



**THE DATASHEET OF  
SI3401A-TP**



## Features

- Trench LV MOSFET Technology
- High Density Cell Design for Ultra Low  $R_{DS(on)}$
- Moisture Sensitivity Level 1
- Halogen Free. "Green" Device (Note 1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

## Maximum Ratings

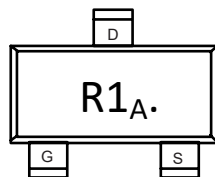
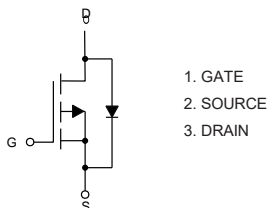
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 104°C/W Junction to Ambient<sup>(Note2)</sup>

Parameter	Symbol	Rating	Unit	
Drain-Source Voltage	$V_{DS}$	-30	V	
Gate-Source Voltage	$V_{GS}$	±12	V	
Continuous Drain Current	$I_D$	$T_A=25^\circ\text{C}$	-4.2	A
		$T_A=100^\circ\text{C}$	-2.6	
Pulsed Drain Current <sup>(Note3)</sup>	$I_{DM}$	-16.8	A	
Total Power Dissipation <sup>(Note4)</sup>	$P_D$	1.2	W	

Note:

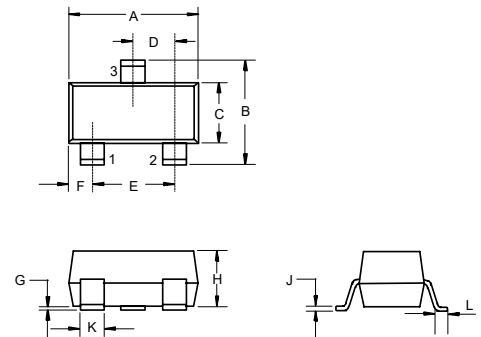
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ\text{C}$ .
3. Repetitive rating; pulse width limited by max. junction temperature.
4.  $P_D$  is based on max. junction temperature, using junction-ambient thermal resistance.

## Internal Structure and Marking Code



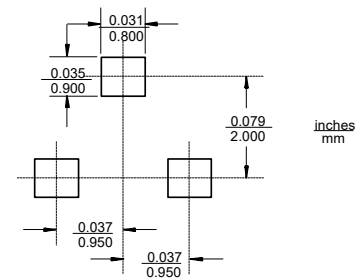
# P-CHANNEL MOSFET

## SOT-23



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	

### 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	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-30			V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.7	-0.85	-1.3	V
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 12V, V_{DS}=0V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-24V, V_{GS}=0V$			-1	$\mu A$
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-4.2A$		45	60	m $\Omega$
		$V_{GS}=-4.5V, I_D=-4A$		52	70	
		$V_{GS}=-2.5V, I_D=-1A$		68	85	
Forward Transconductance	$g_{FS}$	$V_{DS}=-5V, I_D=-4.5A$		14		S
Gate Resistance	$R_g$	f=1 MHz, Open drain		9		$\Omega$
<b>Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$				-4.2	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=-1A$			-1	V
Reverse Recovery Time	$t_{rr}$	$I_F=-2A, dI_F/dt=100A/\mu s$		12		ns
Reverse Recovery Charge	$Q_{rr}$			4		nC
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=-15V, V_{GS}=0V, f=1MHz$		831		pF
Output Capacitance	$C_{oss}$			68		
Reverse Transfer Capacitance	$C_{rss}$			59		
Total Gate Charge	$Q_g$	$V_{DS}=-15V, V_{GS}=-10V, I_D=-2A$		16.5		nC
Gate-Source Charge	$Q_{gs}$			1.3		
Gate-Drain Charge	$Q_{gd}$			2		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=-15V, V_{GS}=-10V, R_G=10\Omega, I_D=-2A$		5		ns
Turn-On Rise Time	$t_r$			3		
Turn-Off Delay Time	$t_{d(off)}$			40		
Turn-Off Fall Time	$t_f$			14		

Curve Characteristics

Fig.1 - Typical Output Characteristics

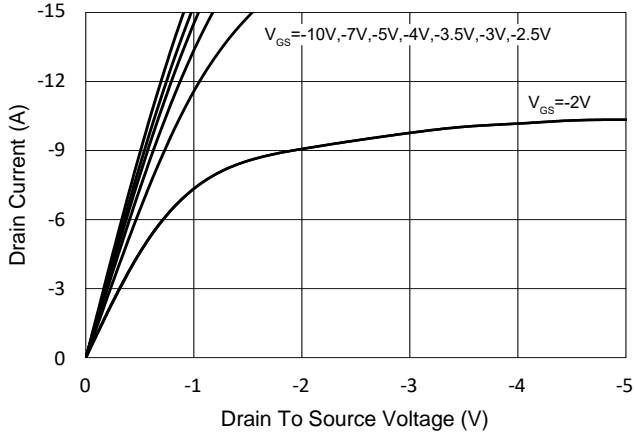


Fig.2 - Transfer Characteristic

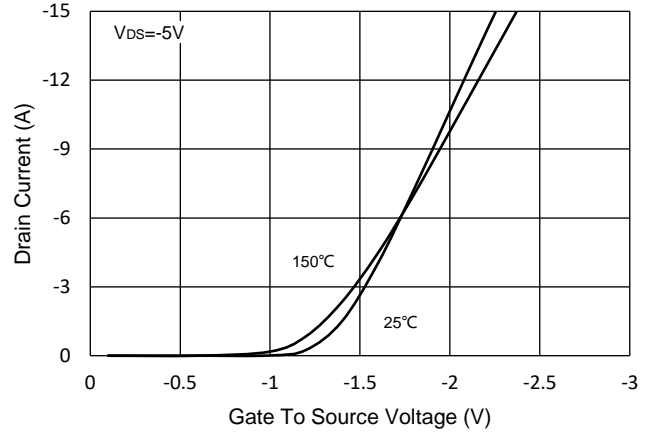


Fig.3 -  $R_{DS(ON)}$  -  $V_{GS}$

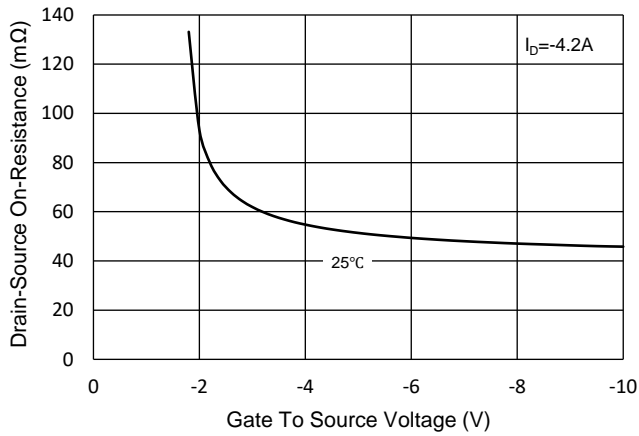


Fig.4 -  $R_{DS(ON)}$  -  $I_D$

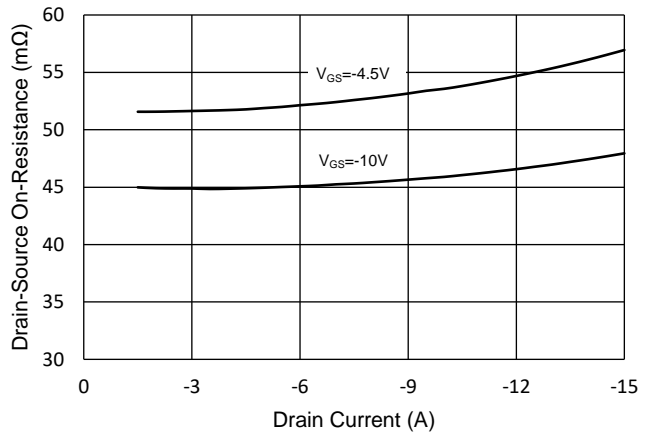


Fig.5 - Capacitance Characteristics

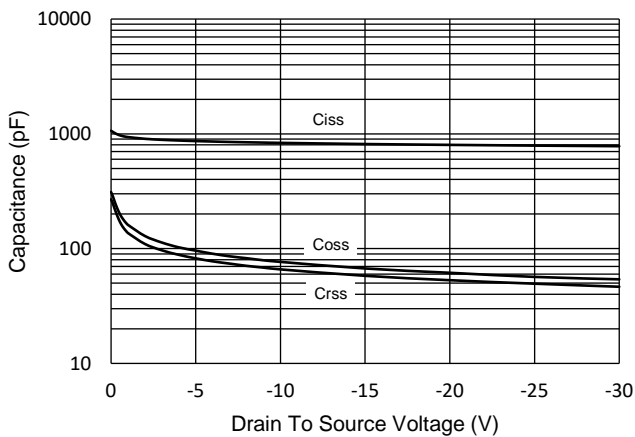
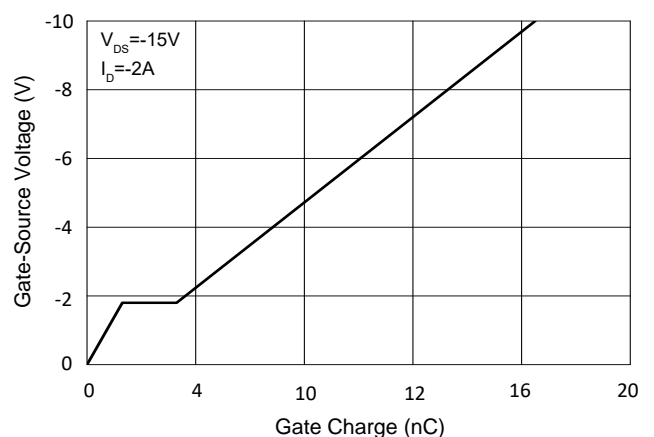
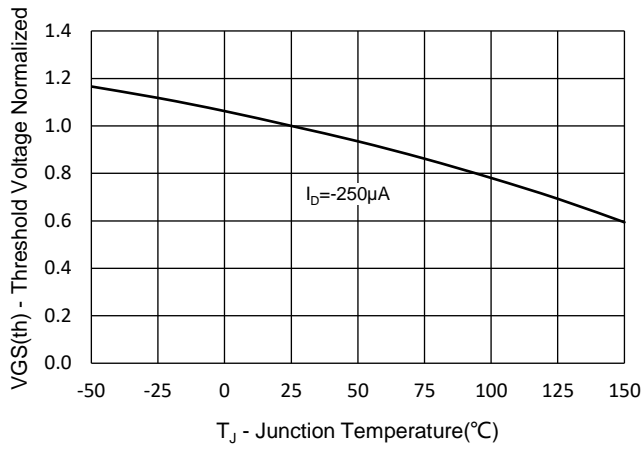


Fig.6 - Gate Charge

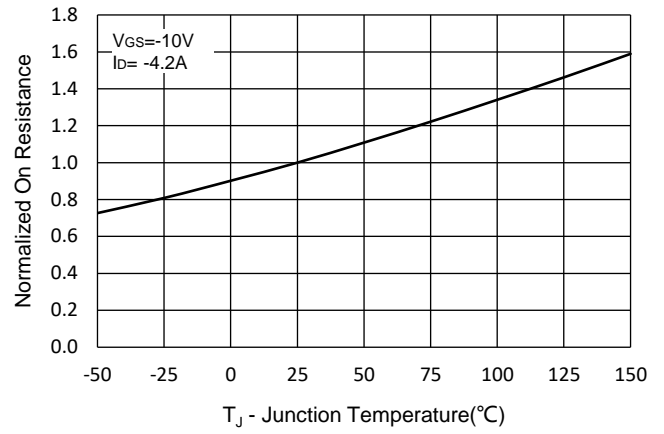


## Curve Characteristics

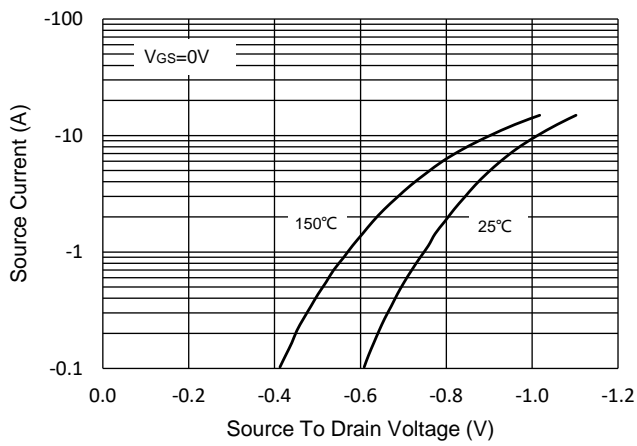
**Fig.7 - Normalized Threshold Voltage**



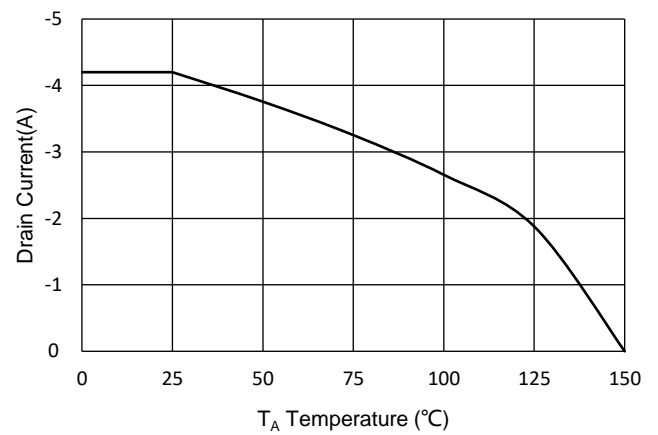
**Fig.8 - Normalized On Resistance Characteristics**



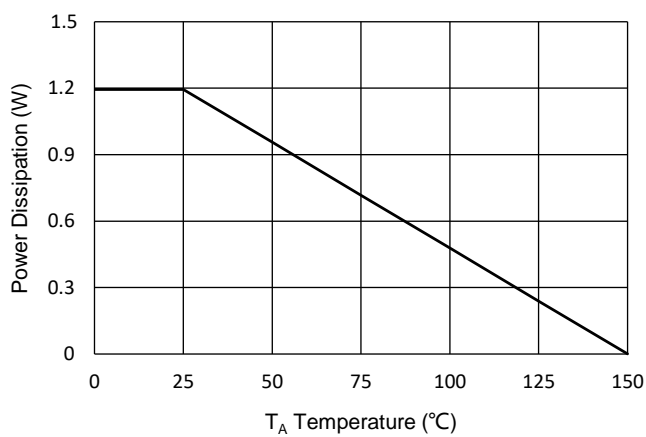
**Fig.9 -  $I_S$  -  $V_{SD}$**



**Fig.10 - Drain Current**



**Fig.11 - PD Dissipation**



Curve Characteristics

Fig.12 - Safe Operation Area

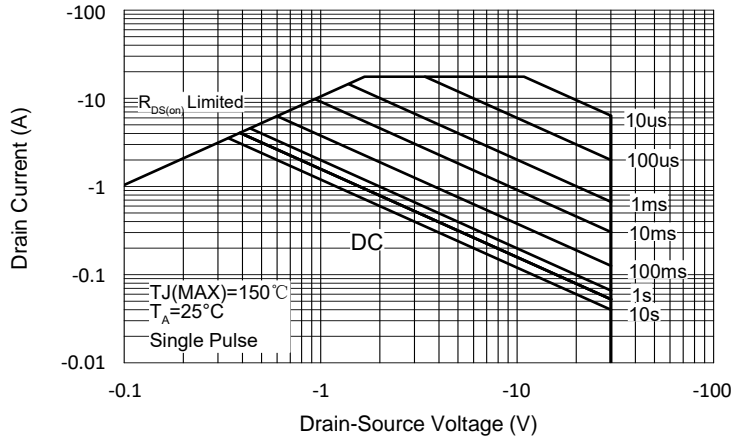
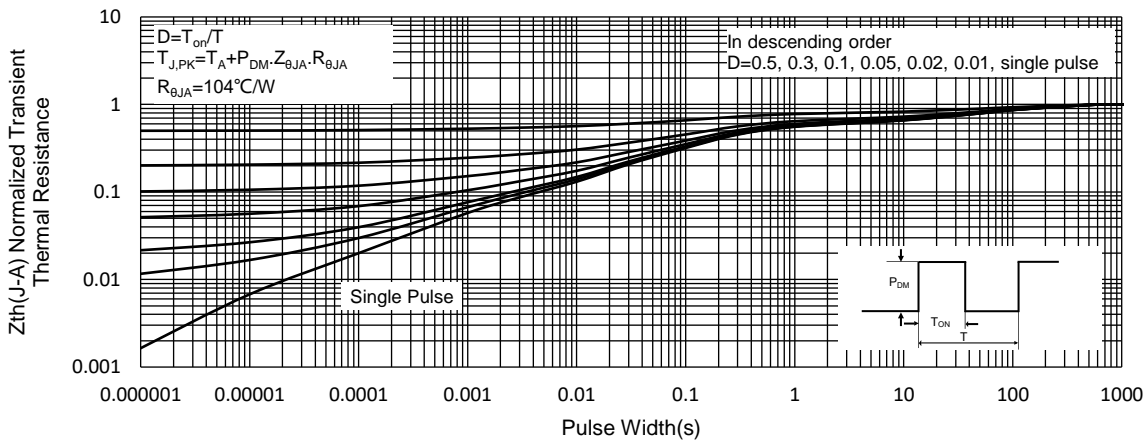


Fig.13 - Normalized Transient Thermal Impedance



## Ordering Information

Device	Packing
Part Number-TP	Tape&Reel: 3Kpcs/Reel
Part Number-13P	Tape&Reel: 10Kpcs/Reel

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