

**Features**

- Trench Power LV MOSFET Technology
- High Density Cell Design for Ultra Low RDS(on)
- ESD Protected Up to 2KV(HBM)
- Exceptional On-Resistance and Maximum DC Current Capability
- Epoxy Meets UL 94 V-0 Flammability Rating
- Moisture Sensitivity Level 1
- Halogen Free."Green"Device (Note1)
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

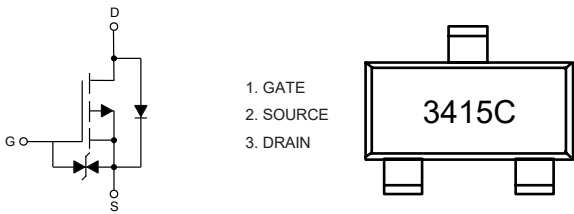
**Maximum Ratings**

- 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

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

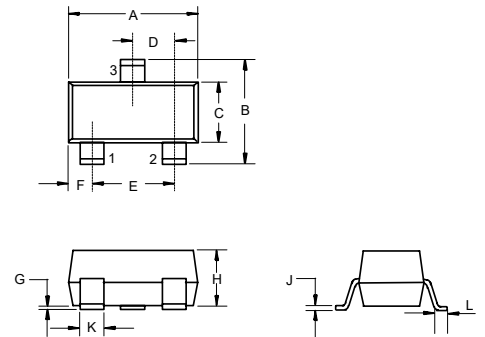
Note: 1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

**Internal Structure and Marking Code**



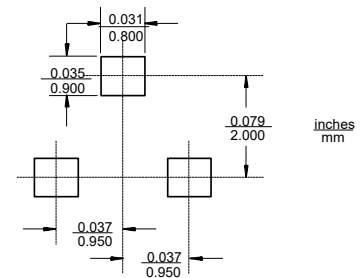
**P-CHANNEL  
MOSFET**

**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
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-20V, V_{GS}=0V$			-1	$\mu A$
		$V_{DS}=-20V, V_{GS}=0V, T_J=150^\circ C$			-100	
Gate-Source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 10V$			$\pm 10$	$\mu A$
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	200	
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=-5A$		-0.9	-1.2	V
Body-Diode Continuous Current	$I_S$				-0.83	A
Gate resistance	$R_G$	f=1MHz, Open drain		16		$\Omega$
<b>Dynamic Characteristics</b> (Note 3)						
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		
<b>Switching Characteristics</b> (Note 3)						
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	$t_{d(on)}$	$V_{GS}=-10V, V_{DD}=-10V, I_D=-5A, R_{GEN}=2.2\Omega$		5		ns
Turn-On Rise Time	$t_r$			47		
Turn-Off Delay Time	$t_{d(off)}$			52		
Turn-Off Fall Time	$t_f$			69		
Reverse Recovery Charge	$Q_{rr}$	$I_F=-5A, d_i/d_t=100A/\mu s$		2.5		nC
Reverse Recovery Time	$t_{rr}$			20		ns

Note: 2. Pulse Test : Pulse Width $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .

3. Guaranteed by Design, Not Subject to Production Testing.

Curve Characteristics

Fig. 1 - Typical Output Characteristics

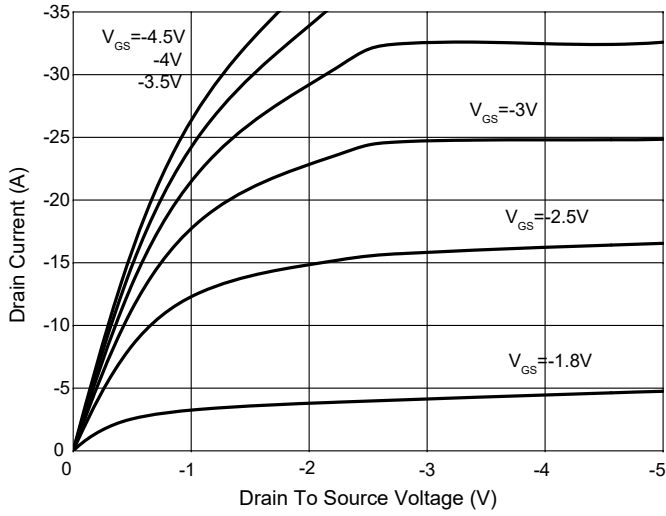


Fig. 2 - Transfer Characteristics

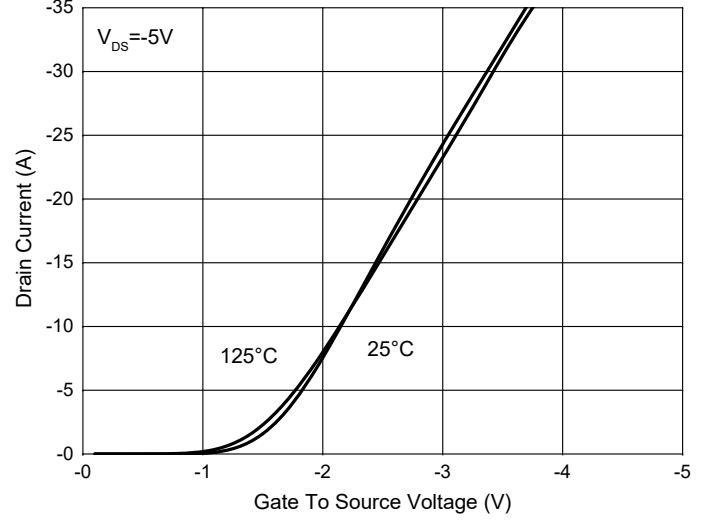


Fig. 3 -  $R_{DS(ON)} - I_D$

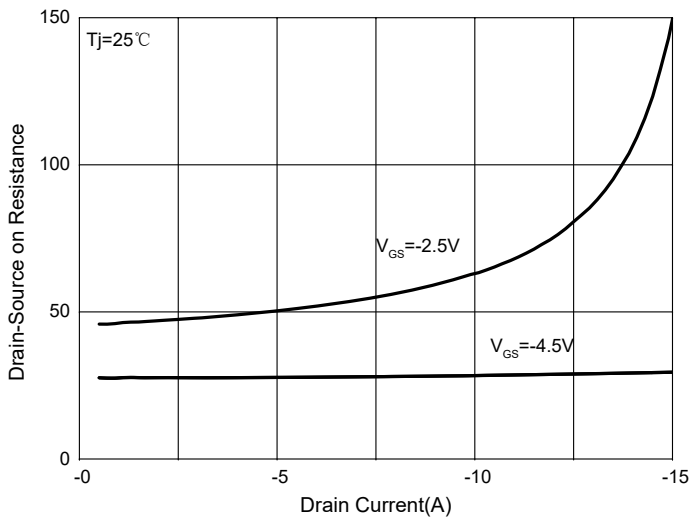


Fig. 4 -  $R_{DS(ON)} - V_{GS}$

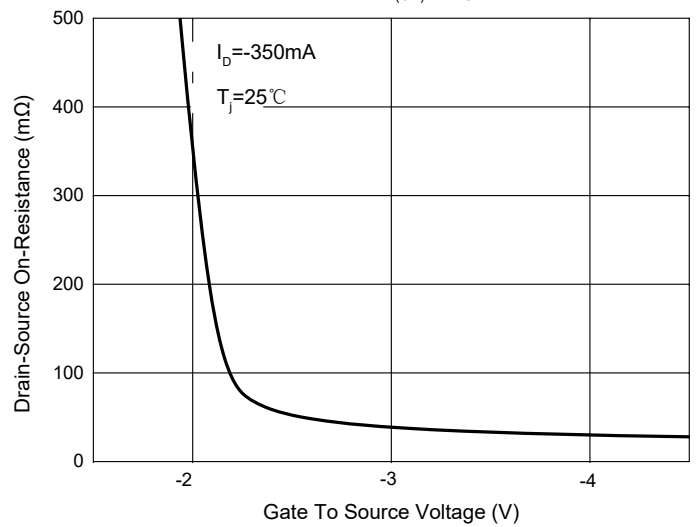


Fig. 5 -  $I_s - V_{SD}$

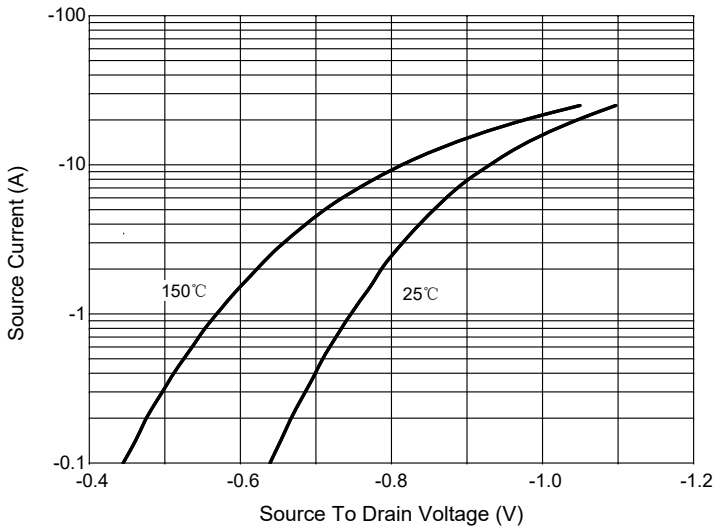
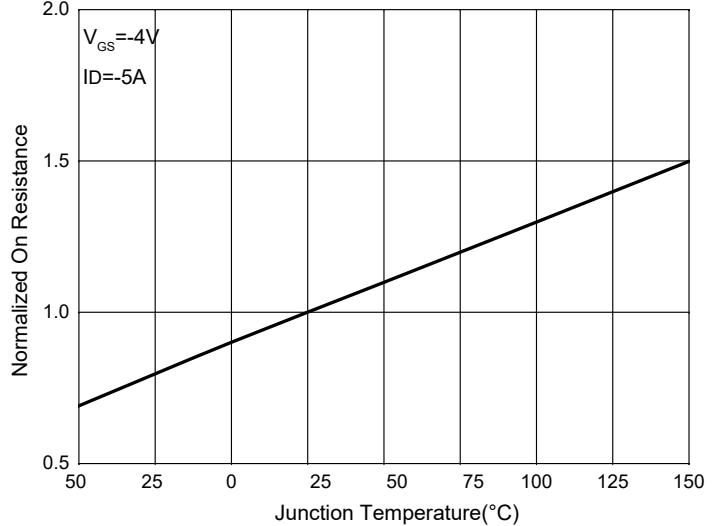


Fig.4-Normalized OnResistance Characteristics



Curve Characteristics

Fig. 7 - GateCharge

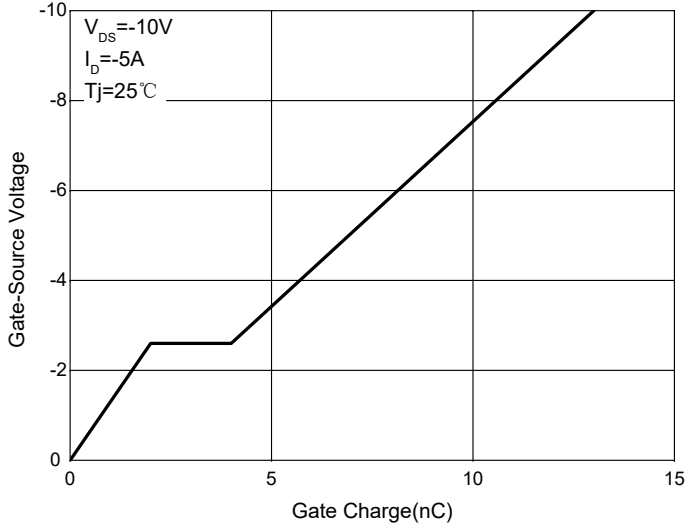


Fig. 8 - Capacitance Characteristics

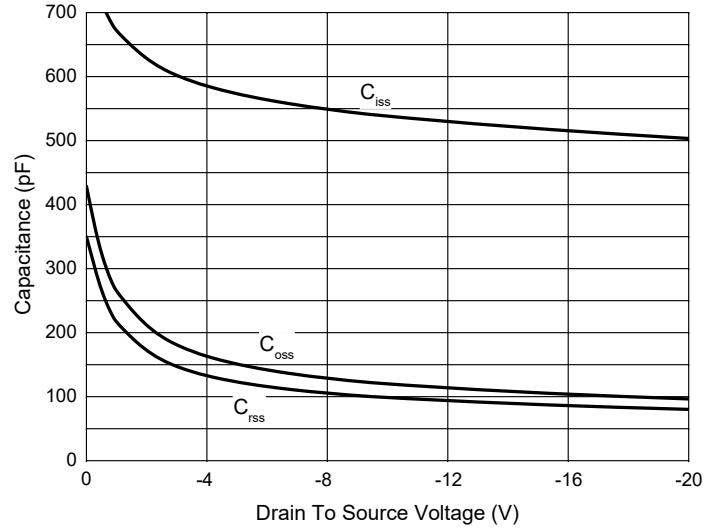


Fig. 9 - Safe Operation Area

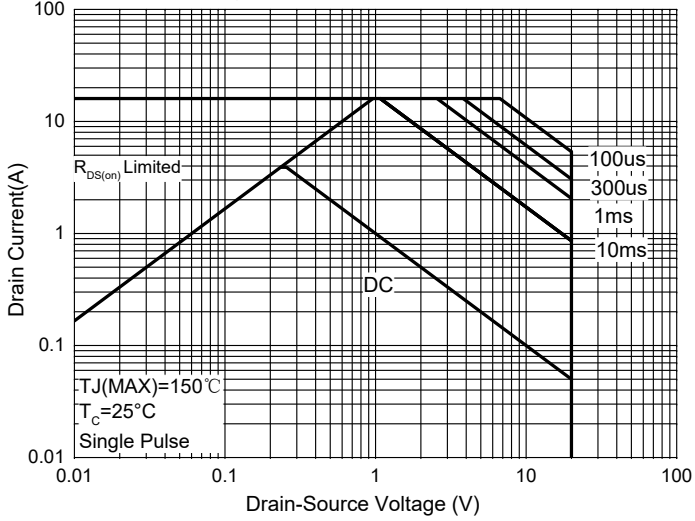
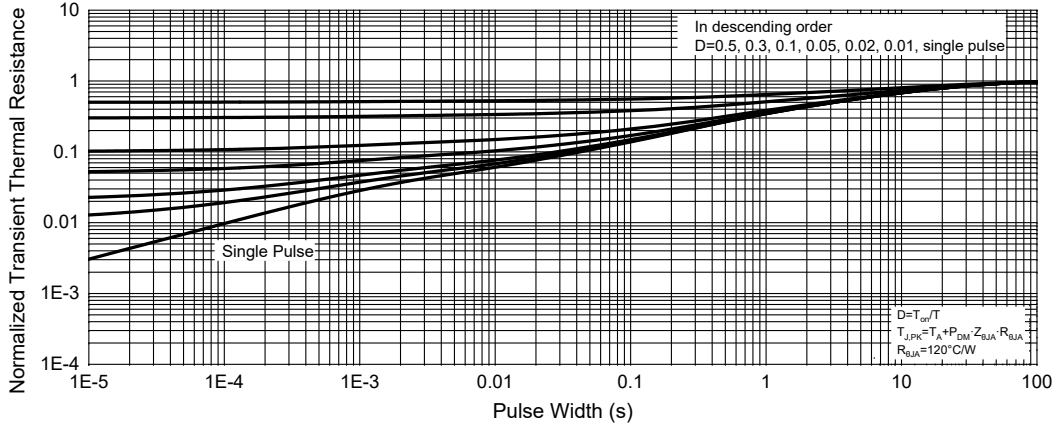


Fig. 10 - Normalized Transient Thermal Impedance



## Ordering Information

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

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