

# STP3415



-20V P-Channel Enhancement Mode MOSFET

## DESCRIPTION

The STP3415 is the P-Channel logic enhancement mode power field effect transistor is produced using high cell density, advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltage as 1.5V

This device is suitable for use as a load switch or in applications.

STP3415S-TRG ROHS Compliant This is Halogen Free

ESD Protected : 3KV

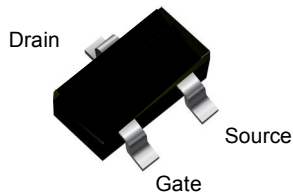
## FEATURE

- ◆ -20V/-4.0A,  $R_{DS(ON)} = 45m\Omega(yp.)@V_{GS} = -4.5V$
- ◆ -20V/-4.0A,  $R_{DS(ON)} = 54m\Omega(yp.)@V_{GS} = -2.5V$
- ◆ -20V/-2.0A,  $R_{DS(ON)} = 68m\Omega(yp.)@V_{GS} = -1.8V$
- ◆ -20V/-1.0A,  $R_{DS(ON)} = 92m\Omega(yp.)@V_{GS} = -1.5V$
- ◆ Super high density cell design for extremely low  $R_{DS(ON)}$
- ◆ Exceptional on-resistance and Maximum DC current capability

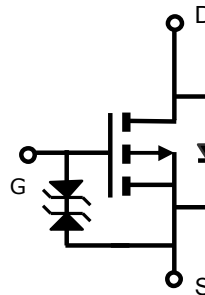
## APPLICATIONS

- ◆ Cellular/Portable
- ◆ Load Switch

## PIN CONFIGURATION



SOT-23L  
Top View



## PART NUMBER INFORMATION

ST P 3415 E S - TR G  
a b c d e f g

a : Company name.  
b : Channel type.  
c : Product Serial number.  
d : ESD (Blank for product without ESD).  
e : Package Code  
f : Handling Code

g : Lead Plating Code  
G : Lead-free product.

***This product is Halogen Free***

# STP3415

## ORDERING INFORMATION

Part Number	Package Code	Handling Code	Shipping
STP3415ES-TRG	S : SOT-23L	TR : Tape&Reel	3K/Reel

※ Year Code : 0 ~ 9, 2010 : 0

※ Week Code : A(1~2) ~ Z(53~54)

※ SOT-23L : Only available in tape and reel packaging.

## ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ Unless otherwise noted)

Symbol	Parameter	Typical	Unit	
$V_{DSS}$	Drain-Source Voltage	-20	V	
$V_{GSS}$	Gate-Source Voltage	$\pm 8$	V	
$I_D$	Continuous Drain Current ( $T_C=25^\circ\text{C}$ ) <sup>A</sup>	$V_{GS}=-8\text{V}$	-4.0	A
	Continuous Drain Current ( $T_C=70^\circ\text{C}$ ) <sup>A</sup>		-3.5	A
$I_{DM}$	Pulsed Drain Current <sup>B</sup>	-20	A	
$P_D$	Power Dissipation	$T_A=25^\circ\text{C}$	1.5	W
		$T_A=70^\circ\text{C}$	0.9	
$T_J$	Operation Junction Temperature	-55 to 150	$^\circ\text{C}$	
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$	

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

## THERMAL DATA

Symbol	Parameter	Typ	Max	Unit	
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	Steady-State	-	140	$^\circ\text{C}/\text{W}$
$R_{\theta JL}$	Thermal Resistance Junction to Lead	Steady-State	-	80	$^\circ\text{C}/\text{W}$

# STP3415

## ELECTRICAL CHARACTERISTICS (T<sub>J</sub> = 25°C Unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
<b>Static Parameters</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =-250μA	-20			V
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-0.3		-1.0	V
I <sub>GSS</sub>	Gate Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±8V			±10	μA
I <sub>DSS</sub>	Zero Gate Voltage, Drain-Source Leakage Current	V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V T <sub>J</sub> =25°C			-1	μA
		V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V T <sub>J</sub> =55°C			-5	
R <sub>DS(ON)</sub>	Drain-source On-Resistance <sup>B</sup>	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-4.0A		44	54	mΩ
		V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-4.0A		53	62	
		V <sub>GS</sub> =-1.8V, I <sub>D</sub> =-2.0A		66	75	
		V <sub>GS</sub> =-1.5V, I <sub>D</sub> =-1.0A		85	110	
G <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =-5V, I <sub>D</sub> =-4.0A		22		S
<b>Source-Drain Diode</b>						
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> =-1.0A, V <sub>GS</sub> =0V		-0.67	-1.0	V
I <sub>S</sub>	Continuous Source Current <sup>AD</sup>				-6	A
<b>Dynamic Parameters</b>						
Q <sub>g</sub> (-4.5V)	Total Gate Charge	V <sub>DS</sub> =-10V V <sub>GS</sub> =-4.5V I <sub>D</sub> =-4.0A		11.1		nC
Q <sub>gs</sub>	Gate-Source Charge			3.1		
Q <sub>gd</sub>	Gate-Drain Charge			2.4		
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-10V V <sub>GS</sub> =0V f=1MHz		989		pF
C <sub>oss</sub>	Output Capacitance			167		
C <sub>rss</sub>	Reverse Transfer Capacitance			75.5		
t <sub>d(on)</sub>	Turn-On Time	V <sub>DD</sub> =-10V I <sub>D</sub> =-1A		712		nS
t <sub>r</sub>				1386		
t <sub>d(off)</sub>	Turn-Off Time	V <sub>GEN</sub> =-4.5V R <sub>G</sub> =2.5Ω		9.1		μA
t <sub>f</sub>				4		

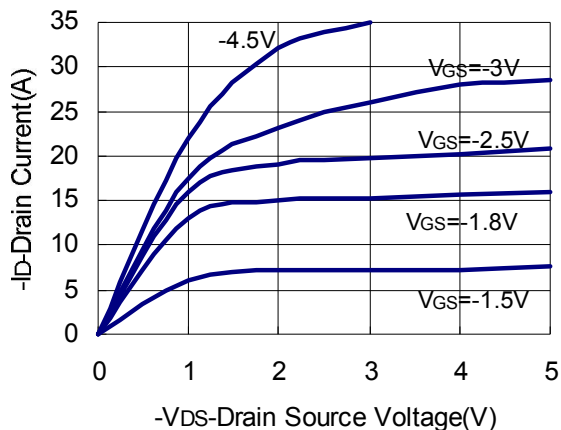
Note:

- The value of R<sub>θJA</sub> is measured with the device mounted on 1in 2 FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25°C.
- The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%
- The EAS data shows Max. rating. The test condition is V<sub>DD</sub>=-25V, V<sub>GS</sub>=-10V, L=0.1mH.
- The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub>, in real applications, should be limited by total power dissipation.

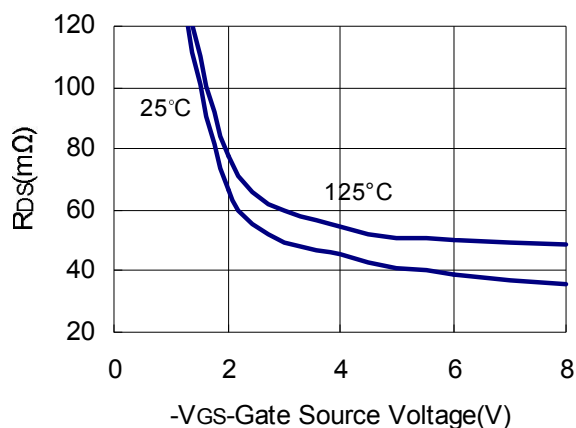
# STP3415

## TYPICAL CHARACTERISTICS (25°C Unless Note)

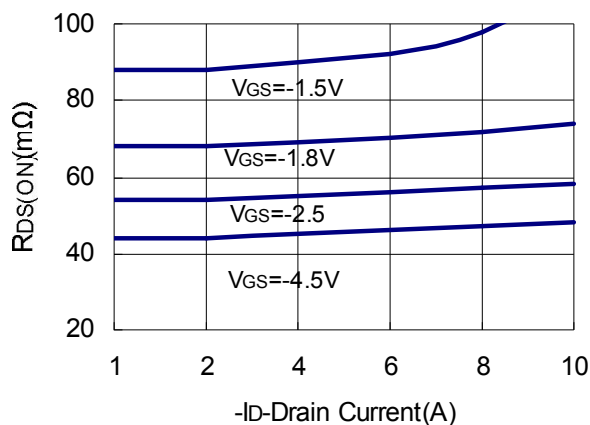
Output Characteristics



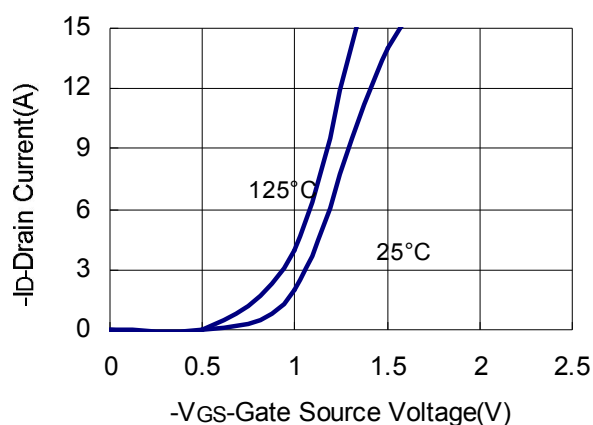
Drain-Source On Resistance



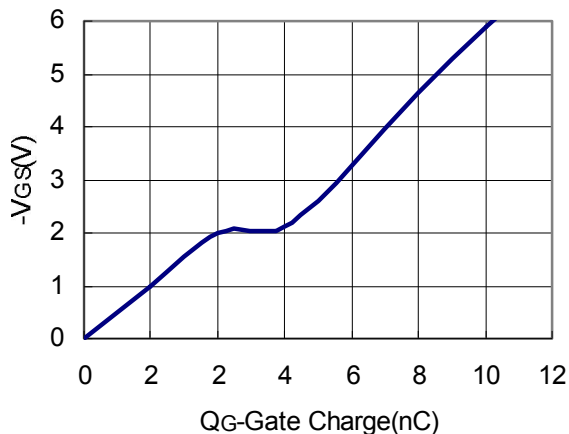
Drain Source On Resistance



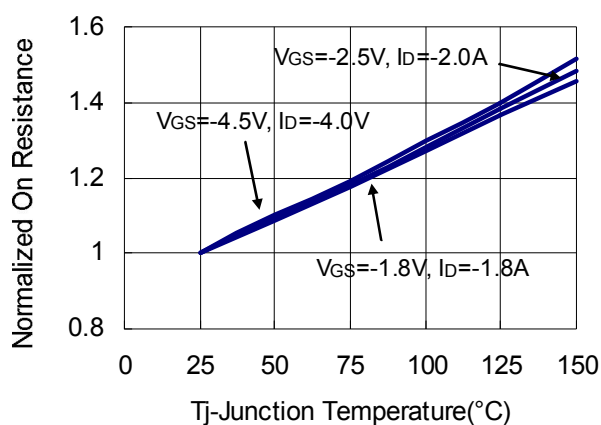
Transfer Characteristics



Gate Charge

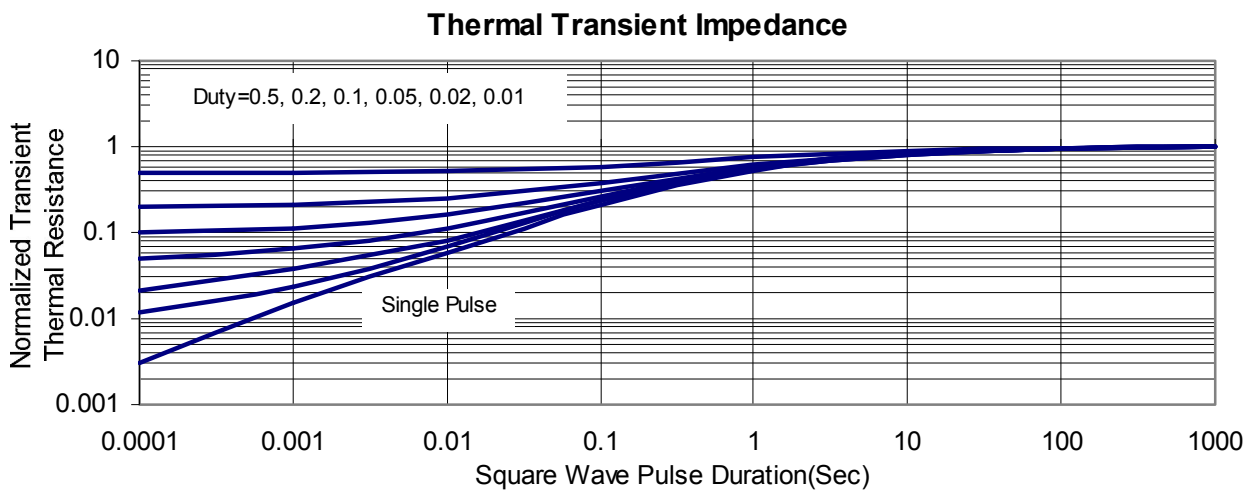
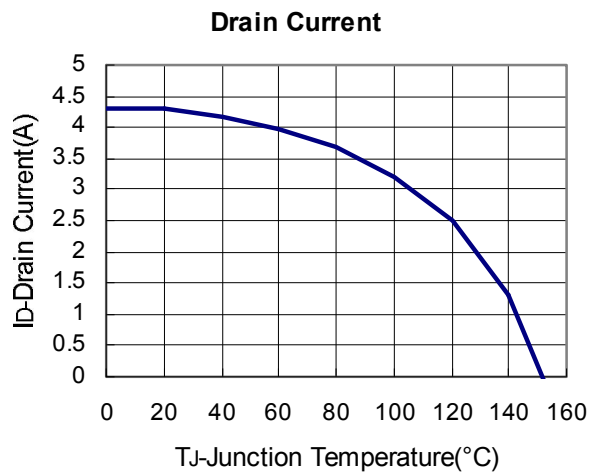
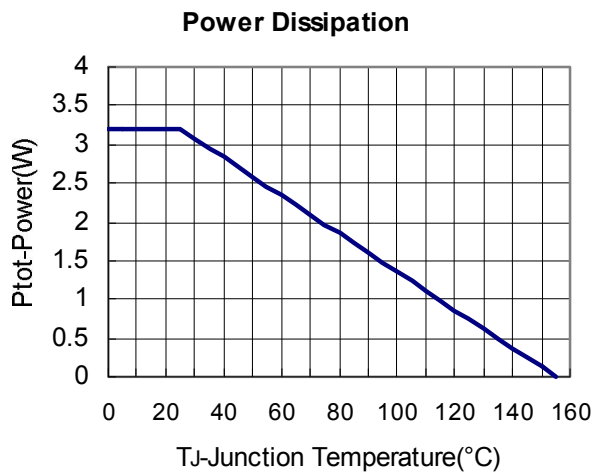
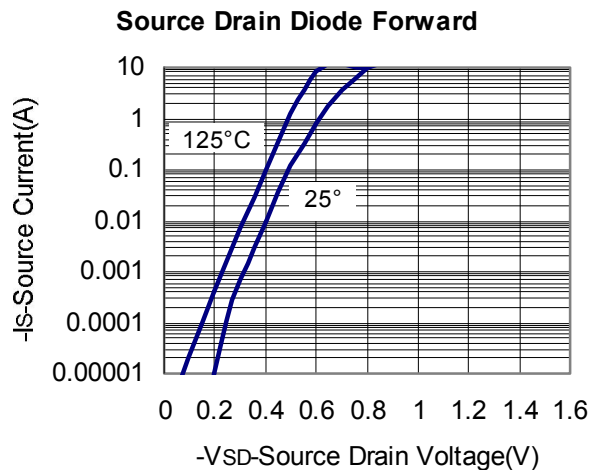
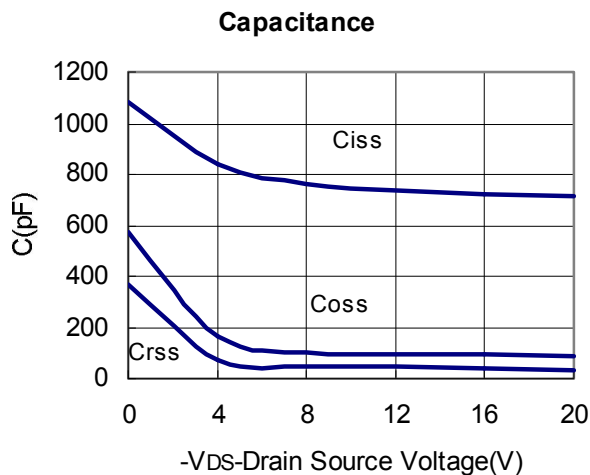


Drain Source Resistance



# STP3415

## TYPICAL CHARACTERISTICS (25°C Unless Note)



# STP3415

## ■ SOT-23L PACKAGE DIMENSIONS

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950 BSC		0.037 BSC	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
$\theta$	0°	8°	0°	8°

SOT-23L PACKAGE OUTLINE DIMENSIONS

