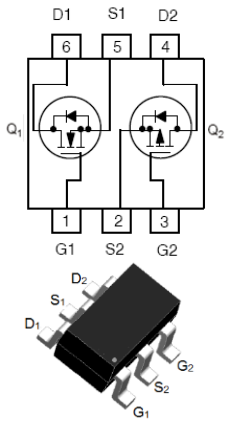
Power MOSFET BL4167-6L

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



SOT-23-6L

ORDERING INFORMATION

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

MAXIMUM RATING – Total Device @ Ta=25℃ 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	℃/W
T_J, T_{STG}	Junction and Storage Temperature	-55 to +150	℃

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Maximum Ratings N-CHANNEL –Q_1 @ Ta=25℃ 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 continuousT_A = 25°C continuousT_A = 85°C	2.6 1.9	A
I_{DM}	Pulsed Drain Current tp = 10 s	8.6	A

ELECTRICAL CHARACTERISTICS–Q_1 @ Ta=25℃ 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 V_{GS}=2.5V,I_D=2.2A	- -	- -	90 125	mΩ
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 d_{IS}/d_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 –Q_2 @ Ta=25℃ 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–Q_2 @ Ta=25℃ 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 V_{DS}=0V, V_{GS}=-12V	- -	- -	100 -100	nA
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 V_{GS}=-2.5V,I_D=-2.2A	- -		170 300	mΩ
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 d_{IS}/d_t=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℃ unless otherwise specified

N-CHANNEL –Q_1

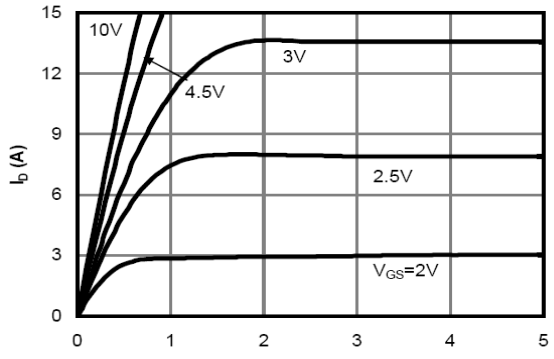

Fig 1: On-Region Characteristics

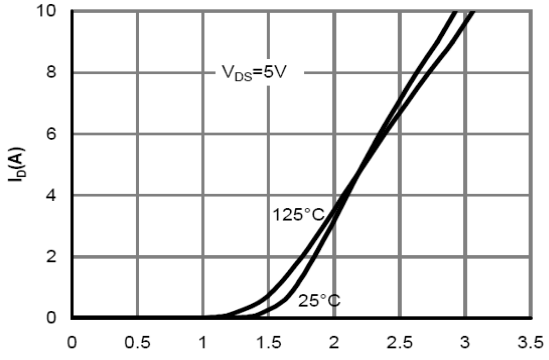

Figure 2: Transfer Characteristics

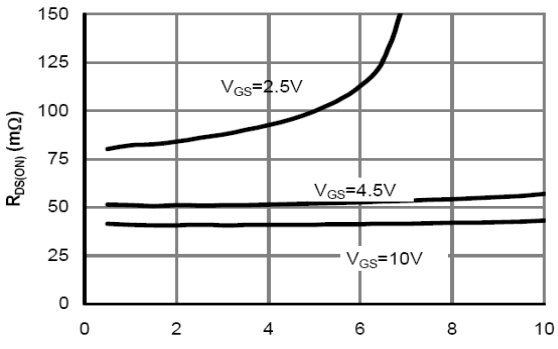

Figure 3: On-Resistance vs. Drain Current and Gate Voltage

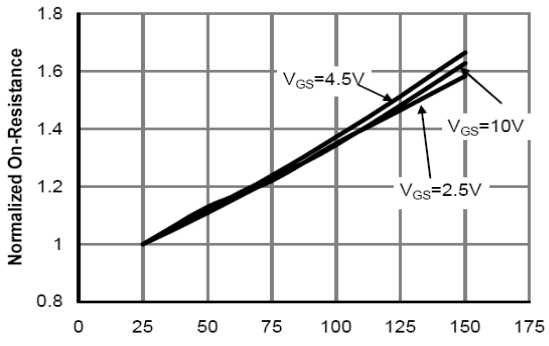

Figure 4: On-Resistance vs. Junction Temperature

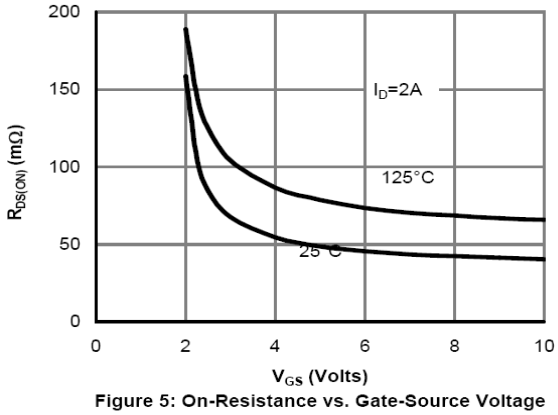

Figure 5: On-Resistance vs. Gate-Source Voltage

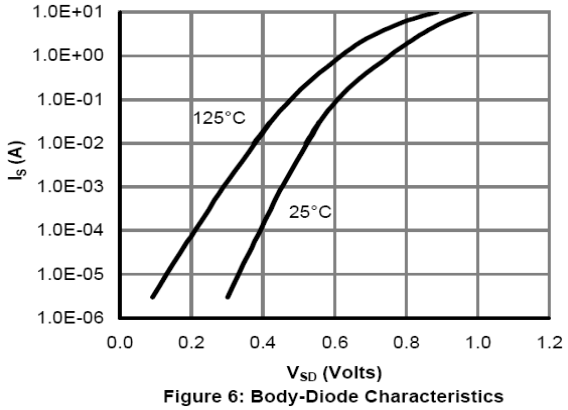

Figure 6: Body-Diode Characteristics

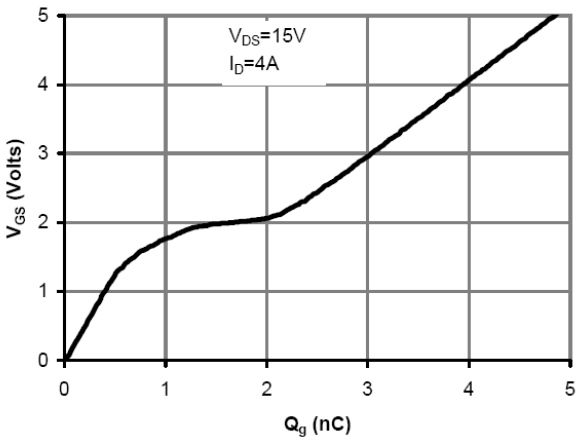

Figure 7: Gate-Charge Characteristics

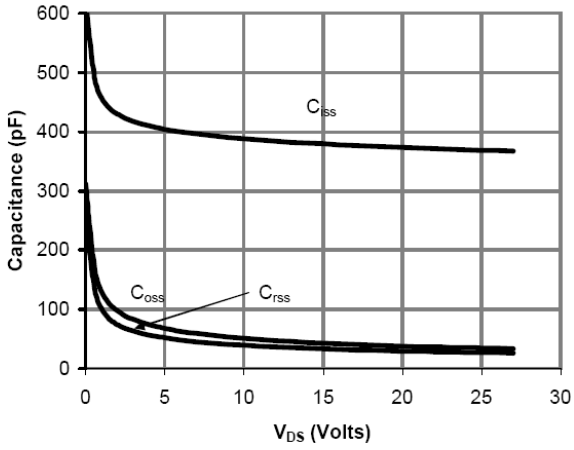

Figure 8: Capacitance Characteristics

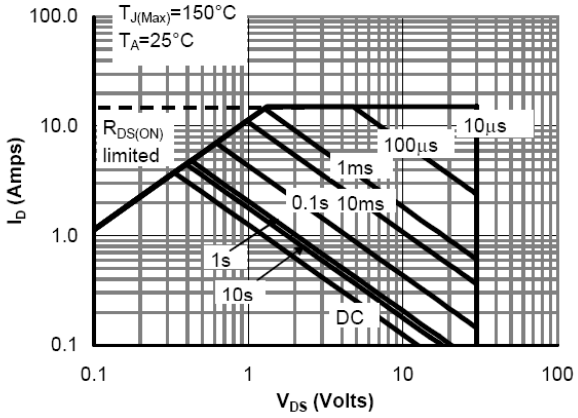

Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

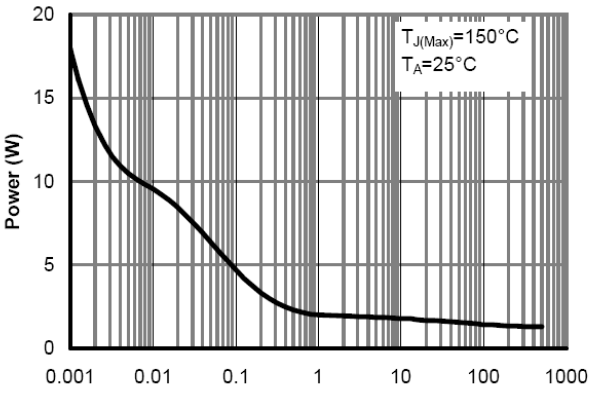

Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

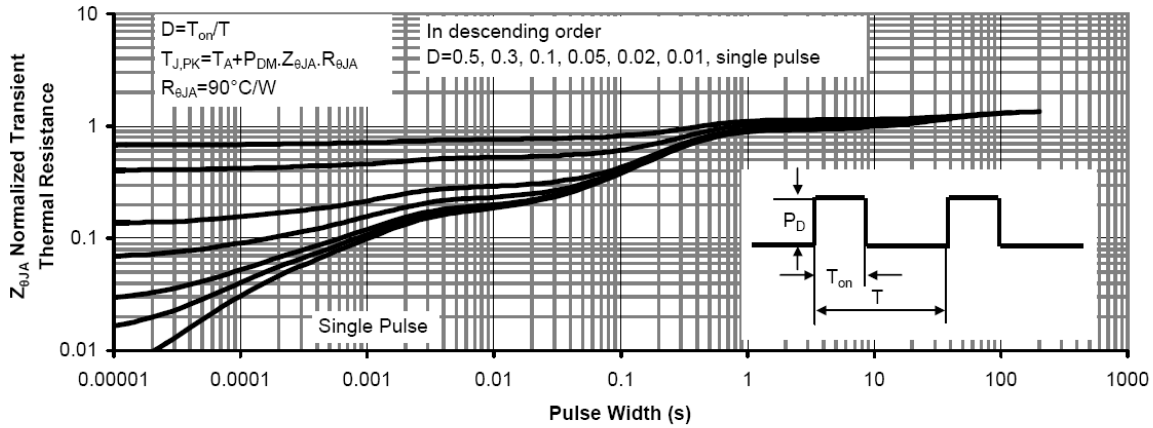

Figure 11: Normalized Maximum Transient Thermal Impedance

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P-CHANNEL $-Q_2$

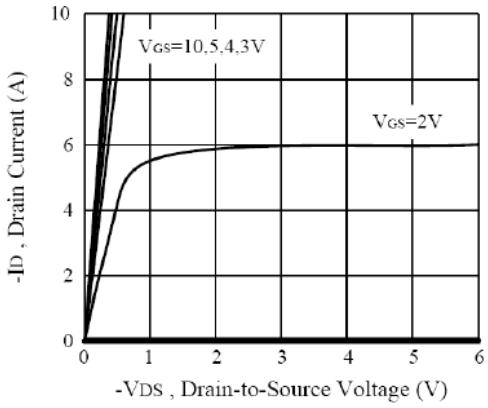

Figure 1. Output Characteristics

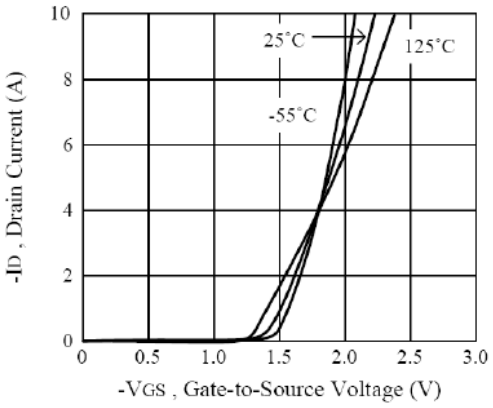

Figure 2. Transfer Characteristics

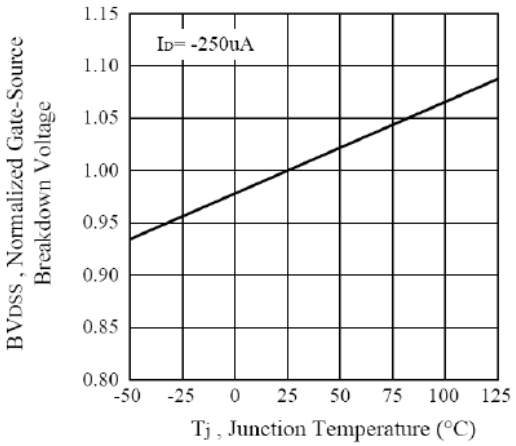

Figure 6. Breakdown Voltage Variation with Temperature

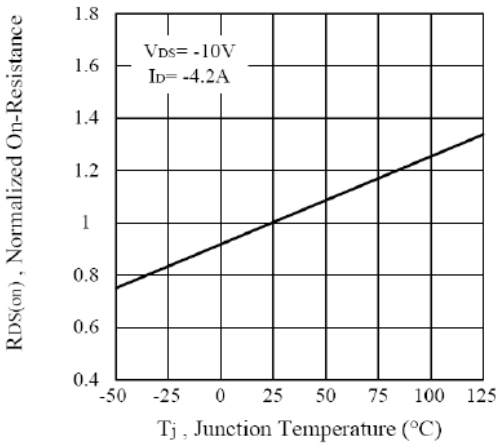

Figure 4. On-Resistance Variation with Temperature

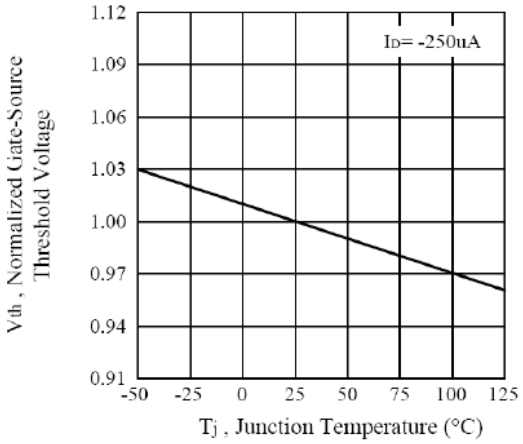

Figure 5. Gate Threshold Variation with Temperature

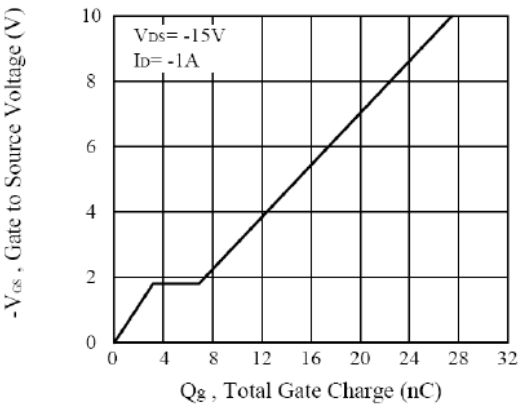

Figure 7. Gate Charge

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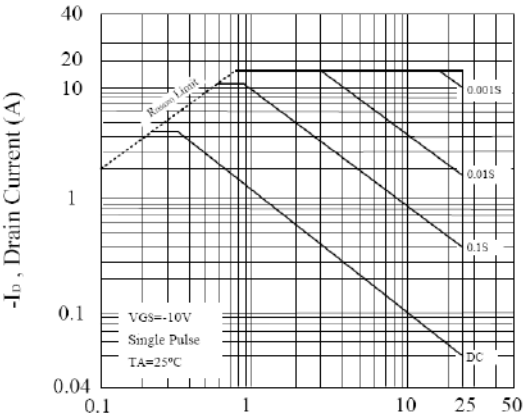

Figure 9. Maximum Safe Operating Area

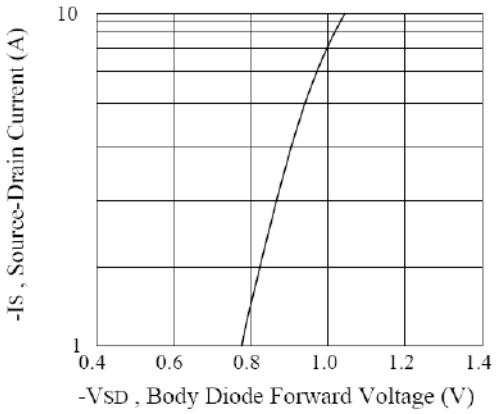

Figure 8. Body Diode Forward Voltage Variation with Source Current

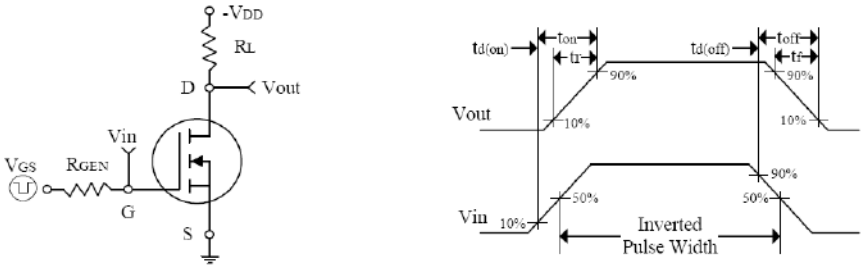

Figure 10. Switching Test Circuit and Switching Waveforms

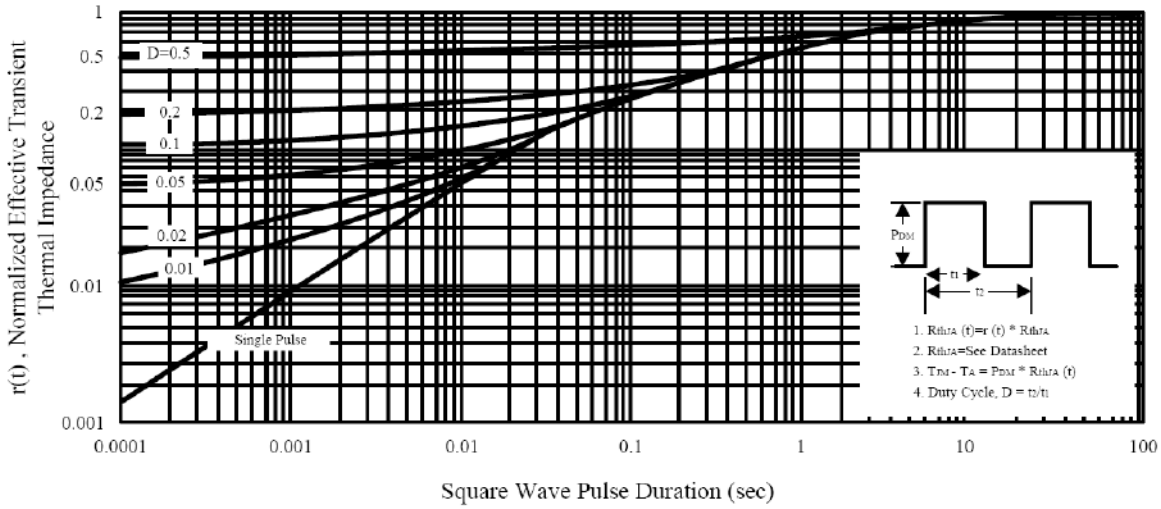

Figure 11. Normalized Thermal Transient Impedance Curve

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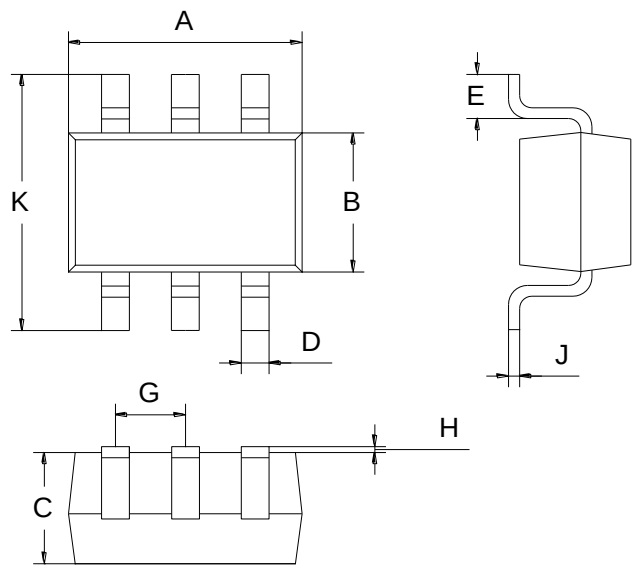
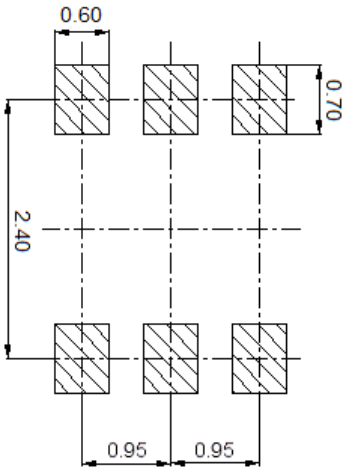
PACKAGE OUTLINE

Plastic surface mounted package SOT-23-6L



SOT-23-6L		
Dim	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	0.90	1.00
H	0.02	0.10
J	0.10	0.20
K	2.60	3.00
All Dimensions in mm		

SOLDERING FOOTPRINT



Unit: mm

PACKAGE INFORMATION

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