

## Features

- Trench LV MOSFET Technology
- ESD Protected Up To 2KV(HBM)
- Exceptional On-Resistance And Maximum DC Current Capability
- Moisture Sensitivity Level 1
- Halogen Free."Green"Device (Note1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

## Maximum Ratings

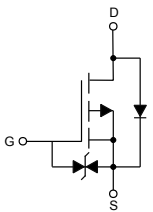
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 120°C/W Junction to Ambient (Note2)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	-20	V
Gate-Source Voltage	$V_{GS}$	±10	V
Continuous Drain Current	$I_D$	$T_A=25^\circ\text{C}$	-3.9
		$T_A=100^\circ\text{C}$	-2.4
Pulsed Drain Current <sup>(Note3)</sup>	$I_{DM}$	-16	A
Total Power Dissipation <sup>(Note4)</sup>	$P_D$	1	W

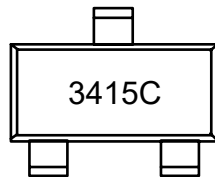
Note:

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

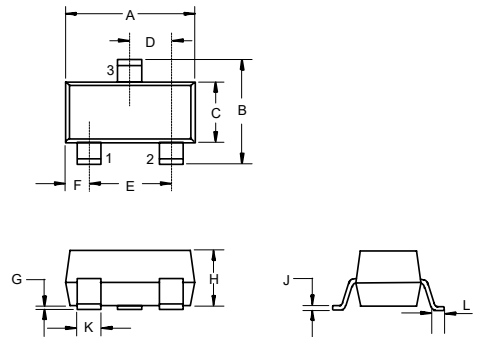


1. GATE
2. SOURCE
3. DRAIN



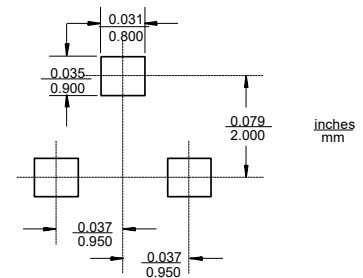
# P-CHANNEL MOSFET

## 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 @ 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-Source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 10V$			$\pm 10$	$\mu A$
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-20V, V_{GS}=0V$			-1	$\mu A$
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.55	-0.85	-1.25	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-5A$		28	40	m $\Omega$
		$V_{GS}=-2.5V, I_D=-4A$		50	75	
		$V_{GS}=-1.8V, I_D=-2A$		150	260	
Gate Resistance	$R_g$	F=1 MHz, Open drain		16		$\Omega$
<b>Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$				-0.83	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=-5A$		-0.9	-1.2	V
Reverse Recovery Time	$t_{rr}$	$I_F=-5A, dI_F/dt=100A/\mu s$		20		ns
Reverse Recovery Charge	$Q_{rr}$			2.5		nC
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=-10V, V_{GS}=0V, f=1MHz$		540		pF
Output Capacitance	$C_{oss}$			120		
Reverse Transfer Capacitance	$C_{rss}$			100		
Total Gate Charge	$Q_g$	$V_{DS}=-10V, V_{GS}=-10V, I_D=-5A$		13		nC
Gate-Source Charge	$Q_{gs}$			2		
Gate-Drain Charge	$Q_{gd}$			2		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=-10V, V_{GS}=-10V, R_{GEN}=2.2\Omega, I_{DS}=-5A$		5		ns
Turn-On Rise Time	$t_r$			47		
Turn-Off Delay Time	$t_{d(off)}$			52		
Turn-Off Fall Time	$t_f$			69		

Curve Characteristics

Fig. 1 - Typical Output Characteristics

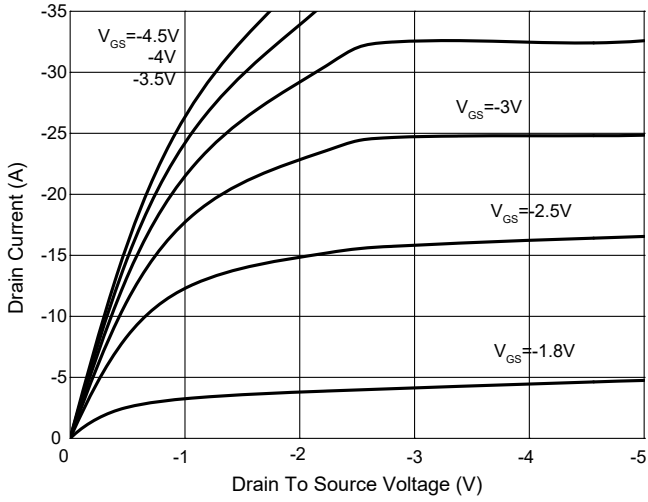


Fig. 2 - Transfer Characteristics

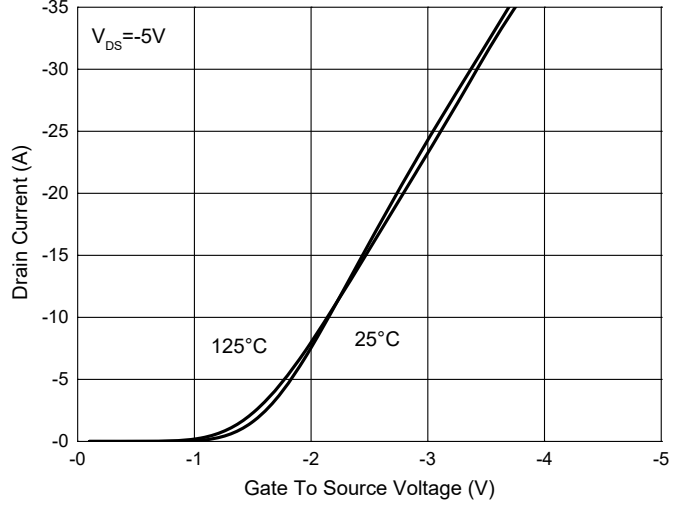


Fig. 3 -  $R_{DS(ON)} - V_{GS}$

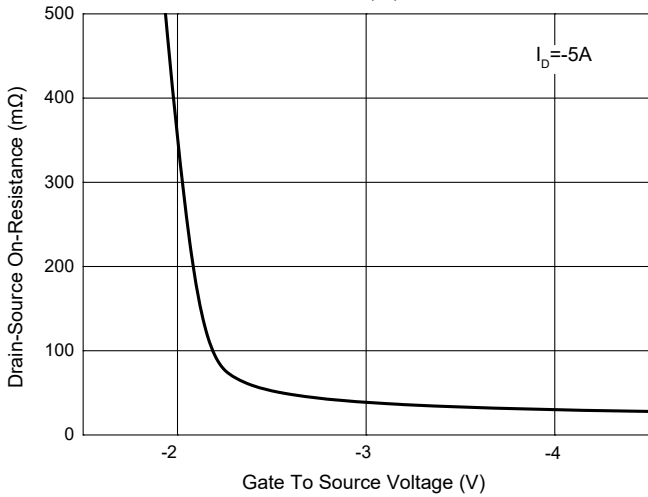


Fig. 4 -  $R_{DS(ON)} - I_D$

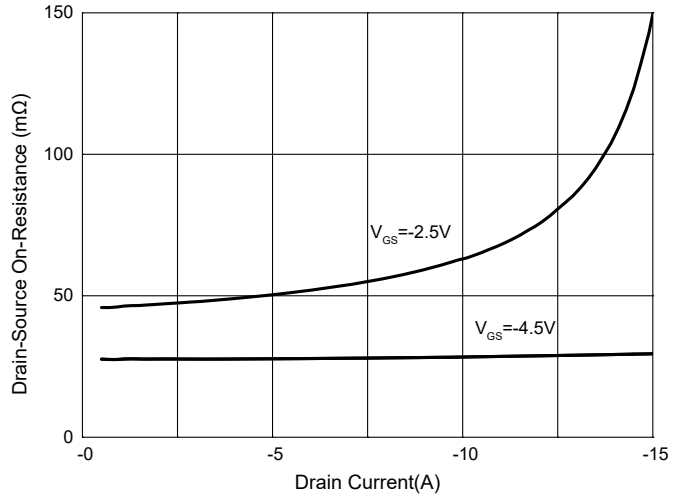


Fig. 5 - Capacitance Characteristics

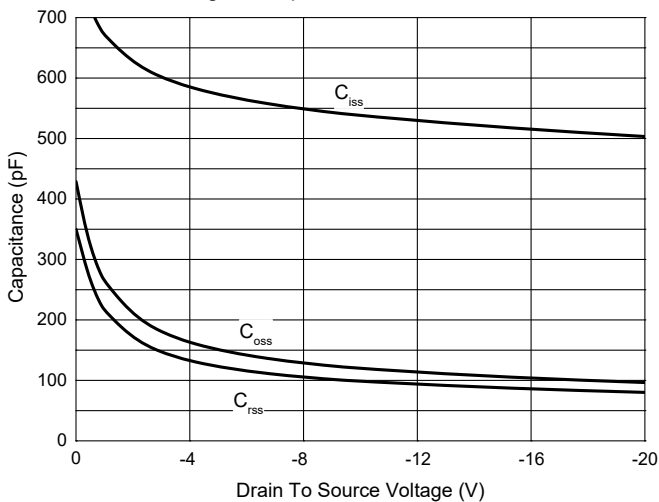
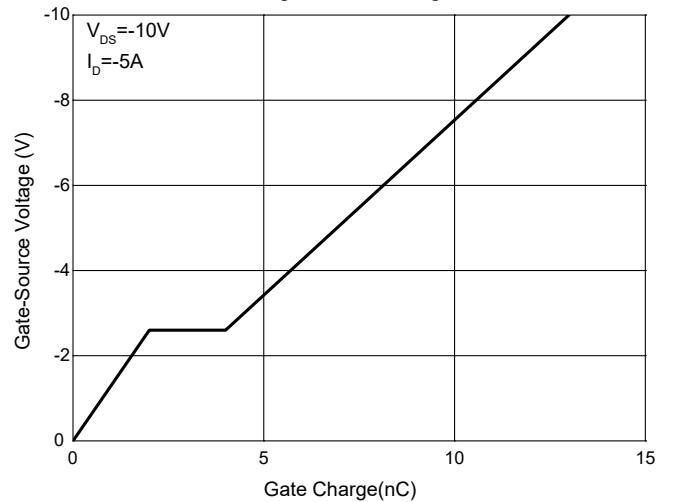


Fig. 6 - GateCharge



Curve Characteristics

Fig. 7 - Normalized Threshold Voltage

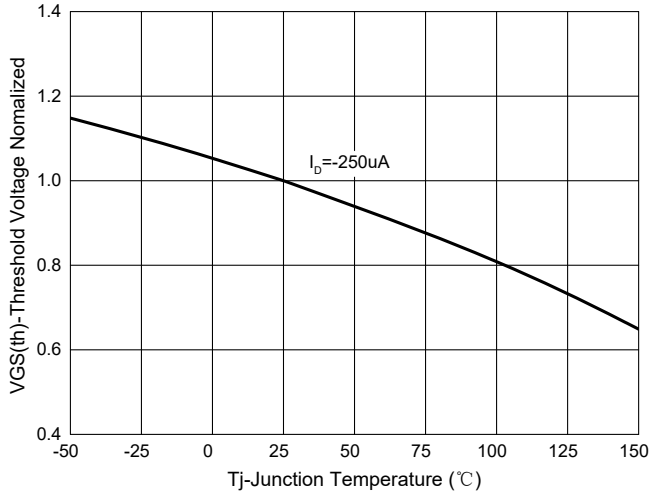


Fig.8-Normalized On Resistance Characteristics

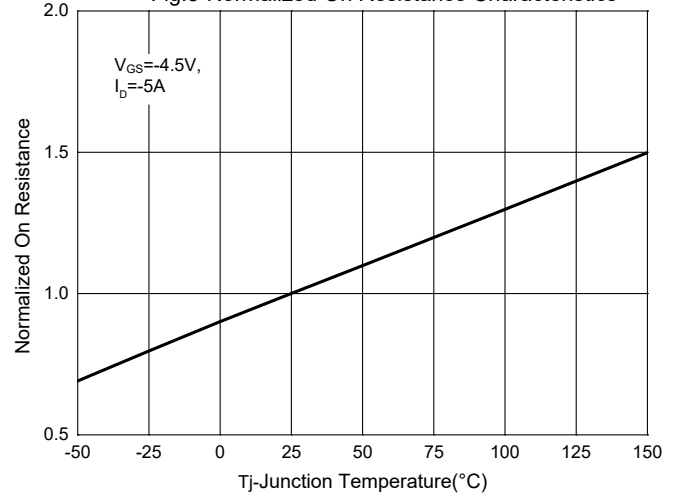


Fig. 9 -  $I_S - V_{SD}$

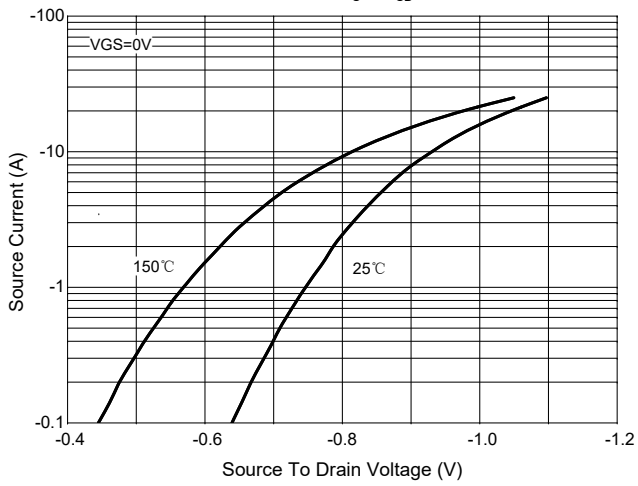


Fig. 10 - Drain Current

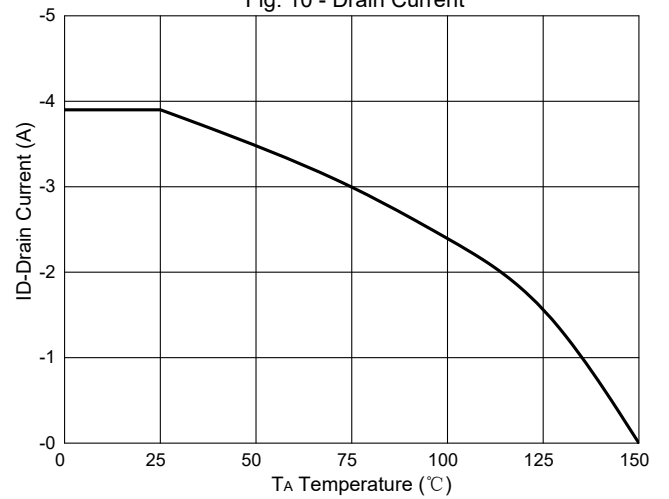
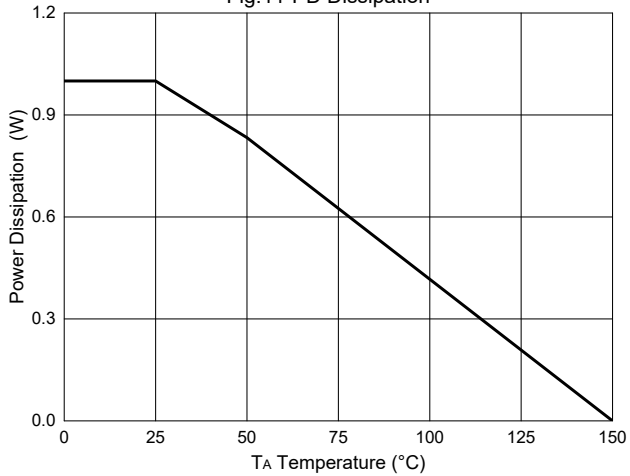


Fig.11-PD Dissipation



Curve Characteristics

Fig. 12 - Safe Operation Area

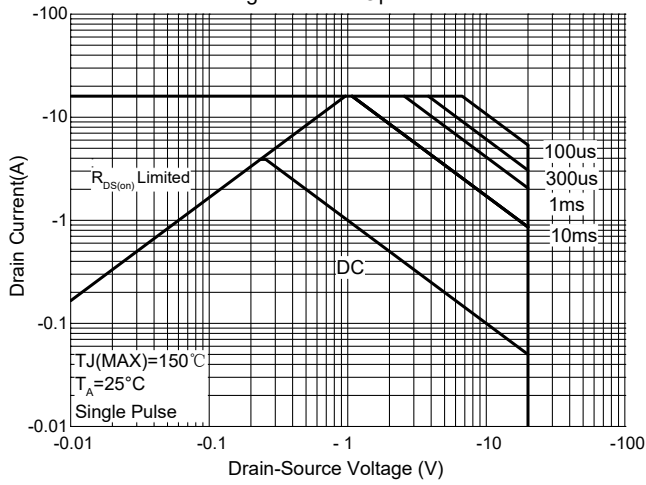
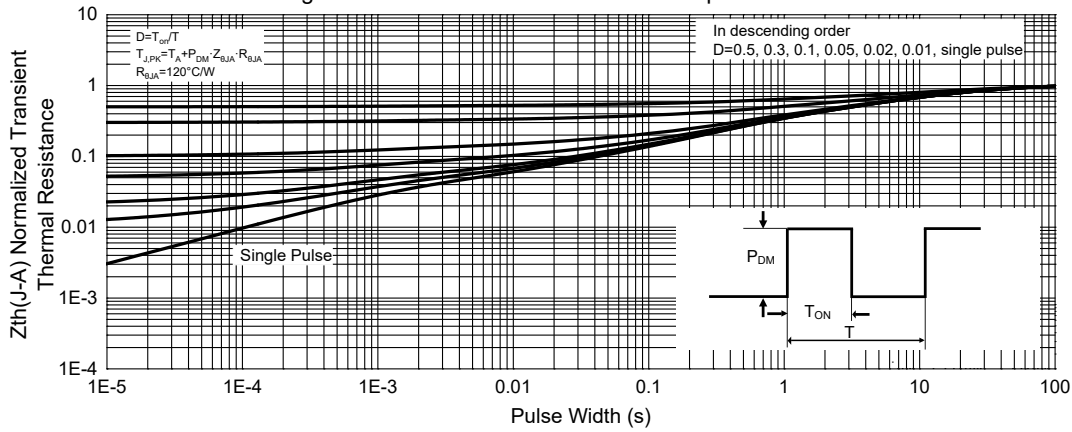


Fig. 13 - Normalized Transient Thermal Impedance



## Ordering Information

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

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