

➤ General Description

This PAC2027ES 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.

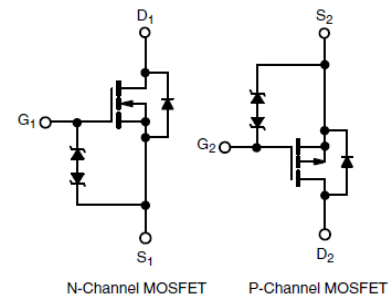
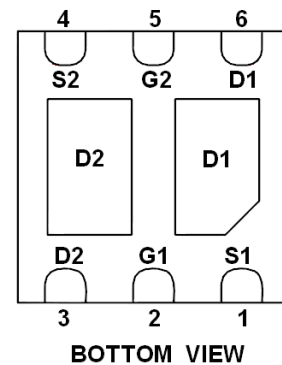
➤ Feature

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

➤ Application

- Load Switches
- Power Management
- DC/DC Converters

➤ DFN2X2-6L



➤ 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	$T_C=25^\circ C$	4.5	-4.5	A
		$T_C=70^\circ C$	4.5	-4.5	
Pulsed Drain Current	I_{DM}	20	-20	A	
Continuous Source Current(Diode Conduction)	I_S	1.6	-1.6	A	
Power Dissipation	P_D	$T_C=25^\circ C$	7.8		W
		$T_C=70^\circ C$	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	52	$^\circ C/W$	
Thermal Resistance-Junction to Case(Drian)	$R_{\theta JC}$	12.5	12.5		

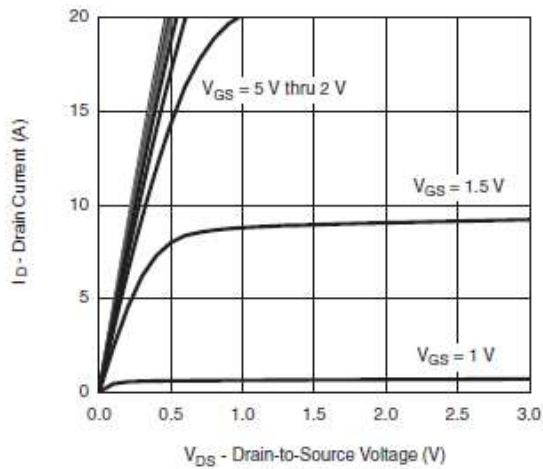
➤ **N-Channel Electrical Characteristics (T_A=25°C Unless otherwise noted)**

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	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.4		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 Ω	
		$V_{GS}=2.5V, I_D=4.6A$		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_{rss}			100			
Turn-On Time	$t_{d(on)}$	$V_{DD}=10V, R_L=5.5\Omega$ $I_D=3.6A, V_{GEN}=4.5V$		10	20	ns	
	t_r			10	20		
Turn-Off Time	$t_{d(off)}$		$R_G=6\Omega$		25		40
	t_f				10		20

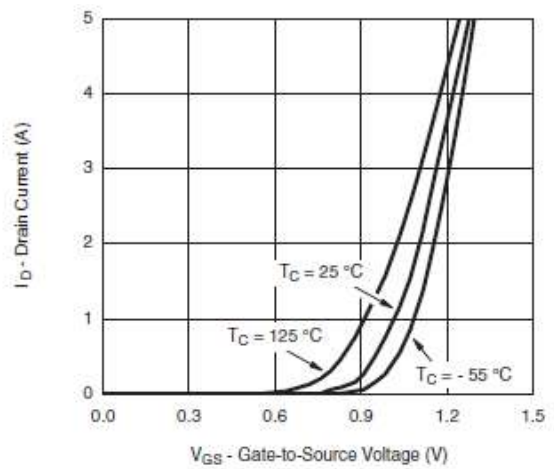
➤ **P-Channel Electrical Characteristics (T_A=25°C Unless otherwise noted)**

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	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.4		-1.0	
Gate Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 8V$			± 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	$I_{D(on)}$	$V_{DS} \geq -5V, V_{GS}=-4.5V$	-10			A
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-4.5A$		37	42	m Ω
		$V_{GS}=-2.5V, I_D=-3.4A$		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
Dynamic						
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	$t_{d(on)}$	$V_{DD}=-10V, R_L=2.7\Omega$ $I_D=-3.7A, V_{GEN}=-4.5V$		15	25	ns
	t_r			25	40	
Turn-Off Time	$t_{d(off)}$	$R_G=1\Omega$		40	65	ns
	t_f			15	25	

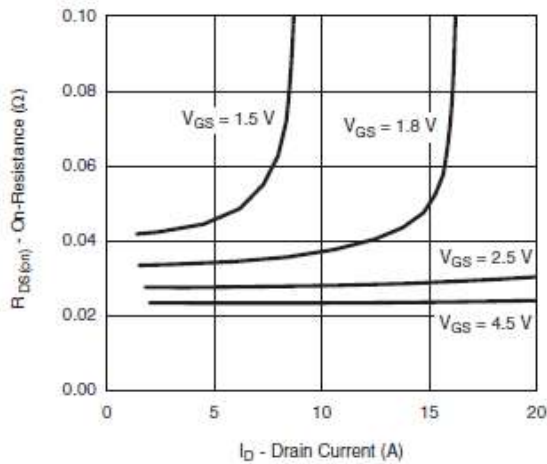
➤ N-Channel Typical Characteristics



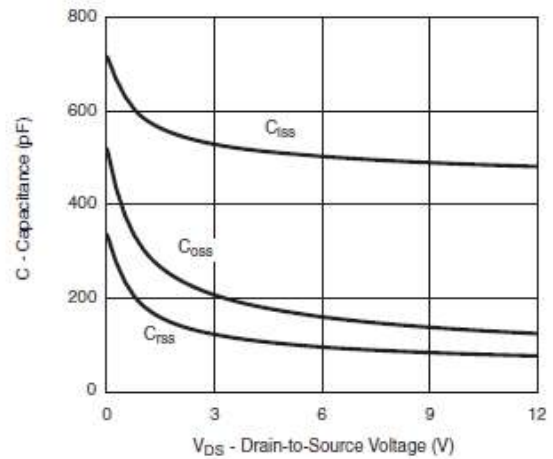
Output Characteristics



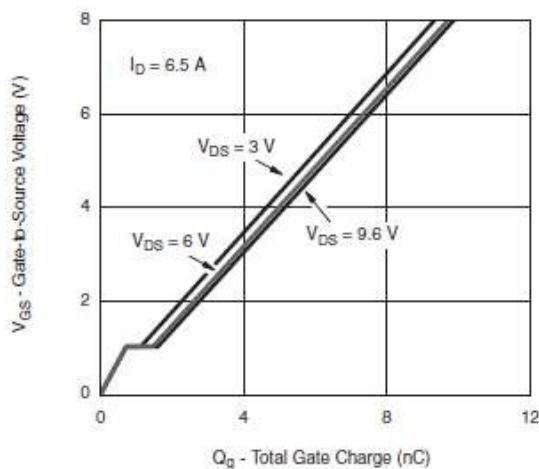
Transfer Characteristics



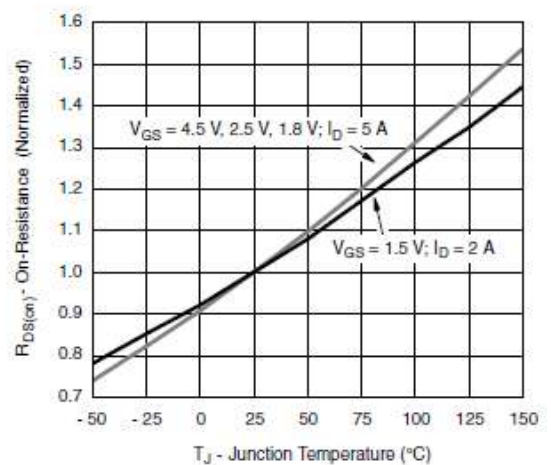
On-Resistance vs. Drain Current and Gate Voltage



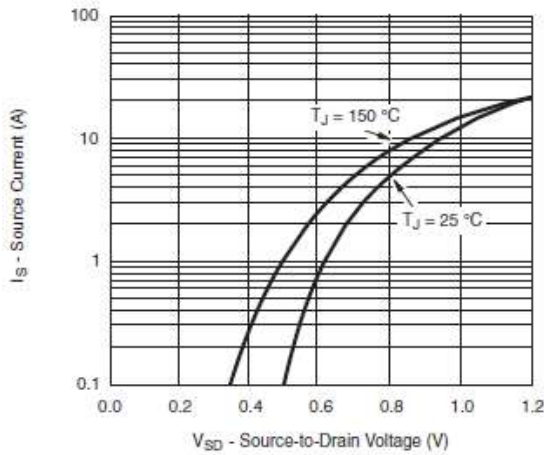
Capacitance



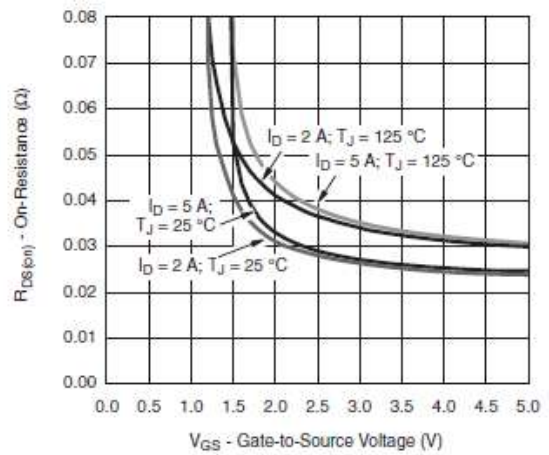
Gate Charge



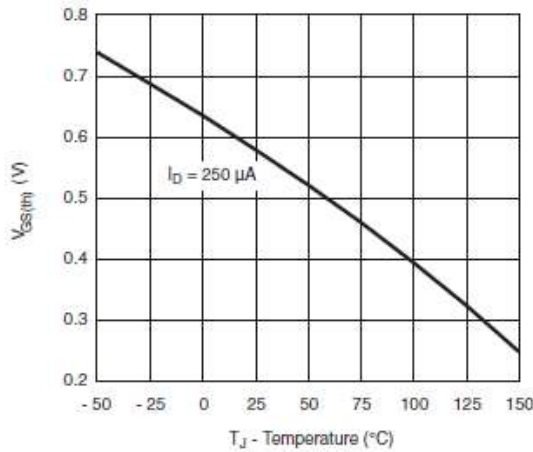
On-Resistance vs. Junction Temperature



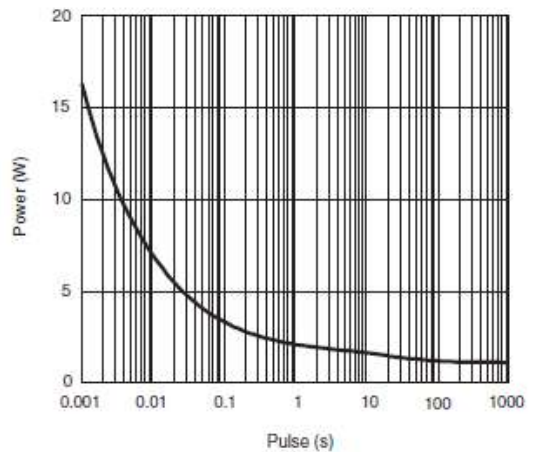
Source-Drain Diode Forward Voltage



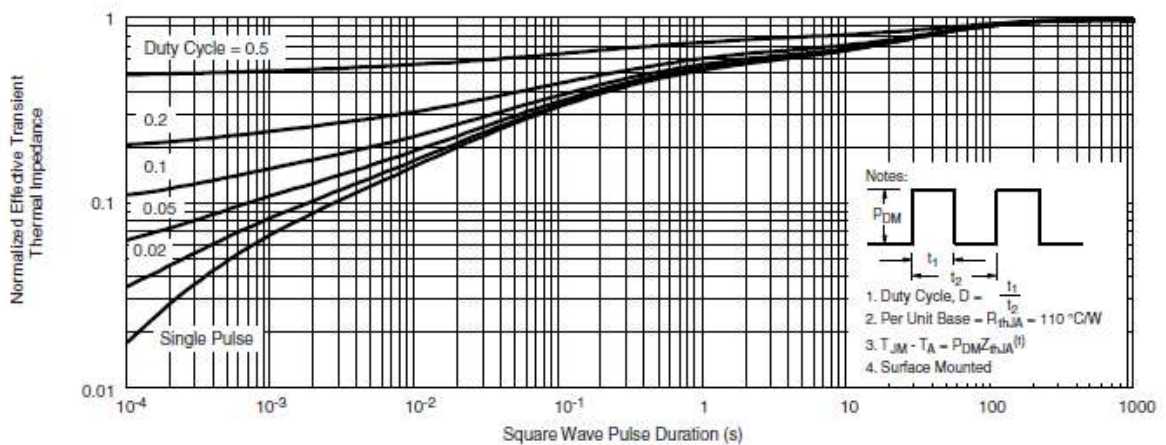
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



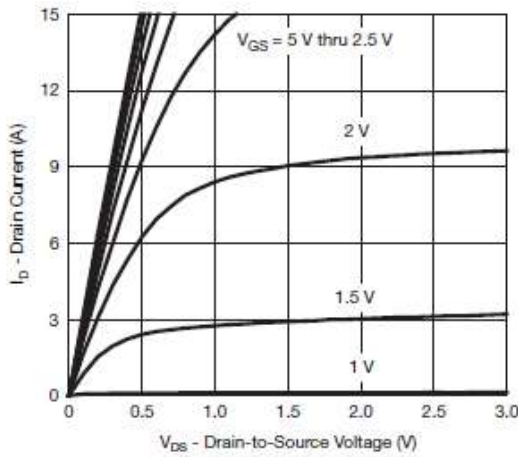
Single Pulse Power (Junction-to-Ambient)



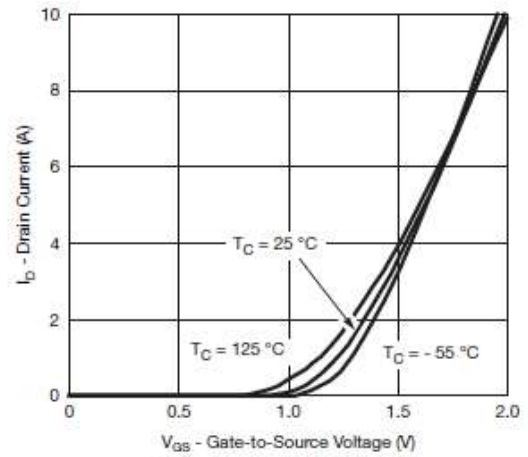
Normalized Thermal Transient Impedance, Junction-to-Ambient

Notes:
 1. Duty Cycle, $D = \frac{t_1}{t_2}$
 2. Per Unit Base = $R_{thJA} = 110^\circ\text{C/W}$
 3. $T_{JM} - T_A = P_{DM} Z_{thJA}^{(t)}$
 4. Surface Mounted

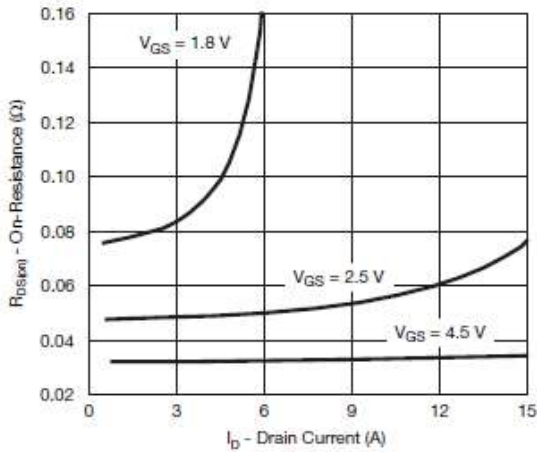
➤ P-Channel Typical Characteristics



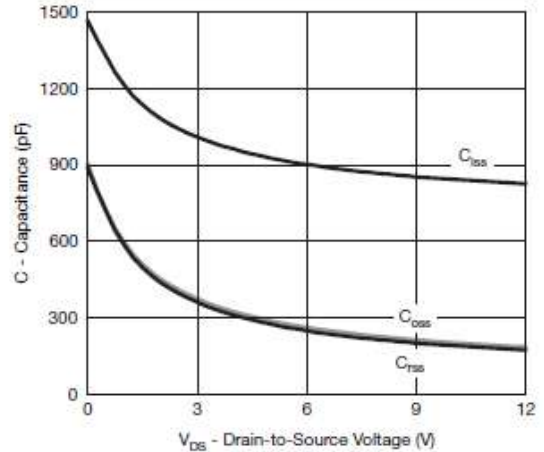
Output Characteristics



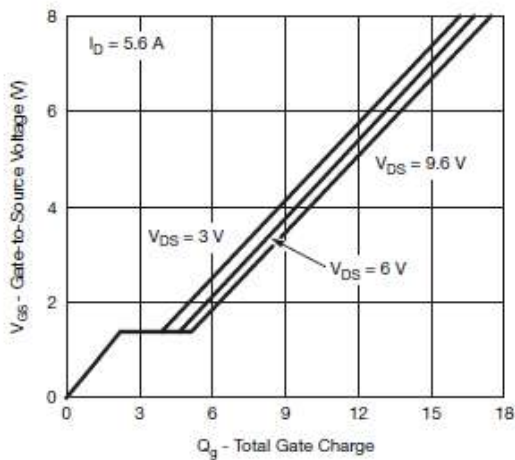
Transfer Characteristics



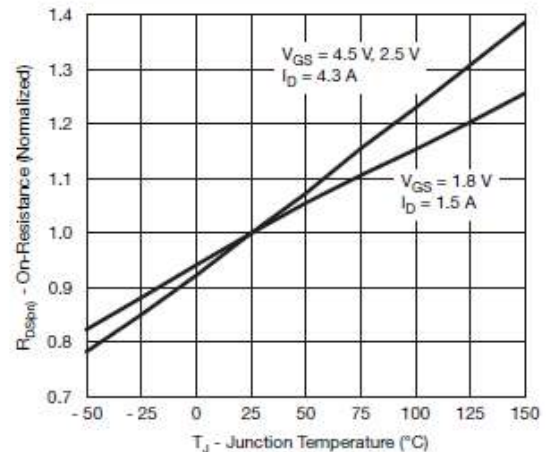
On-Resistance vs. Drain Current and Gate Voltage



Capacitance



Gate Charge

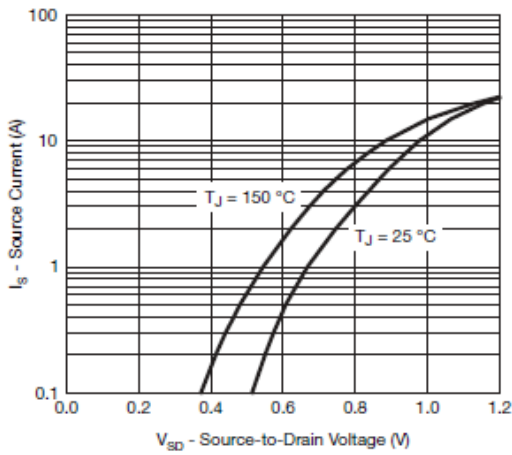


On-Resistance vs. Junction Temperature

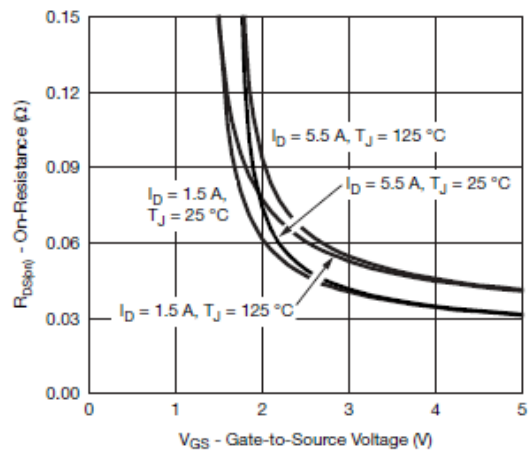
N-Ch and PCh Fast Switching MOSFET

$V_{DS}=20V, I_D=4.5A, R_{DS(on)}=19m\Omega$

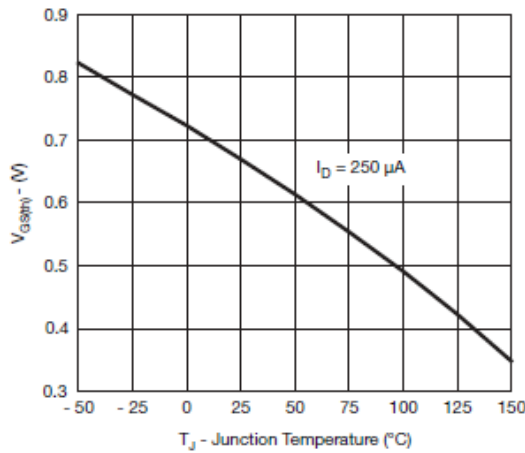
$V_{DS}=20V, I_D=4.5A, R_{DS(on)}=42m\Omega$



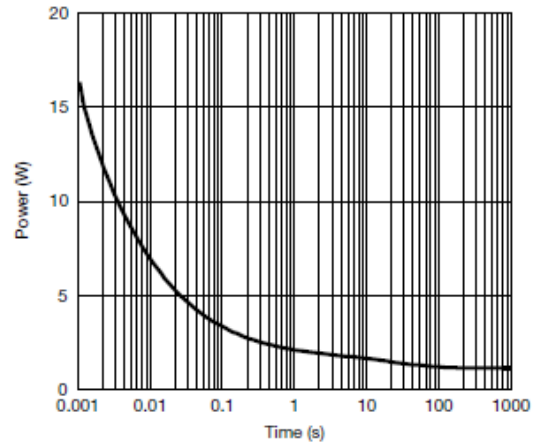
Source-Drain Diode Forward Voltage



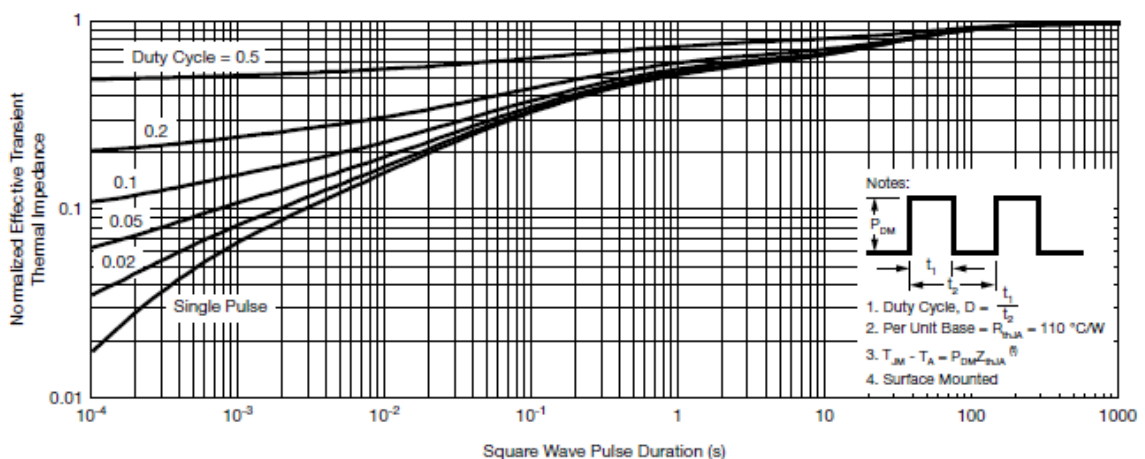
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

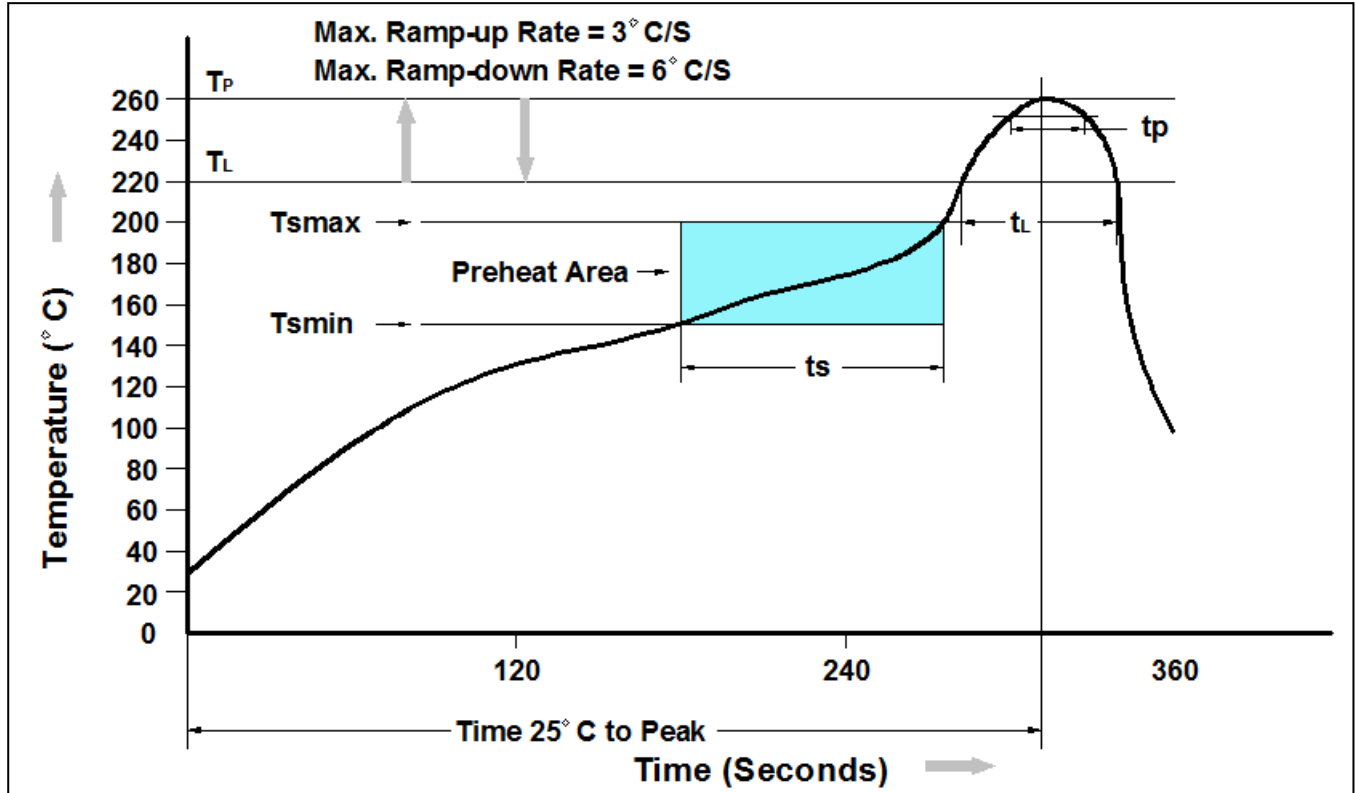


Single Pulse Power, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Ambient

➤ Recommand IR Reflow Soldering Thermal Profile

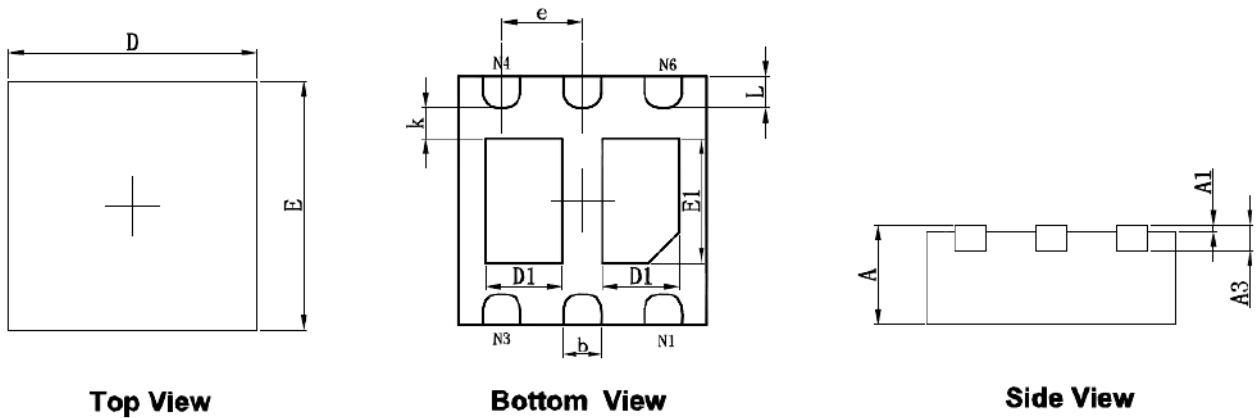


Profile Feature	Pb-Free Assembly Profile
Temperature Min. (Tsmin)	150°C
Temperature Max. (Tsmax)	200°C
Time (ts) from (Tsmin to Tsmax)	60-120 seconds
Average Ramp-up Rate (tL to tP)	3°C/second max.
Liquidous Temperature (TL)	217°C
Time (tL) Maintained Above (TL)	60 – 150 seconds
Peak Temperature	260°C +0°C / -5°C
Time (tP) within 5°C of actual Peak Temperature	30 seconds
Ramp-down Rate (TP to TL)	6°C/second max
Time 25°C to Peak Temperature	8 minutes max.

➤ Ordering Information

Part Number	Description	Quantity
PAC2027ES	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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