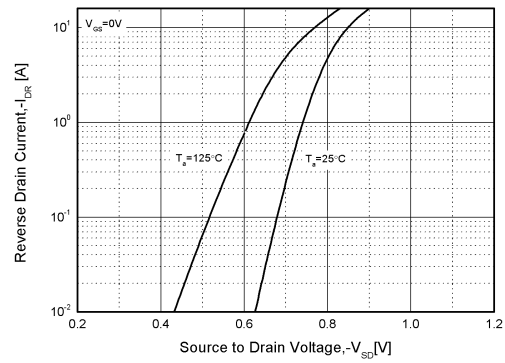


Figure4. Typical Source-Drain Diode Forward Voltage

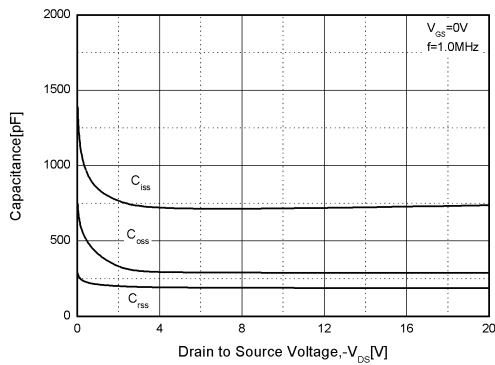


Figure5. Capacitance Characteristics

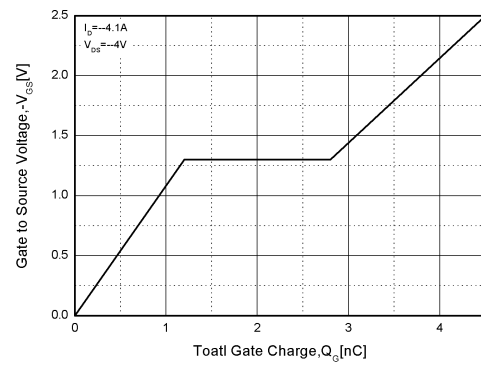


Figure6. Gate Charge

## Typical Performance Characteristics (cont.)

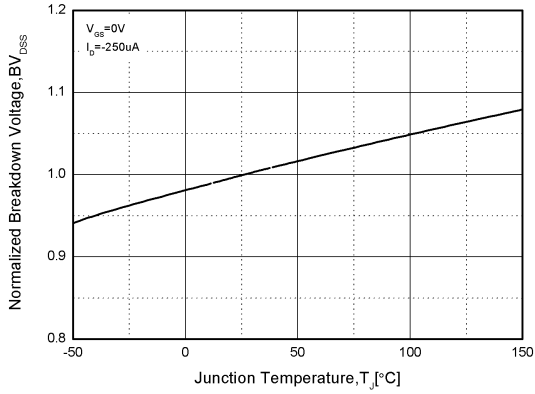


Figure7. Normalized Breakdown Voltage vs. Temperature

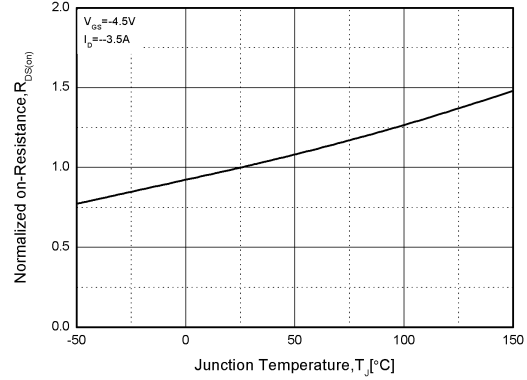


Figure8. Normalized on Resistance vs. Temperature

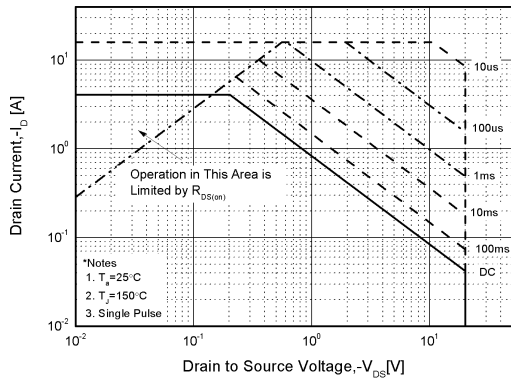


Figure9. Safe Operation Area

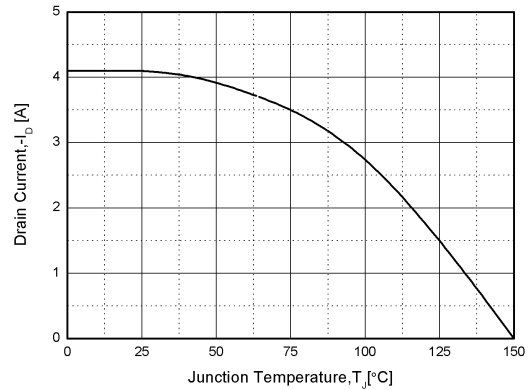
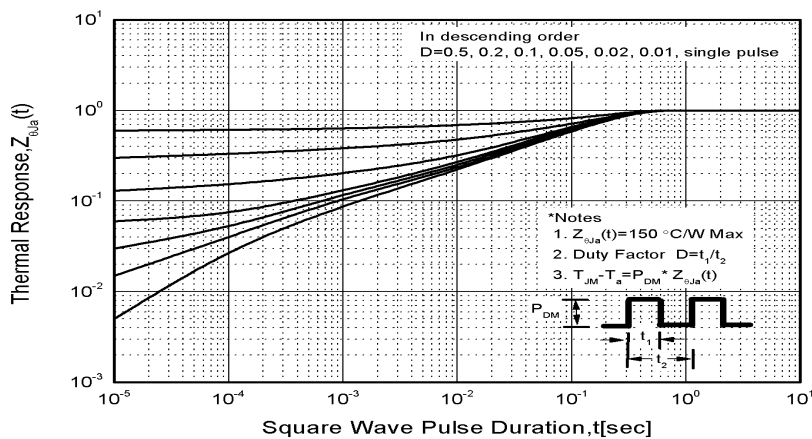
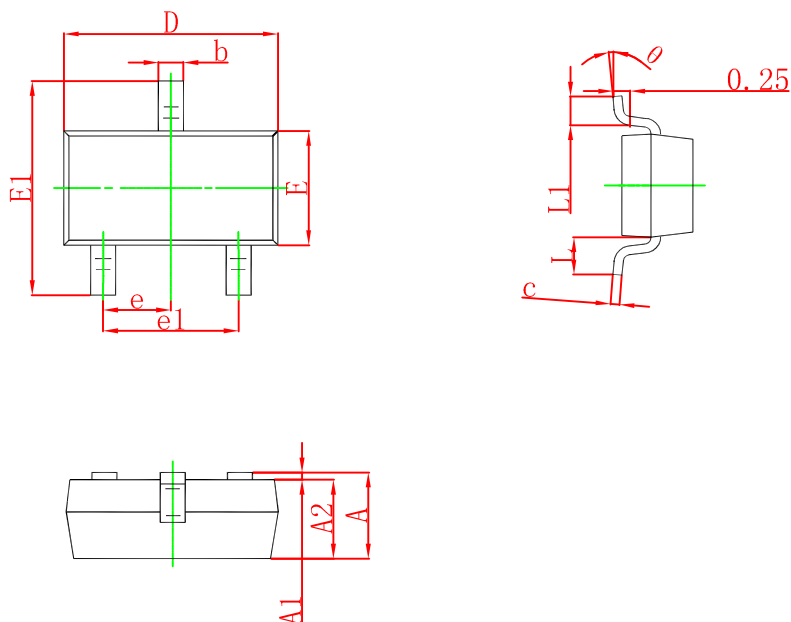


Figure10. Drain Current vs. Case Temperature

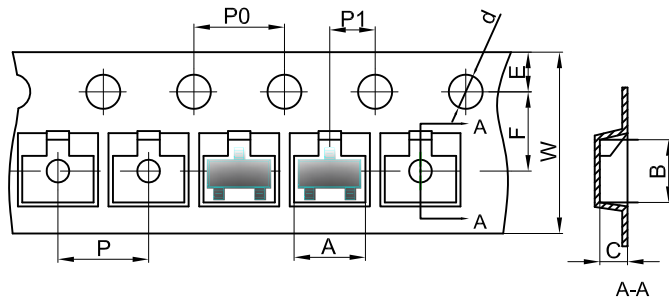


**SOT-23 Package Outline Dimensions**



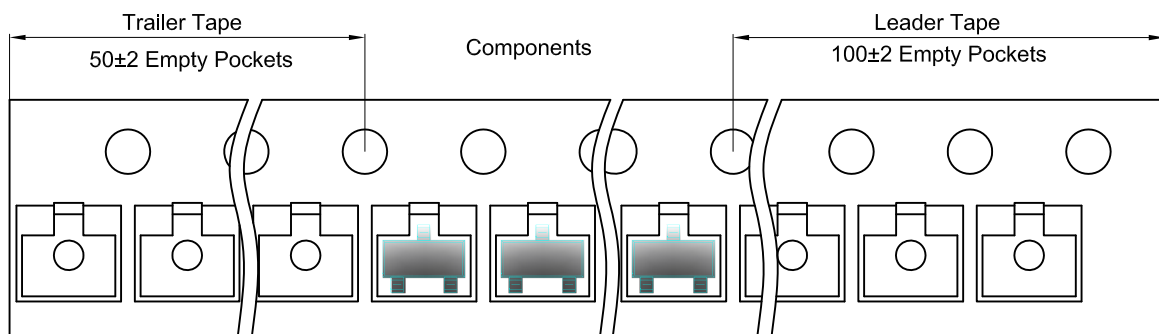
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037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

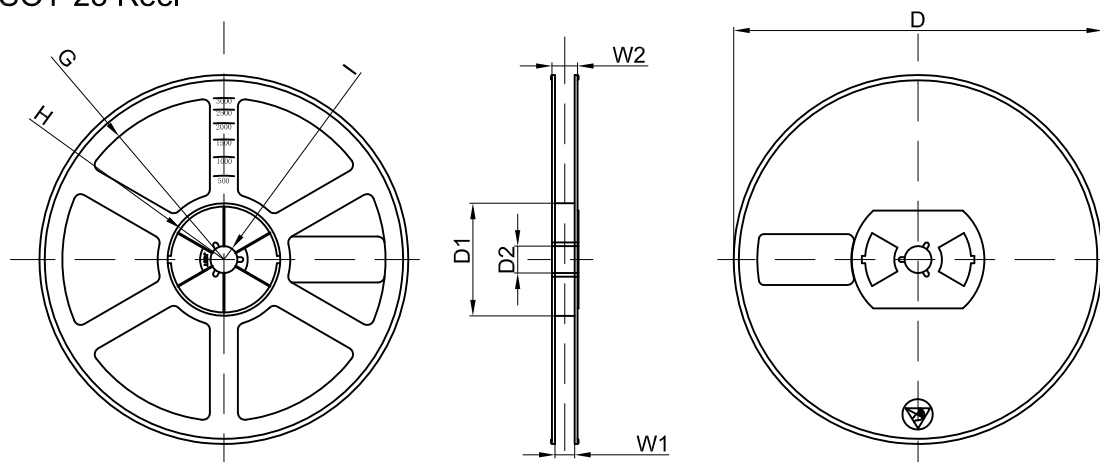


Dimensions are in millimeter										
Pkg type	A	B	C	d	E	F	P0	P	P1	W
SOT-23	3.15	2.77	1.22	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00

## 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	