

N-Ch and P-Ch Fast Switching MOSFET

$V_{DS}=20V, I_D=4.5A, R_{DS(ON)}=38m\Omega$

$V_{DS}=-20V, I_D=-4.5A, R_{DS(ON)}=80m\Omega$

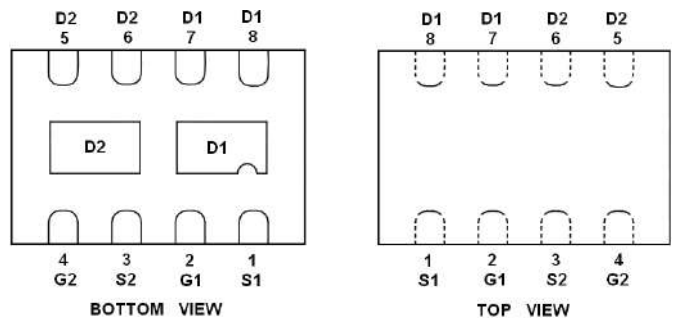
➤ General Description

This PAC2604D N&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

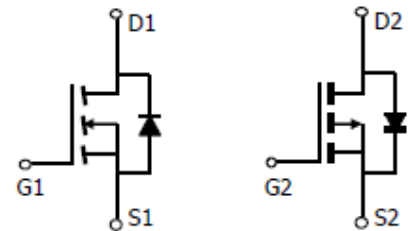
- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability
- DFN3X2-8L package design

➤ DFN3X2-8L



➤ Application

- Load Switch
- Portable Equipment
- Battery Powered System



n-channel

p-channel

➤ Absolute Maximum Ratings

Parameter	Symbol	Rating		Unit	
		N-Channel	P-Channel		
Drain-Source Voltage	V_{DSS}	20	-20	V	
Gate -Source Voltage	V_{GSS}	± 12	± 12	V	
Continuous Drain Current($T_J=150^\circ C$)	I_D	$T_A=25^\circ C$	4.5	-4.5	A
		$T_A=70^\circ C$	2.4	-2.4	
Pulsed Drain Current	I_{DM}	20	-15	A	
Continuous Source Current(Diode Conduction)	I_S	2.0	-2.0	A	
Power Dissipation	P_D	$T_A=25^\circ C$	6.5		W
		$T_A=70^\circ C$	4.2		
Operating Junction Temperature	T_J	150		$^\circ C$	
Storage Temperature Range	T_{STG}	-55/150		$^\circ C$	
Thermal Resistance-Junction to Ambient	$R_{\theta JA}$	120		$^\circ C/W$	

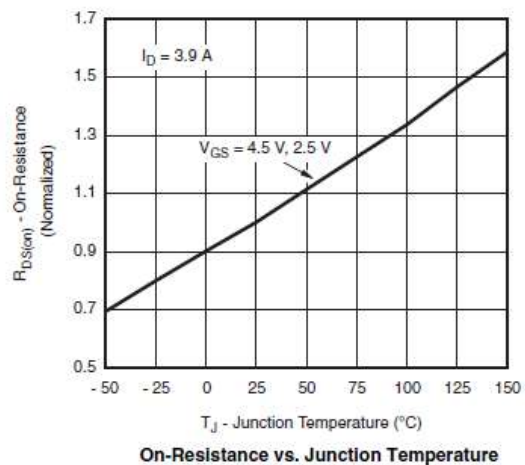
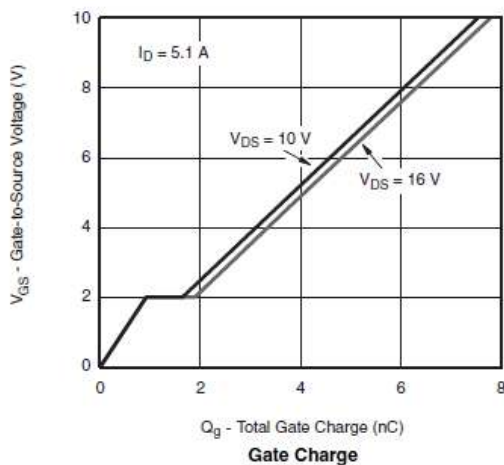
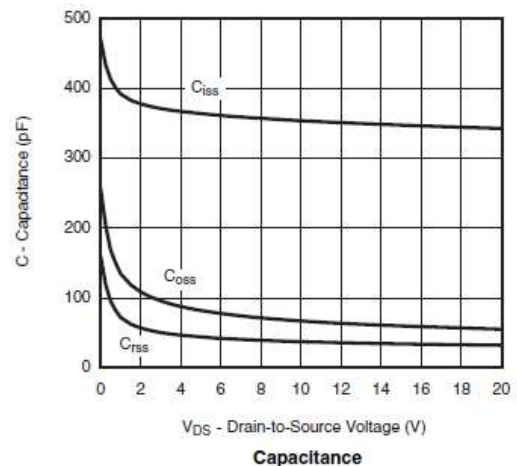
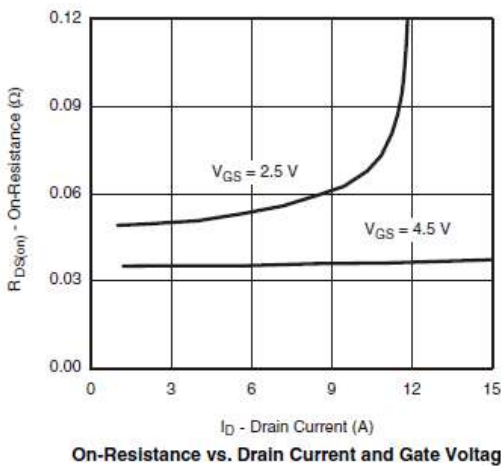
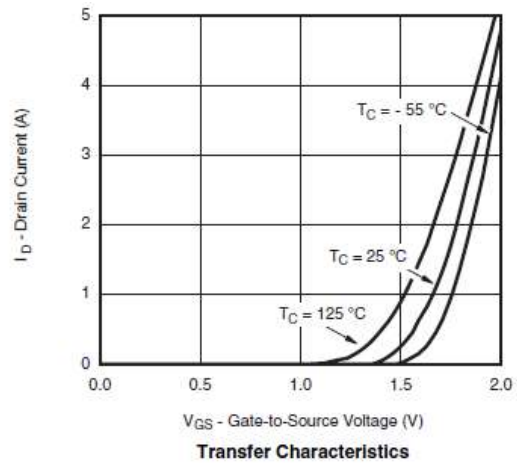
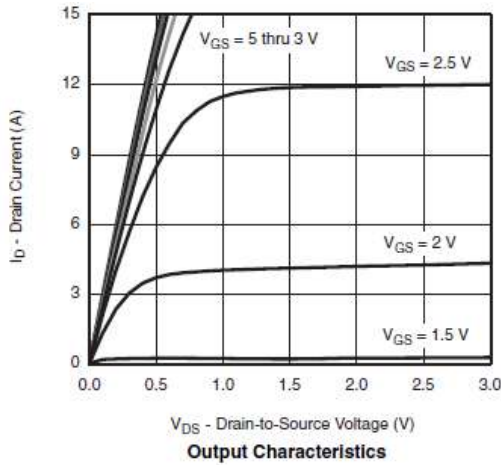
➤ N-Channel Electrical Characteristics (T_J=25°C Unless otherwise noted)

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	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.3		0.8	
Gate Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 12V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=16V, V_{GS}=0V$			1	uA
		$V_{DS}=16V, V_{GS}=0V$ $T_J=85^\circ C$			10	
On-State Drain Current	$I_{D(on)}$	$V_{DS} \geq 5V, V_{GS}=4.5V$	6			A
		$V_{DS} \geq 5V, V_{GS}=2.5V$	4			
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=4.5A$		28	38	mΩ
		$V_{GS}=2.5V, I_D=3.6A$		35	48	
		$V_{GS}=1.8V, I_D=2.4A$		50	68	
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=3.6A$		10		S
Diode Forward Voltage	V_{SD}	$I_S=1.6A, V_{GS}=0V$		0.85	1.2	V
Dynamic						
Total Gate Charge	Q_g	$V_{DS}=10V, V_{GS}=4.5V$ $I_D=3.6A$		4.2	5.0	nC
Gate-Source Charge	Q_{gs}			0.6		
Gate-Drain Charge	Q_{gd}			0.4		
Input Capacitance	C_{iss}	$V_{DS}=10V, V_{GS}=0V$ $f=1MHz$		340		pF
Output Capacitance	C_{oss}			115		
Reverse Transfer Capacitance	C_{rss}			33		
Turn-On Time	$t_{d(on)}$	$V_{DD}=10V, R_L=2.8\Omega$ $I_D=3.6A, V_{GEN}=4.5V$ $R_G=1\Omega$		8	15	ns
	t_r			8	15	
Turn-Off Time	$t_{d(off)}$			25	40	
	t_f			8	15	

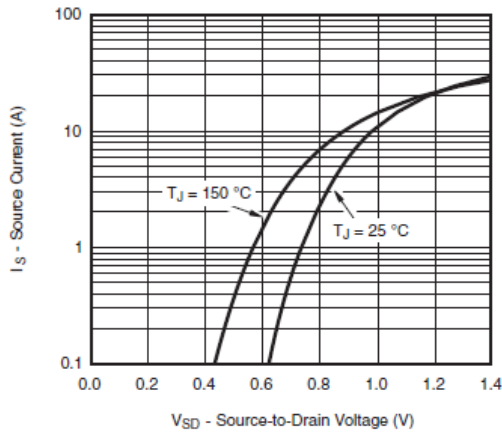
➤ P-Channel Electrical Characteristics (T_J=25° C Unless otherwise noted)

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	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.3		-0.8	
Gate Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 12V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-16V, V_{GS}=0V$			-1	uA
		$V_{DS}=-16V, V_{GS}=0V$ $T_J=85^\circ C$			-30	
On-State Drain Current	$I_{D(on)}$	$V_{DS} \leq -5V, V_{GS}=-4.5V$	-8			A
		$V_{DS} \leq -5V, V_{GS}=-2.5V$	-3			
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-4.5A$		60	80	mΩ
		$V_{GS}=-2.5V, I_D=-3.8A$		80	105	
		$V_{GS}=-1.8V, I_D=-2.5A$		115	145	
Forward Transconductance	g_{FS}	$V_{DS}=-5V, I_D=-2.8A$		6.5		S
Diode Forward Voltage	V_{SD}	$I_S=-1.25A, V_{GS}=0V$		-0.75	-1.3	V
Dynamic						
Total Gate Charge	Q_g	$V_{DS}=-10V, V_{GS}=-4.5V$ $I_D \equiv -3.5A$		5	10	nC
Gate-Source Charge	Q_{gs}			0.85		
Gate-Drain Charge	Q_{gd}			1.5		
Input Capacitance	C_{iss}	$V_{DS}=-10V, V_{GS}=0V$ $f=1MHz$		375		pF
Output Capacitance	C_{oss}			80		
Reverse Transfer Capacitance	C_{riss}			60		
Turn-On Time	$t_{d(on)}$	$V_{DD}=-10V, R_L=2.85\Omega$ $I_D \equiv -3.5A, V_{GEN}=-4.5V$ $R_G=1\Omega$		15	25	ns
	t_r			36	60	
Turn-Off Time	$t_{d(off)}$			25	50	
	t_f			15	25	

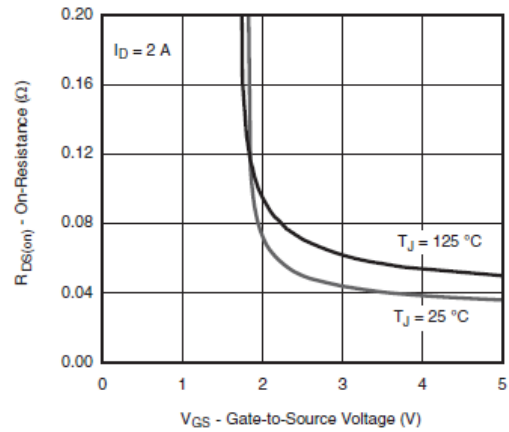
➤ Typical Characteristics (N-Channel)



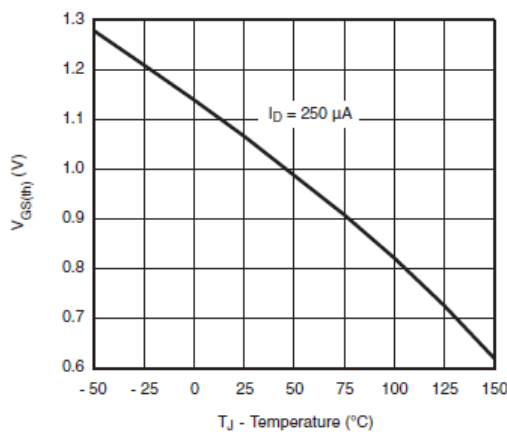
➤ Typical Characteristics (N-Channel)



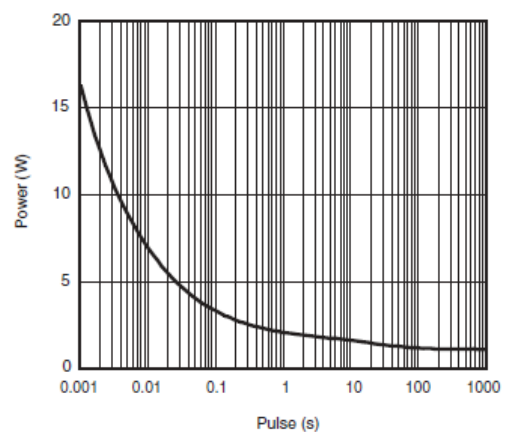
Source-Drain Diode Forward Voltage



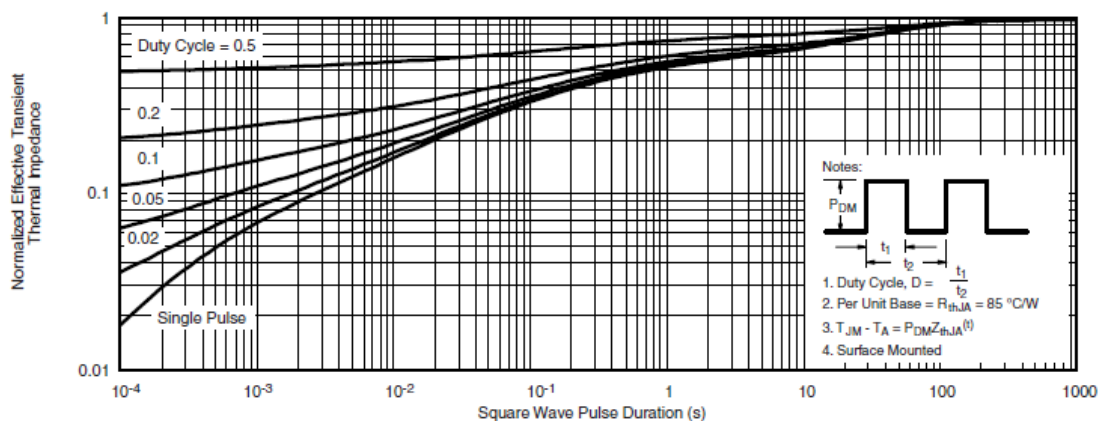
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



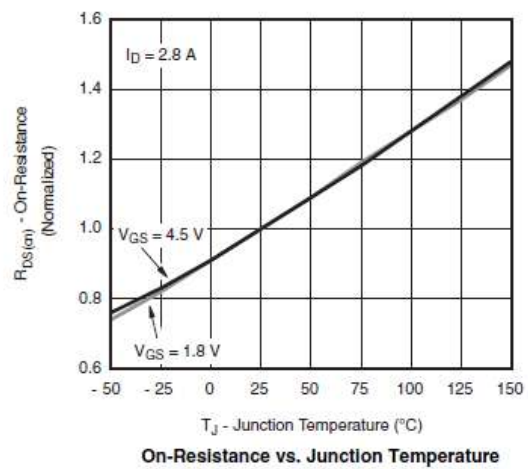
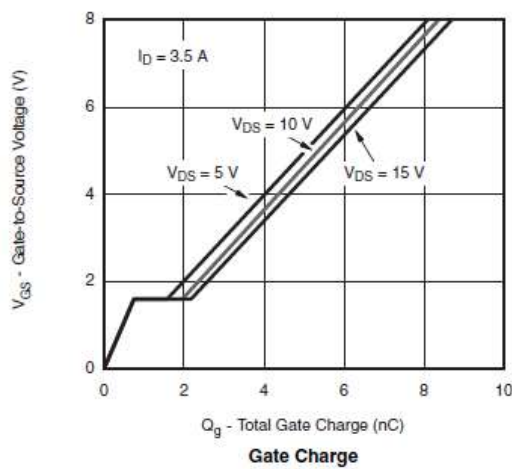
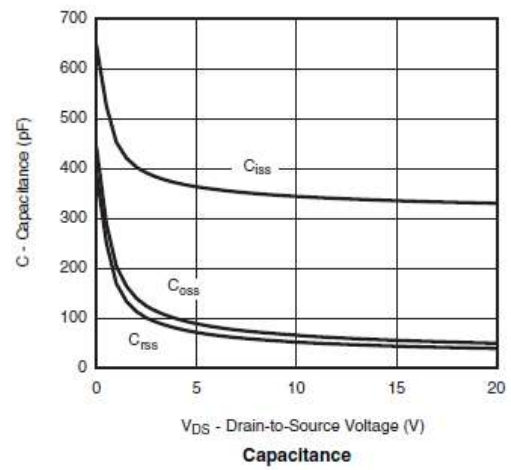
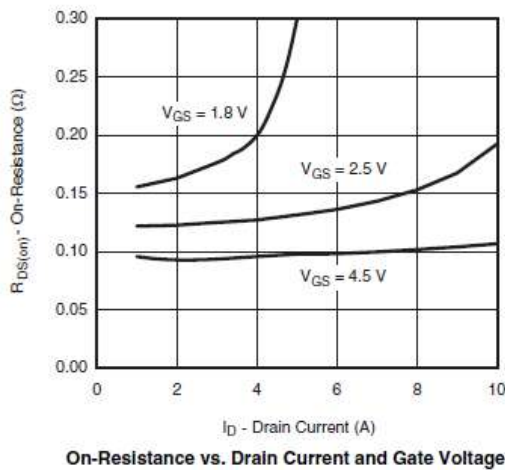
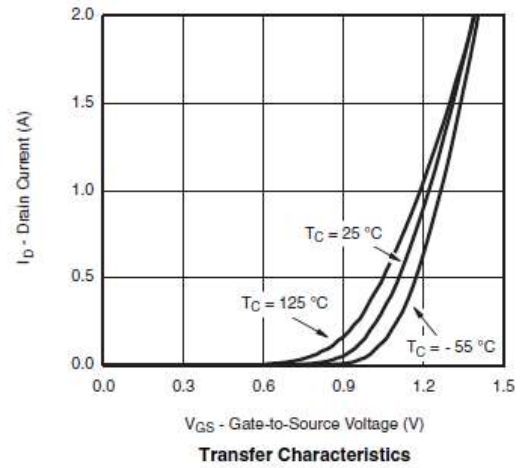
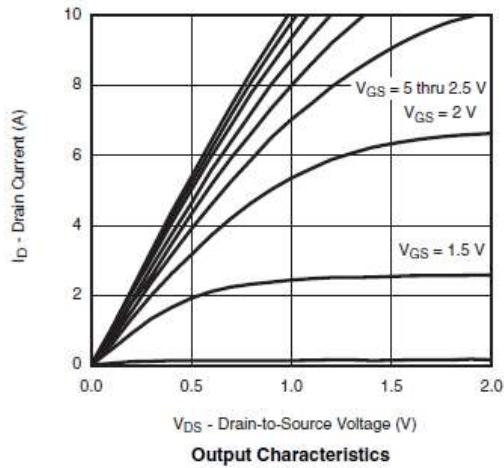
Single Pulse Power (Junction-to-Ambient)



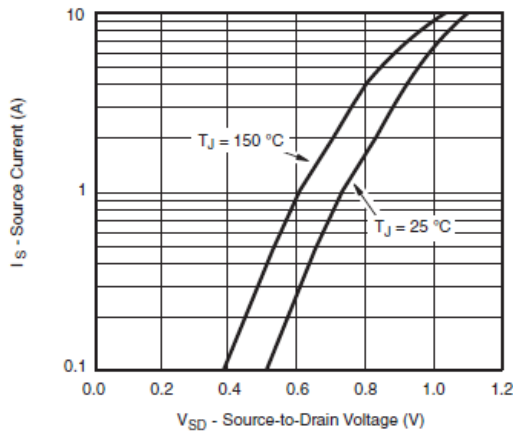
Normalized Thermal Transient Impedance, Junction-to-Ambient

- Notes:
1. Duty Cycle, $D = \frac{t_1}{t_2}$
 2. Per Unit Base = $R_{th,JA} = 85 \text{ } ^\circ\text{C/W}$
 3. $T_{JM} - T_A = P_{DM} Z_{th,JA}^{(t)}$
 4. Surface Mounted

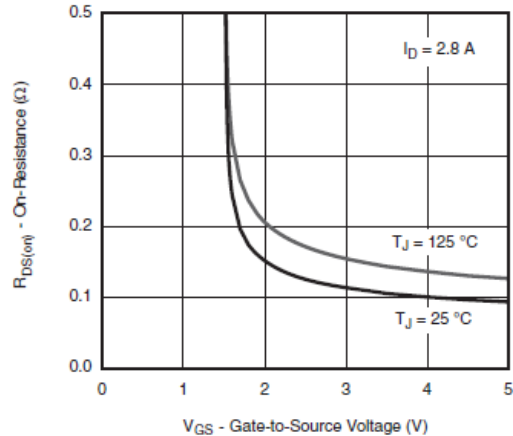
➤ Typical Characteristics (P-Channel)



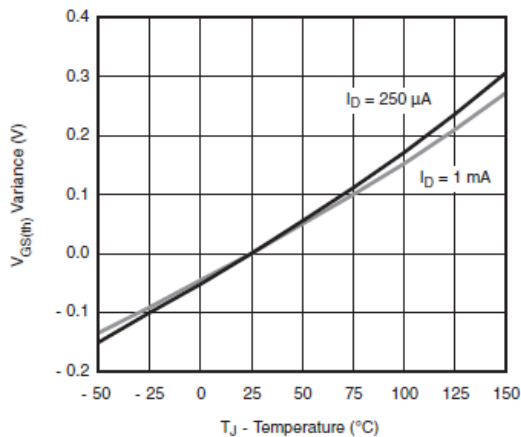
➤ Typical Characteristics (P-Channel)



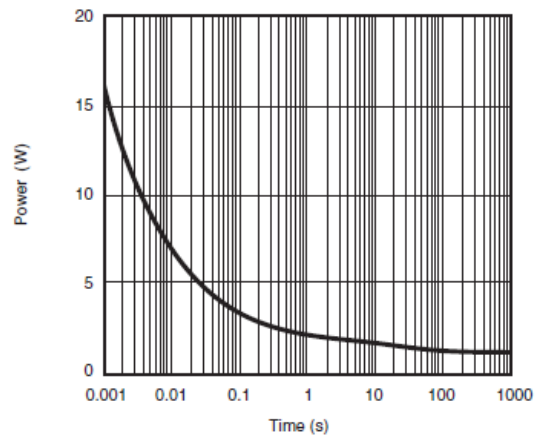
Source-Drain Diode Forward Voltage



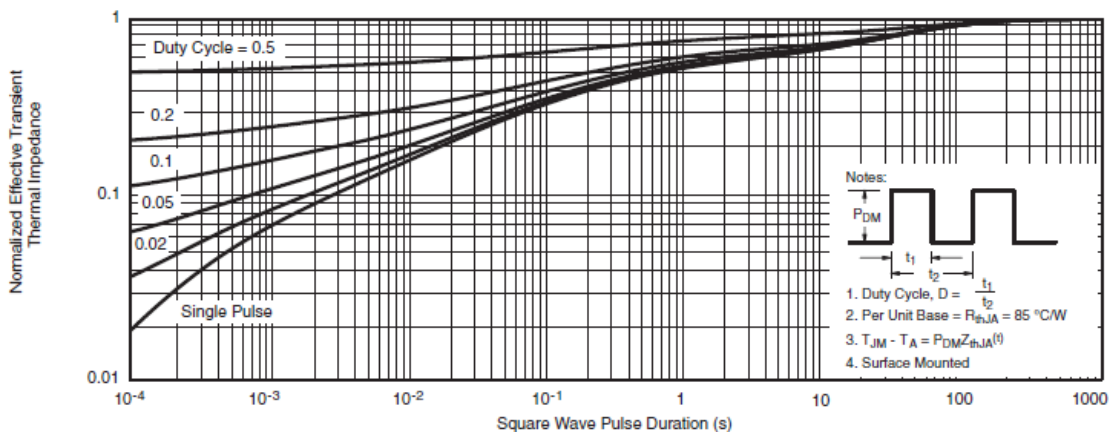
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

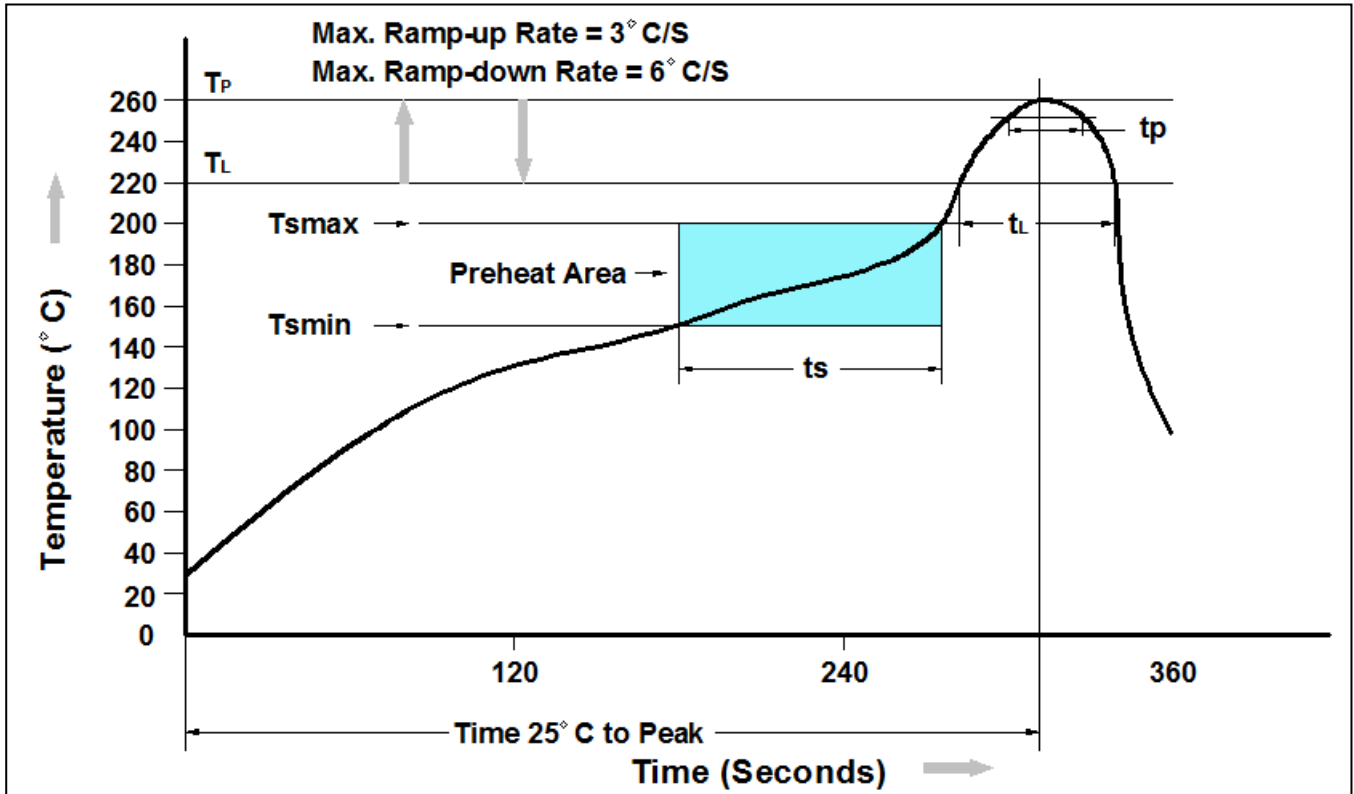


Single Pulse Power, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Ambient

➤ Recommend IR Reflow Soldering Thermal Profile

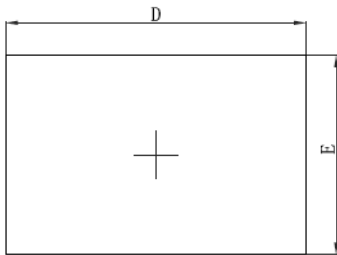


Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T _{smin})	150°C
Temperature Max. (T _{smax})	200°C
Time (t _s) from (T _{smin} to T _{smax})	60-120 seconds
Average Ramp-up Rate (t _L to t _P)	3°C/second max.
Liquidous Temperature (T _L)	217°C
Time (t _L) Maintained Above (T _L)	60 – 150 seconds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

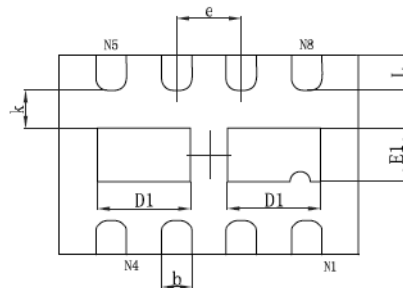
➤ Ordering Information

Part Number	Description	Quantity
PAC2604D	DFN3X2-8L Reel	4000 pcs

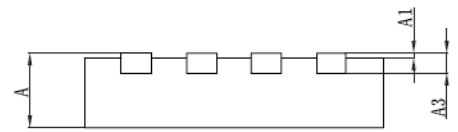
➤ Package Information (DFN3X2-8L)



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	2.924	3.076	0.115	0.121
E	1.924	2.076	0.076	0.082
D1	0.820	1.020	0.032	0.040
E1	0.430	0.630	0.017	0.025
k	0.200MIN.		0.008MIN.	
b	0.250	0.350	0.010	0.014
e	0.650TYP.		0.026TYP.	
L	0.274	0.426	0.011	0.017

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