

# PJA3416AE

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

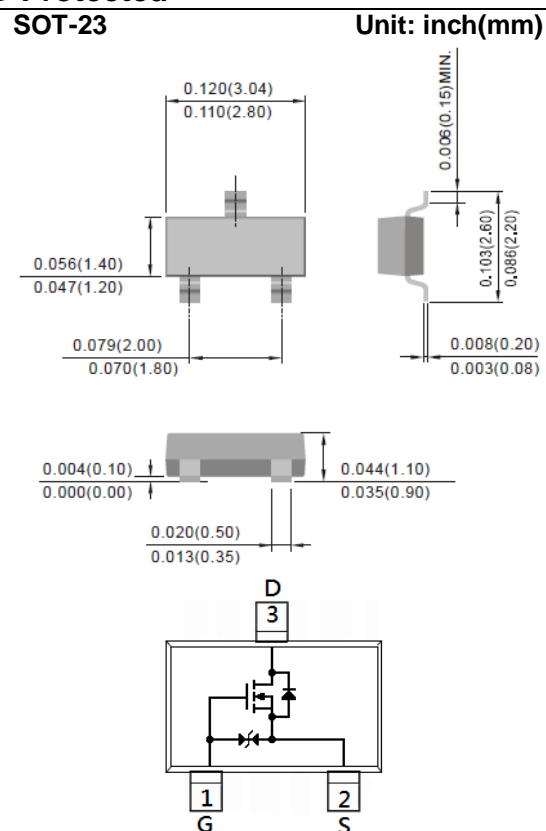
<b>Voltage</b>	<b>20 V</b>	<b>Current</b>	<b>6.5A</b>
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### Features

- $R_{DS(ON)}$  ,  $V_{GS}@4.5V$ ,  $I_D@6.5A<22m\Omega$
- $R_{DS(ON)}$  ,  $V_{GS}@2.5V$ ,  $I_D@5.5A<26m\Omega$
- $R_{DS(ON)}$  ,  $V_{GS}@1.8V$ ,  $I_D@5.0A<34m\Omega$
- Advanced Trench Process Technology
- Specially Designed for Switch Load, PWM Application, etc.
- ESD Protected 2KV HBM
- 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: A6E



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

PARAMETER		SYMBOL	LIMIT	UNITS
Drain-Source Voltage		V <sub>DS</sub>	20	V
Gate-Source Voltage		V <sub>GS</sub>	±8	V
Continuous Drain Current		I <sub>D</sub>	6.5	A
Pulsed Drain Current <sup>(Note 4)</sup>		I <sub>DM</sub>	32	A
Power Dissipation	T <sub>a</sub> =25°C	P <sub>D</sub>	1.25	W
	Derate above 25°C		10	mW/°C
Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55~150	°C
Typical Thermal resistance		R <sub>θJA</sub>	100	°C/W
- Junction to Ambient <sup>(Note 3)</sup>				



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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 <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	0.4	0.58	1.0	V
Drain-Source On-State Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =6.5A	-	18.4	22	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =5.5A	-	21.5	26	
		V <sub>GS</sub> =1.8V, I <sub>D</sub> =5.0A	-	26.4	34	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V	-	-	1	uA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±8V, V <sub>DS</sub> =0V	-	-	±10	uA
Dynamic						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =6.5A, V <sub>GS</sub> =4.5V (Note 1,2)	-	8.6	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	1.06	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	1.04	-	
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1.0MHZ	-	836	-	pF
Output Capacitance	C <sub>oss</sub>		-	96	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	80	-	
Switching						
Turn-On Delay Time	td <sub>(on)</sub>	V <sub>DD</sub> =10V, I <sub>D</sub> =1A, V <sub>GS</sub> =4.5V, R <sub>G</sub> =3Ω (Note 1,2)	-	24	-	ns
Turn-On Rise Time	tr		-	46	-	
Turn-Off Delay Time	td <sub>(off)</sub>		-	0.22	-	us
Turn-Off Fall Time	tf		-	0.30	-	
Drain-Source Diode						
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	-	0.74	1.0	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 FR-4 with 2oz. square pad of copper.
4. The maximum current rating is package limited.

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## TYPICAL CHARACTERISTIC CURVES

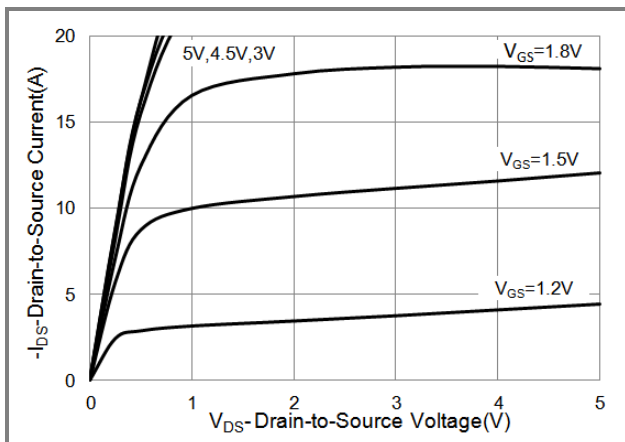


Fig.1 On-Region Characteristics

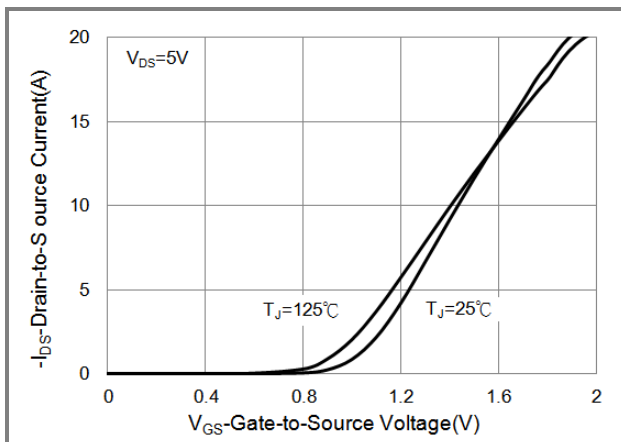


Fig.2 Transfer Characteristics

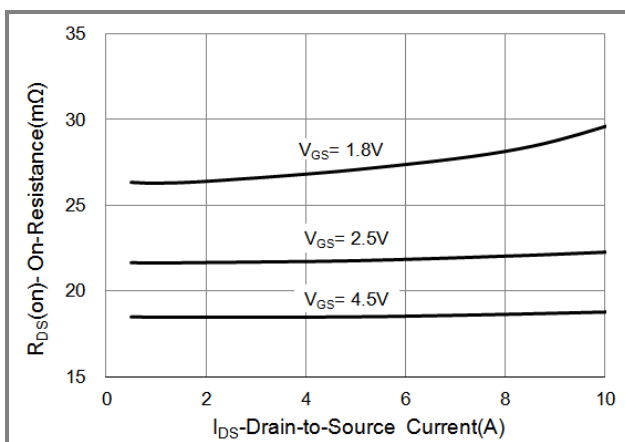


Fig.3 On-Resistance vs. Drain Current

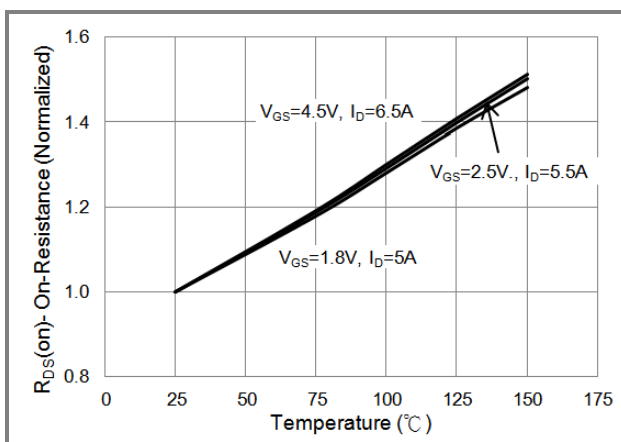


Fig.4 On-Resistance vs. Junction temperature

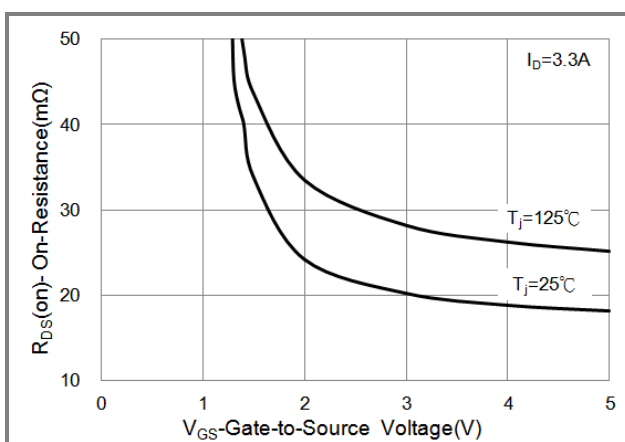


Fig.5 On-Resistance Variation with VGS.

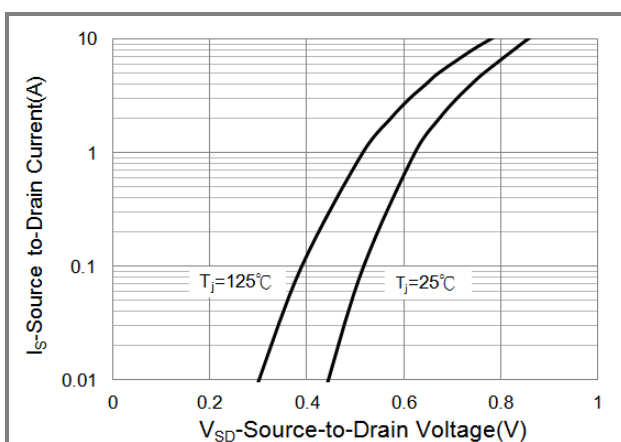


Fig.6 Body Diode Characteristics



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### TYPICAL CHARACTERISTIC CURVES

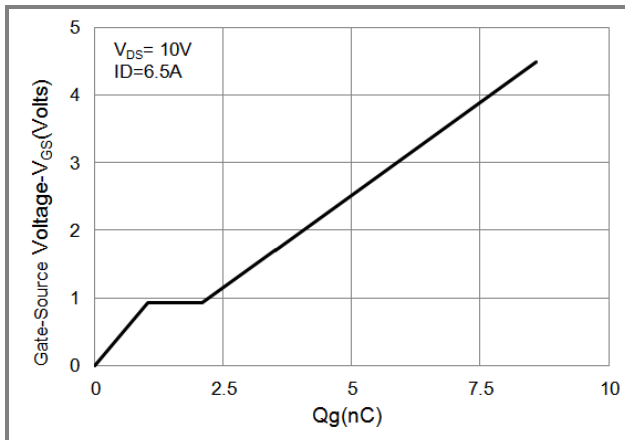


Fig.7 Gate-Charge Characteristics

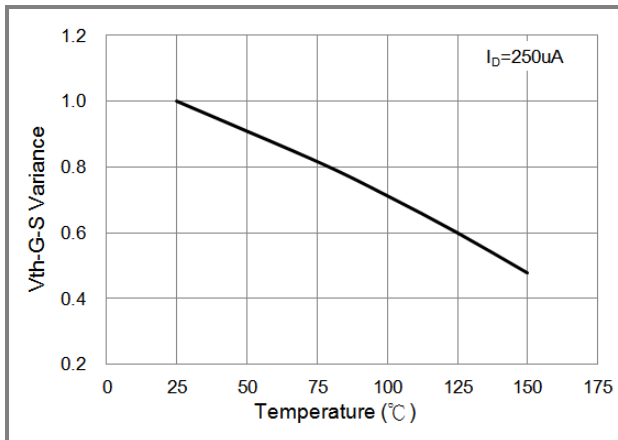


Fig.8 Threshold Voltage Variation with Temperature.

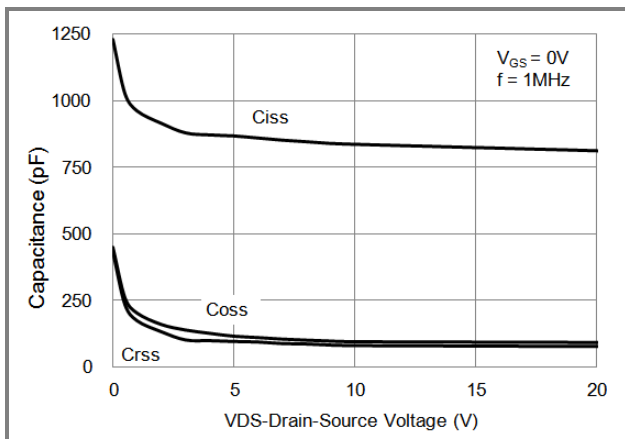


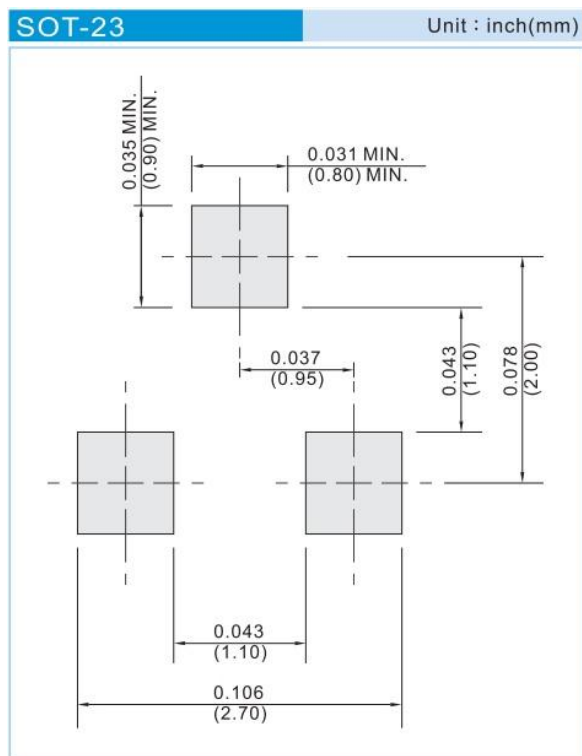
Fig.9 Capacitance vs. Drain-Source Voltage.

## PJA3416AE

### PART NO PACKING CODE VERSION

PART NO PACKING CODE	Package Type	Packing type	Marking	Version
PJA3416AE_R1_00001	SOT-23	3K pcs / 7" reel	A6E	Halogen free
PJA3416AE_R2_00001	SOT-23	12K pcs / 13" reel	A6E	Halogen free

### MOUNTING PAD LAYOUT





## PJA3416AE

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