

**Features**

- TrenchFET Power Mosfet
- Excellent  $R_{DS(ON)}$
- 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)

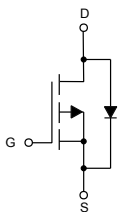
**Maximum Ratings**

- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 113°C/W Junction to Ambient<sup>(Note 2)</sup>
- Thermal Resistance: 357°C/W Junction to Ambient<sup>(Note 3)</sup>

Parameter	Symbol	Rating	Unit
Drain -source Voltage	$V_{DS}$	-12	V
Gate -Source Voltage	$V_{GS}$	±8	V
Drain Current-Continuous <sup>(Note 2)</sup>	$I_D$	-6.0	A
Drain Current-Pulse	$I_{DM}$	-20	A
Total Power Dissipation	$P_D$	0.35 <sup>(Note 3)</sup>	W
		1.10 <sup>(Note 2)</sup>	

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**

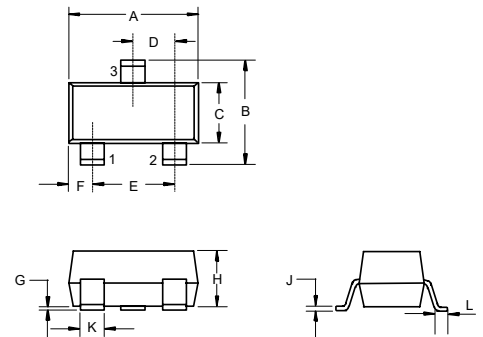


1. GATE
2. SOURCE
3. DRAIN

Marking:S33

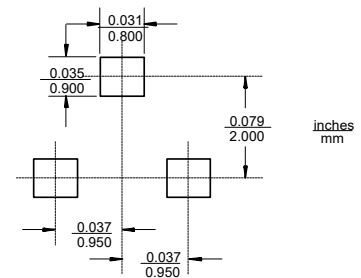
**P-Channel MOSFET**

**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	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-12			V
Gate-Threshold Voltage <sup>(Note 3)</sup>	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.40		-1.0	V
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS} = \pm 8V, V_{DS} = 0V$			$\pm 0.1$	$\mu A$
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -12V, V_{GS} = 0V$			-1	$\mu A$
Drain-Source On-Resistance <sup>(Note 3)</sup>	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-5.0A$			28	m $\Omega$
		$V_{GS}=-3.7V, I_D=-4.6A$			32	
		$V_{GS}=-2.5V, I_D=-4.3A$			40	
		$V_{GS}=-1.8V, I_D=-1.0A$			63	
		$V_{GS}=-1.5V, I_D=-0.5A$			150	
Forward Transconductance <sup>(Note 3)</sup>	$g_{FS}$	$V_{DS}=-5V, I_D=-5.0A$		18		S
<b>Dynamic Characteristics<sup>(Note 4)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS}=-6V, V_{GS}=0V, f=1MHz$		1275		pF
Output Capacitance	$C_{oss}$			255		
Reverse Transfer Capacitance	$C_{rss}$			236		
Gate Resistance	$R_g$	$f = 1MHz$	1.9		19	$\Omega$
Total Gate Charge	$Q_g$	$V_{DS}=-6V, V_{GS}=-4.5V, I_D=-5A$		14	21	nC
Gate-Source Charge	$Q_{gs}$			2.3		
Gate-Drain Charge	$Q_{gd}$			3.6		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=-6V, V_{GEN}=-4.5V, I_D=-4A$ $R_L=6\Omega, R_{GEN}=1\Omega$		6	16	ns
Turn-On Rise Time	$t_r$			6	16	
Turn-Off Delay Time	$t_{d(off)}$			11	16	
Turn-Off Fall Time	$t_f$			26	16	
<b>Source-Drain Diode Characteristics</b>						
Diode Forward Current	$I_S$	$T_C=25^\circ C$			-1.4	A
Diode Pulsed Forward Current	$I_{SM}$				-20	A
Diode Forward Voltage <sup>(Note 3)</sup>	$V_{SD}$	$V_{GS}=0V, I_S=-4A$			-1.2	V
Diode Reverse Leakage Current <sup>(Note 1)</sup>	$I_{ri}$	$V_{GS}=-6V, V_{SD}=-6V, I_D=-4A$		6	11	nA
Diode Reverse Recovery Time <sup>(Note 1)</sup>	$t_{rr}$			1	16	

Note:

1. Device Mounted On FR-4 Substrated Board, With Minimum Recommended Pad Layout, Single Side.
2. Device Mounted on No Heat Sink.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by Design, Not Subject to Production Testing.

Curve Characteristics

Fig. 1 - Output Characteristics

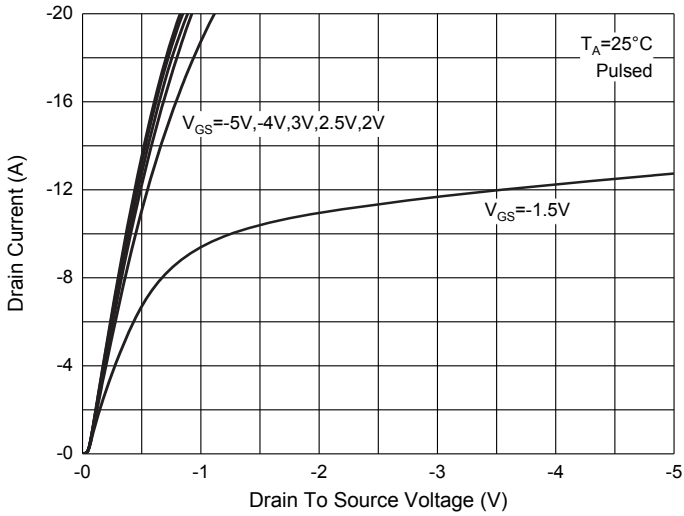


Fig. 2 - Transfer Characteristics

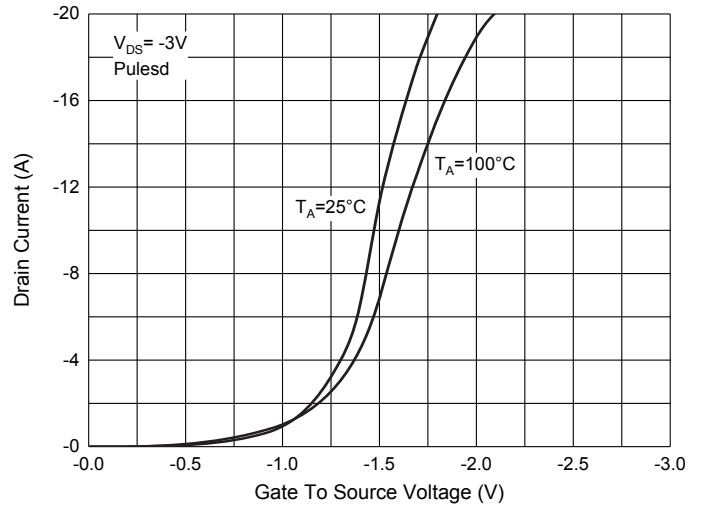


Fig. 3 -  $R_{DS(ON)} - I_D$

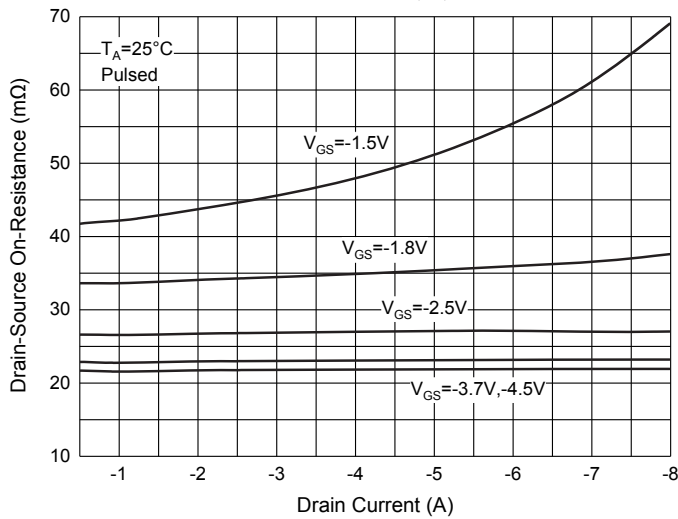


Fig. 4 -  $R_{DS(ON)} - V_{GS}$

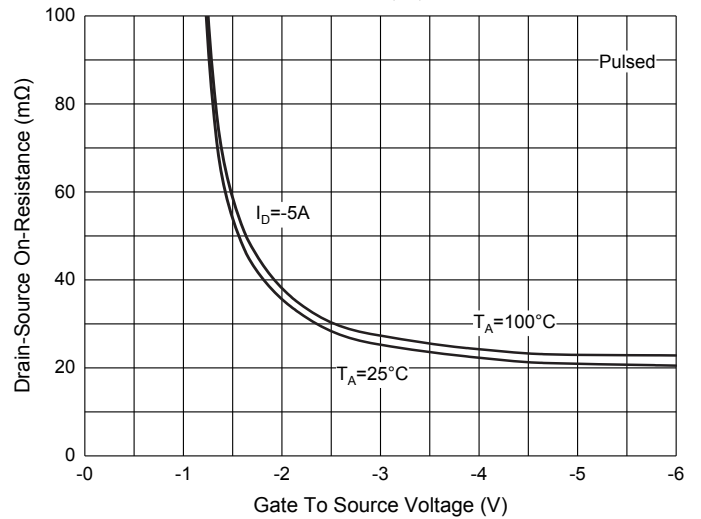


Fig. 5 -  $I_S - V_{SD}$

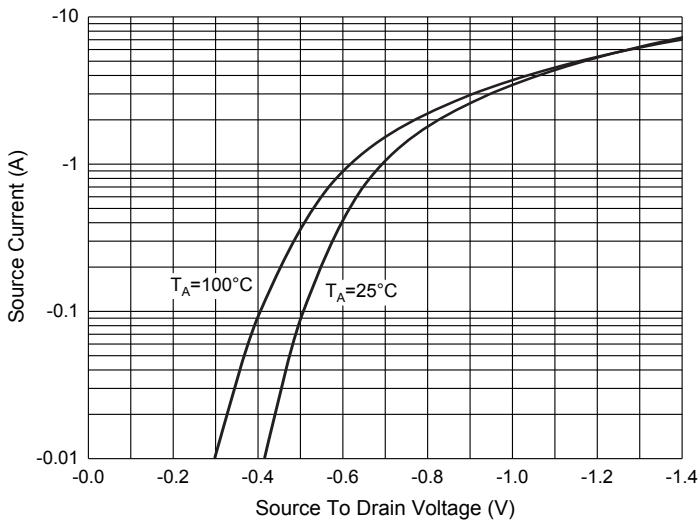
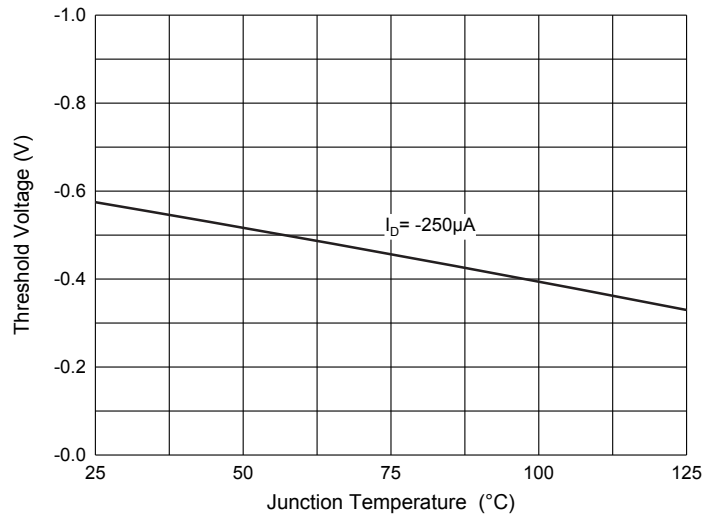


Fig. 6 - Threshold Voltage



## Ordering Information

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

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