

# PJA3431

## 20V P-Channel Enhancement Mode MOSFET – ESD Protected

**Voltage**

**-20 V**

**Current**

**-1.5A**

### Features

- $R_{DS(ON)}$ ,  $V_{GS}@-4.5V$ ,  $I_D@-1.5A < 325m\Omega$
- $R_{DS(ON)}$ ,  $V_{GS}@-2.5V$ ,  $I_D@-1.2A < 420m\Omega$
- $R_{DS(ON)}$ ,  $V_{GS}@-1.8V$ ,  $I_D@-0.5A < 600m\Omega$
- Advanced Trench Process Technology
- Specially Designed for Switch Load, PWM Application, etc.
- ESD Protected 2KV HBM
- Lead free in comply with EU RoHS 2011/65/EU directives.
- Green molding compound as per IEC61249 Std.

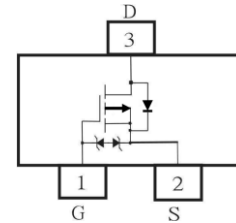
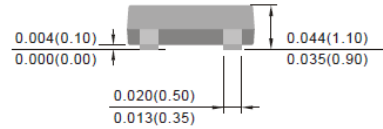
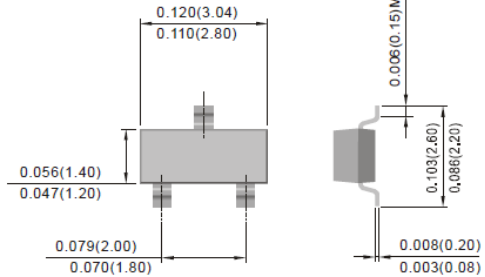
(Halogen Free)

### Mechanical Data

- Case : SOT-23 Package
- Terminals : Solderable per MIL-STD-750, Method 2026
- Approx. Weight : 0.0003 ounces, 0.0084 grams
- Marking : A31

SOT-23

Unit: inch(mm)



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

PARAMETER	SYMBOL	LIMIT	UNITS	
Drain-Source Voltage	$V_{DS}$	-20	V	
Gate-Source Voltage	$V_{GS}$	$\pm 8$	V	
Continuous Drain Current	$I_D$	-1.5	A	
Pulsed Drain Current <sup>(Note 4)</sup>	$I_{DM}$	-4	A	
Power Dissipation	$P_D$	$T_a=25^\circ\text{C}$	1.25	W
		Derate above 25°C	10	mW/°C
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55~150	°C	
Typical Thermal Resistance	$R_{\theta JA}$	100	°C/W	
- Junction to Ambient <sup>(Note 3)</sup>				

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## Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNITS
<b>Static</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA	-20	-	-	V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250uA	-0.5	-0.64	-1.0	V
Drain-Source On-State Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-1.5A	-	240	325	mΩ
		V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-1.2A	-	295	420	
		V <sub>GS</sub> =-1.8V, I <sub>D</sub> =-0.5A	-	405	600	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V	-	-0.02	-1	uA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±8V, V <sub>DS</sub> =0V	-	±3.5	±10	uA
<b>Dynamic</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =-10V, I <sub>D</sub> =-1.5A, V <sub>GS</sub> =-4.5V(Notes 1,2)	-	1.7	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	0.35	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	0.43	-	
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-10V, V <sub>GS</sub> =0V, f=1.0MHZ	-	165	-	pF
Output Capacitance	C <sub>oss</sub>		-	25	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	14.7	-	
<b>Switching</b>						
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =-10V, I <sub>D</sub> =-1.5A, V <sub>GS</sub> =-4.5V, R <sub>G</sub> =6Ω(Notes 1,2)	-	11	-	ns
Turn-On Rise Time	t <sub>r</sub>		-	38	-	
Turn-Off Delay Time	t <sub>d(off)</sub>		-	130	-	
Turn-Off Fall Time	t <sub>f</sub>		-	75	-	
<b>Drain-Source Diode</b>						
Maximum Continuous Drain-Source Diode Forward Current	I <sub>s</sub>	---	-	-	-1.6	A
Diode Forward Voltage	V <sub>sD</sub>	I <sub>s</sub> =-1.6A, V <sub>GS</sub> =0V	-	-1.03	-1.2	V

NOTES :

1. Pulse width ≤ 300us, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature typical characteristics.
3. R<sub>θJA</sub> 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 FR-4 with 2oz.square pad of copper.
4. The maximum current rating is package limited.

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## TYPICAL CHARACTERISTIC CURVES

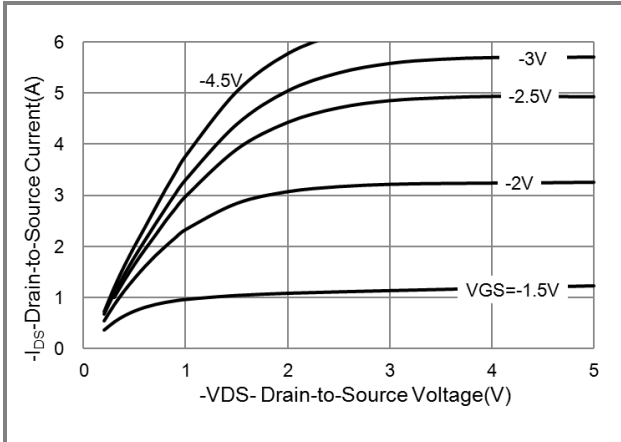


Fig.1 On-Region Characteristics

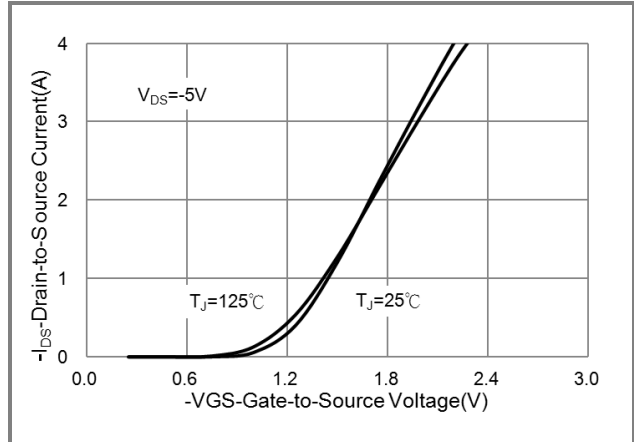


Fig.2 Transfer Characteristics

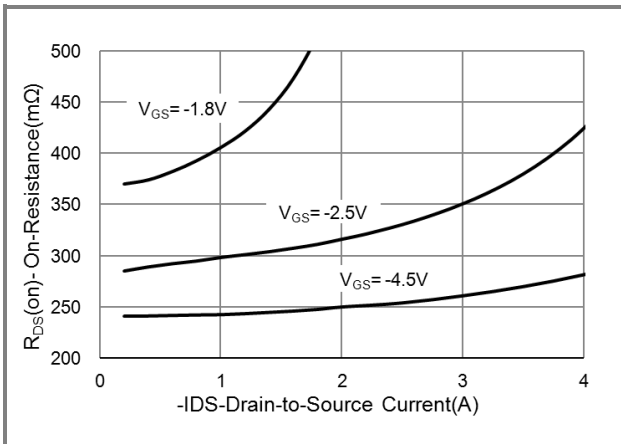


Fig.3 On-Resistance vs. Drain Current

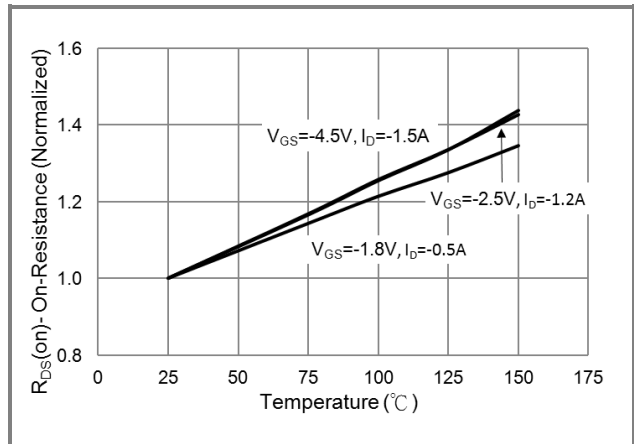


Fig.4 On-Resistance vs. Junction temperature

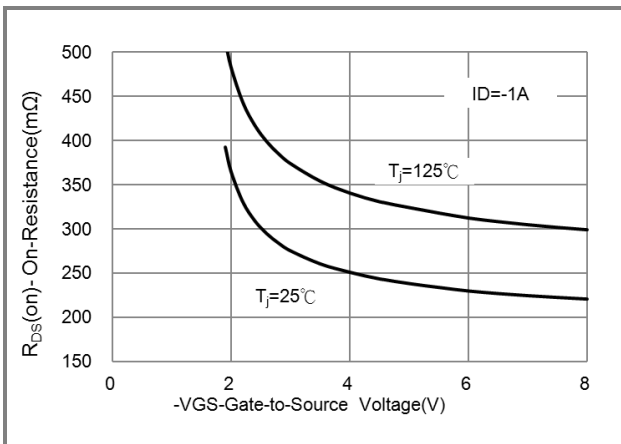


Fig.5 On-Resistance Variation with V\_GS

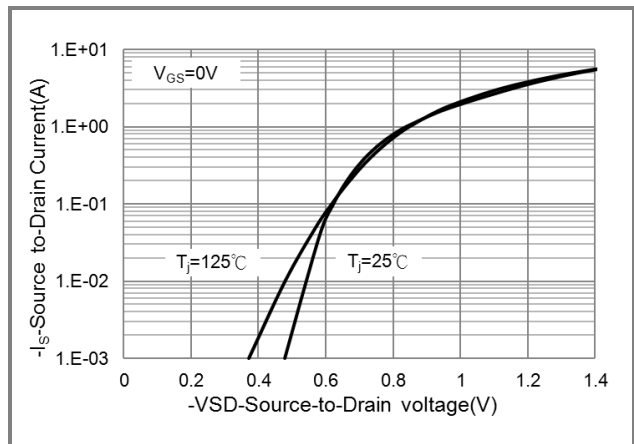


Fig.6 Body Diode Characteristics

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## TYPICAL CHARACTERISTIC CURVES

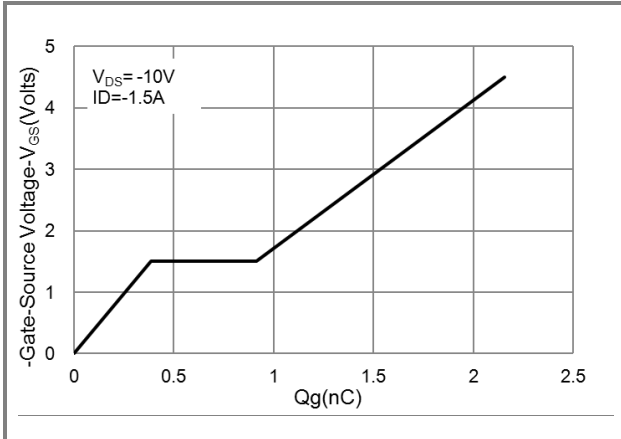


Fig.7 Gate-Charge Characteristics

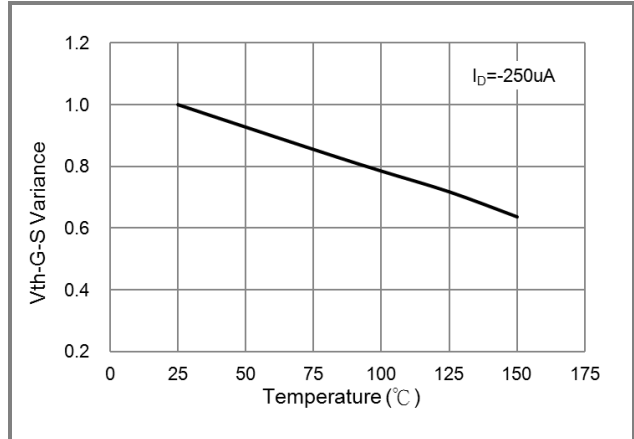


Fig.8 Threshold Voltage Variation with Temperature

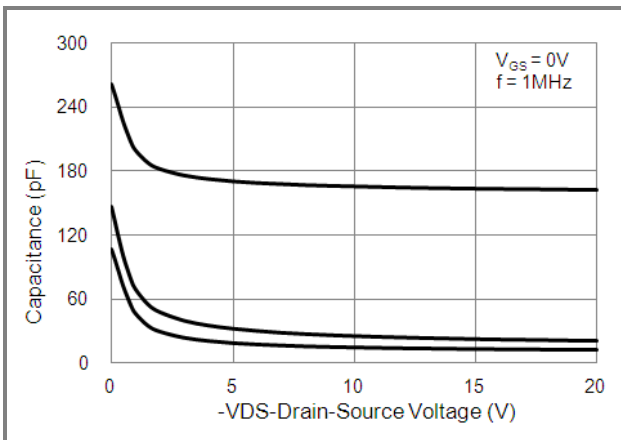


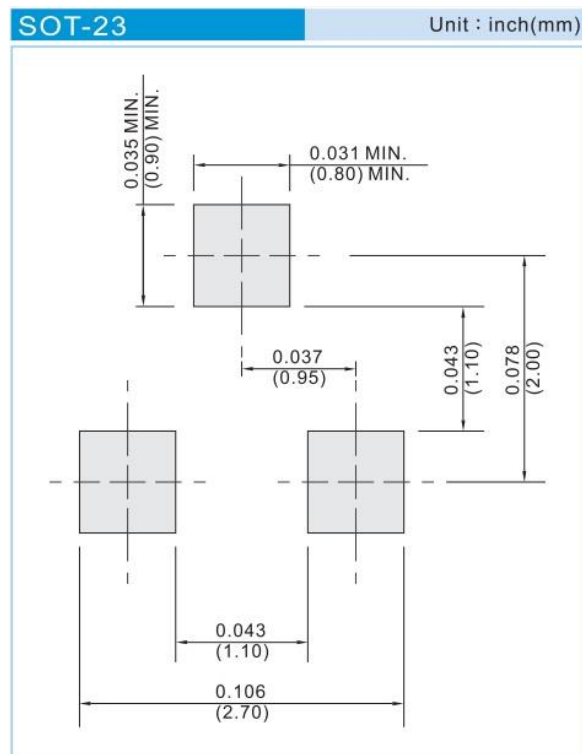
Fig.9 Capacitance vs. Drain-Source Voltage

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## Product and Packing Information

Part No.	Package Type	Packing Type	Marking
PJA3431	SOT-23	3K pcs / 7" reel	A31

## Mounting Pad Layout



## PJA3431

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