

### ➤ General Description

This PAP2023ES Dual P-Channel enhancement mode power field effect transistor is the high density trench technology and this advanced technology can provide excellent  $R_{ds(On)}$  performance and efficiency for power switching and load switching application., this device also comply with the RoHS and Green Product requirement with full function reliability approved.

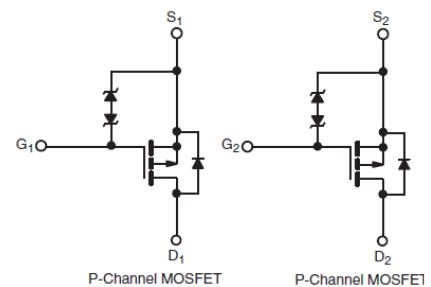
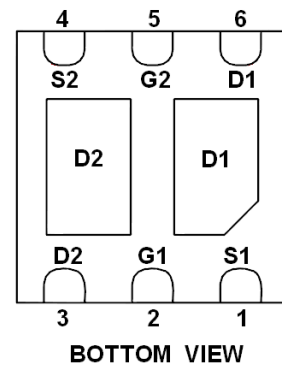
### ➤ Feature

- Super high density cell design for extremely low  $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability
- ESD Protected
- DFN2X2-6L package design

### ➤ Application

- Charger Switches and Load Switches for Portable Devices
- DC/DC Converters

### ➤ DFN2X2-6L



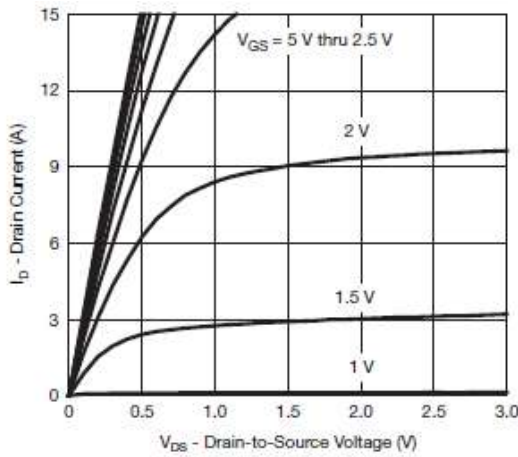
### ➤ Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DSS}$	-20	V
Gate -Source Voltage	$V_{GSS}$	$\pm 12$	V
Continuous Drain Current( $T_J=150^\circ C$ )	$I_D$	$T_C=25^\circ C$	-4.5
		$T_C=70^\circ C$	-4.5
Pulsed Drain Current	$I_{DM}$	-20	A
Continuous Source Current(Diode Conduction)	$I_S$	-1.6	A
Power Dissipation	$P_D$	$T_C=25^\circ C$	7.8
		$T_C=70^\circ C$	5.0
Operating Junction Temperature	$T_J$	150	$^\circ C$
Storage Temperature Range	$T_{STG}$	-55/150	$^\circ C$
Thermal Resistance-Junction to Ambient	$R_{\theta JA}$	52	$^\circ C/W$
Thermal Resistance-Junction to Case(Drian)	$R_{\theta JC}$	12.5	

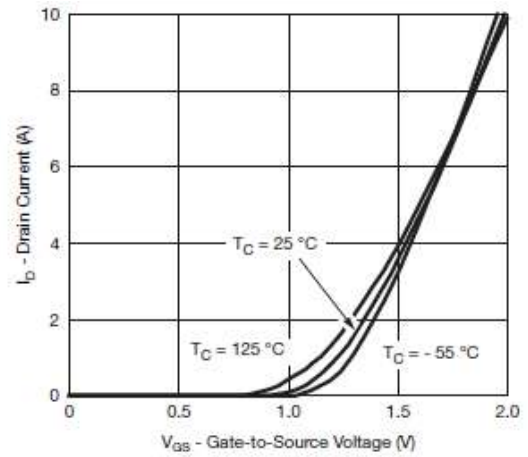
#### ➤ Electrical Characteristics ( $T_A=25^\circ C$ Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-20			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.4		-1.0	
Gate Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 8V$			$\pm 10$	$\mu A$
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-16V, V_{GS}=0V$			-1	$\mu A$
		$V_{DS}=-16V, V_{GS}=0V$ $T_J=85^\circ C$			-10	
On-State Drain Current	$I_{D(on)}$	$V_{DS} \geq -5V, V_{GS}=-4.5V$	-10			A
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-4.5A$		37	42	$m\Omega$
		$V_{GS}=-2.5V, I_D=-3.4A$		46	52	
		$V_{GS}=-1.8V, I_D=-2.4A$		59	68	
Forward Transconductance	$g_{FS}$	$V_{DS}=-6V, I_D=-4.6A$		12		S
Diode Forward Voltage	$V_{SD}$	$I_S=-1.25A, V_{GS}=0V$		-0.85	-1.2	V
<b>Dynamic</b>						
Total Gate Charge	$Q_g$	$V_{DS}=-6V, V_{GS}=-4.5V$ $I_D=-5.6A$		10	18	nC
Gate-Source Charge	$Q_{gs}$			2.5		
Gate-Drain Charge	$Q_{gd}$			2.8		
Input Capacitance	$C_{iss}$	$V_{DS}=-6V, V_{GS}=0V$ $f=1MHz$		1450		pF
Output Capacitance	$C_{oss}$			265		
Reverse Transfer Capacitance	$C_{rss}$			255		
Turn-On Time	$t_{d(on)}$	$V_{DD}=-10V, R_L=2.7\Omega$ $I_D=-3.7A, V_{GEN}=-4.5V$ $R_G=1\Omega$		15	25	ns
	$t_r$			25	40	
Turn-Off Time	$t_{d(off)}$			40	65	
	$t_f$			15	25	

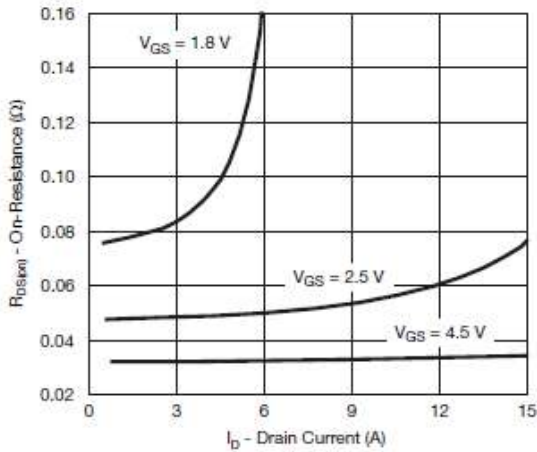
### ➤ Typical Characteristics



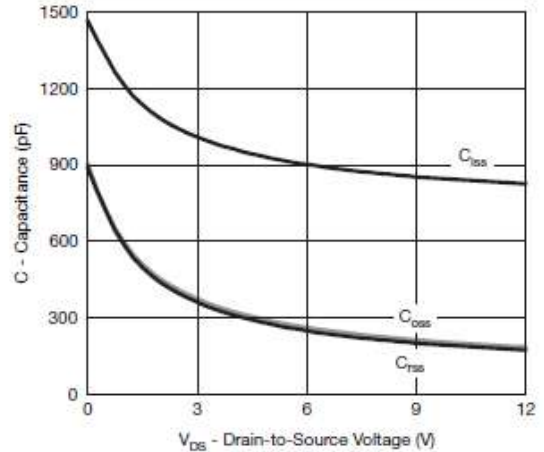
Output Characteristics



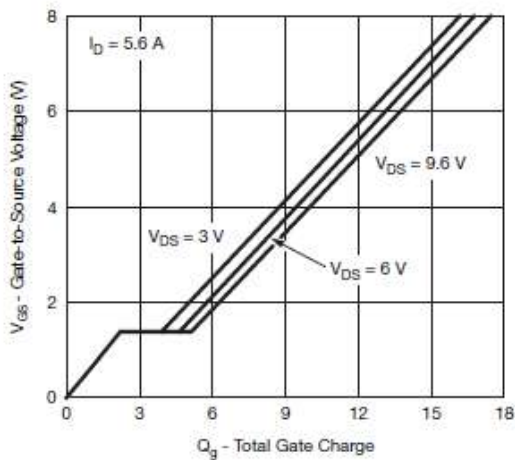
Transfer Characteristics



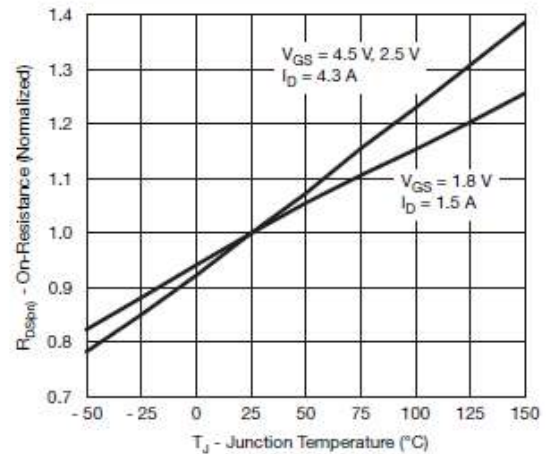
On-Resistance vs. Drain Current and Gate Voltage



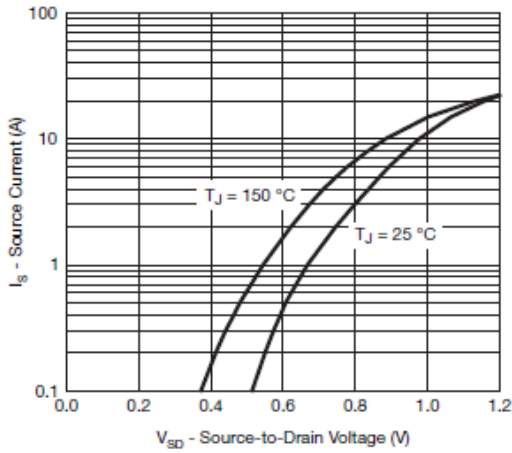
Capacitance



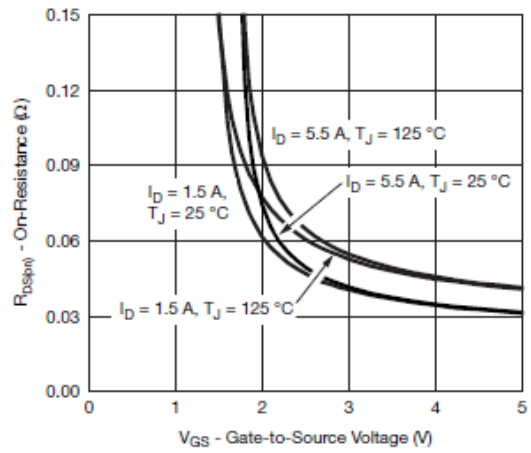
Gate Charge



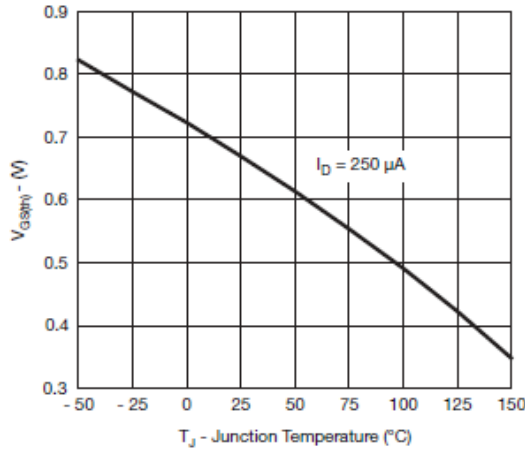
On-Resistance vs. Junction Temperature



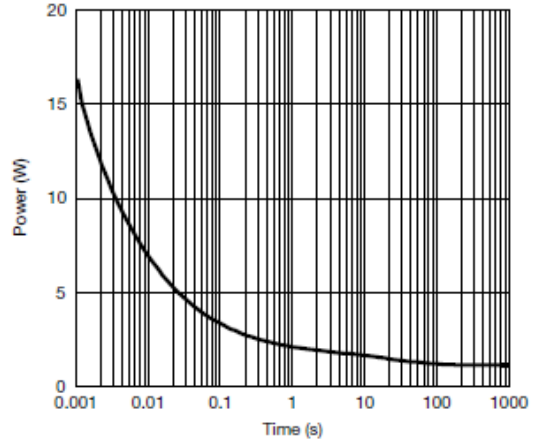
Source-Drain Diode Forward Voltage



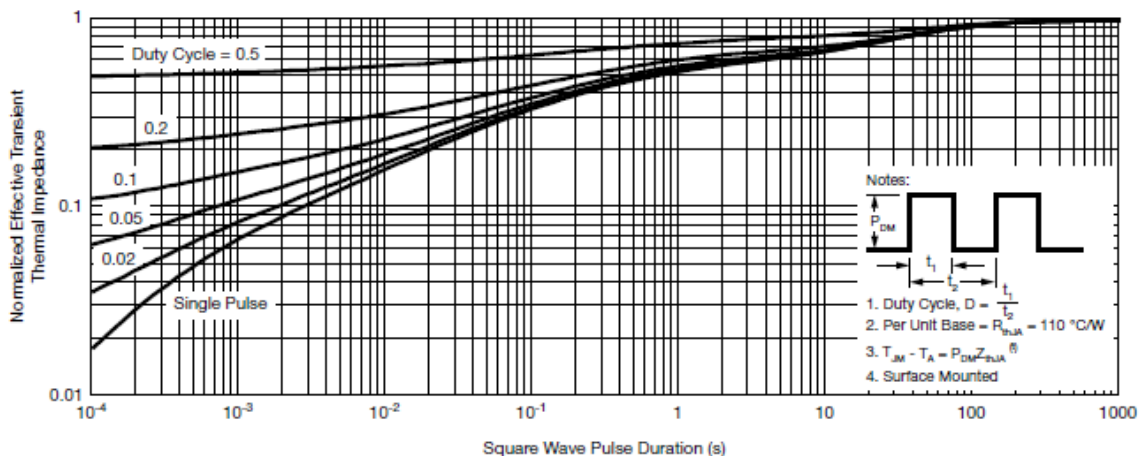
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Ambient

### ➤ Recommnd IR Reflow Soldering Thermal Profile

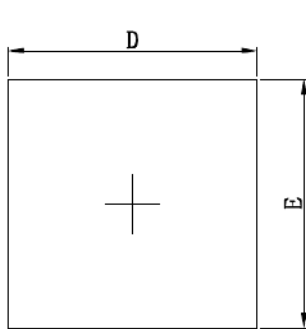


Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T <sub>smin</sub> )	150°C
Temperature Max. (T <sub>smax</sub> )	200°C
Time (t <sub>s</sub> ) from (T <sub>smin</sub> to T <sub>smax</sub> )	60-120 seconds
Average Ramp-up Rate (t <sub>L</sub> to t <sub>P</sub> )	3°C/second max.
Liquidous Temperature (T <sub>L</sub> )	217°C
Time (t <sub>L</sub> ) Maintained Above (T <sub>L</sub> )	60 – 150 seconds
Peak Temperature	260°C +0°C / -5°C
Time (t <sub>P</sub> ) within 5°C of actual Peak Temperature	30 seconds
Ramp-down Rate (T <sub>P</sub> to T <sub>L</sub> )	6°C/second max
Time 25°C to Peak Temperature	8 minutes max.

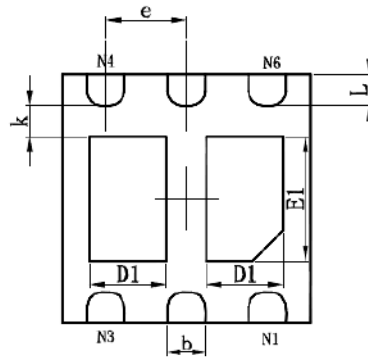
### ➤ Ordering Information

Part Number	Description	Quantity
PAP2023ES	DFN2X2-6L Reel	4000 pcs

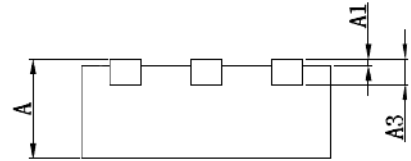
### ➤ Package Information (DFN2X2-6L)



**Top View**



**Bottom View**



**Side View**

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700/0.800	0.800/0.900	0.028/0.031	0.031/0.035
A1	0.000	0.050	0.000	0.002
A3	0.203REF.		0.008REF.	
D	1.924	2.076	0.076	0.082
E	1.924	2.076	0.076	0.082
D1	0.520	0.720	0.020	0.028
E1	0.900	1.100	0.035	0.043
k	0.200MIN.		0.008MIN.	
b	0.250	0.350	0.010	0.014
e	0.650TYP.		0.026TYP.	
L	0.174	0.326	0.007	0.013

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