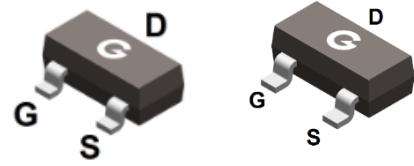


### Features

- High-speed switching
- Drive circuits can be simple
- Parallel use is easy
- HBM: JESD22-A114-B: 1A

HF



BL3415  
SOT-23

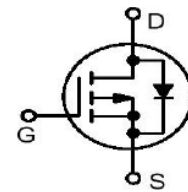
BL3415-3L  
SOT-23-3L

### Typical Applications

- Power management in note book
- Switching application
- Battery powered system
- Load switch

### Mechanical Data

- Case: SOT-23, SOT-23-3L
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208



### Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
BL3415	SOT-23	3000 pcs / Tape & Reel	3415
BL3415-3L	SOT-23-3L	3000 pcs / Tape & Reel	3415

### Maximum Ratings (@ T<sub>A</sub> = 25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V <sub>DSS</sub>	-20	V
Gate-to-Source Voltage	V <sub>GSS</sub>	±12	V
Continuous Drain Current (T <sub>A</sub> = 25°C) <sup>*1</sup>		-4	A
Continuous Drain Current (T <sub>A</sub> = 70°C) <sup>*1</sup>		-3.5	A
Pulsed Drain Current (t <sub>p</sub> = 10μs, T <sub>A</sub> = 25°C)	I <sub>DM</sub>	-30	A
Single Pulse Avalanche Energy <sup>*3</sup>	E <sub>AS</sub>	5.5	mJ
Power Dissipation (T <sub>C</sub> = 25°C)	P <sub>D</sub>	2.5	W
Power Dissipation (T <sub>A</sub> = 25°C) <sup>*1</sup>		1.25	W
Operating Junction Temperature Range	T <sub>J</sub>	-55 ~ +150	°C
Storage Temperature Range	T <sub>STG</sub>	-55 ~ +150	°C

### Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	-	35	50	$^{\circ}\text{C}/\text{W}$
Thermal Resistance Junction-to-Air <sup>*1</sup>	$R_{\theta JA}$	-	90	100	$^{\circ}\text{C}/\text{W}$

### Electrical Characteristics (@ $T_A = 25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
$V_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$	-20	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = -20\text{V}, V_{GS} = 0\text{V}$	-	-	-1	$\mu\text{A}$
$I_{GSS}$	Gate-Body Leakage Current	$V_{GS} = \pm 12\text{V}, V_{DS} = 0\text{V}$	-	-	$\pm 100$	nA
<b>On Characteristics</b>						
$R_{DS(ON)}$	Drain-Source On-resistance <sup>*2</sup>	$V_{GS} = -4.5\text{V}, I_D = -4\text{A}$	-	32	50	m $\Omega$
		$V_{GS} = -2.5\text{V}, I_D = -4\text{A}$	-	43	70	
		$V_{GS} = -1.8\text{V}, I_D = -1\text{A}$	-	78	100	m $\Omega$
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$	-0.3	-0.75	-1.0	V
$R_G$	Gate Resistance	$V_{GS} = 0\text{V}, f = 1\text{MHz}$	-	29	-	$\Omega$
<b>Dynamic Characteristics</b>						
$C_{ISS}$	Input Capacitance	$V_{GS} = 0\text{V}$	-	977	-	pF
$C_{OSS}$	Output Capacitance	$V_{DS} = -10\text{V}$	-	109	-	
$C_{RSS}$	Reverse Transfer Capacitance	$f = 1.0\text{MHz}$	-	92	-	
<b>Switching Characteristics</b>						
$t_{d(ON)}$	Turn-on Delay Time <sup>*4</sup>	$V_{DD} = -10\text{V}$	-	9.5	-	ns
$t_r$	Turn-on Rise Time <sup>*4</sup>	$V_{GS} = -4.5\text{V}$	-	17	-	
$t_{d(OFF)}$	Turn-Off Delay Time <sup>*4</sup>	$R_G = 3\Omega$	-	94	-	
$t_f$	Turn-Off Fall Time <sup>*4</sup>	$R_L = 2.5\Omega$	-	35	-	
$Q_G$	Total Gate-Charge	$V_{DD} = -10\text{V}$	-	10	-	nC
$Q_{GS}$	Gate to Source Charge	$V_{GS} = -4.5\text{V}$	-	2.3	-	
$Q_{GD}$	Gate to Drain (Miller) Charge	$I_D = -4\text{A}$	-	2	-	
<b>Source-Drain Diode Characteristics</b>						
$V_{SD}$	Diode Forward Voltage <sup>*2</sup>	$I_{SD} = -1\text{A}, V_{GS} = 0\text{V}$	-	-0.7	-1	V

Notes:

- The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper
- The data tested by pulsed, pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$
- The  $E_{AS}$  data shows Max. rating. The test condition is  $V_{DD} = -10\text{V}, V_{GS} = -6\text{V}, L = 0.1\text{mH}$
- Guaranteed by design, not subject to production

Ratings and Characteristics Curves (@  $T_A = 25^\circ\text{C}$  unless otherwise specified)

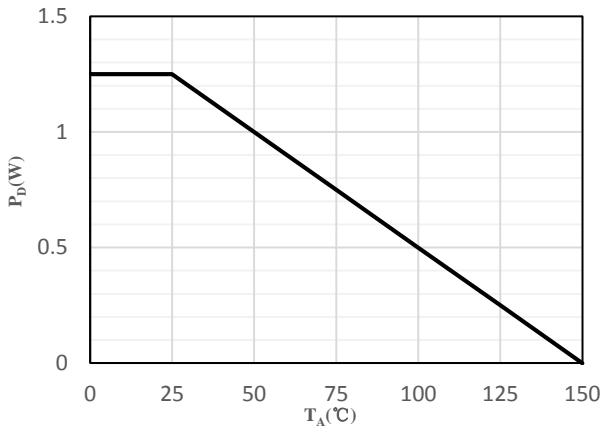


Fig 1 Power Dissipation

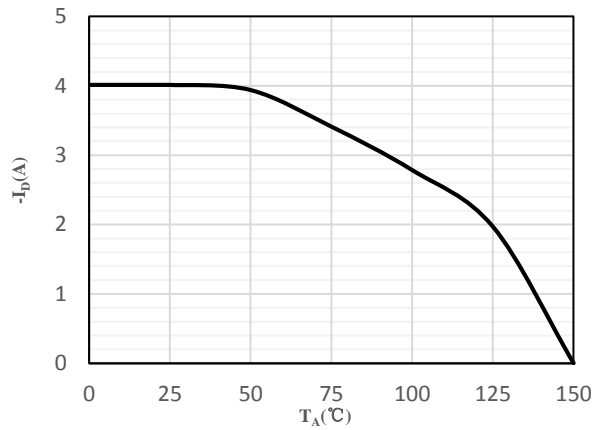


Fig 2 Drain Current

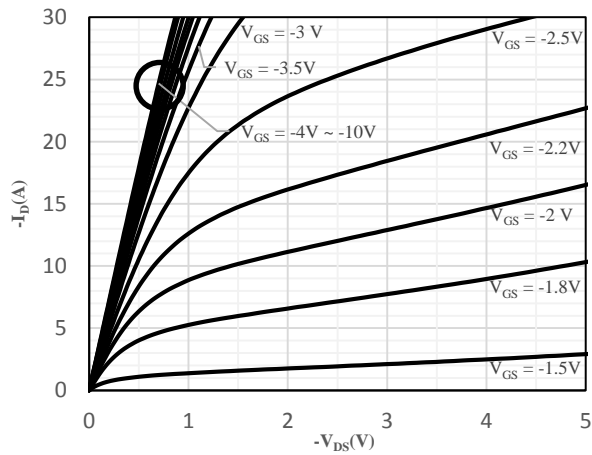


Fig 3 Typical Output Characteristics

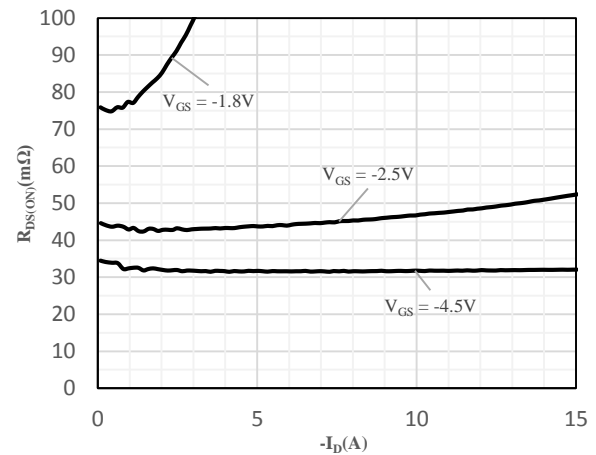


Fig 4 On-Resistance vs. Drain Current and Gate Voltage

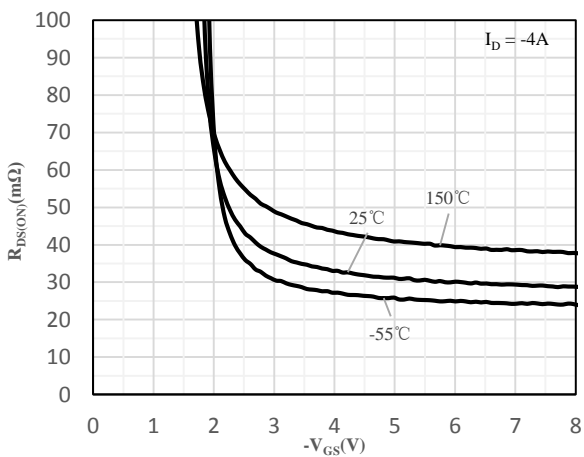


Fig 5 On-Resistance vs. Gate-Source Voltage

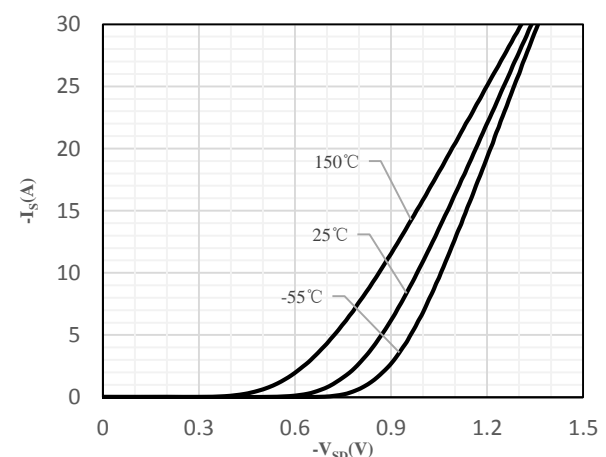


Fig 6 Body-Diode Characteristics

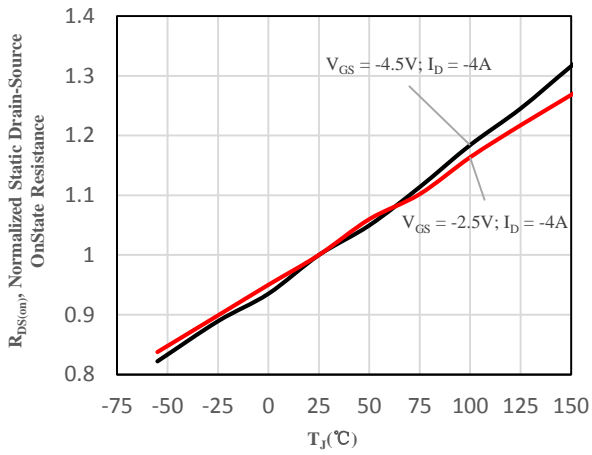


Fig 7 Normalized On-Resistance vs. Junction Temperature

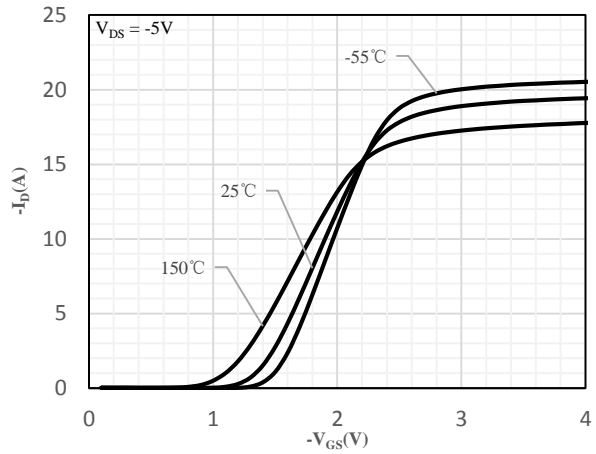


Fig 8 Transfer Characteristics

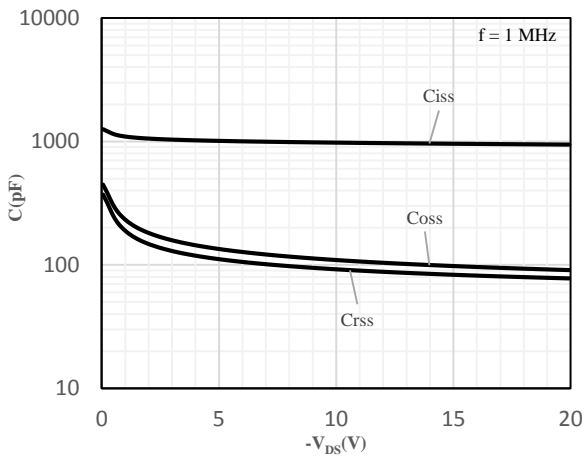


Fig 9 Capacitance Characteristics

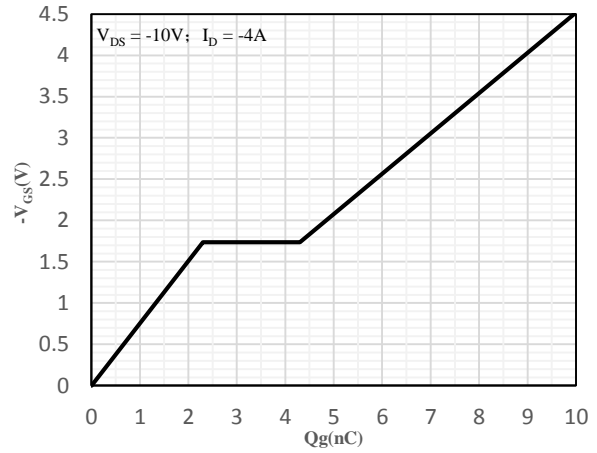


Fig 10 Gate-Charge Characteristics

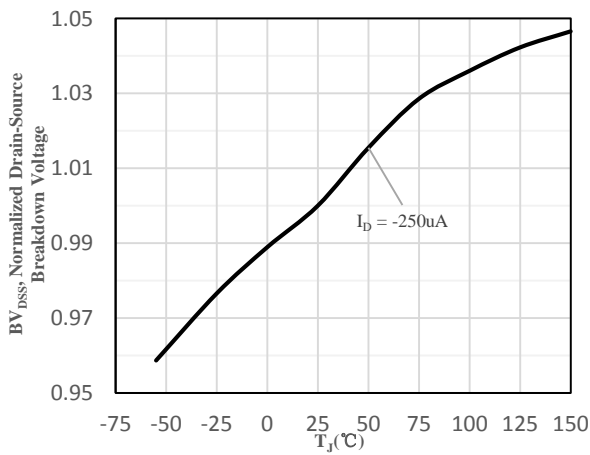


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

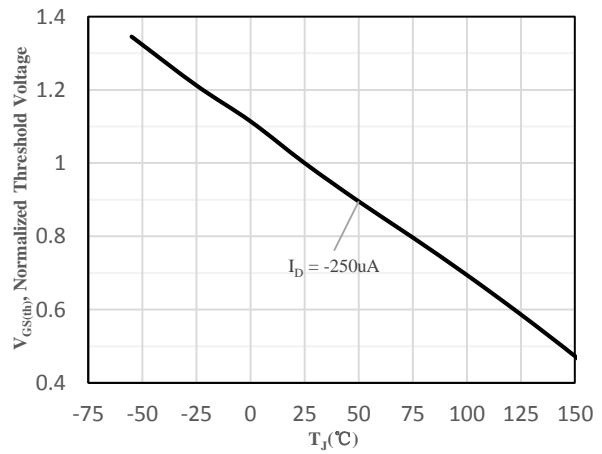
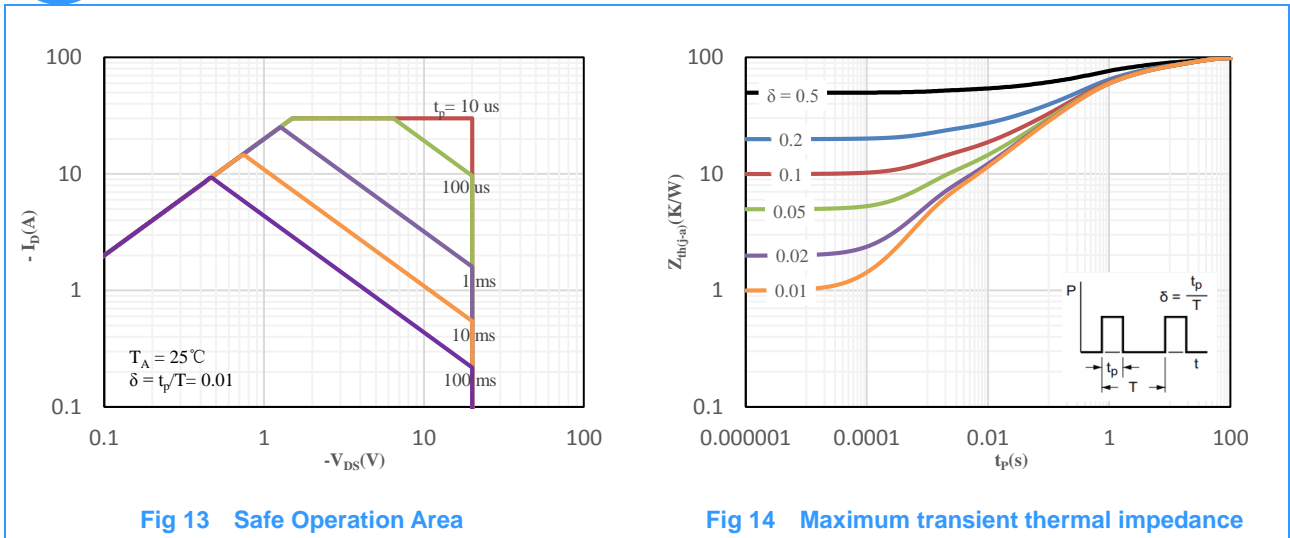
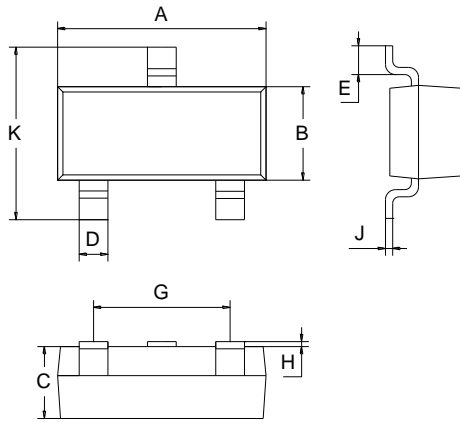


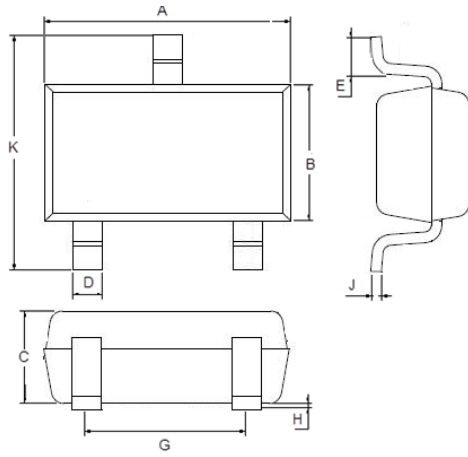
Fig 12 Normalized  $V_{GS(th)}$  vs. Junction Temperature



**Package Outline Dimensions** (Unit: mm)



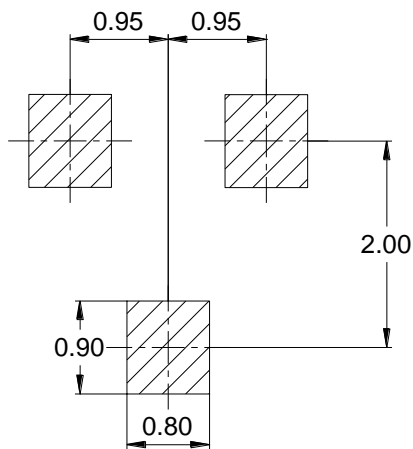
SOT-23		
Dimension	Min.	Max.
A	2.70	3.10
B	1.10	1.50
C	0.90	1.10
D	0.30	0.50
E	0.35	0.48
G	1.80	2.00
H	0.02	0.10
J	0.05	0.15
K	2.20	2.60



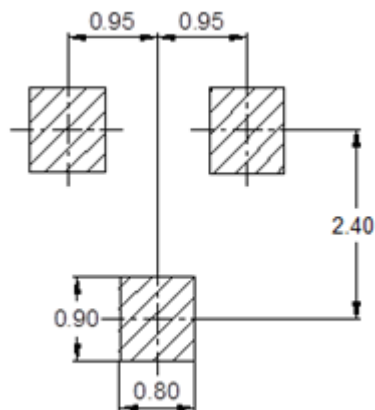
SOT-23-3L		
Dimension	Min.	Max.
A	2.80	3.00
B	1.50	1.70
C	1.00	1.20
D	0.35	0.45
E	0.35	0.55
G	1.80	2.00
H	0.02	0.10
J	0.10	0.20
K	2.60	3.00

**Mounting Pad Layout** (Unit: mm)

**SOT-23**



**SOT-23-3L**



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