



# PJA3461

## 60V P-Channel Enhancement Mode MOSFET

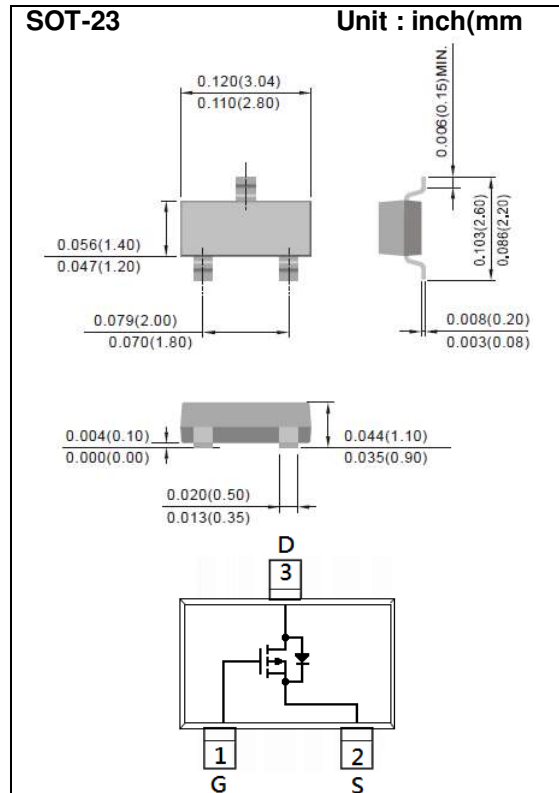
**Voltage**    **-60 V**    **Current**    **-1.9A**

### Features

- $R_{DS(ON)}$  ,  $V_{GS}@-10V$ ,  $I_D@-1.9A < 190m\Omega$
- $R_{DS(ON)}$  ,  $V_{GS}@-4.5V$ ,  $I_D@-1.5A < 240m\Omega$
- Advanced Trench Process Technology
- Specially Designed for Switch Load, PWM Application, etc
- Lead free in compliance with EU RoHS 2011/65/EU directive.
- 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: A61



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

PARAMETER		SYMBOL	LIMIT	UNITS
Drain-Source Voltage		$V_{DS}$	-60	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$T_A=25^\circ C$	$I_D$	-1.9	A
	$T_A=70^\circ C$		-1.5	
Pulsed Drain Current <sup>(Note 1)</sup>		$I_{DM}$	-7.6	A
Power Dissipation	$T_A=25^\circ C$	$P_D$	1.25	W
	$T_A=70^\circ C$		0.8	
Single Pulse Avalanche Energy <sup>(Note 5)</sup>		$E_{AS}$	32	mJ
Operating Junction and Storage Temperature Range		$T_J, T_{STG}$	-55~150	$^\circ C$
Typical Thermal resistance		$R_{\theta JA}$	100	$^\circ C/W$
- Junction to Ambient <sup>(Note 6)</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	-60	-	-	V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250uA	-1.0	-1.88	-2.5	V
Drain-Source On-State Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-1.9A	-	140	190	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-1.5A	-	190	240	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-60V, V <sub>GS</sub> =0V	-	-	-1	uA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
<b>Dynamic</b> (Note 7)						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =-30V, I <sub>D</sub> =-1.9A, V <sub>GS</sub> =-10V (Note 1,2)	-	8.3	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	1.8	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	1.6	-	
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V, f=1.0MHZ	-	430	-	pF
Output Capacitance	C <sub>oss</sub>		-	33	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	29	-	
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =-30V, I <sub>D</sub> =-1.0A, V <sub>GS</sub> =-10V, R <sub>G</sub> =6Ω (Note 1,2)	-	5.1	-	ns
Turn-On Rise Time	t <sub>r</sub>		-	20	-	
Turn-Off Delay Time	t <sub>d(off)</sub>		-	36	-	
Turn-Off Fall Time	t <sub>f</sub>		-	11	-	
<b>Drain-Source Diode</b>						
Maximum Continuous Drain-Source Diode Forward Current	I <sub>S</sub>	---	-	-	-1.5	A
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =-1.0A, V <sub>GS</sub> =0V	-	-0.78	-1.0	V

**NOTES :**

1. Pulse width ≤ 300us, Duty cycle ≤ 2%
2. Essentially independent of operating temperature typical characteristics.
3. The maximum current rating is package limited.
4. Repetitive rating, pulse width limited by junction temperature T<sub>J</sub>(MAX)=150°C. Ratings are based on low frequency and duty cycles to keep initial T<sub>J</sub> = 25°C.
5. The test condition is L=1mH, I<sub>AS</sub>=8A, V<sub>DD</sub>=25V, V<sub>GS</sub>=10V
6. 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<sup>2</sup> with 2oz.square pad of copper.
7. Guaranteed by design, not subject to production testing.



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## TYPICAL CHARACTERISTIC CURVES

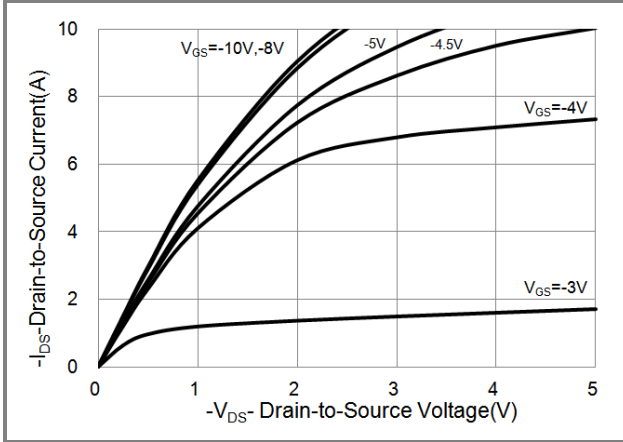


Fig.1 On-Region Characteristics

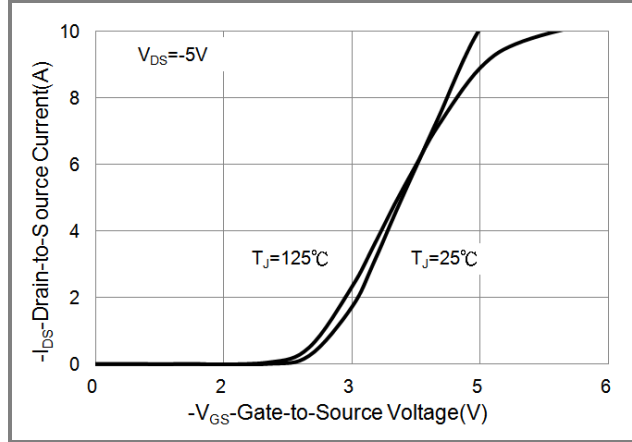


Fig.2 Transfer Characteristics

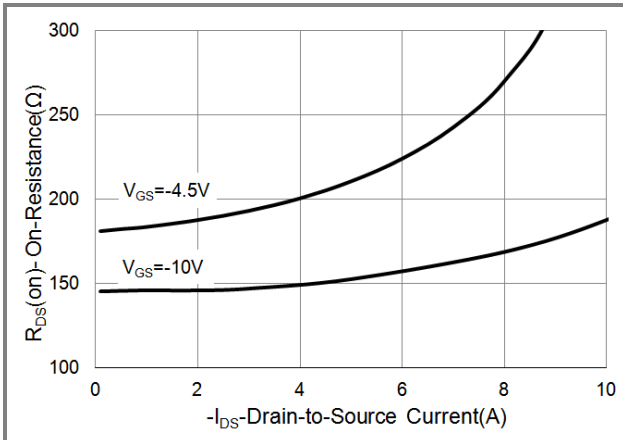


Fig.3 On-Resistance vs. Drain Current

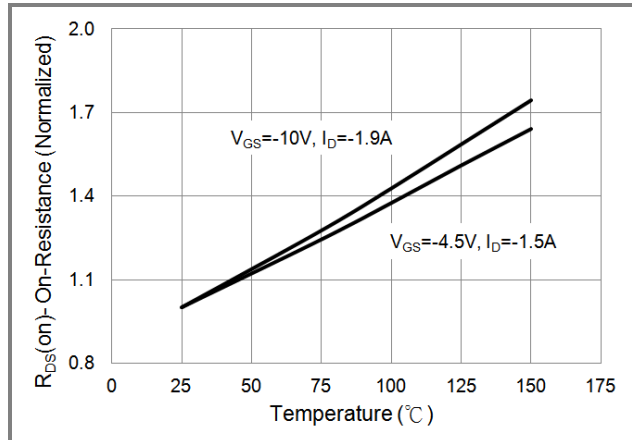


Fig.4 On-Resistance vs. Junction temperature

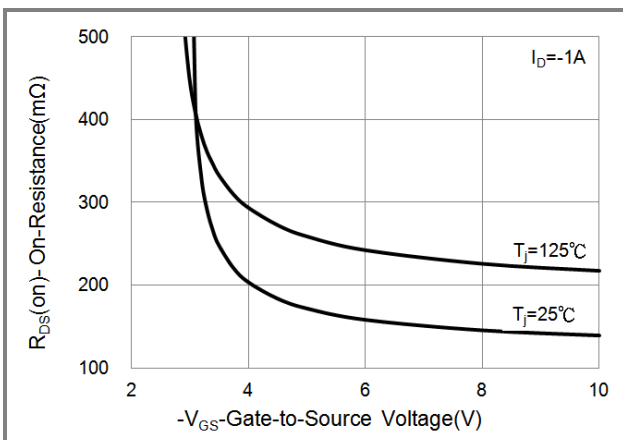


Fig.5 On-Resistance Variation with VGS.

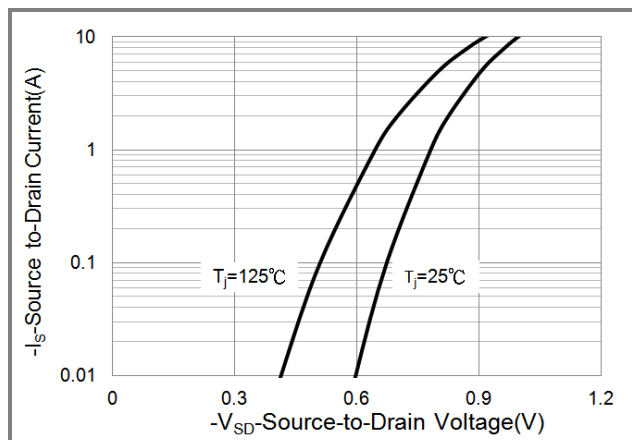


Fig.6 Body Diode Characteristics



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## TYPICAL CHARACTERISTIC CURVES

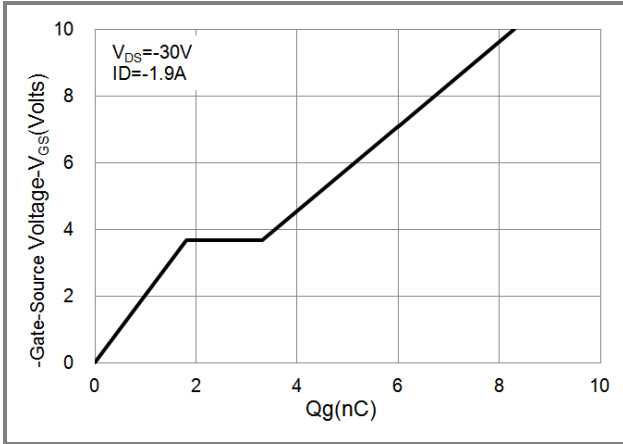


Fig.7 Gate-Charge Characteristics

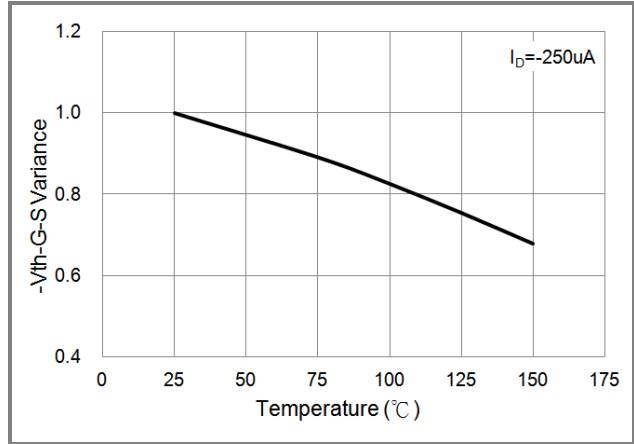


Fig.8 Threshold Voltage Variation with Temperature.

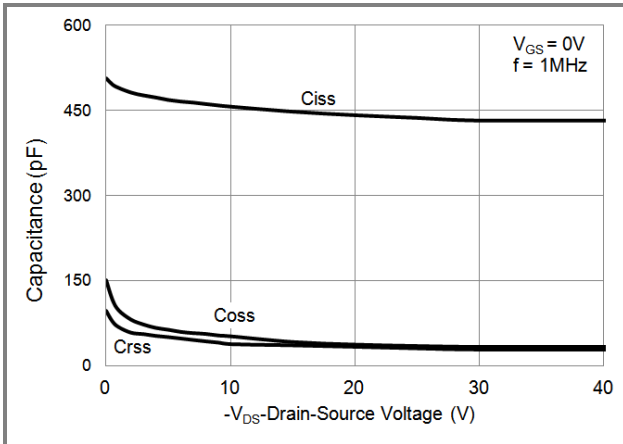


Fig.9 Capacitance vs. Drain-Source Voltage.

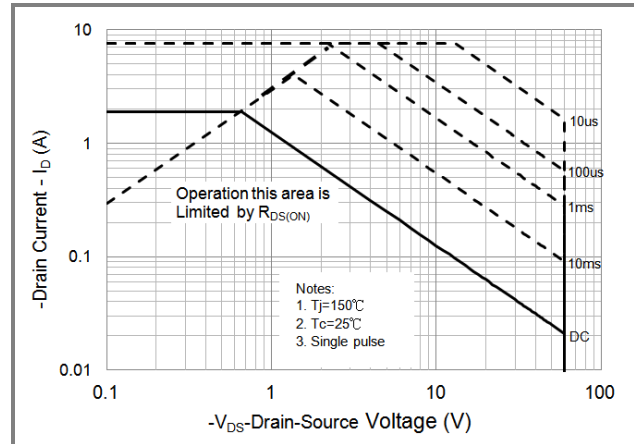


Fig.10 Maximum Safe Operating Area.

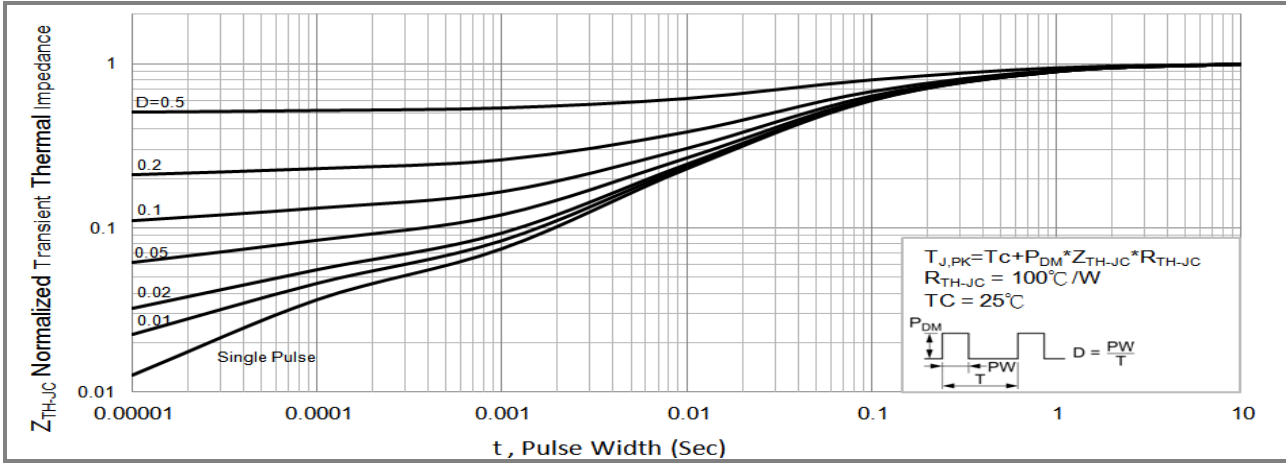


Fig.11 Normalized Transient Thermal Impedance vs. Pulse Width

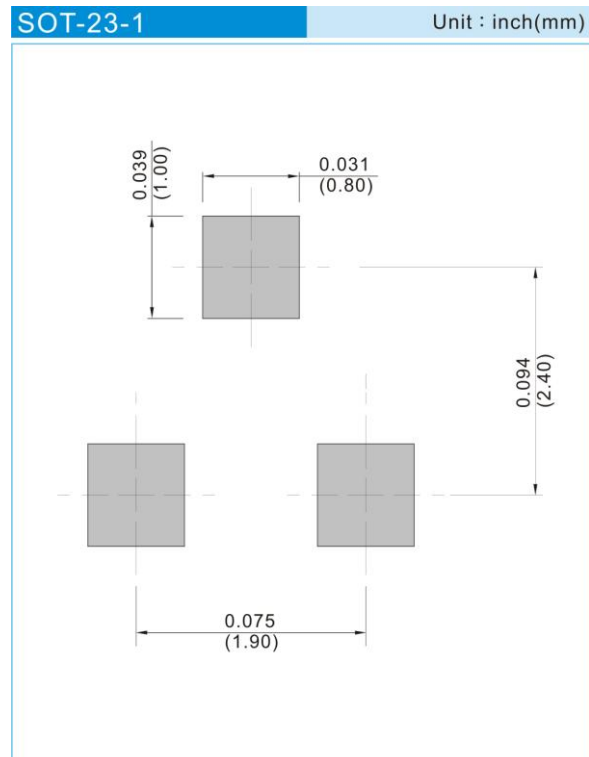


# PJA3461

## PART NO PACKING CODE VERSION

Part No Packing Code	Package Type	Packing type	Marking	Version
PJA3461_R1_00001	SOT-23	3K pcs / 7" reel	A61	Halogen free
PJA3461_R2_00001	SOT-23	12K pcs / 13" reel	A61	Halogen free

## MOUNTING PAD LAYOUT





## PJA3461

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