

## Features

- High Dense Cell Design for Extremely Low  $R_{DS(ON)}$
- Voltage Controlled Small Signal Switch
- Surface Mount Package
- 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

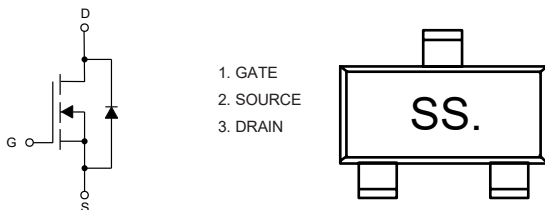
- Operating Junction Temperature Range:  $-55^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$
- Storage Temperature:  $-55^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$
- Thermal Resistance:  $357^{\circ}\text{C/W}$  Junction to Ambient (Note 2)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	50	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	$T_A=25^{\circ}\text{C}$	0.22
		$T_A=100^{\circ}\text{C}$	0.14
Pulsed Drain Current (Note3)	$I_{DM}$	0.88	A
Total Power Dissipation (Note4)	$P_D$	0.35	W

Note:

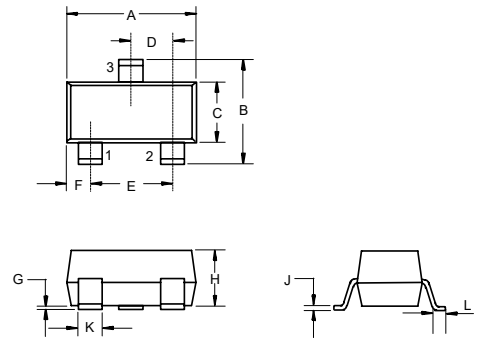
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of  $R_{\theta JA}$  is measured with the device mounted on the minimum recommend pad size, in the still air environment with  $T_A = 25^{\circ}\text{C}$ .
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



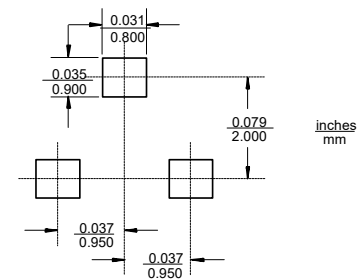
# N-Channel MOSFET

## 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	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	50			V
Gate-Threshold Voltage <sup>(Note5)</sup>	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=1mA$	0.8	1.1	1.5	V
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=50V, V_{GS}=0V$			100	nA
Drain-Source On-Resistance <sup>(Note5)</sup>	$R_{DS(on)}$	$V_{GS}=10V, I_D=0.3A$		0.9	2.5	$\Omega$
		$V_{GS}=4.5V, I_D=0.2A$		1.05	3	
Forward Transconductance <sup>(Note5)</sup>	$g_{FS}$	$V_{DS}=10V, I_D=0.22A$	120			mS
Gate Resistance	$R_g$	F=1 MHz, Open drain		4.2		$\Omega$
<b>Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$				0.22	A
Diode Forward Voltage <sup>(Note5)</sup>	$V_{SD}$	$V_{GS}=0V, I_S=0.44A$			1.4	V
Reverse Recovery Time	$t_{rr}$	$I_F=300mA, dI_F/dt=100A/\mu s$		12.2		ns
Reverse Recovery Charge	$Q_{rr}$			2.6		nC
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=25V, V_{GS}=0V, f=1MHz$		27	60	pF
Output Capacitance	$C_{oss}$			3	10	
Reverse Transfer Capacitance	$C_{rss}$			2	6	
Total Gate Charge	$Q_g$	$V_{DS}=25V, V_{GS}=10V, I_D=0.3A$		1.65		nC
Gate-Source Charge	$Q_{gs}$			0.24		
Gate-Drain Charge	$Q_{gd}$			0.4		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=30V, V_{GS}=10V, R_G=6\Omega, I_D=0.29A$			5	ns
Turn-On Rise Time	$t_r$				18	
Turn-Off Delay Time	$t_{d(off)}$				36	
Turn-Off Fall Time	$t_f$				73	

Note:

5.Pulse Test : Pulse Width=300 $\mu s$ , Duty Cycles $\leq$ 2%.

## Curve Characteristics

Fig. 1 - Typical Output Characteristics

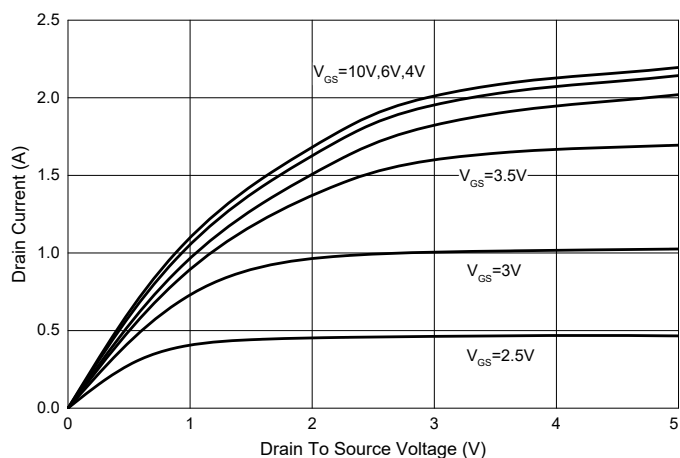


Fig. 2 - Transfer Characteristics

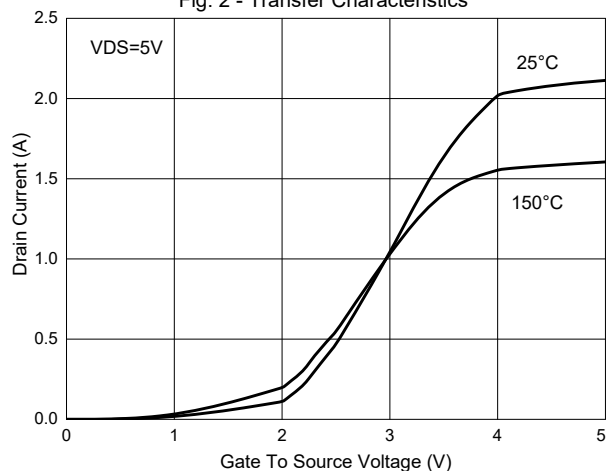


Fig. 3 -  $R_{DS(ON)} - I_D$

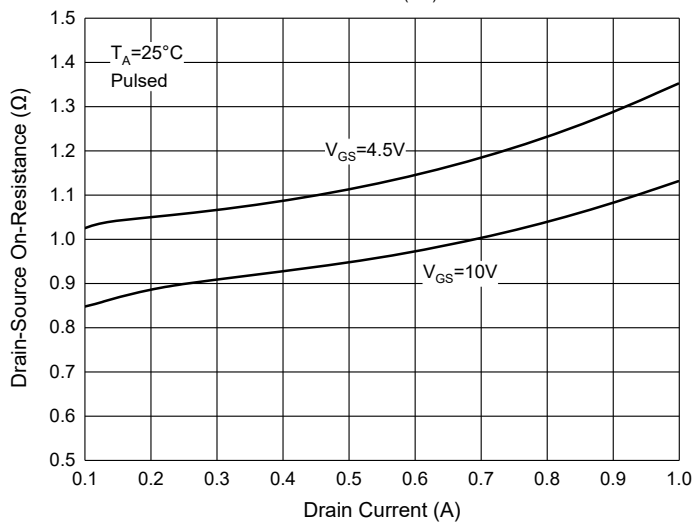


Fig. 4 -  $R_{DS(ON)} - V_{GS}$

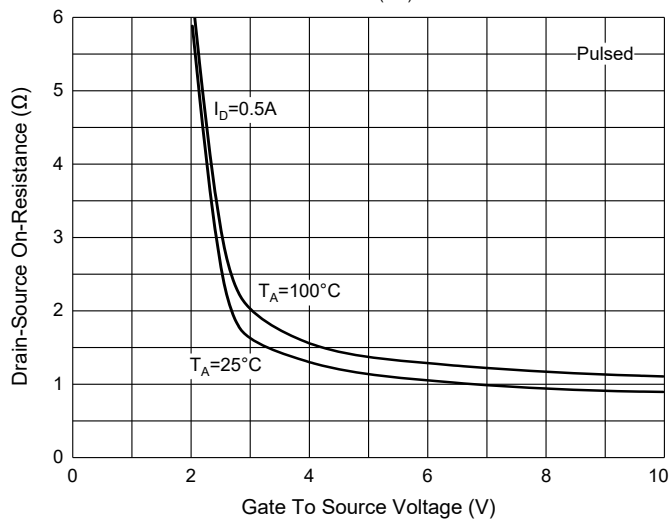


Fig. 5 -  $I_S - V_{SD}$

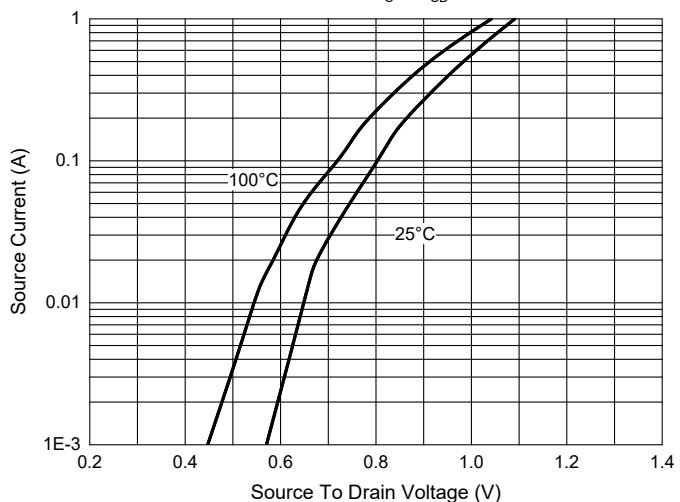


Fig. 6 - Threshold Voltage

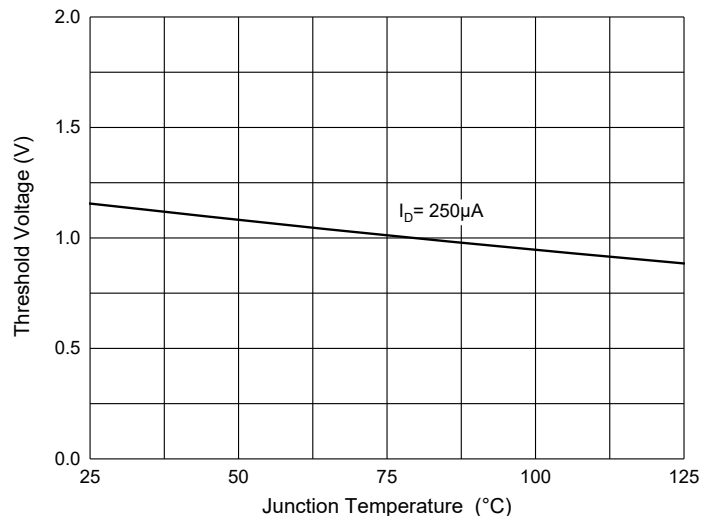


Fig. 7 - Normalized On Resistance Characteristics

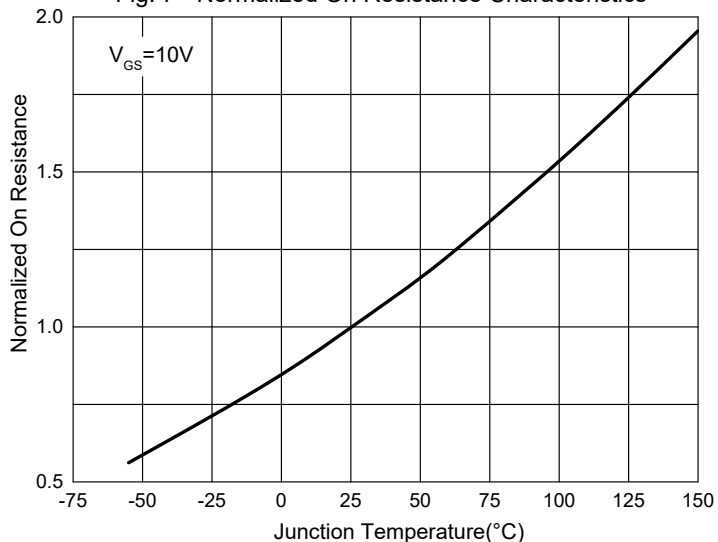


Fig. 8 - Gate Charge

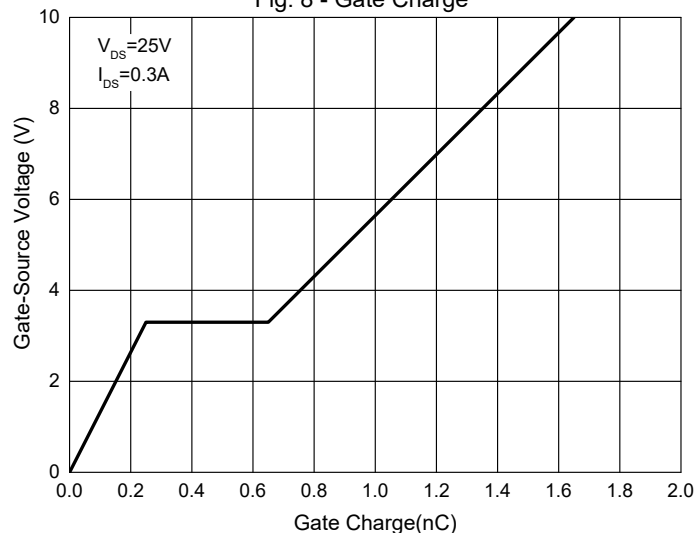


Fig. 9 - Capacitance Characteristics

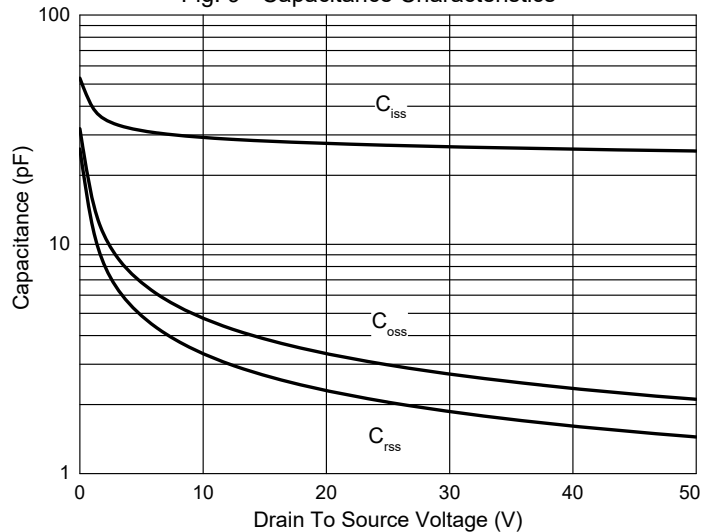


Fig. 10 - Current dissipation

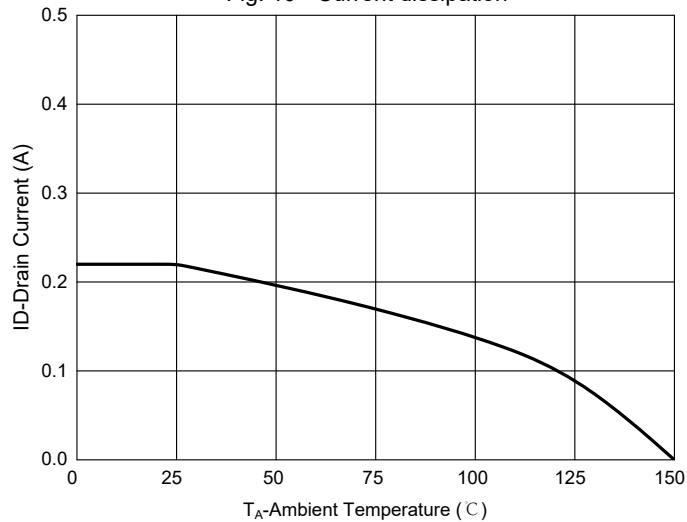


Fig. 11 - PD—TJ

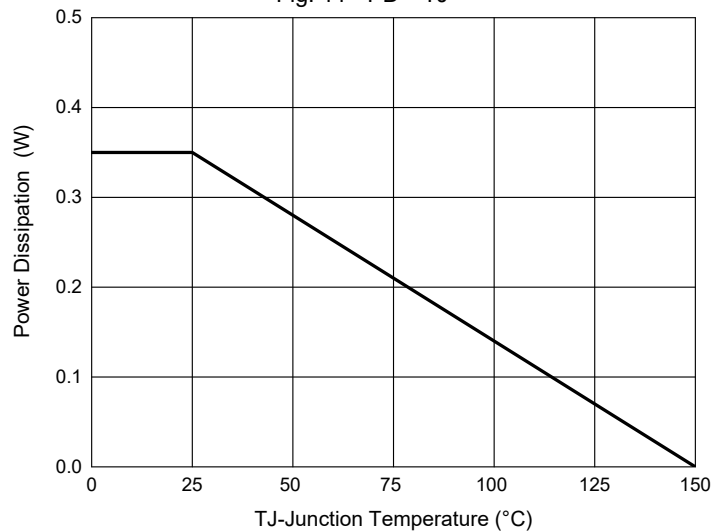


Fig. 12 - Safe Operation Area

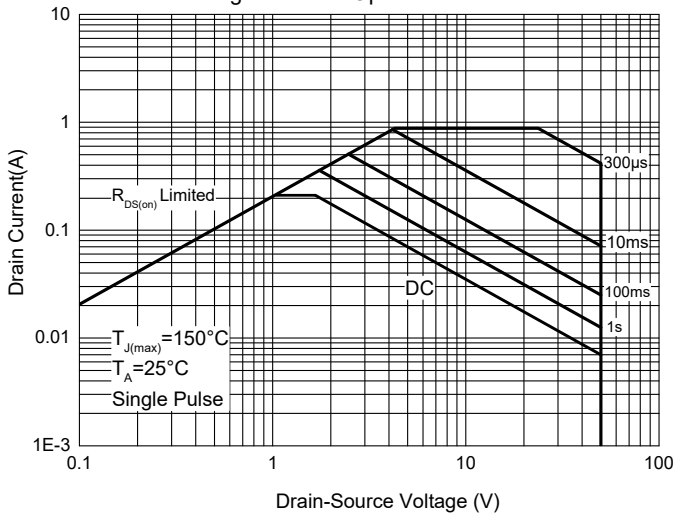
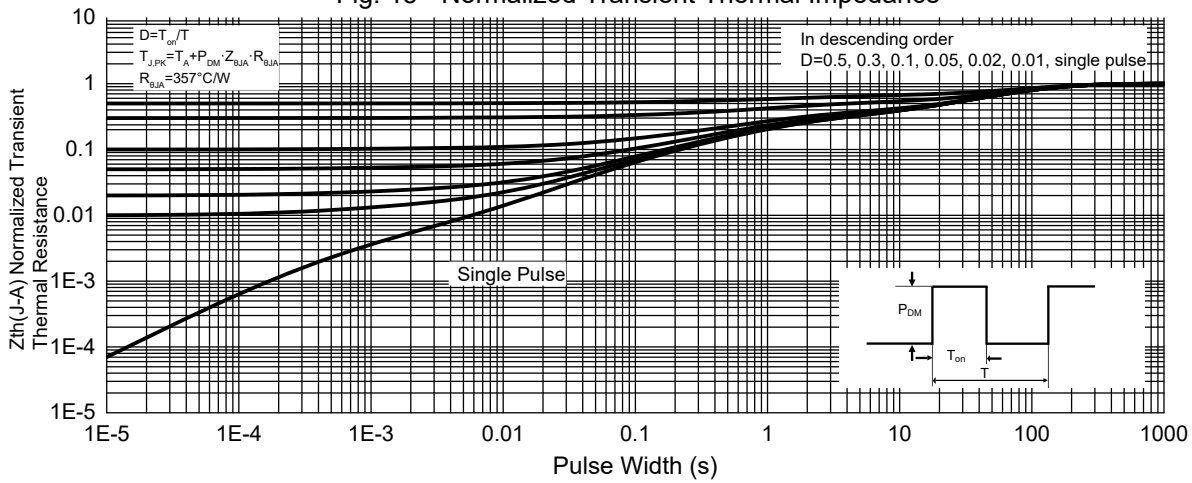


Fig. 13 - Normalized Transient Thermal Impedance



## Ordering Information

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

## Revision History

Datasheet status	Version No	Release date	Update content
New product datasheet	Rev4-1	20230106	

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