

### Features

- Excellent  $R_{DS(ON)}$  low gate charge, low gate voltages
- 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)

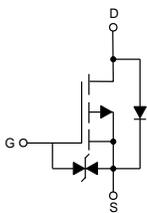
### Maximum Ratings

- Operating Junction Temperature Range: -55°C to +150°C
- Storage Temperature: -55°C to +150°C
- Thermal Resistance: 357°C/W Junction to Ambient

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	-20	V
Gate-Source Voltage	$V_{GS}$	±8	V
Drain Current-Continuous	$I_D$	-4.0	A
Power Dissipation	$P_D$	0.35	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

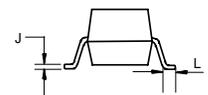
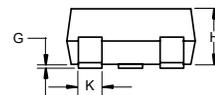
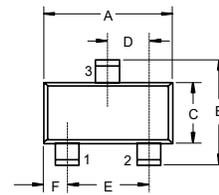


1. GATE
2. SOURCE
3. DRAIN

Marking: 3415

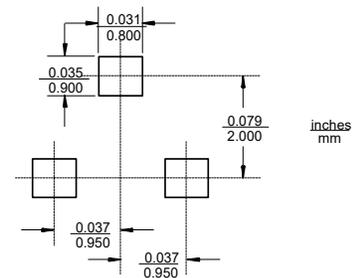
## P-Channel MOSFET

### SOT-23



DIM	DIMENSIONS				NOTE
	INCHES		MM		
	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	

#### 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	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.3		-1.0	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-16V, V_{GS}=0V$			-1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 8V, V_{DS}=0V$			$\pm 10$	
		$V_{GS}=\pm 4.5V, V_{DS}=0V$			$\pm 1$	
Drain-Source On-Resistance <sup>(Note 2)</sup>	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-4A$			0.050	$\Omega$
		$V_{GS}=-2.5V, I_D=-4A$			0.060	
		$V_{GS}=-1.8V, I_D=-2A$			0.073	
Forward Transconductance <sup>(Note 3)</sup>	$g_{FS}$	$V_{DS}=-5V, I_D=-4A$	8			mS
Diode Forward Voltage <sup>(Note 3)</sup>	$V_{SD}$	$V_{GS}=0V, I_S=-1A$			-1	V
<b>Dynamic Characteristics<sup>(Note 4)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS}=-10V, V_{GS}=0V, f=1MHz$		1450		$\mu F$
Output Capacitance	$C_{oss}$			205		
Reverse Transfer Capacitance	$C_{rss}$			160		
Gate resistance	$R_g$	$V_{DS}=0V, V_{GS}=0V, f=1MHz$		6.5		$\Omega$
<b>Switching Characteristics</b>						
Total Gate Charge	$Q_g$	$V_{DS}=-10V, V_{GS}=-4.5V, I_D=-4A$		1.4	2	nC
Gate-Source Charge	$Q_{gs}$			0.15	0.25	
Gate-Drain Charge	$Q_{gd}$			0.2	0.4	
Turn-On Delay Time <sup>(Note 4)</sup>	$t_{d(on)}$	$V_{DD}=-10V, V_{GS}=-4.5V, R_G=30\Omega, R_L=2.5\Omega$		9.5		ns
Turn-On Rise Time <sup>(Note 4)</sup>	$t_r$			17		
Turn-Off Delay Time <sup>(Note 4)</sup>	$t_{d(off)}$			94		
Turn-Off Fall Time <sup>(Note 4)</sup>	$t_f$			35		

Note:

2. Repetitive rating, pulse width limited by junction temperature.
3. Pulse Test : Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
4. These parameters have no way to verify.

Curve Characteristics

Fig. 1 - Output Characteristics

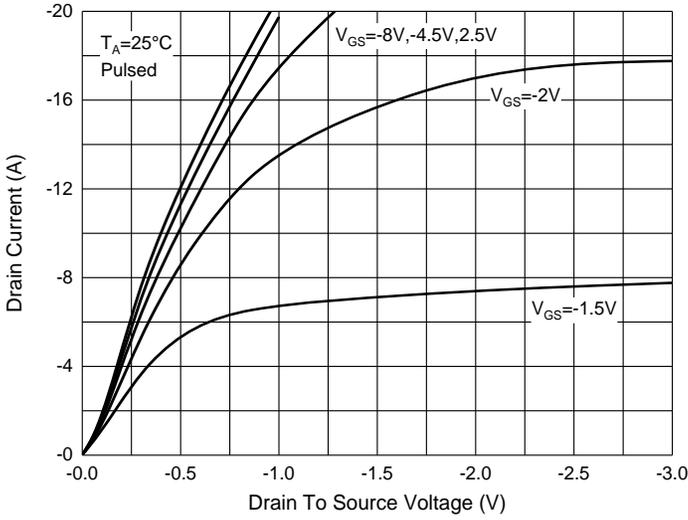


Fig. 2 - Transfer Characteristics

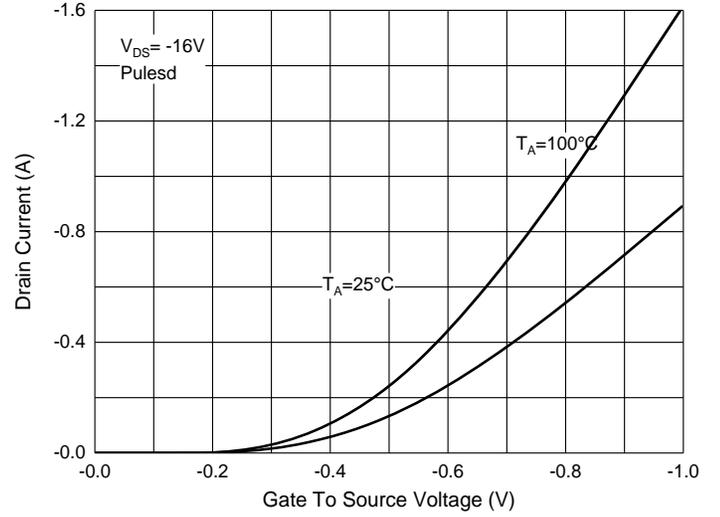


Fig. 3 -  $R_{DS(ON)} - I_D$

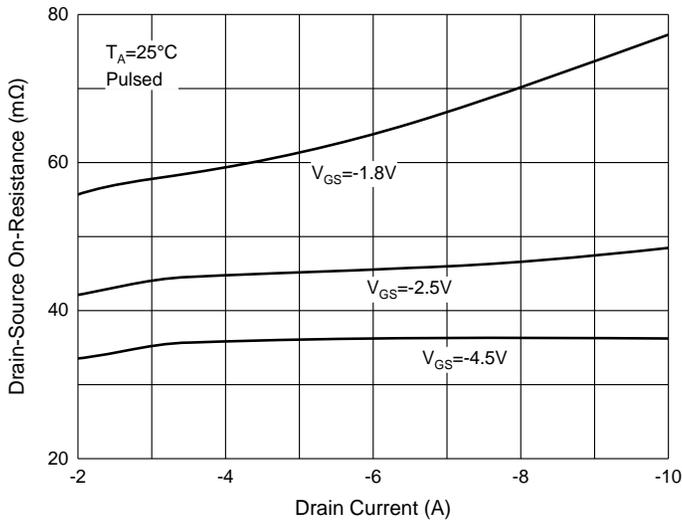


Fig. 4 -  $R_{DS(ON)} - V_{GS}$

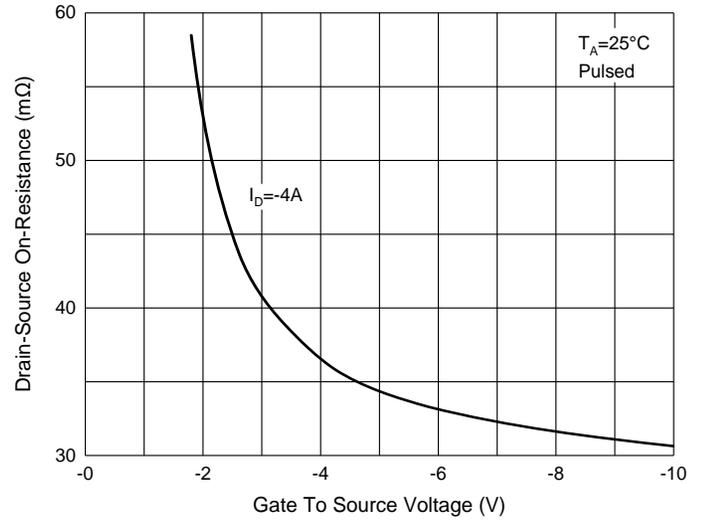


Fig. 5 -  $I_S - V_{SD}$

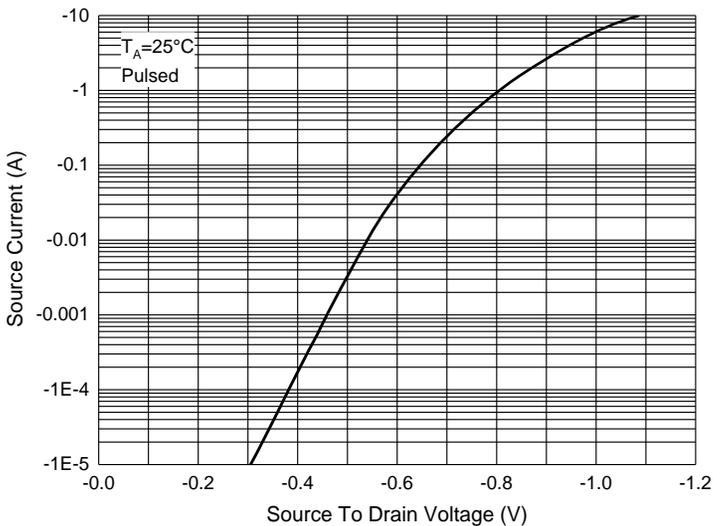
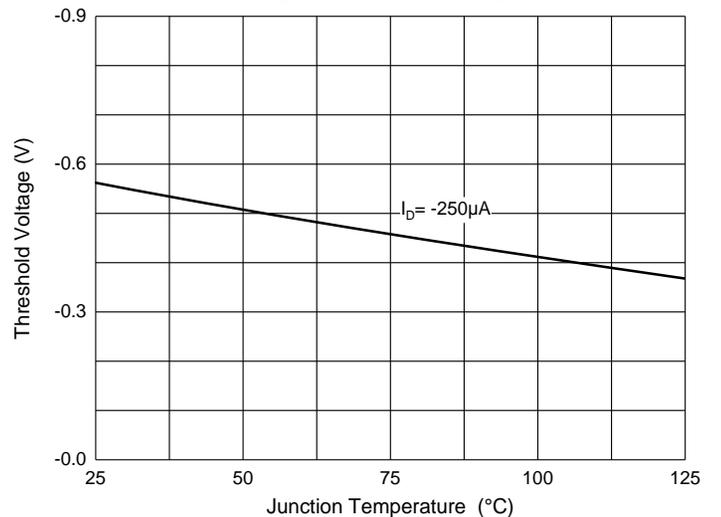


Fig. 6 - Threshold Voltage



## Ordering Information

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

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