



PJA138L

60V N-Channel Enhancement Mode MOSFET

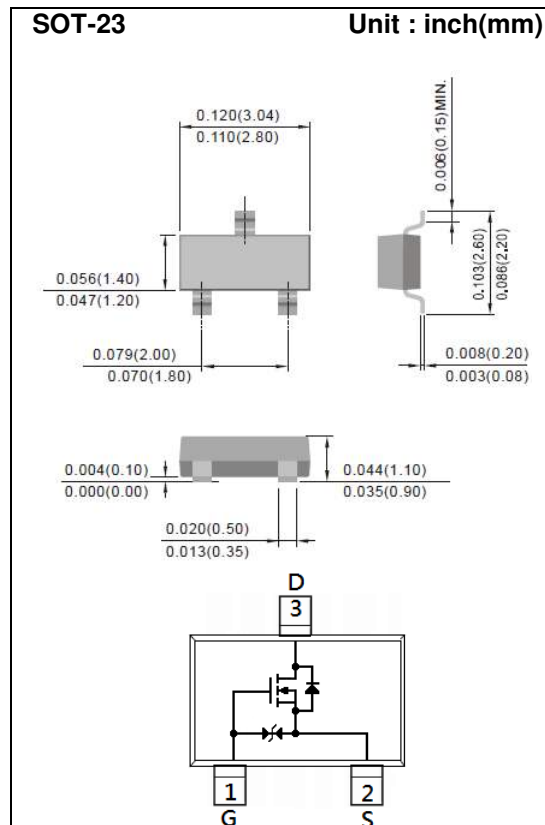
Voltage	60 V	Current	250mA
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Features

- $R_{DS(ON)}$, $V_{GS}@10V$, $I_D@250mA < 4.2\Omega$
- $R_{DS(ON)}$, $V_{GS}@4.5V$, $I_D@100mA < 5\Omega$
- $R_{DS(ON)}$, $V_{GS}@2.5V$, $I_D@50mA < 7\Omega$
- Advanced Trench Process Technology
- ESD Protected
- Specially Designed for Relay driver, Speed line drive, etc.
- Lead free in compliance with EU RoHS 2.0
- Green molding compound as per IEC 61249 standard

Mechanical Data

- Case : SOT-23 Package
- Terminals : Solderable per MIL-STD-750, Method 2026
- Approx. Weight : 0.0003 ounces, 0.0084 grams
- Marking: A8L



Maximum Ratings and Thermal Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

PARAMETER		SYMBOL	LIMIT	UNITS
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current		I_D	250	mA
Pulsed Drain Current		I_{DM}	1000	mA
Power Dissipation	$T_A=25^\circ\text{C}$	P_D	500	mW
	Derate above 25°C		4	mW/ $^\circ\text{C}$
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55~150	$^\circ\text{C}$
Typical Thermal resistance		$R_{\theta JA}$	250	$^\circ\text{C/W}$
- Junction to Ambient ^(Note 3)				



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

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNITS
Static						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	60	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.8	1.2	1.5	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=250mA$	-	2.5	4.2	Ω
		$V_{GS}=4.5V, I_D=100mA$	-	2.8	5	
		$V_{GS}=2.5V, I_D=50mA$	-	3.7	7	
		$V_{GS}=1.8V, I_D=10mA$	-	12	-	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V$	-	0.01	1	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	± 1.0	± 10	μA
Dynamic (Note 4)						
Total Gate Charge	Q_g	$V_{DS}=15V, I_D=250mA,$ $V_{GS}=4.5V$ (Note 1,2)	-	0.7	-	nC
Gate-Source Charge	Q_{gs}		-	0.33	-	
Gate-Drain Charge	Q_{gd}		-	0.2	-	
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V,$ $f=1.0MHz$	-	15	-	pF
Output Capacitance	C_{oss}		-	8.4	-	
Reverse Transfer Capacitance	C_{rss}		-	4.2	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=10V, I_D=250mA,$ $V_{GS}=10V,$ $R_G=6\Omega$ (Note 1,2)	-	7	-	ns
Turn-On Rise Time	t_r		-	22	-	
Turn-Off Delay Time	$t_{d(off)}$		-	21	-	
Turn-Off Fall Time	t_f		-	25	-	
Drain-Source Diode						
Maximum Continuous Drain-Source Diode Forward Current	I_S	---	-	-	250	mA
Diode Forward Voltage	V_{SD}	$I_S=250mA, V_{GS}=0V$	-	0.8	1.1	V

NOTES :

1. Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$
2. Essentially independent of operating temperature typical characteristics.
3. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. mounted on a 1 inch square pad of copper
4. Guaranteed by design, not subject to production testing.



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TYPICAL CHARACTERISTIC CURVES

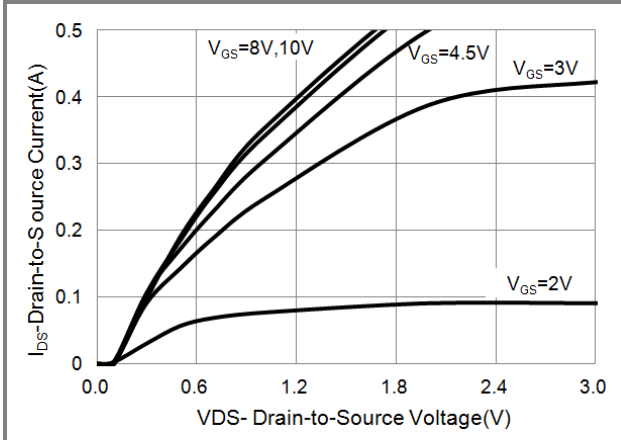


Fig.1 On-Region Characteristics

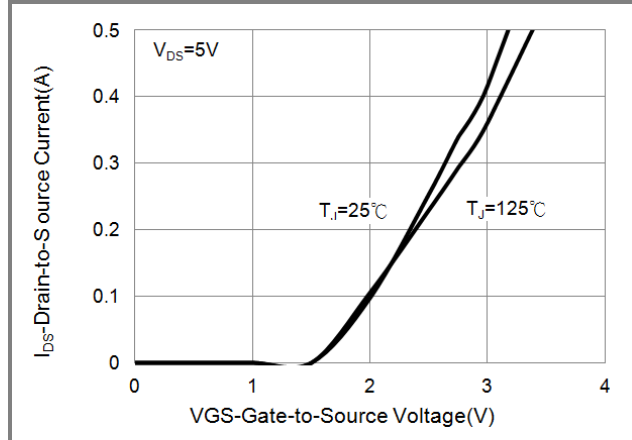


Fig.2 Transfer Characteristics

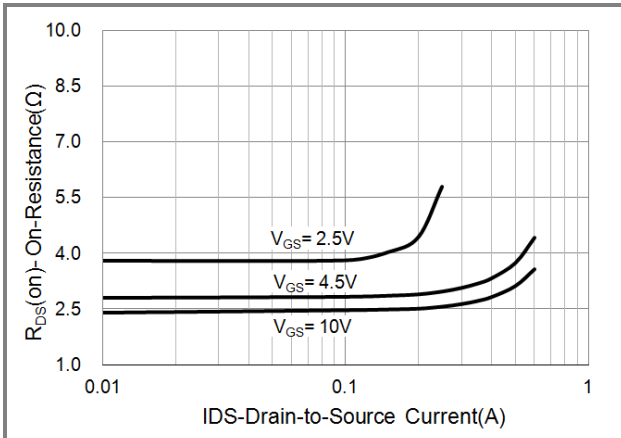


Fig.3 On-Resistance vs. Drain Current

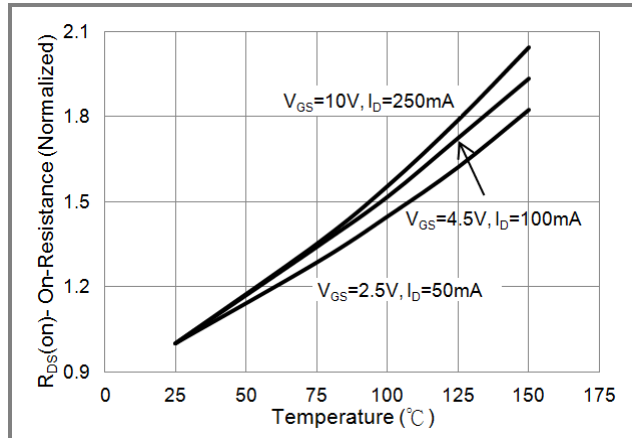


Fig.4 On-Resistance vs. Junction temperature

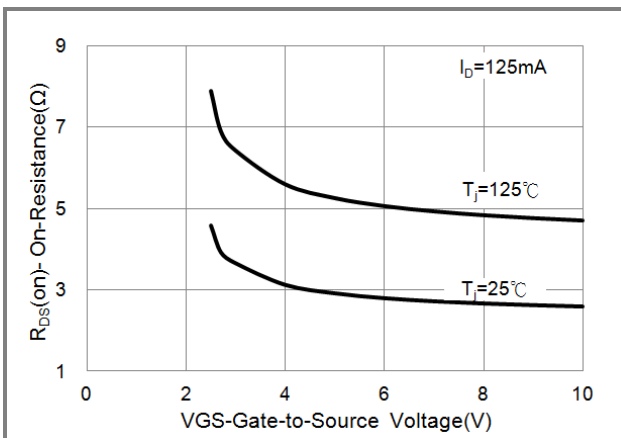


Fig.5 On-Resistance Variation with VGS.

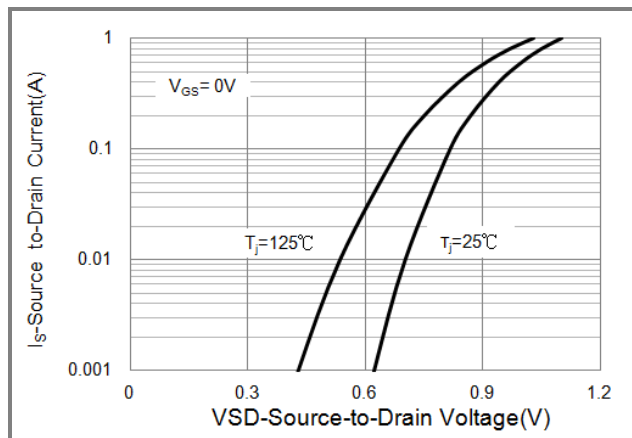


Fig.6 Body Diode Characteristics



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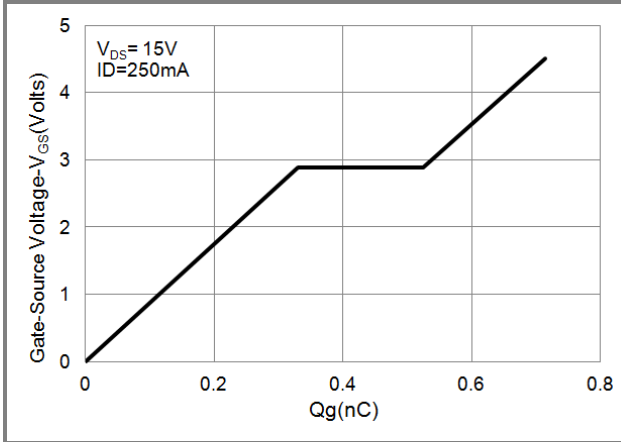


Fig.7 Gate-Charge Characteristics

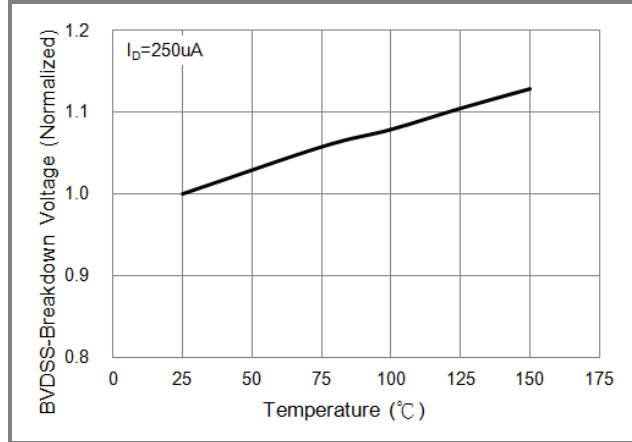


Fig.8 Breakdown Voltage Variation vs. Temperature

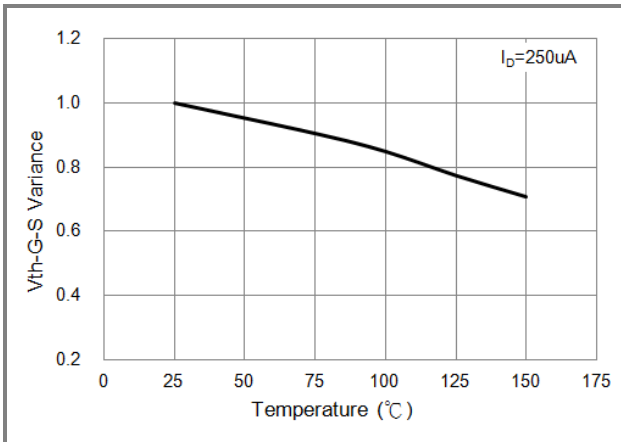


Fig.9 Threshold Voltage Variation with Temperature.

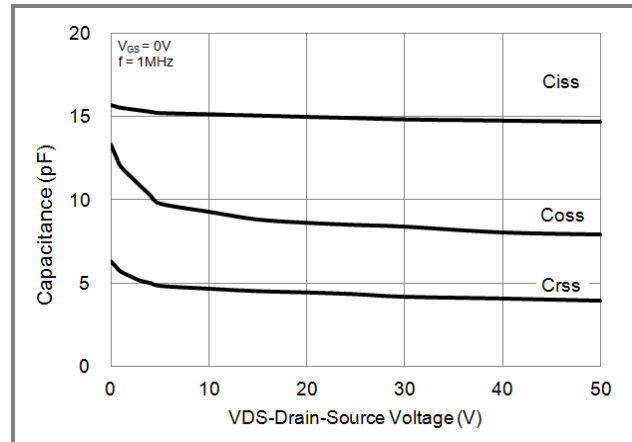


Fig.10 Capacitance vs. Drain-Source Voltage.

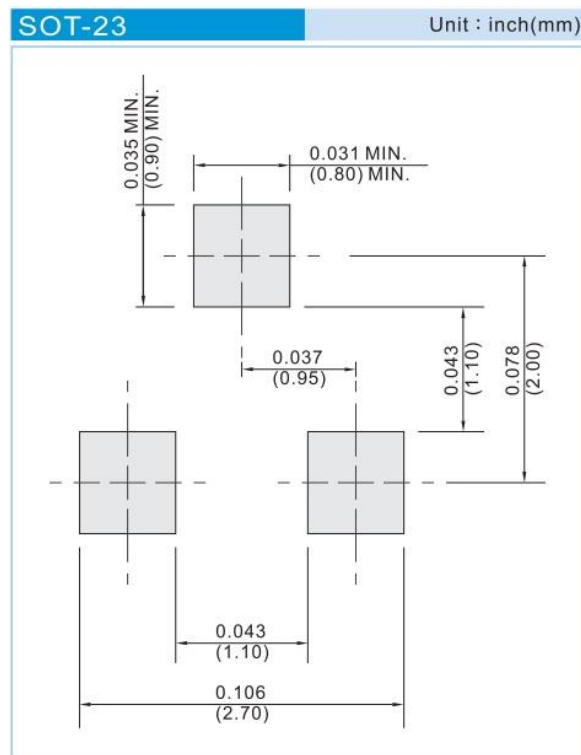


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PART NO PACKING CODE VERSION

Part No Packing Code	Package Type	Packing type	Marking	Version
PJA138L_R1_00001	SOT-23	3K pcs / 7" reel	A8L	Halogen free
PJA138L_R2_00001	SOT-23	12K pcs / 13" reel	A8L	Halogen free

MOUNTING PAD LAYOUT





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