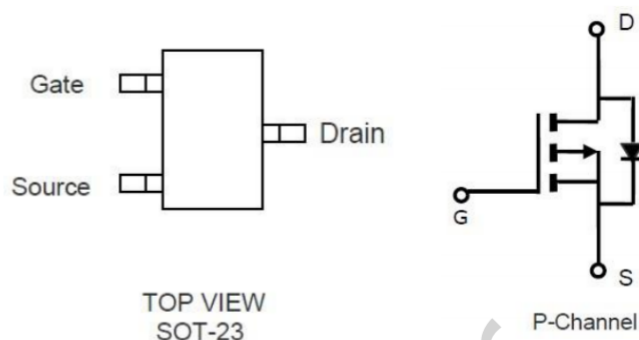


■ FEATURE

- ◆ -20V/-4.3A, $R_{DS(ON)}=30m\Omega$ (typ.)@ $V_{GS}=-4.5V$
- ◆ -20V/-3.5A, $R_{DS(ON)}=40m\Omega$ (typ.)@ $V_{GS}=-2.5V$
- ◆ -20V/-2.0A, $R_{DS(ON)}=56m\Omega$ (typ.)@ $V_{GS}=-1.8V$
- ◆ -20V/-1.0A, $R_{DS(ON)}=85m\Omega$ (typ.)@ $V_{GS}=-1.5V$
- ◆ Super high design for extremely low $R_{DS(ON)}$
- ◆ Exceptional on-resistance and Maximum DC current capability
- ◆ Full RoHS compliance
- ◆ SOT23-3 package design



■ DESCRIPTION

The 3415 is the P-Channel logic enhancement mode power field effect transistor is produced using high cell density advanced trench technology..

This high density process is especially tailored to minimize on-state resistance. These devices are particularly suited for low voltage application, and low in-line power loss are needed in a very small outline surface mount package.

■ APPLICATIONS

- ◆ Power Management
- ◆ Portable Equipment
- ◆ DC/DC Converter
- ◆ Load Switch
- ◆ DSC
- ◆ LCD Display inverter

■ 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		±10	V
I _D	Continuous Drain Current (T _C =25°C)	V _{GS} =-10V	-4.2	A
	Continuous Drain Current (T _C =70°C)		-3.5	A
I _{DM}	Pulsed Drain Current		-20	A
P _D	Power Dissipation	T _A =25°C	1.5	W
		T _A =70°C	0.9	
T _J	Operation Junction Temperature		150	°C
T _{STG}	Storage Temperature Range		-55~+150	°C
R _{θJA}	Thermal Resistance Junction to Ambient		120	°C/W

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

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

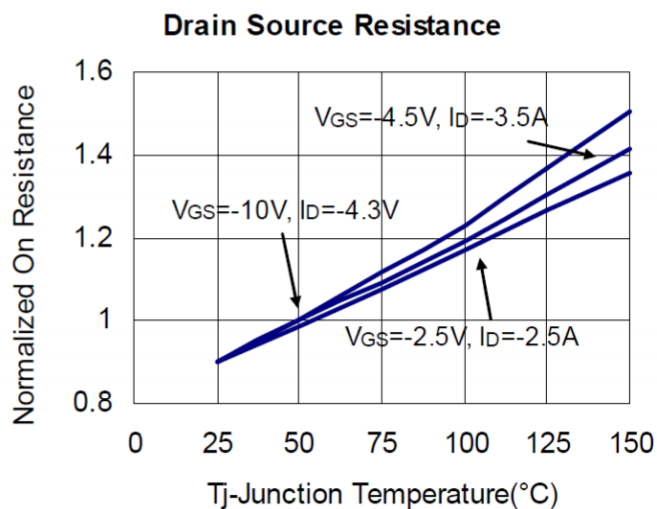
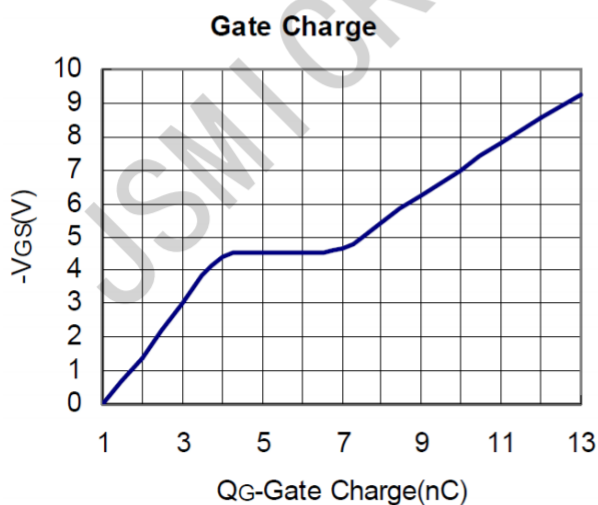
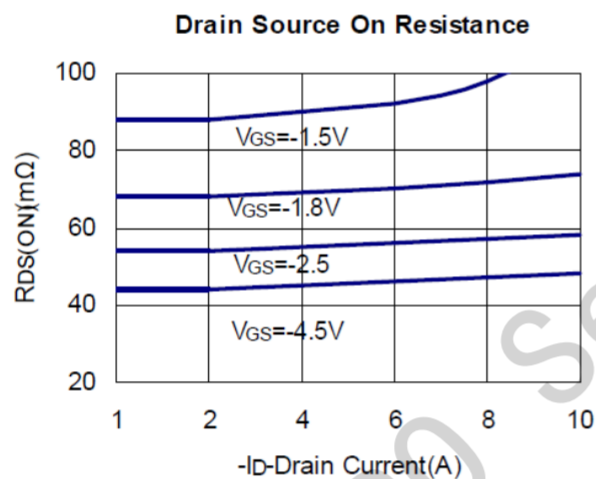
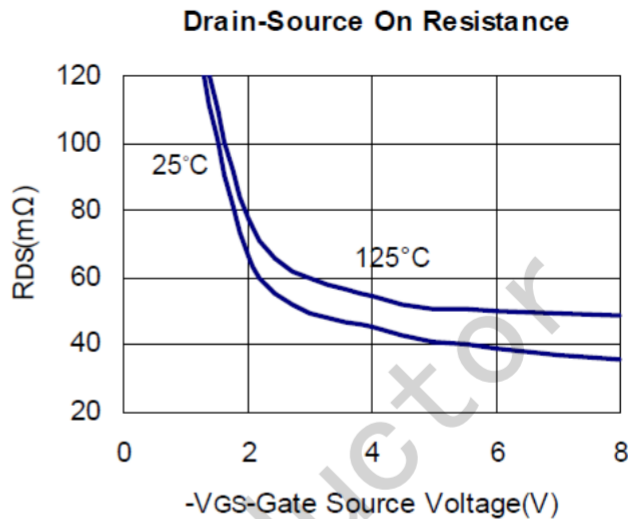
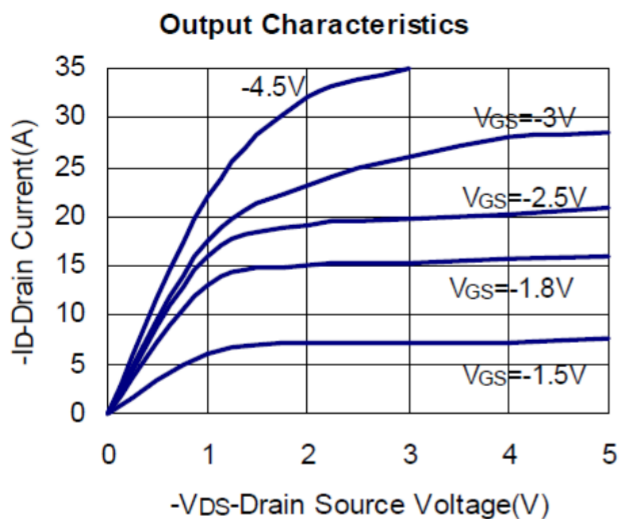
■ **ELECTRICAL CHARACTERISTICS** ($T_A=25^\circ\text{C}$ Unless otherwise noted)

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	$V_{DS}=0V, V_{GS}=\pm 10V$			± 100	nA
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=-20V, V_{GS}=0$			-1	μA
		$V_{DS}=-20V, V_{GS}=0$ $T_J=55^{\circ}C$			-5	
$R_{DS(ON)}$	Drain-Source On-Resistance	$V_{GS}=-4.5V, I_D=-4.0A$		30	40	m Ω
		$V_{GS}=-2.5V, I_D=-4.0A$		40	60	
		$V_{GS}=-1.8V, I_D=-2.0A$		56	78	
		$V_{GS}=-1.5V, I_D=-1.0A$		85	110	
Gfs	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	-1.2	V
Dynamic Parameters						
Q_g	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	$V_{DS}=-10V$ $I_D=-3.7A$ $V_{GEN}=-4.5V$ $R_G=1\Omega$		712		nS
T_r				1386		
$T_{d(off)}$	Turn-Off Time			9.1		
T_f				4		

Note: 1. Pulse test: pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$

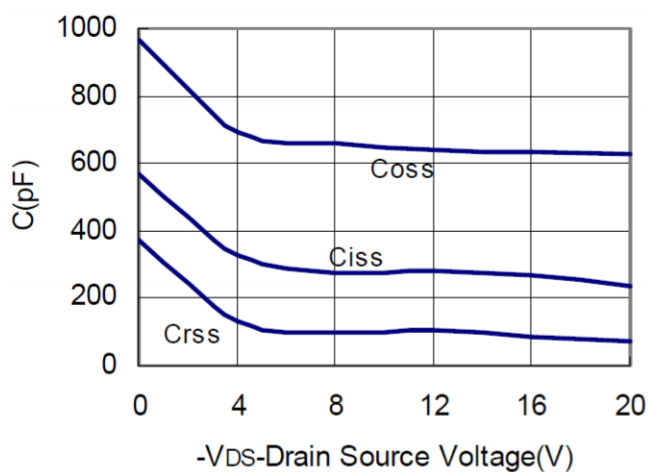
2. Static parameters are based on package level with recommended wire bonding

■ **TYPICAL CHARACTERISTICS** (25 °C Unless Note)

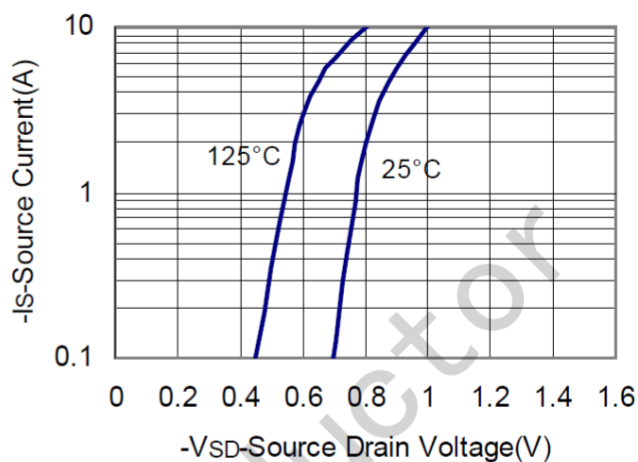


■ **TYPICAL CHARACTERISTICS** (continuous)

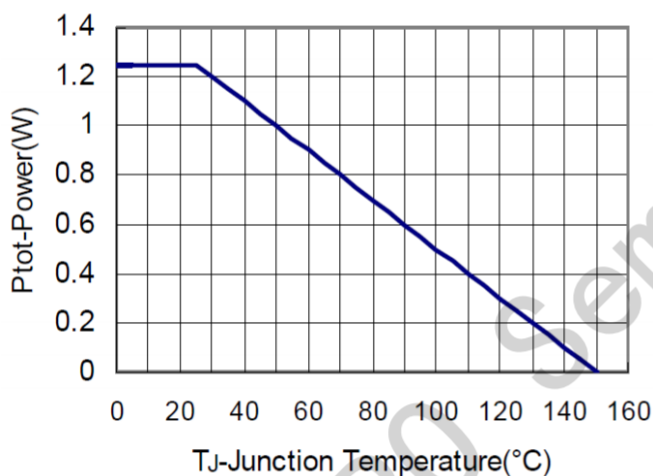
Capacitance



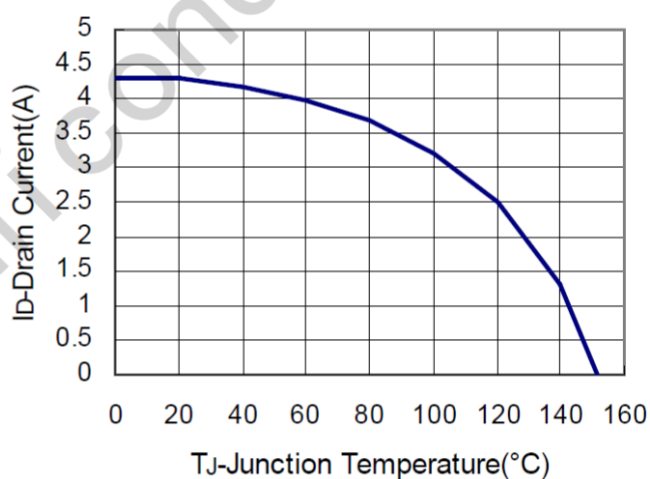
Source Drain Diode Forward



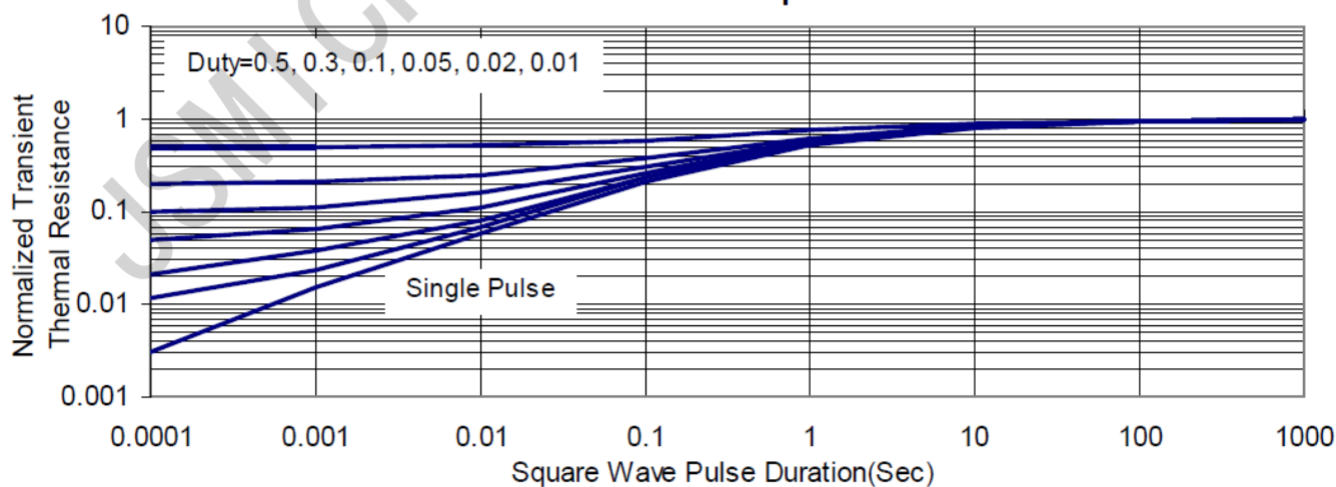
Power Dissipation



Drain Current

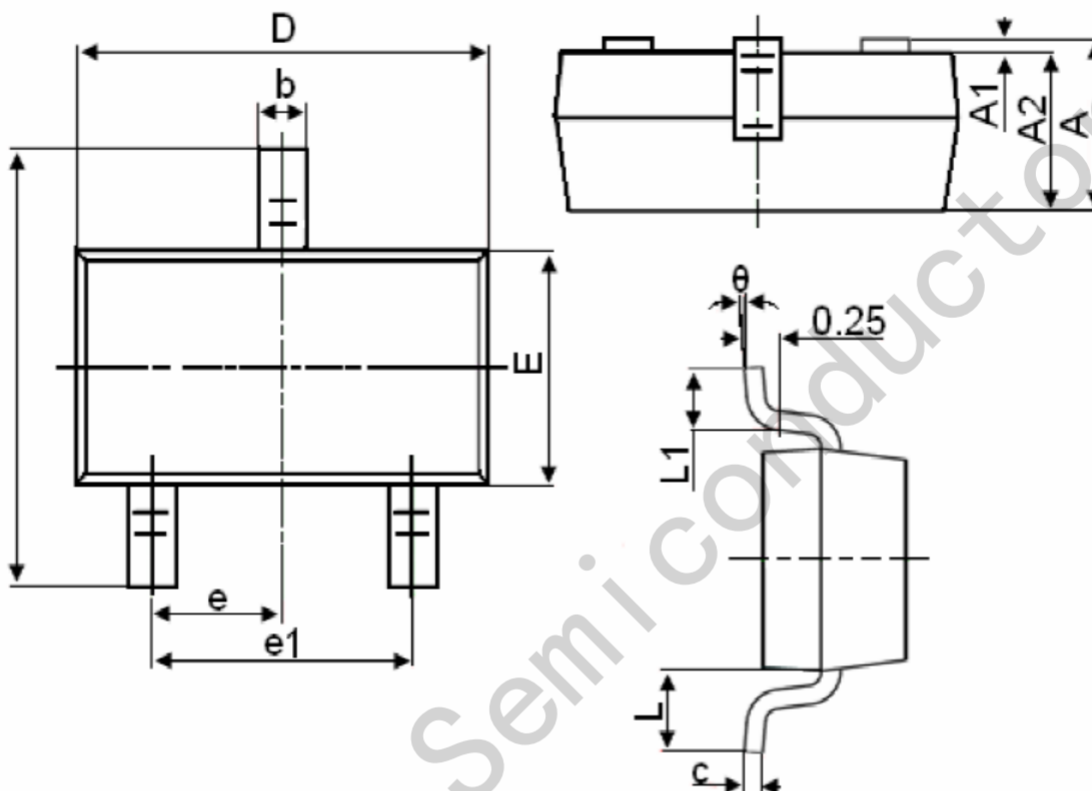


Thermal Transient Impedance



Package Information

SOT-23



Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.550REF		0.022REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°