



-20V P-Channel Enhancement Mode MOSFET

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GENERAL DESCRIPTION

The 8415 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 1.8V. This device is suitable for use as a load switch or in applications.

8415S-TRG ROHS Compliant This is Halogen Free

ESD Protected : 3KV

FEATURE

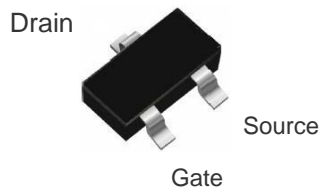
- ◆ -20V/-4.0A, $R_{DS(ON)}=40m\Omega(typ.)@V_{GS}=-4.5V$
- ◆ -20V/-4.0A, $R_{DS(ON)}=48m\Omega(typ.)@V_{GS}=-2.5V$
- ◆ -20V/-2.0A, $R_{DS(ON)}=58m\Omega(typ.)@V_{GS}=-1.8V$
- ◆ -20V/-1.0A, $R_{DS(ON)}=68m\Omega(typ.)@V_{GS}=-1.5V$
- ◆ Super high density cell design for extremely low $R_{DS(ON)}$
- ◆ Exceptional on-resistance and Maximum DC current capability

APPLICATIONS

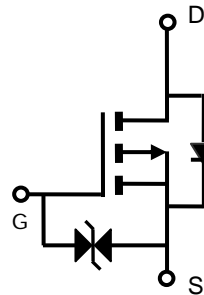
- ◆ Cellular/Portable
- ◆ Load Switch



PIN CONFIGURATION



SOT-23L
Top View



PART NUMBER INFORMATION

<p><u>UP</u> 8415 <u>ES</u>-<u>TR</u> <u>G</u></p> <p>a b c d e f g</p>	<p>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.</p> <p><i>This product is Halogen Free</i></p>
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ORDERING INFORMATION

Part Number	Package Code	Handling Code	Shipping []
Á] 8415ES-TRG	S : SOT-23	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 °C Unless otherwise noted)

Symbol	Parameter	Typical	Unit
V _{DSS}	Drain-Source Voltage	-20	V
V _{GSS}	Gate-Source Voltage	±8	V
I _D	Continuous Drain Current (T _C =25°C)	V _{GS} =-8V	-4.0
	Continuous Drain Current (T _C =70°C)		-3.5
I _{DM}	Pulsed Drain Current	-20	A
P _D	Power Dissipation	T _A =25°C	1.5
		T _A =70°C	0.9
T _J	Operation Junction Temperature	-55 to150	°C
T _{STG}	Storage Temperature Range	-55 to150	°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 _{θJA}	Thermal Resistance-Junction to Ambient	Steady-State	-	140	°C/W
R _{θJL}	Thermal Resistance Junction to Lead	Steady-State	-	80	°C/W



ELECTRICAL CHARACTERISTICS($T_J = 25^\circ\text{C}$ Unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-20			V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.3		-1.0	V
I_{GSS}	Gate Leakage Current	$V_{DS}=0V, V_{GS}=\pm 8V$			± 10	μA
I_{DSS}	Zero Gate Voltage, Drain-Source Leakage Current	$V_{DS}=-20V, V_{GS}=0V$ $T_J=25^\circ\text{C}$			-1	μA
		$V_{DS}=-20V, V_{GS}=0V$ $T_J=55^\circ\text{C}$			-5	
$R_{DS(ON)}$	Drain-source On-Resistance	$V_{GS}=-4.5V, I_D=-4.0A$		4€	15	mΩ
		$V_{GS}=-2.5V, I_D=-4.0A$		11	16	
		$V_{GS}=-1.8V, I_D=-2.0A$		18	65	
		$V_{GS}=-1.5V, I_D=-1.0A$		11	78	
G_{fs}	Forward Transconductance	$V_{DS}=-5V, I_D=-4.0A$		22		S
Source-Drain Diode						
V_{SD}	Diode Forward Voltage	$I_S=-1.0A, V_{GS}=0V$		-0.67	-1.0	V
Dynamic Parameters						
$Q_g (-4.5V)$	Total Gate Charge	$V_{DS}=-10V$ $V_{GS}=-4.5V$ $I_D=-4.0A$		11.1		nC
Q_{gs}	Gate-Source Charge			3.1		
Q_{gd}	Gate-Drain Charge			2.4		
C_{iss}	Input Capacitance	$V_{DS}=-10V$ $V_{GS}=0V$ $f=1MHz$		989		pF
C_{oss}	Output Capacitance			167		
C_{rss}	Reverse Transfer Capacitance			75.5		
$t_{d(on)}$	Turn-On Time	$V_{DD}=-10V$ $I_D=-1A$		712		nS
t_r				1386		
$t_{d(off)}$	Turn-Off Time	$V_{GEN}=-4.5V$ $R_G=2.5\Omega$		9.1		μA
t_f				4		

Note : 1. Pulse test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
2. Static parameters are based on package level with recommended wire-bonding

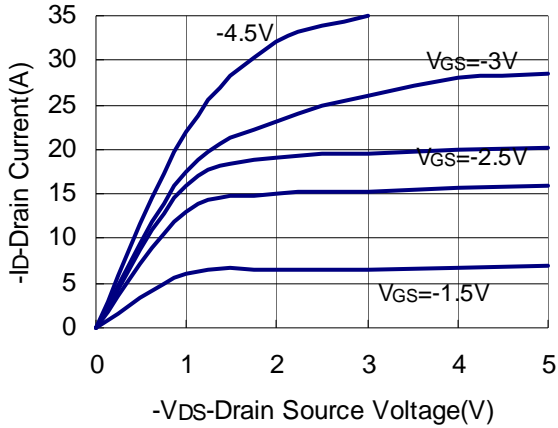
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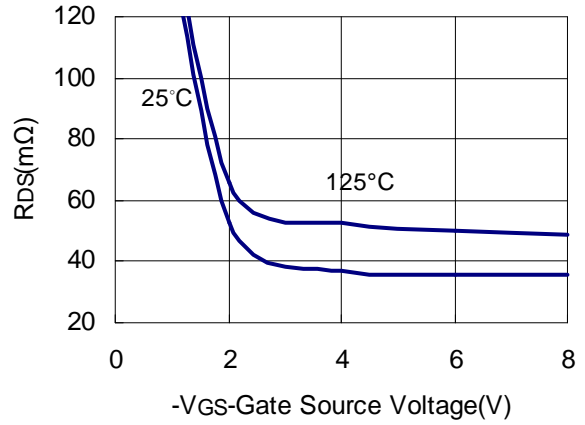


TYPICAL CHARACTERISTICS (25°C Unless Note)

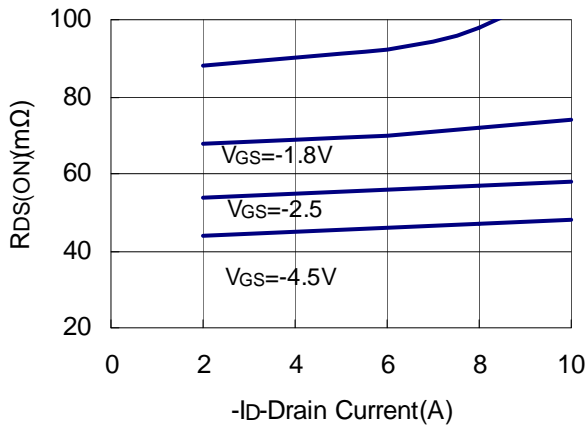
Output Characteristics



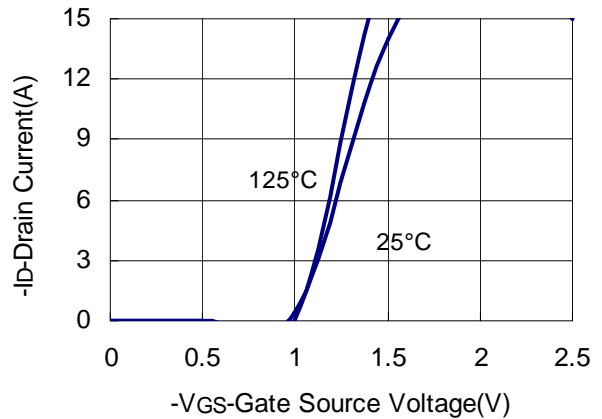
Drain-Source On Resistance



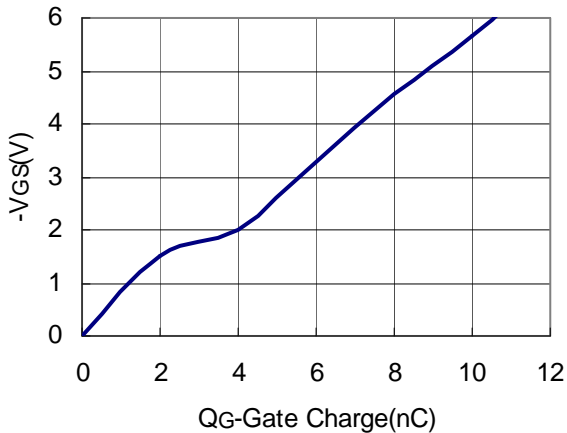
Drain Source On Resistance



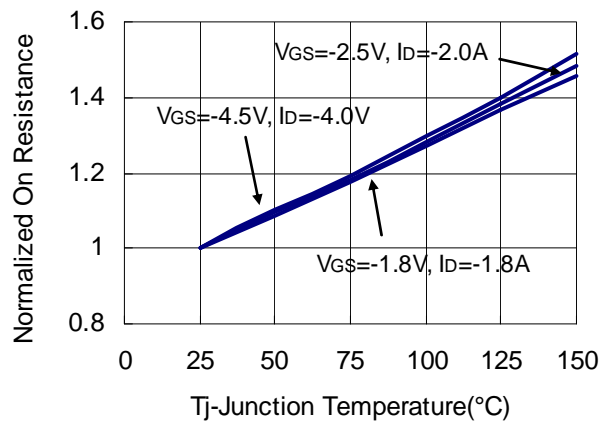
Transfer Characteristics



Gate Charge

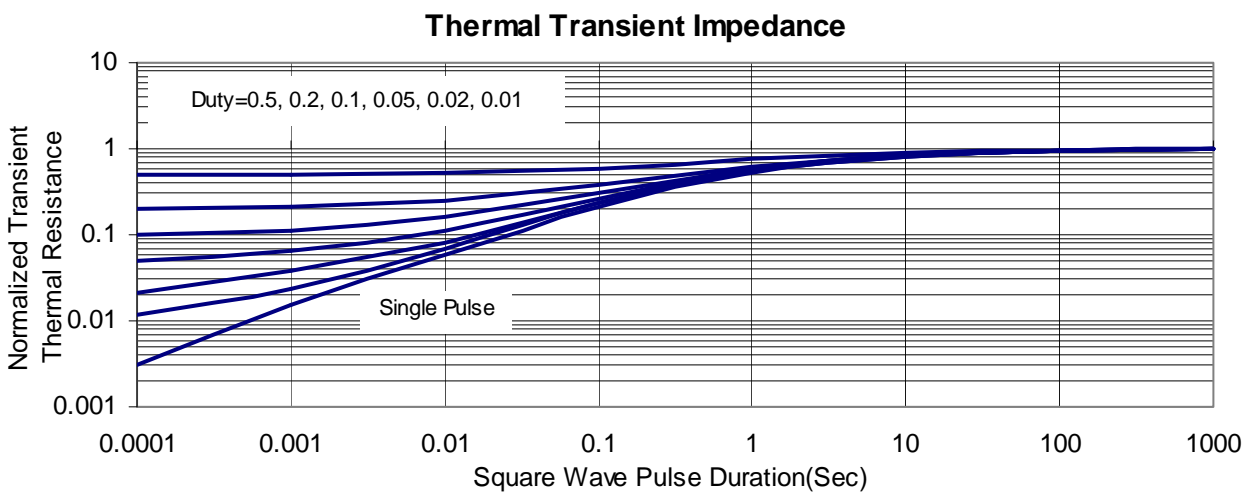
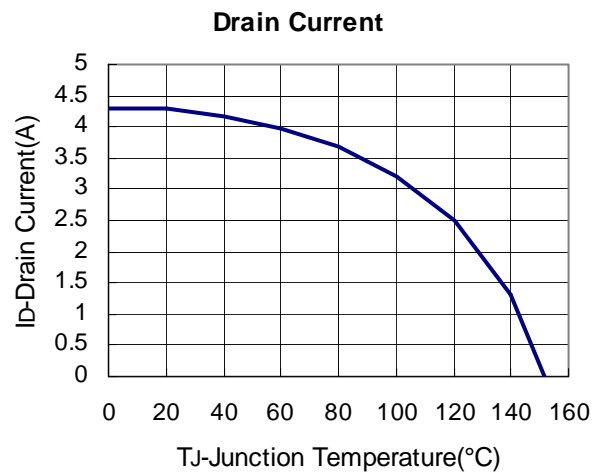
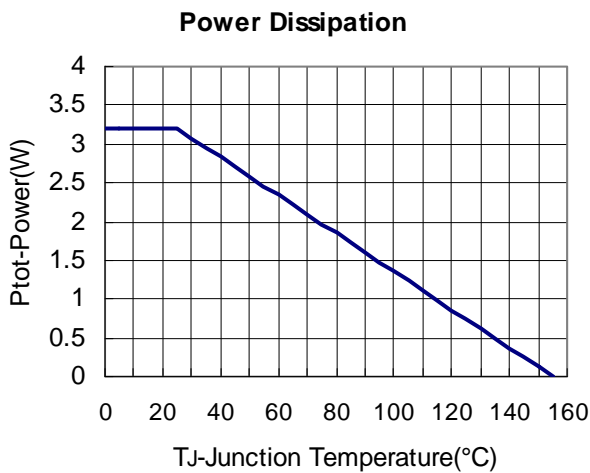
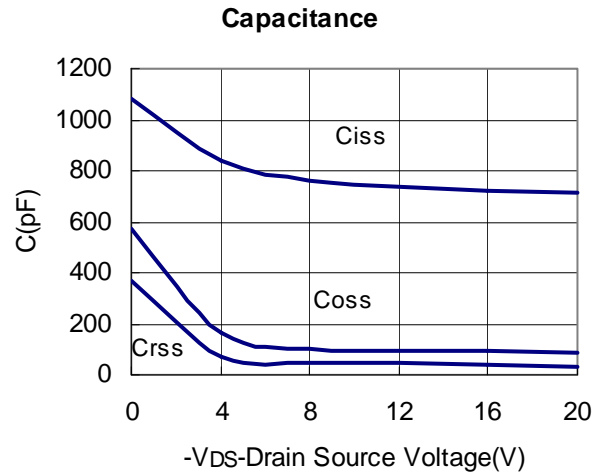
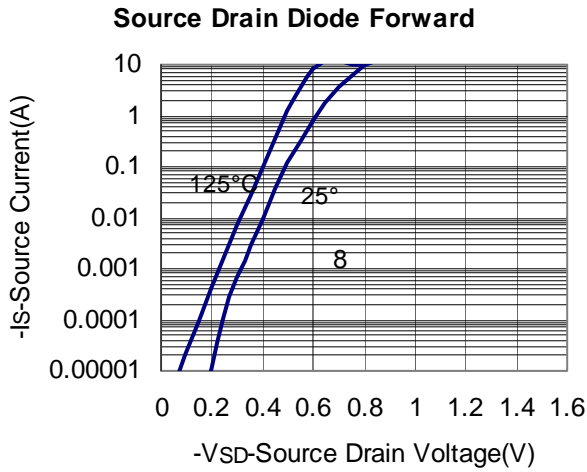


Drain Source Resistance



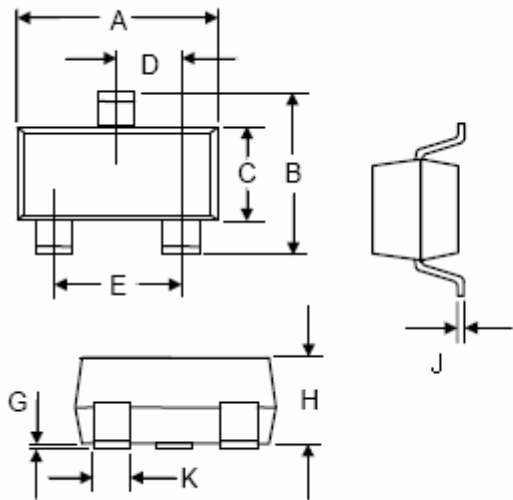


TYPICAL CHARACTERISTICS (25°C Unless Note)





SOT-23L PACKAGE DIMENSIONS



Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	0.110	0.120	2.80	3.04
B	0.104	0.116	2.65	2.95
C	0.059	0.067	1.50	1.70
D	0.037 TYP		0.95 TYP	
E	0.70	0.081	1.78	2.05
G	---	0.004	---	0.10
H	0.041	0.045	1.05	1.15
J	0.004	0.008	0.10	0.20
K	0.012	0.16	0.30	0.40