

➤ General Description

This PAN2020ES Dual N-Channel enhancement mode power field effect transistor is the high density trench technology and this advanced technology can provide excellent Rds(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.

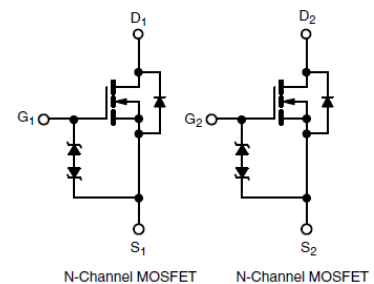
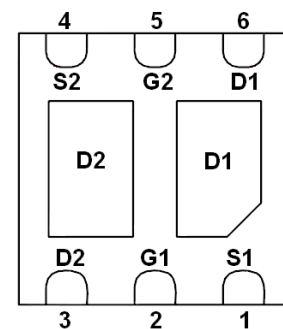
➤ Feature

- Super high density cell design for extremely low RDS (ON)
- Exceptional on-resistance and maximum DC current capability
- ESD Protection
- DFN2X2-6L package design

➤ Application

- Load Switch with Low Voltage Drop
- Load Switch for 1.2 V/1.5 V/1.8 V Power Lines
- Smart Phones, Tablet PCs, Portable Media Players

➤ DFN2X2-6L



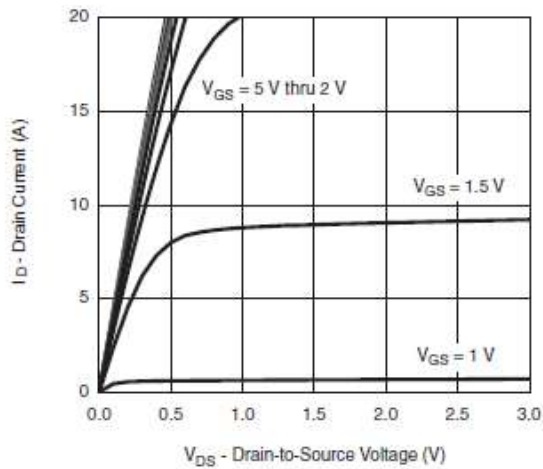
➤ Absolute Maximum Ratings

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	$T_C=25^\circ C$	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	

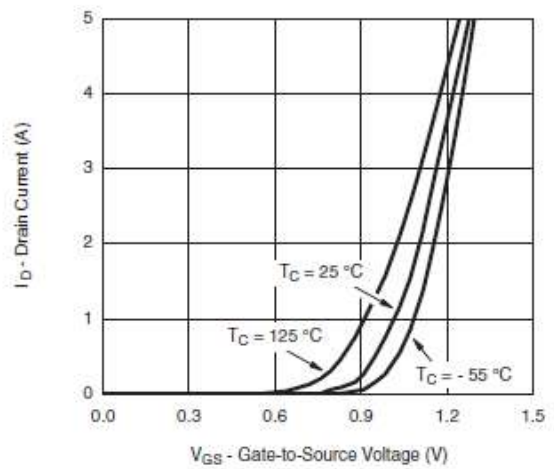
➤ **Electrical Characteristics ($T_A=25^\circ C$ Unless otherwise noted)**

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	20			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.4		1.0	
Gate Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 12V$			± 10	μA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=16V, V_{GS}=0V$			1	μA
		$V_{DS}=16V, V_{GS}=0V$ $T_J=85^\circ C$			10	
On-State Drain Current	$I_{D(on)}$	$V_{DS} \geq 5V, V_{GS}=4.5V$	15			A
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=5.0A$		15	19	$m\Omega$
		$V_{GS}=2.5V, I_D=4.6A$		18	23	
		$V_{GS}=1.8V, I_D=4.2A$		27	34	
Forward Transconductance	g_{FS}	$V_{DS}=6V, I_D=5A$		28		S
Diode Forward Voltage	V_{SD}	$I_S=1.5A, V_{GS}=0V$		0.85	1.2	V
Dynamic						
Total Gate Charge	Q_g	$V_{DS}=6V, V_{GS}=4.5V$ $I_D=5.0A$		6.0	12	nC
Gate-Source Charge	Q_{gs}			0.8		
Gate-Drain Charge	Q_{gd}			0.8		
Input Capacitance	C_{iss}	$V_{DS}=6V, V_{GS}=0V$ $f=1MHz$		620		pF
Output Capacitance	C_{oss}			180		
Reverse Transfer Capacitance	C_{riss}			100		
Turn-On Time	$t_{d(on)}$	$V_{DD}=10V, R_L=5.5\Omega$ $I_D=3.6A, V_{GEN}=4.5V$ $R_G=6\Omega$		10	20	ns
	t_r			10	20	
Turn-Off Time	$t_{d(off)}$			25	40	
	t_f			10	20	

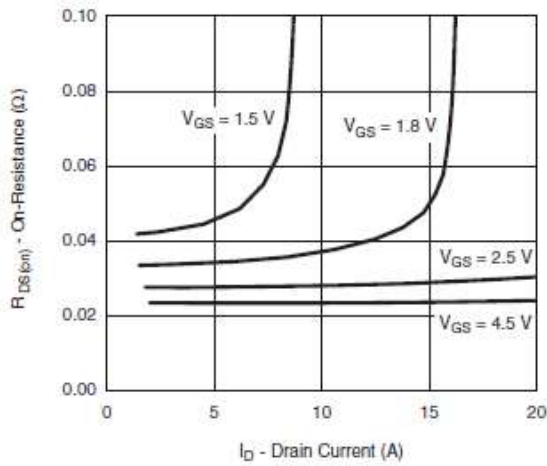
➤ Typical Characteristics



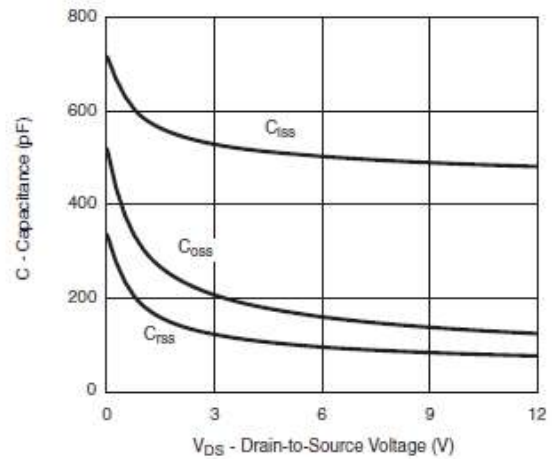
Output Characteristics



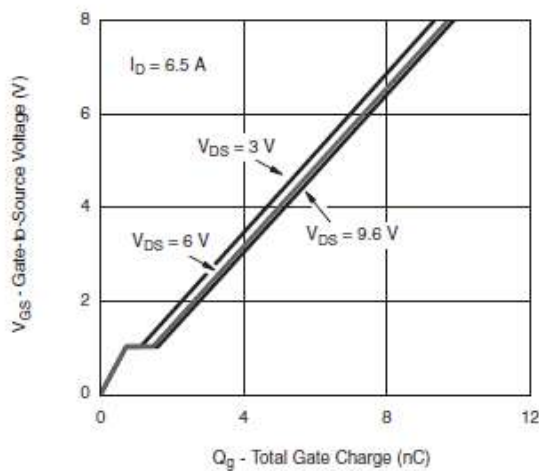
Transfer Characteristics



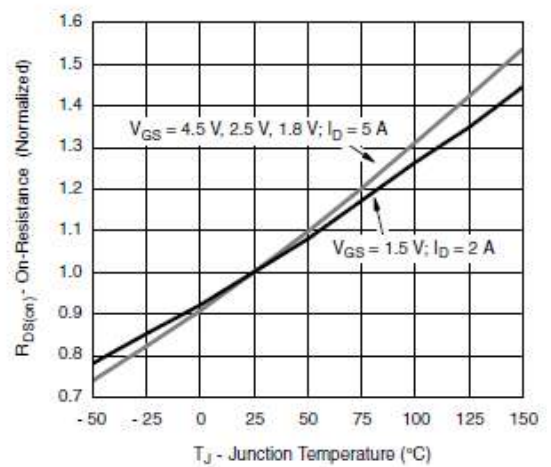
On-Resistance vs. Drain Current and Gate Voltage



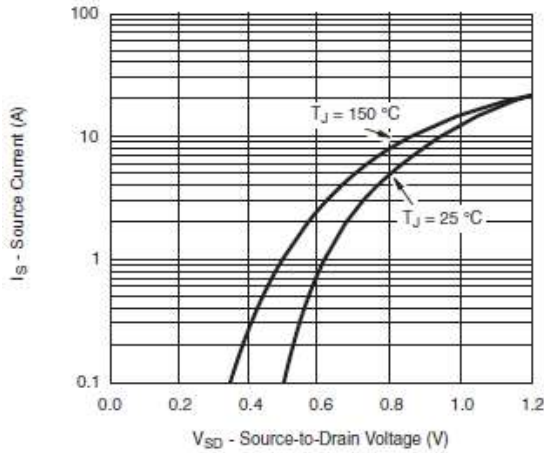
Capacitance



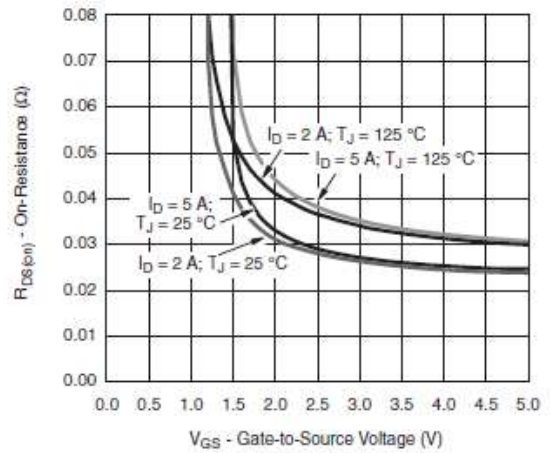
Gate Charge



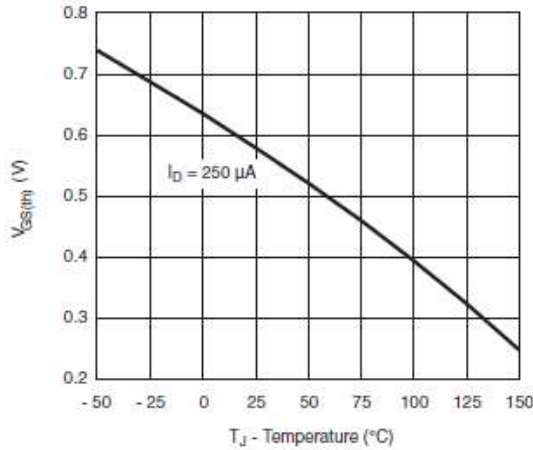
On-Resistance vs. Junction Temperature



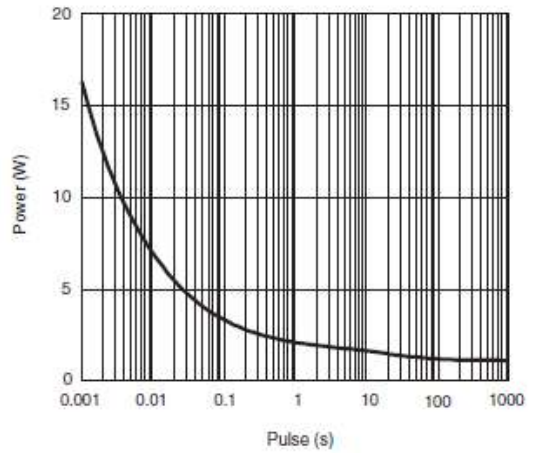
Source-Drain Diode Forward Voltage



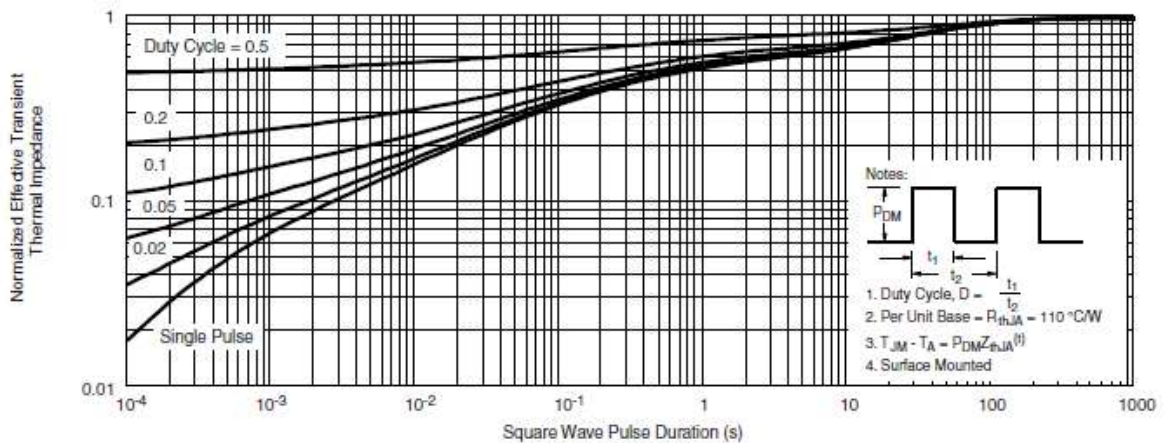
On-Resistance vs. Gate-to-Source Voltage



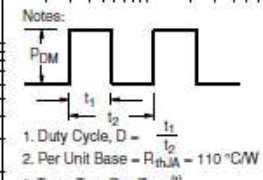
Threshold Voltage



Single Pulse Power (Junction-to-Ambient)



Normalized Thermal Transient Impedance, Junction-to-Ambient



➤ Recommand IR Reflow Soldering Thermal Profile

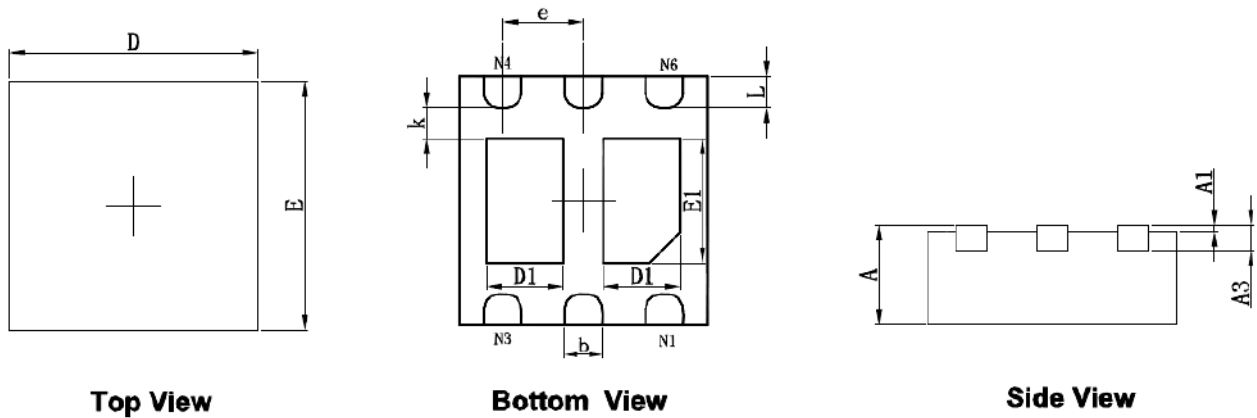


Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T _{smin})	150°C
Temperature Max. (T _{smax})	200°C
Time (t _s) from (T _{smin} to T _{smax})	60-120 seconds
Average Ramp-up Rate (t _L to t _P)	3°C/second max.
Liquidous Temperature (T _L)	217°C
Time (t _L) Maintained Above (T _L)	60 – 150 seconds
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
PAN2020ES	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	0.800/0.900	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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