

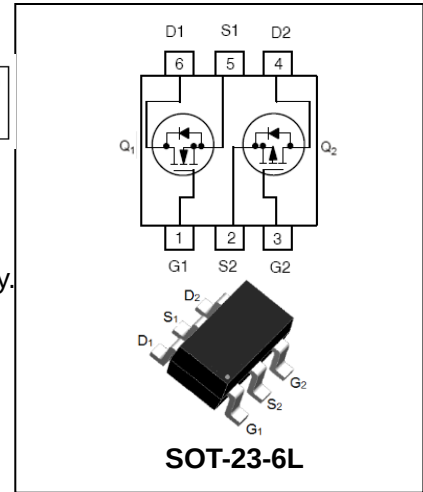
Power MOSFET

BL4167-6L

FEATURES

- Complementary N-Channel and P-Channel MOSFET.
- Leading Edge Trench Technology for Low On Resistance.
- Reduced Gate Charge to Improve Switching Response.
- Independently Connected Devices to Provide Design Flexibility.

HF



ORDERING INFORMATION

Type No.	Marking	Package Code
BL4167-6L	TA	SOT-23-6L

MAXIMUM RATING – Total Device @ Ta=25°C unless otherwise specified

Symbol	Parameter	Value	Units
$P_D^{(Note1)}$	Power Dissipation	0.9	W
I_S	Source Current (Body Diode)	± 0.9	A
$R_{\theta JA}^{(Note1)}$	Thermal resistance, Junction-to-Ambient	140	°C/W
T_J, T_{STG}	Junction and Storage Temperature	-55 to +150	°C

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Maximum Ratings N-CHANNEL –Q₁ @ Ta=25°C unless otherwise specified

Symbol	Parameter	Value	Units
V _{DSS}	Drain-Source voltage	30	V
V _{GSS}	Gate -Source voltage	± 12	V
I _D (Note1)	Drain current continuous T _A = 25°C continuous T _A = 85°C	2.6 1.9	A
I _{DM}	Pulsed Drain Current tp = 10 s	8.6	A

ELECTRICAL CHARACTERISTICS–Q₁ @ Ta=25°C unless otherwise specified

Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =250μA	30	-	-	V
Gate Threshold Voltage	V _{GS(th)} (Note2)	V _{DS} =V _{GS} , I _D =250μA	0.6	1	1.4	
Gate-body Leakage Forward Reverse	I _{GSS}	V _{DS} =0V, V _{GS} =12V V _{DS} =0V, V _{GS} =-12V	- -	- -	100 -100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =24V, V _{GS} =0V	-	-	1	μA
Forward transconductance	g _{FS} (Note2)	V _{DS} =15V, I _D =2.6A	-	2.6	-	S
Static drain-Source on-resistance	R _{DS(ON)} (Note2)	V _{GS} =4.5V, I _D =2.6A	-	-	90	mΩ
		V _{GS} =2.5V, I _D =2.2A	-	-	125	
Input capacitance	C _{ISS}	V _{DS} =15V, V _{GS} =0V, f=1.0M Hz	-	295	-	pF
Output capacitance	C _{OSS}		-	48	-	
Reverse transfer capacitance	C _{RSS}		-	27	-	
Total Gate Charge	Q _{G(TOT)}	V _{GS} = 4.5 V V _{DS} = 15 V I _D = 2.0 A	-	3.7	5.5	nC
Threshold Gate Charge	Q _{G(TH)}		-	0.6	-	
Gate-to-Source Gate Charge	Q _{GS}		-	0.9	-	
Gate-to-Drain “Miller” Charge	Q _{GD}		-	0.8	-	
Turn-On Delay Time	t _{D(ON)} (Note3)	V _{DD} = 15V I _D = 1A V _{GS} =4.5V R _{GEN} = 6Ω	-	7	-	ns
Rise Time	t _r (Note3)		-	4	-	
Turn-Off Delay Time	t _{D(OFF)} (Note3)		-	14	-	
Fall Time	t _f (Note3)		-	2	-	
Forward Diode Voltage	V _{SD}	V _{GS} =0V, T _J =25 °C, I _S =0.9 A	-	0.7	1.2	V
Reverse Recovery Time	t _{RR}	V _{GS} =0V dI _S /dI _t =100 A/s I _S =0.9 A	-	8	-	ns
Charge Time	t _a		-	5	-	
Discharge Time	t _b		-	3	-	
Reverse Recovery Charge	Q _{RR}		-	3	-	nC

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Maximum Ratings P-CHANNEL –Q₂ @ Ta=25°C unless otherwise specified

Symbol	Parameter	Value	Units
V _{DSS}	Drain-Source voltage	-30	V
V _{GSS}	Gate -Source voltage	± 12	V
I _D (Note1)	Drain current T _A = 25°C T _A = 70°C	-2.2 -1.6	A
I _{DM}	Pulsed Drain Current	-10	A

ELECTRICAL CHARACTERISTICS–Q₂ @ Ta=25°C unless otherwise specified

Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =-250μA	-30	-	-	V
Gate Threshold Voltage	V _{GS(th)} (Note2)	V _{DS} =V _{GS} , I _D =-250μA	-0.6	-0.95	-1.3	
Gate-body Leakage Forward Reverse	I _{GSS}	V _{DS} =0V, V _{GS} =12V	-	-	100	nA
		V _{DS} =0V, V _{GS} =-12V	-	-	-100	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-30V, V _{GS} =0V	-	-	-1	μA
Forward transconductance	g _{FS} (Note2)	V _{DS} =-15V, I _D =-1.9A	-	2.6	-	S
Static drain-Source on-resistance	R _{DS(ON)} (Note2)	V _{GS} =-4.5V, I _D =-2.2A	-		170	mΩ
		V _{GS} =-2.5V, I _D =-2.2A	-		300	
Input capacitance	C _{ISS}	V _{DS} =-15V, V _{GS} =0V, f=1.0 MHz	-	419	-	pF
Output capacitance	C _{OSS}		-	51	-	
Reverse transfer capacitance	C _{RSS}		-	26	-	
Total Gate Charge	Q _{G(TOT)}	V _{GS} = -4.5 V V _{DS} = -15 V I _D = -2.0 A	-	3.9	6	nC
Threshold Gate Charge	Q _{G(TH)}		-	0.6	-	
Gate-to-Source Gate Charge	Q _{GS}		-	1.0	-	
Gate-to-Drain “Miller” Charge	Q _{GD}		-	1.0	-	
Turn-On Delay Time	t _{D(ON)} (Note3)	V _{DD} = -15V I _D = -1A V _{GS} = -4.5V R _{GEN} = 6Ω	-	8	-	ns
Rise Time	t _r (Note3)		-	8	-	
Turn-Off Delay Time	t _{D(OFF)} (Note3)		-	22	-	
Fall Time	t _f (Note3)		-	8	-	
Forward Diode Voltage	V _{SD}	V _{GS} =0V, T _J =25 °C, I _S =-1 A	-	-	-1.2	V
Reverse Recovery Time	t _{RR}	V _{GS} =0V dI _S /dt=100 A/s I _S =-0.9 A	-	12	-	ns
Charge Time	t _a		-	10	-	
Discharge Time	t _b		-	2	-	
Reverse Recovery Charge	Q _{RR}		-	7	-	nC

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Note1. Surface Mounted on FR4 Board using 1 in sq pad size (Cu area = 1.127 in sq[1 oz] including traces).

2. Pulse Test: pulse width _ 300 _s, duty cycle _ 2%.
3. Switching characteristics are independent of operating junction temperatures.

TYPICAL CHARACTERISTICS @ Ta=25°C unless otherwise specified

N-CHANNEL –Q₁

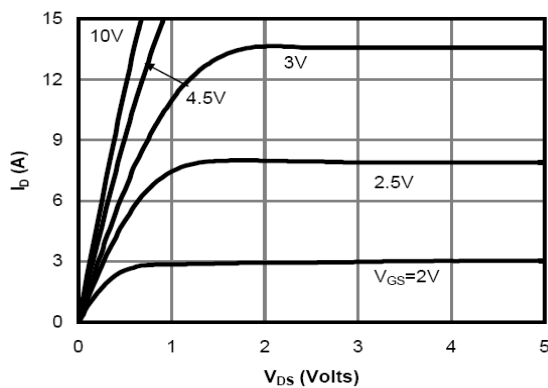


Fig 1: On-Region Characteristics

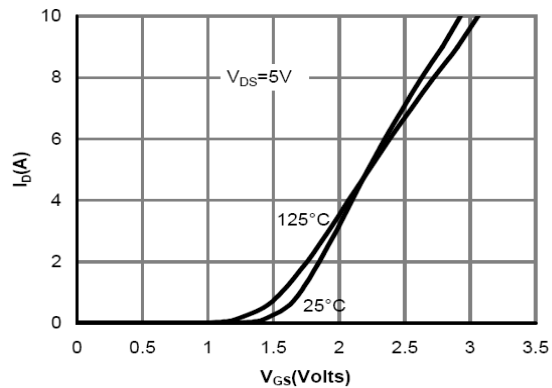


Figure 2: Transfer Characteristics

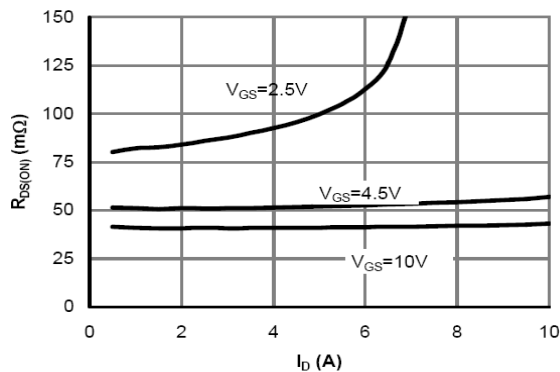


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

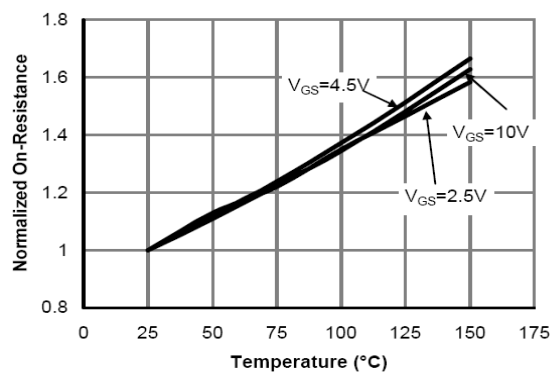


Figure 4: On-Resistance vs. Junction Temperature

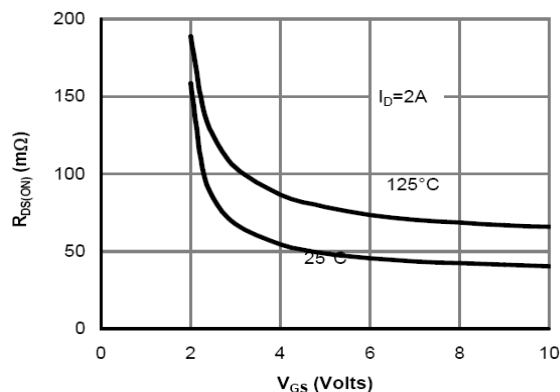


Figure 5: On-Resistance vs. Gate-Source Voltage

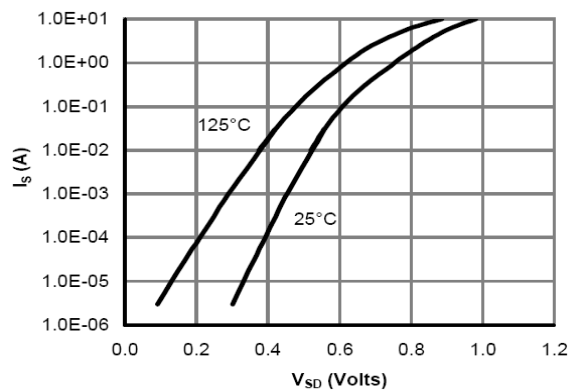


Figure 6: Body-Diode Characteristics

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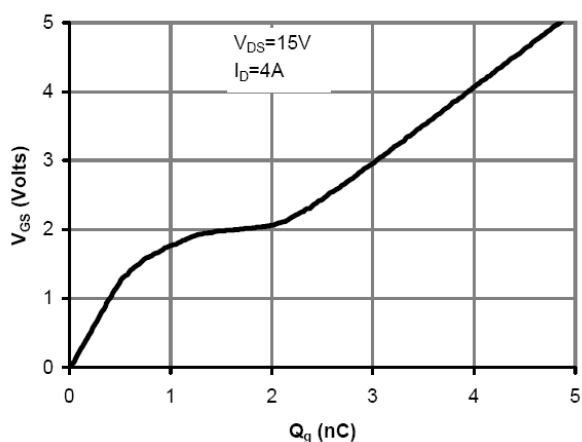


Figure 7: Gate-Charge Characteristics

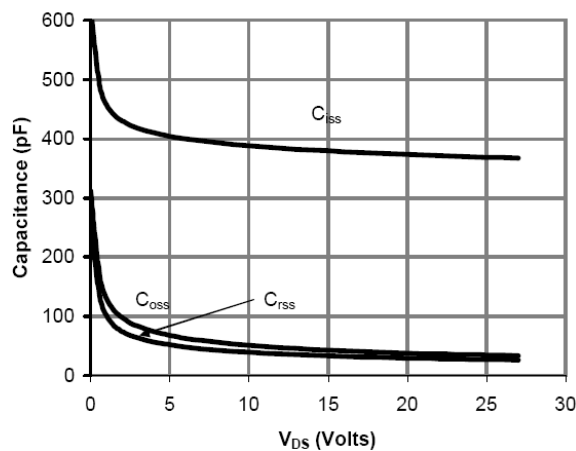


Figure 8: Capacitance Characteristics

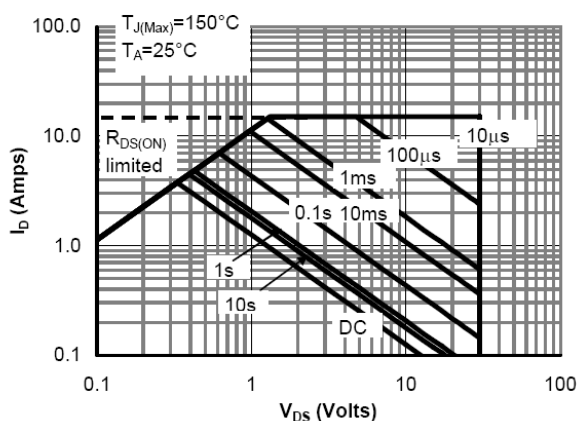


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

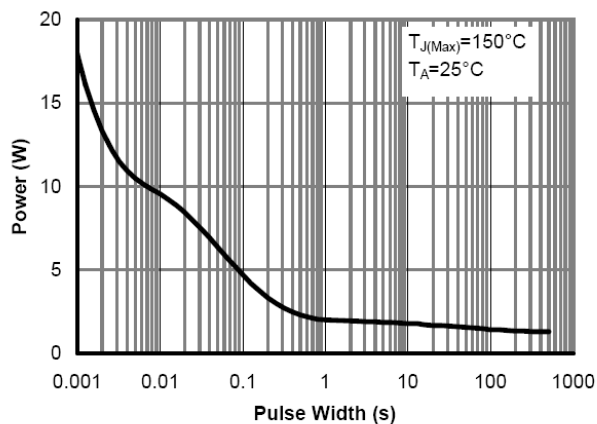


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

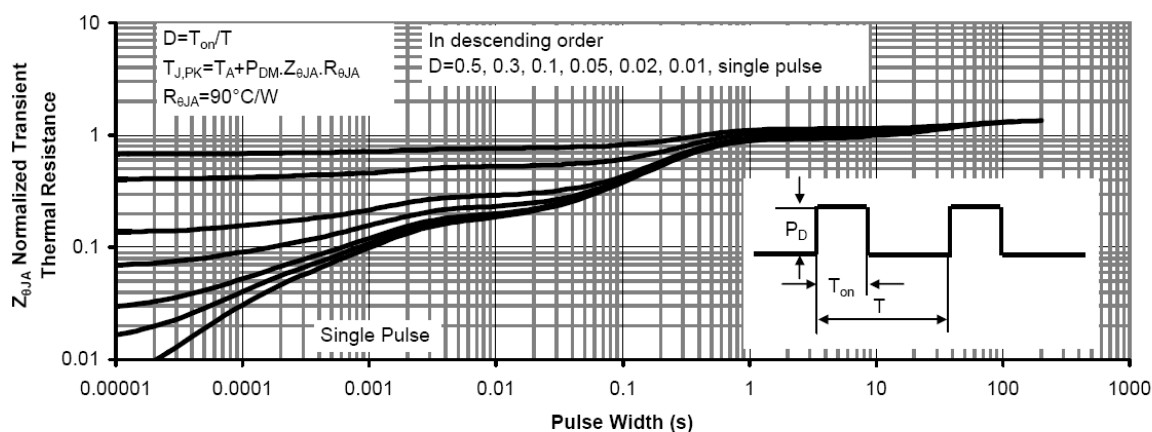


Figure 11: Normalized Maximum Transient Thermal Impedance

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P-CHANNEL $-Q_2$

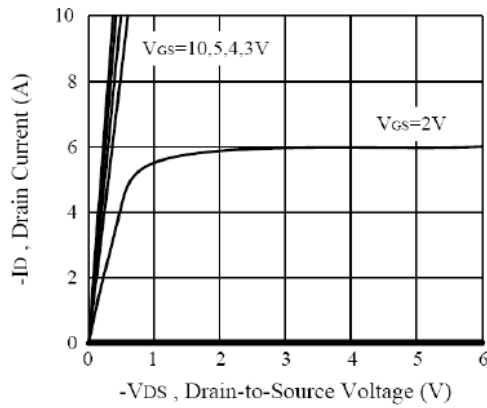


Figure 1. Output Characteristics

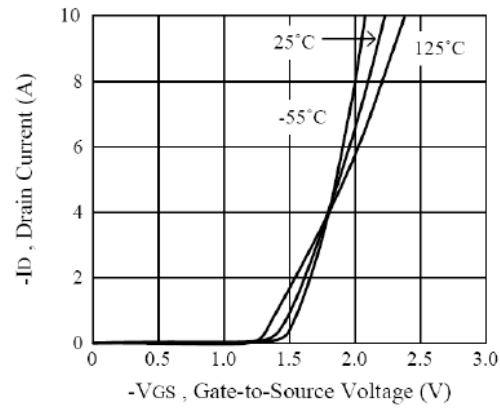


Figure 2. Transfer Characteristics

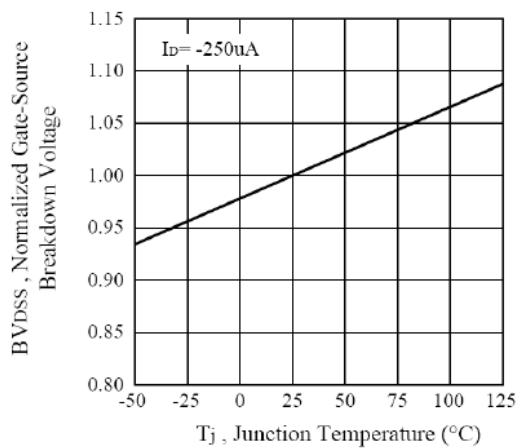


Figure 6. Breakdown Voltage Variation with Temperature

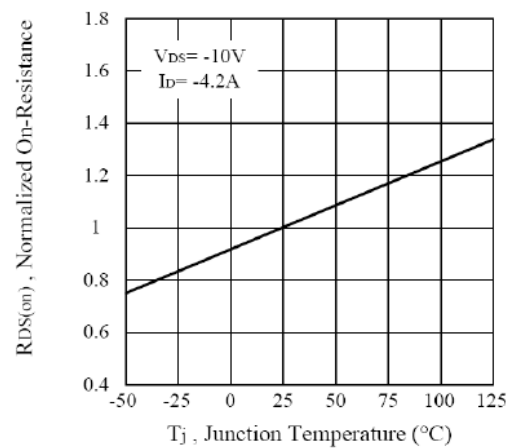


Figure 4. On-Resistance Variation with Temperature

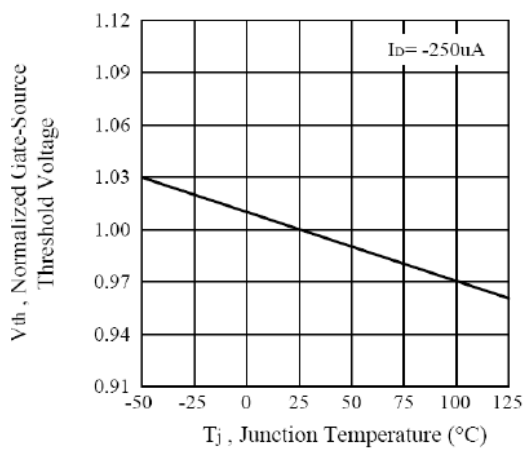


Figure 5. Gate Threshold Variation with Temperature

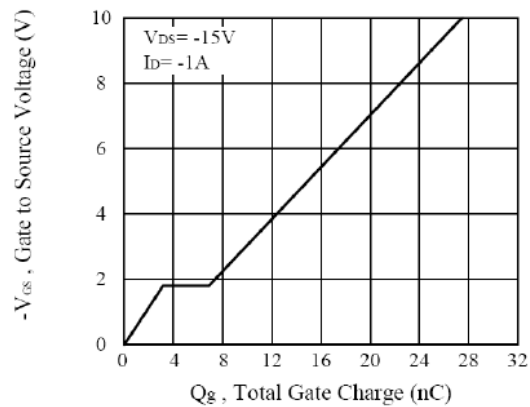


Figure 7. Gate Charge

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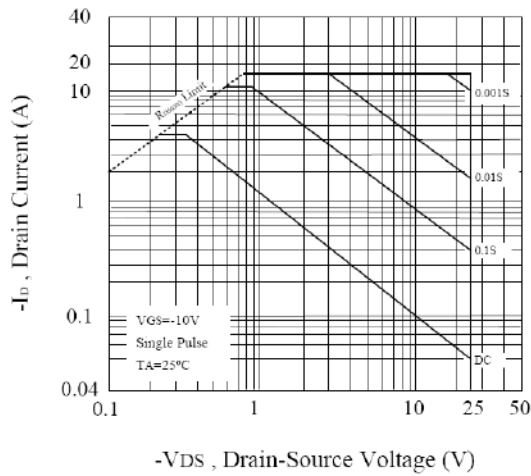


Figure 9. Maximum Safe Operating Area

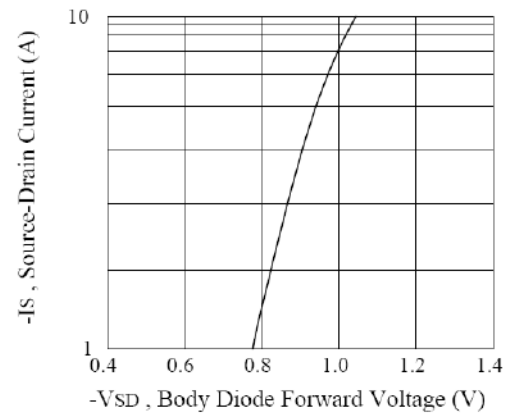


Figure 8. Body Diode Forward Voltage Variation with Source Current

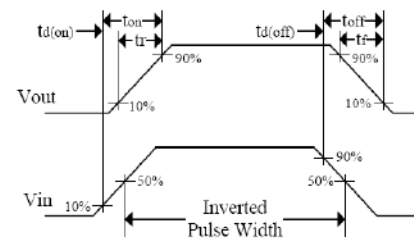
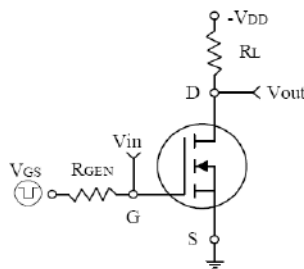


Figure 10. Switching Test Circuit and Switching Waveforms

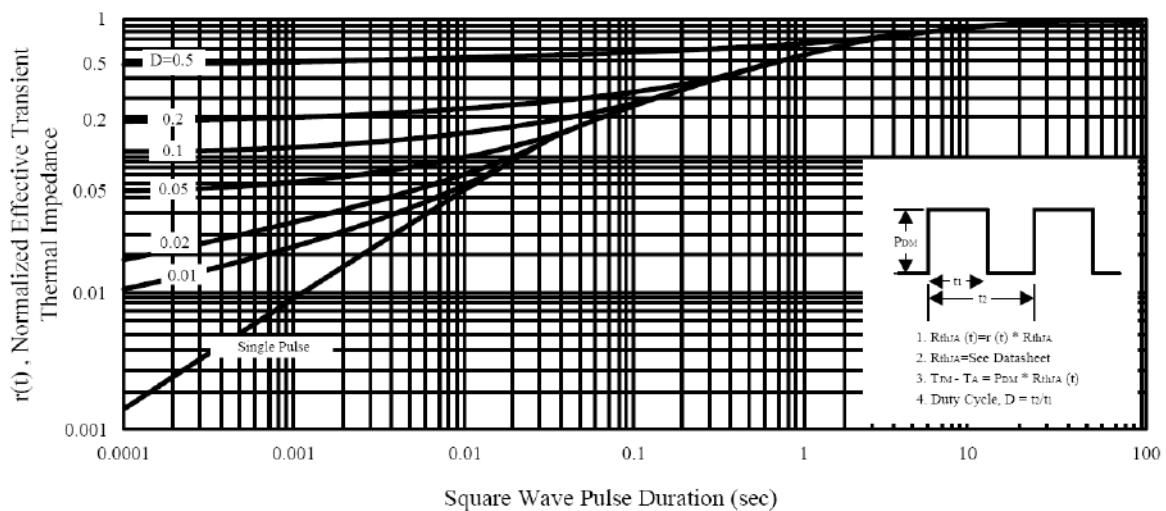


Figure 11. Normalized Thermal Transient Impedance Curve

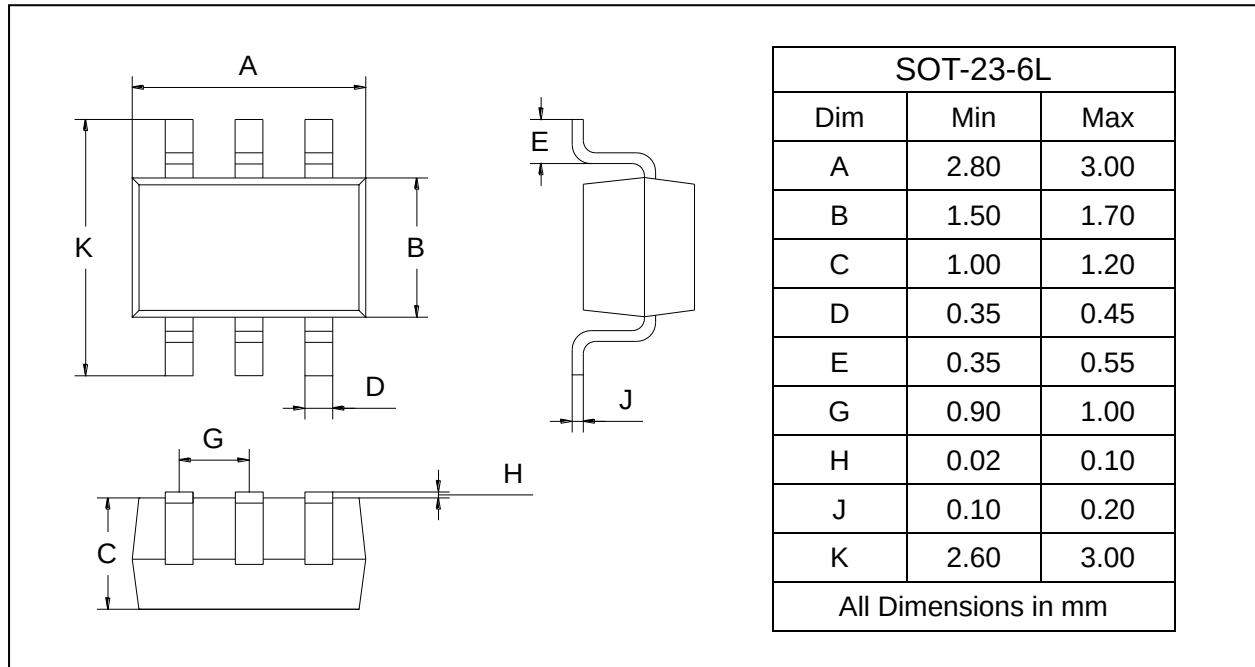
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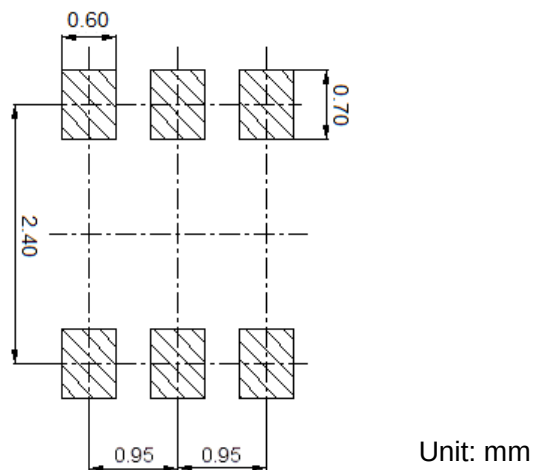
PACKAGE OUTLINE

Plastic surface mounted package

SOT-23-6L



SOLDERING FOOTPRINT



PACKAGE INFORMATION

Device	Package	Shipping
BL4167-6L	SOT-23-6L	3000pcs / Tape & Reel