

➤ General Description

This PAN2048ES N-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.

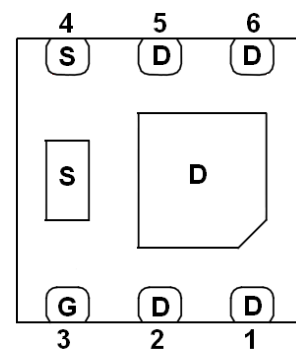
➤ Feature

- Super high density cell design for extremely low $R_{DS(ON)}$
- ESD Protection (>2KV) Diode design – in
- DFN2X2-6L package design

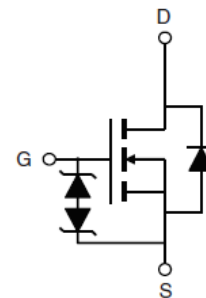
➤ Application

- For Smart Phones and Mobile Computing
 - Load Switches
 - DC/DC Converters

➤ DFN2X2-6L



BOTTOM VIEW



N-Channel MOSFET

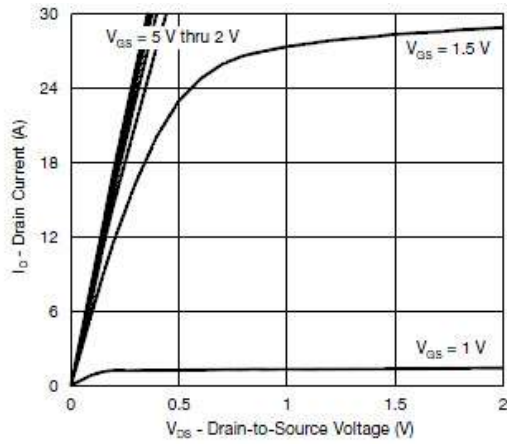
➤ Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DSS}	20	V
Gate –Source Voltage	V_{GSS}	± 12	V
Continuous Drain Current($T_J=150^{\circ}C$)	I_D	$T_A=25^{\circ}C$	12
		$T_A=70^{\circ}C$	10
Pulsed Drain Current	I_{DM}	30	A
Continuous Source Current(Diode Conduction)	I_S	2.9	A
Power Dissipation	P_D	$T_A=25^{\circ}C$	3.5
		$T_A=70^{\circ}C$	2.2
Operating Junction Temperature	T_J	150	$^{\circ}C$
Storage Temperature Range	T_{STG}	-55/150	$^{\circ}C$
Thermal Resistance-Junction to Ambient	$R_{\theta JA}$	36	$^{\circ}C/W$

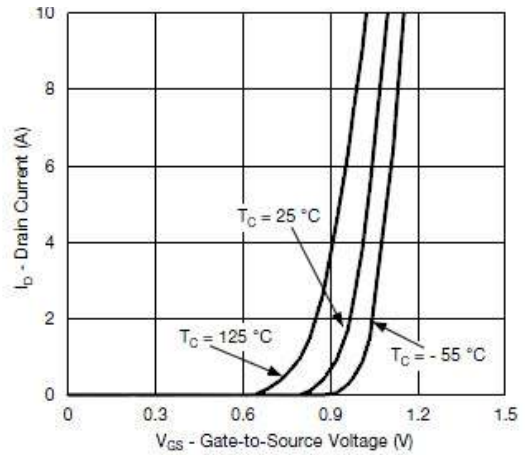
➤ Electrical Characteristics ($T_A=25^\circ C$ Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	20			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.5		1.3	
Gate Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 12V$			± 10	μA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=16V, V_{GS}=0V$			10	μA
		$V_{DS}=16V, V_{GS}=0V$ $T_J=85^\circ C$			30	
On-State Drain Current	$I_{D(on)}$	$V_{DS} \geq 5V, V_{GS}=4.5V$	12			A
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=3.0A$		9.2	11	m Ω
		$V_{GS}=2.5V, I_D=3.0A$		10.7	13	
		$V_{GS}=1.8V, I_D=3.0A$		16.8	20	
Forward Transconductance	g_{FS}	$V_{DS}=10V, I_D=12.4A$		70		S
Diode Forward Voltage	V_{SD}	$I_S=10A, V_{GS}=0V$		0.85	1.2	V
Dynamic						
Total Gate Charge	Q_g	$V_{DS}=10V, V_{GS}=4.5V$ $I_D=12.4A$		13	20	nC
Gate-Source Charge	Q_{gs}			2.5		
Gate-Drain Charge	Q_{gd}			1.5		
Input Capacitance	C_{iss}	$V_{DS}=10V, V_{GS}=0V$ $f=1MHz$		1340		pF
Output Capacitance	C_{oss}			200		
Reverse Transfer Capacitance	C_{rss}			85		
Turn-On Time	$t_{d(on)}$	$V_{DD}=10V, R_L=1.0\Omega$ $I_D=10A, V_{GEN}=4.5V$		8	15	ns
	t_r			15	25	
Turn-Off Time	$t_{d(off)}$	$R_G=1\Omega$		30	60	
	t_f			8	15	

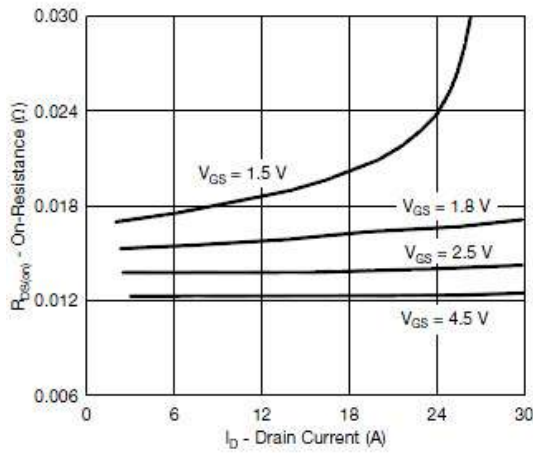
➤ Typical Characteristics



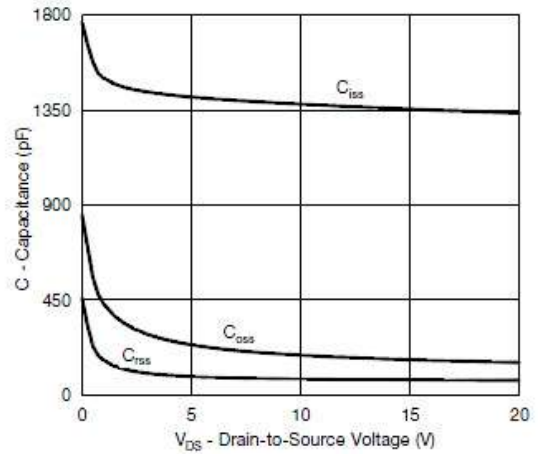
Output Characteristics



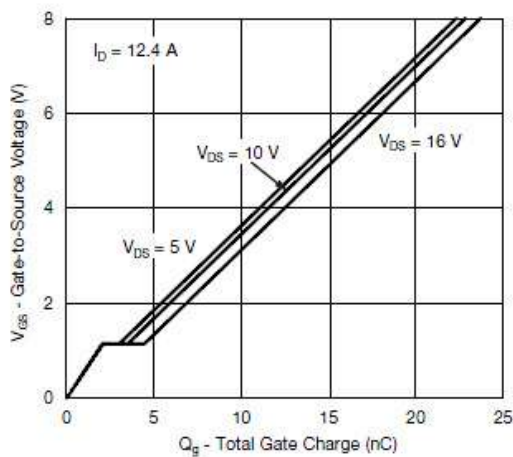
Transfer Characteristics



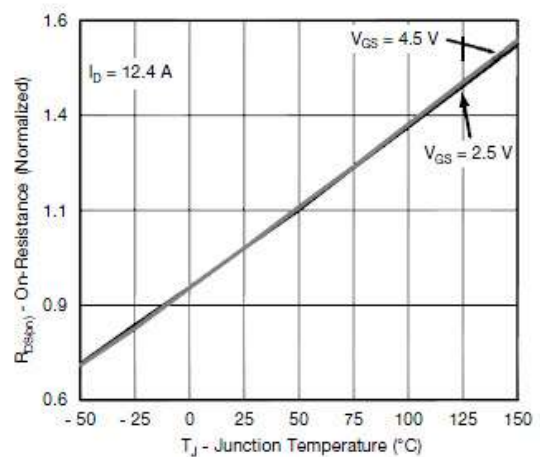
On-Resistance vs. Drain Current and Gate Voltage



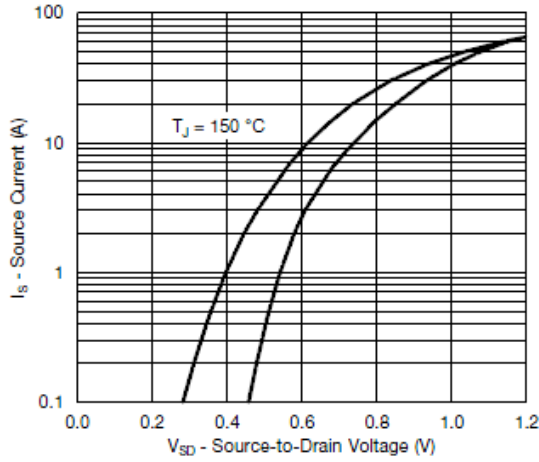
Capacitance



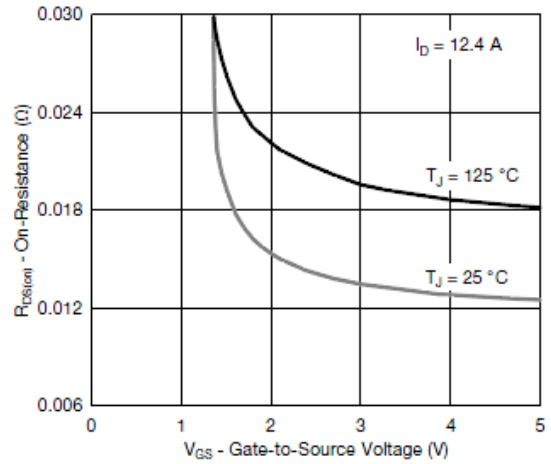
Gate Charge



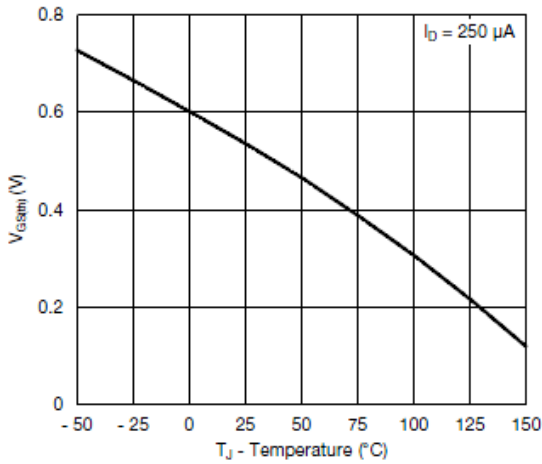
On-Resistance vs. Junction Temperature



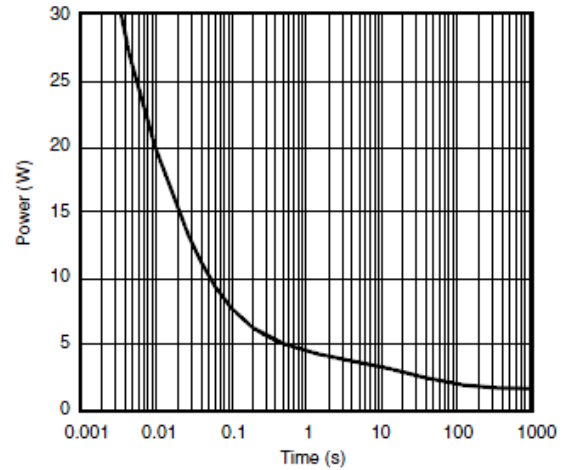
Source-Drain Diode Forward Voltage



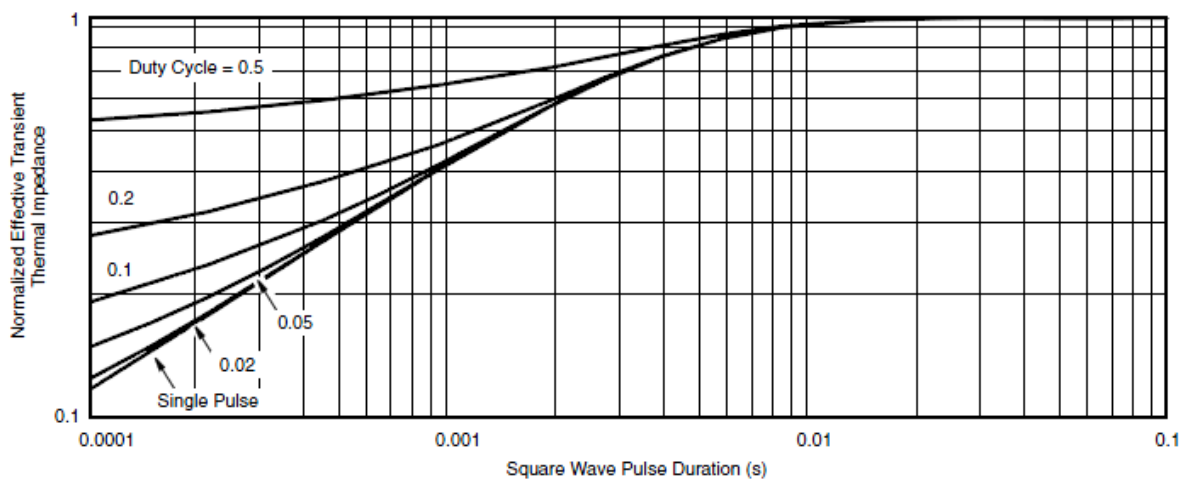
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

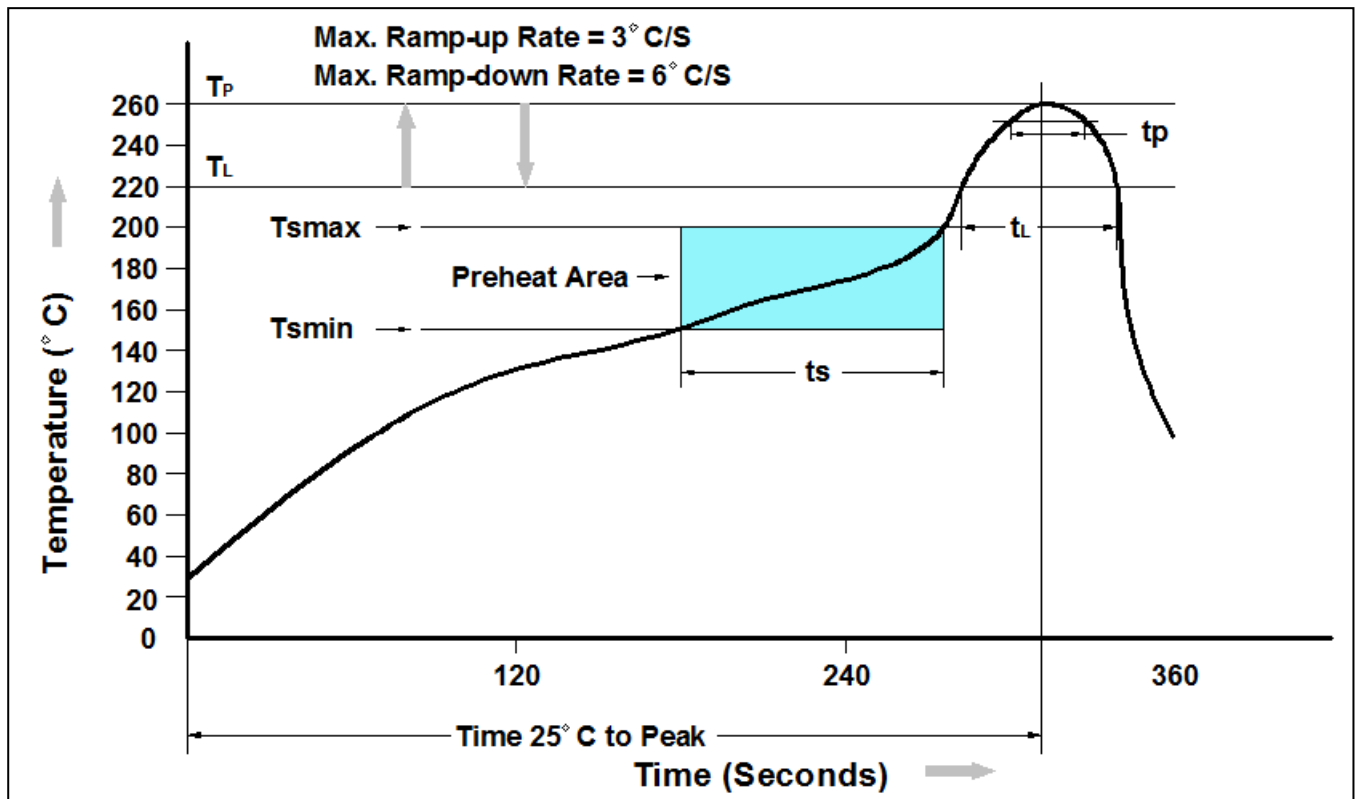


Single Pulse Power, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

➤ Recommand IR Reflow Soldering Thermal Profile

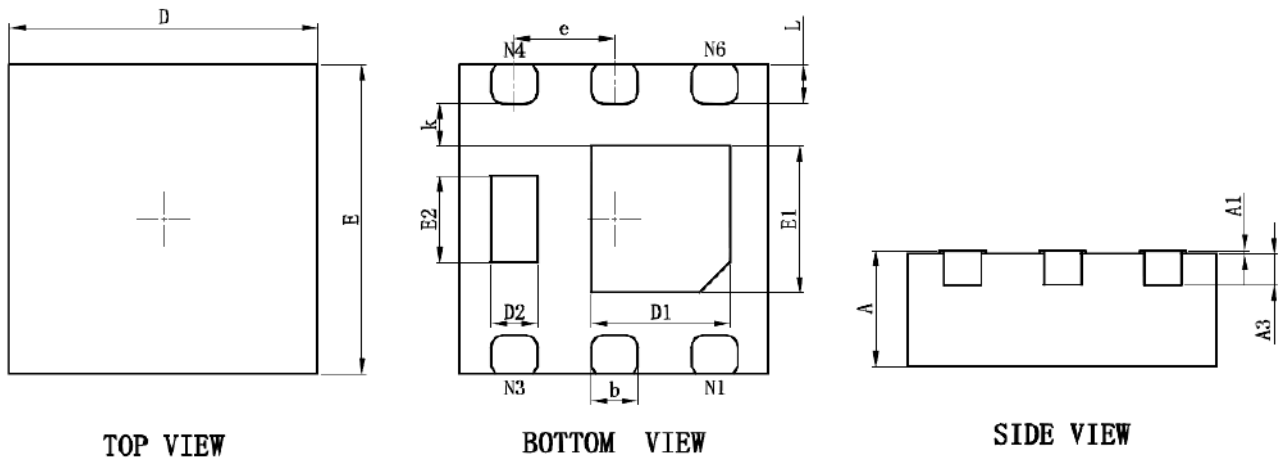


Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T _{smin})	150°C
Temperature Max. (T _{smax})	200°C
Time (t _s) from (T _{smin} to T _{smax})	60-120 seconds
Average Ramp-up Rate (t _L to t _P)	3°C/second max.
Liquidous Temperature (T _L)	217°C
Time (t _L) Maintained Above (T _L)	60 – 150 seconds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

➤ Ordering Information

Part Number	Description	Quantity
PAN2048ES	DFN2X2-6L Reel	4000 pcs

➤ Package Information (DFN2X2-6L)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700	0.800	0.028	0.031
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	0.800	1.000	0.031	0.039
E1	0.850	1.050	0.033	0.041
D2	0.200	0.400	0.008	0.016
E2	0.460	0.660	0.018	0.026
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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