

## Features

- Low  $R_{DS(ON)}$
- Epoxy Meets UL 94 V-0 Flammability Rating
- Moisture Sensitivity Level 1
- Halogen Free. "Green" Device (Note 1)
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

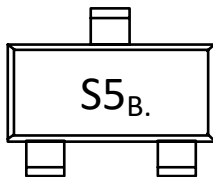
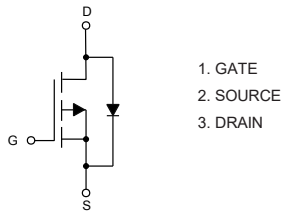
## Maximum Ratings

- Operating Junction Temperature Range:  $-55^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$
- Storage Temperature:  $-55^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$
- Thermal Resistance:  $90^{\circ}\text{C/W}$  Junction to Ambient (Note 2)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	-20	V
Gate-Source Voltage	$V_{GS}$	$\pm 10$	V
Drain Current-Continuous	$I_D$	-4.2	A
Drain Current-Pulse (Note 2)	$I_{DM}$	-21	A
Power Dissipation	$P_D$	1.4	W

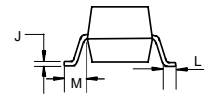
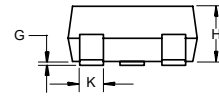
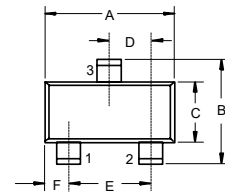
Note: 1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

## Internal Structure and Marking Code



# P-Channel MOSFET

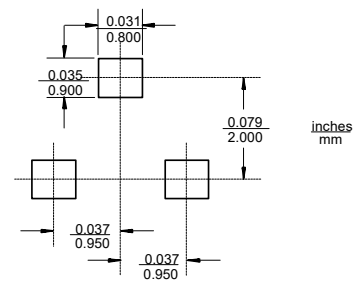
## SOT-23



### DIMENSIONS

DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.110	0.120	2.80	3.04	
B	0.083	0.104	2.10	2.64	
C	0.047	0.055	1.20	1.40	
D	0.034	0.041	0.85	1.05	
E	0.067	0.083	1.70	2.10	
F	0.018	0.024	0.45	0.60	
G	0.0004	0.006	0.01	0.15	
H	0.035	0.043	0.90	1.10	
J	0.003	0.007	0.08	0.18	
K	0.012	0.020	0.30	0.51	
L	0.007	0.020	0.20	0.50	
M	0.022 REF		0.55 REF		

### Suggested Solder Pad Layout



**ELECTRICAL CHARACTERISTICS (Ta=25°C unless otherwise specified)**

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-20			V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.5		-0.9	V
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 10V, V_{DS}=0V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-20V, V_{GS}=0V$			-1	$\mu A$
Drain-Source On-Resistance <sup>(Note 4)</sup>	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-4A$		30	39	m $\Omega$
		$V_{GS}=-2.5V, I_D=-3A$		38	49	
		$V_{GS}=-1.8V, I_D=-2A$		51	63	
Forward Transconductance <sup>(Note 4)</sup>	$g_{FS}$	$V_{DS}=-5V, I_D=-4.1A$	6			S
<b>Dynamic Characteristics</b>						
Input Capacitance <sup>(Note 2,5)</sup>	$C_{iss}$	$V_{DS}=-4V, V_{GS}=0V, f=1MHz$		740		pF
Output Capacitance <sup>(Note 2,5)</sup>	$C_{oss}$			290		
Reverse Transfer Capacitance <sup>(Note 2,5)</sup>	$C_{rss}$			190		
Total Gate Charge <sup>(Note 2)</sup>	$Q_g$	$V_{DS}=-4V, V_{GS}=-4.5V, I_D=-4.1A$		7.8	15	nC
				4.5	9	
Gate-Source Charge <sup>(Note 2)</sup>	$Q_{gs}$	$V_{DS}=-4V, V_{GS}=-2.5V, I_D=-4.1A$		1.2		
Gate-Drain Charge <sup>(Note 2)</sup>	$Q_{gd}$			1.6		
Gate Resistance <sup>(Note 2,5)</sup>	$R_g$	$f=1MHz$	1.4	7	14	$\Omega$
Turn-On Delay Time <sup>(Note 2,5)</sup>	$t_{d(on)}$	$V_{DD}=-4V, V_{GEN}=-4.5V, R_L=1.2\Omega, I_D=-3.3A, R_G=1\Omega$		13	20	ns
Turn-On Rise Time <sup>(Note 2,5)</sup>	$t_r$			35	53	
Turn-Off Delay Time <sup>(Note 2,5)</sup>	$t_{d(off)}$			32	48	
Turn-Off Fall Time <sup>(Note 2,5)</sup>	$t_f$			10	20	
Turn-On Delay Time <sup>(Note 2,5)</sup>	$t_{d(on)}$	$V_{DD}=-4V, V_{GEN}=-8V, R_L=1.2\Omega, I_D=-3.3A, R_G=1\Omega$		5	10	ns
Turn-On Rise Time <sup>(Note 2,5)</sup>	$t_r$			11	17	
Turn-Off Delay Time <sup>(Note 2,5)</sup>	$t_{d(off)}$			22	33	
Turn-Off Fall Time <sup>(Note 2,5)</sup>	$t_f$			16	24	
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Source-Drain Diode Current	$I_S$	$T_C=25^\circ C$			-4.2	A
Pulse Diode Forward Current <sup>(Note 4)</sup>	$I_{SM}$				-10	
Body Diode Voltage	$V_{SD}$	$I_F=-3.3A$		-0.8	-1.2	V

Note:

2. Guaranteed by Design, Not Subject to Production Testing.
3. Repetitive Rating: Pulse Width Limited by Max. Junction Temperature.
4. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
5. These Parameters Have No Way to Verify.

## Curve Characteristics

Fig. 1 - On-Resistance Characteristics

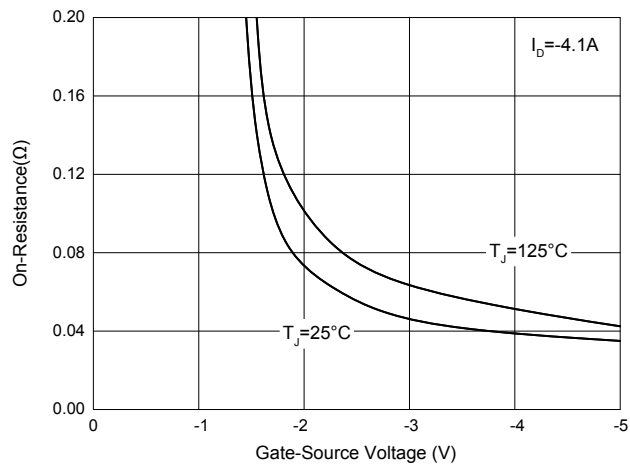


Fig. 2 - Drain Current Characteristics

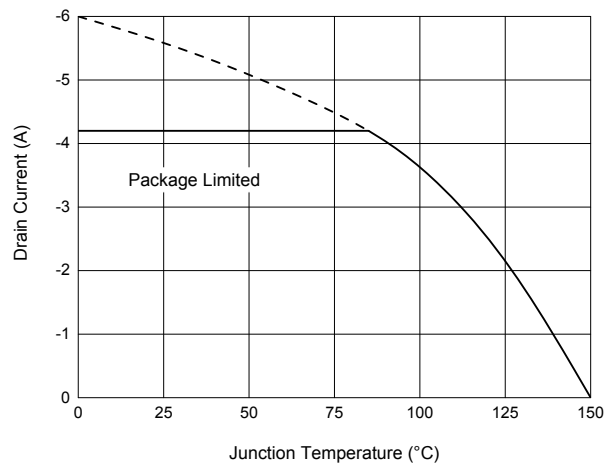


Fig. 3 - Output Characteristics

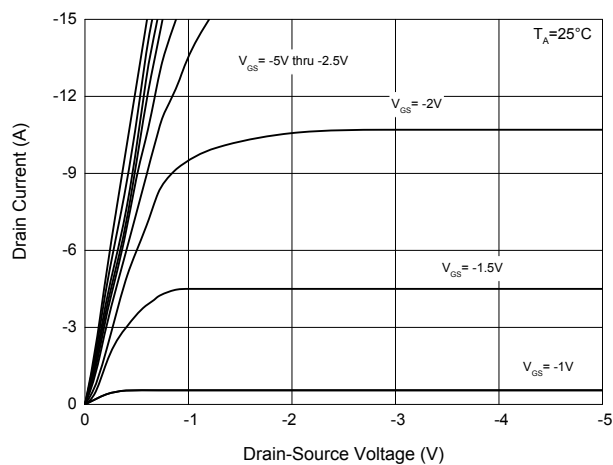


Fig. 4 - On-Resistance Characteristics

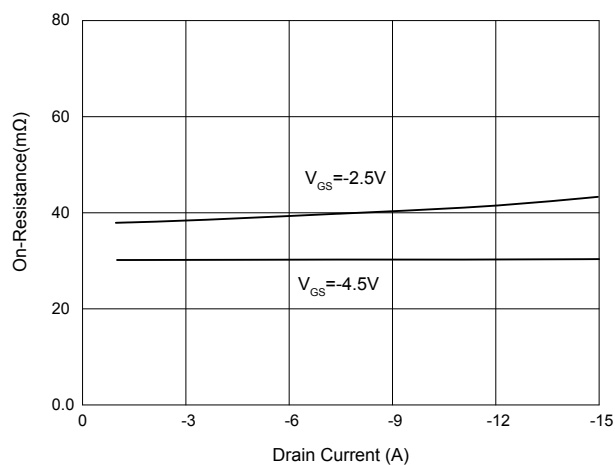
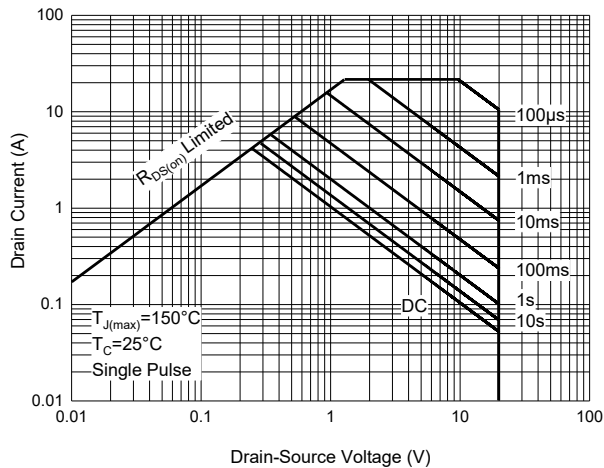


Fig. 5 - Safe Operation Area



## Ordering Information

Device	Packing
Part Number-TP	Tape&Reel:3Kpcs/Reel

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