SPC4703

P-Channel Trench MOSFET with Schottky Diode

DESCRIPTION

The SPC4703combines the Trench MOSFET technology with a very low forward voltage drop Schottky barrier rectifier in an DFN3X2-8L package. The Trench MOSFET is the P-Channel enhancement mode power field effect transistors are produced using high cell density , DMOS trench technology. This high density process is especially tailored to minimize on-state resistance and provide superior switching performance. The Schottky diode is provided to facilitate the implementation of a bidirectional blocking switch, or for DC-DC conversion applications.

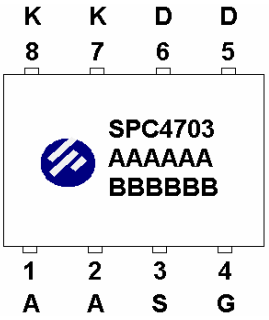
APPLICATIONS

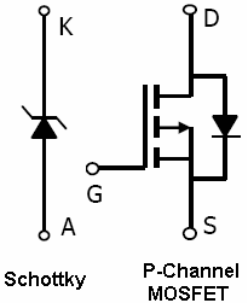
- Battery Powered System
- DC/DC Buck Converter
- Load Switch
- Cell Phone

FEATURES

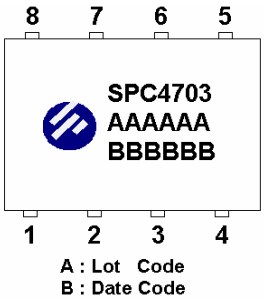
- P-Channel
  -20V/-3.4A,$R_{DS(ON)}$= 90mΩ@V_{GS}=-4.5V
  -20V/-2.4A,$R_{DS(ON)}$=120mΩ@V_{GS}=-2.5V
  -20V/-1.7A,$R_{DS(ON)}$=155mΩ@V_{GS}=-1.8V
- Schottky
  VKA (V) = 20V, IF = 1A, VF<0.43V@1.0A
- Super high density cell design for extremely low RDS (ON)
- Exceptional on-resistance and maximum DC current capability
- DFN3X2-8L package design

PIN CONFIGURATION(DFN3X2 – 8L)





PART MARKING



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P-Channel Trench MOSFET with Schottky Diode

PIN DESCRIPTION

Pin	Symbol	Description
1	A	Schottky Anode
2	A	Schottky Anode
3	S	MOSFET Source
4	G	MOSFET Gate
5	D	MOSFET Drain
6	D	MOSFET Drain
7	K	Schottky Cathode
8	K	Schottky Cathode

ORDERING INFORMATION

Part Number	Package	Part Marking
SPC4703DF8RGB	DFN3X2- 8L	SPC4703

※ SPC4703DF8RGB : Tape Reel ; Pb – Free ; Halogen – Free

ABSOULTE MAXIMUM RATINGS

(T_A=25℃ Unless otherwise noted)

Parameter		Symbol	Typical		Unit
			P-Channel	Schottky	
Drain-Source Voltage		V_{DSS}	-20		V
Gate –Source Voltage		V_{GSS}	±12		V
Continuous Drain Current(T_J=150℃)	T_A=25℃	I_D	-3.5		A
	T_A=70℃		-2.8		
Pulsed Drain Current		I_{DM}	-15		A
Schottky Reverse Voltage		V_{KA}		20	V
Continuous Forward Current	T_A=25℃	I_F		1	A
	T_A=70℃			0.7	
Pulsed Forward Current		I_{FM}		10	A
Continuous Source Current(Diode Conduction)		I_S	-1.4		A
Power Dissipation	T_A=25℃	P_D	1.25	0.9	W
	T_A=70℃		0.8	0.6	
Operating Junction Temperature		T_J	-55/150		℃
Storage Temperature Range		T_{STG}	-55/150		℃
Thermal Resistance-Junction to Ambient	T ≤ 10sec	$R_{\theta JA}$	65		℃/W
	Steady State		95		

SPC4703

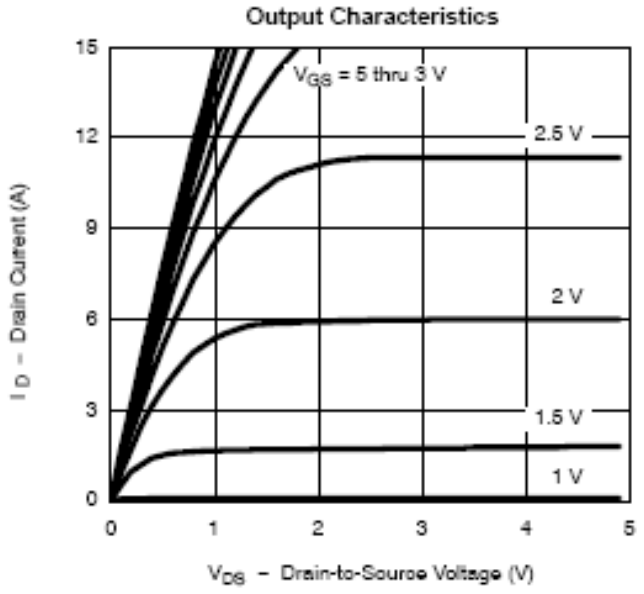
P-Channel Trench MOSFET with Schottky Diode

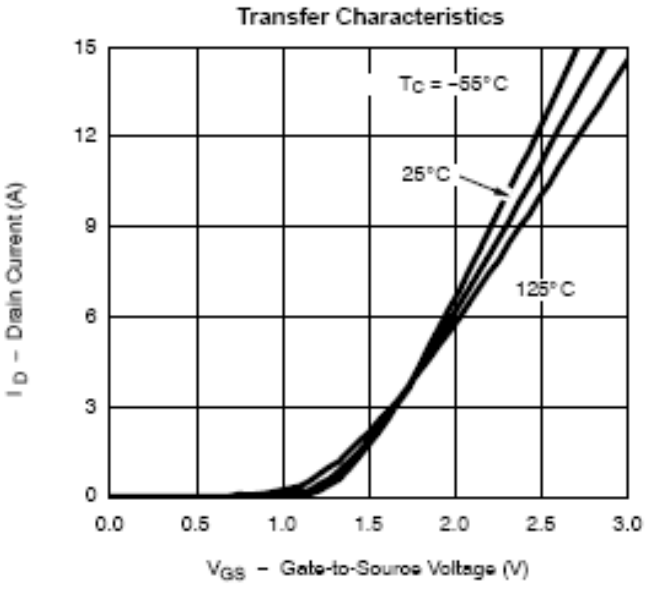
ELECTRICAL CHARACTERISTICS

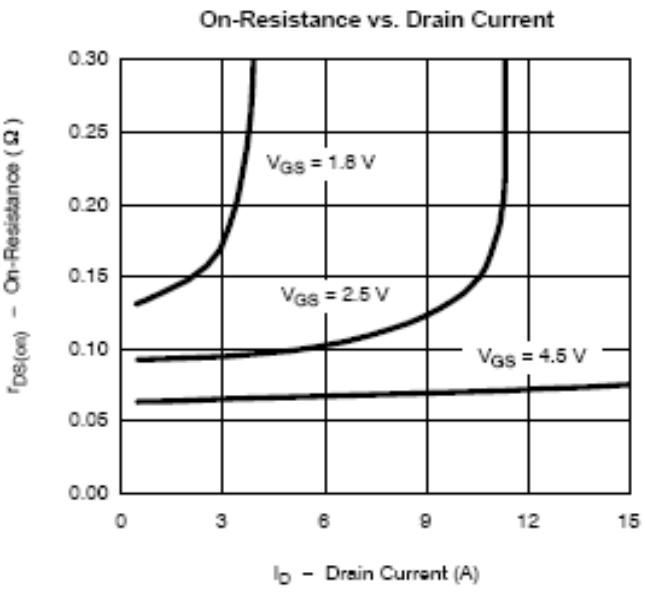
(T_A=25℃ Unless otherwise noted)

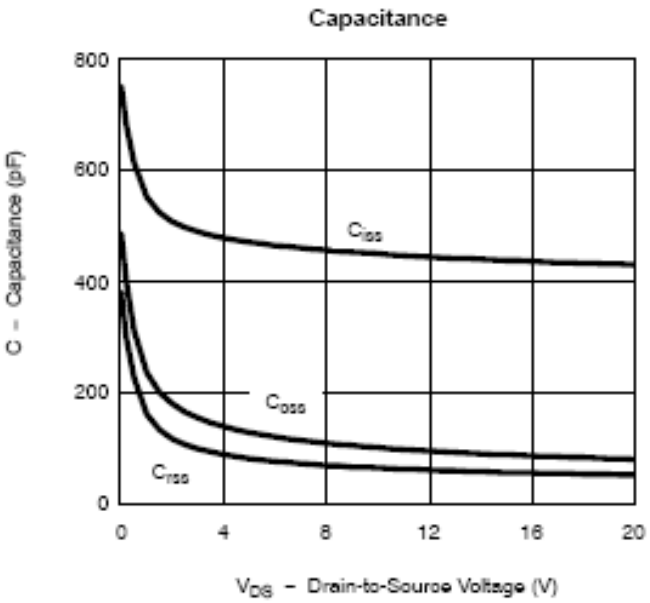
Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
MOSFET Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V,I_D=-250uA	-20			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=-250uA	-0.35		-0.8	
Gate Leakage Current	I_{GSS}	V_{DS}=0V,V_{GS}=±12V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-20V,V_{GS}=0V			-1	uA
		V_{DS}=-20V,V_{GS}=0V T_J=55℃			-5	
On-State Drain Current	$I_{D(on)}$	V_{DS}≦-5V,V_{GS}=-4.5V	-6			A
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=-4.5V,I_D=-3.4A		0.075	0.090	Ω
		V_{GS}=-2.5V,I_D=-2.4A		0.095	0.120	
		V_{GS}=-1.8V,I_D=-1.7A		0.120	0.155	
		V_{GS}=-1.25V,I_D=-1.0A		0.185	0.210	
Forward Transconductance	gfs	V_{DS}=-5V,I_D=-2.8A		6		S
MOSFET Dynamic						
Total Gate Charge	Q_g	V_{DS}=-6V,V_{GS}=-4.5V I_D≡-2.8A		4.8	8	nC
Gate-Source Charge	Q_{gs}			1.0		
Gate-Drain Charge	Q_{gd}			1.0		
Input Capacitance	C_{iss}	V_{DS}=-6V,V_{GS}=0V f=1MHz		485		pF
Output Capacitance	C_{oss}			85		
Reverse Transfer Capacitance	C_{rss}			40		
Turn-On Time	$t_{d(on)}$	V_{DD}=-6V,R_L=6Ω I_D≡-1.0A,V_{GEN}=-4.5V R_G=6Ω		10	16	ns
	t_r			13	23	
Turn-Off Time	$t_{d(off)}$			18	25	
	t_f			15	20	
Schottky Parameters						
Forward Voltage Drop	V_F	I_F =1A		0.43	0.47	V
Reverse Breakdown Voltage	V_{BR}	I_R = 500uA	20			V
Maximum reverse leakage current	Irm	V_R = 23V			0.1	mA
		V_R = 23V , T_J=70℃			1	
Junction Capacitance	C_T	V_R = 10V		31		pF
		V_R = 0V , f=1MHz		120		
SchottkyReverse Recovery Time	T_{rr}	I_F=1A, dI/dt=100A/μs		5.4	10	ns
Schottky Reverse Recovery Charge	Q_{rr}	I_F=1A, dI/dt=100A/μs		0.8		nC

TYPICAL CHARACTERISTICS (P-Channel MOSFET)



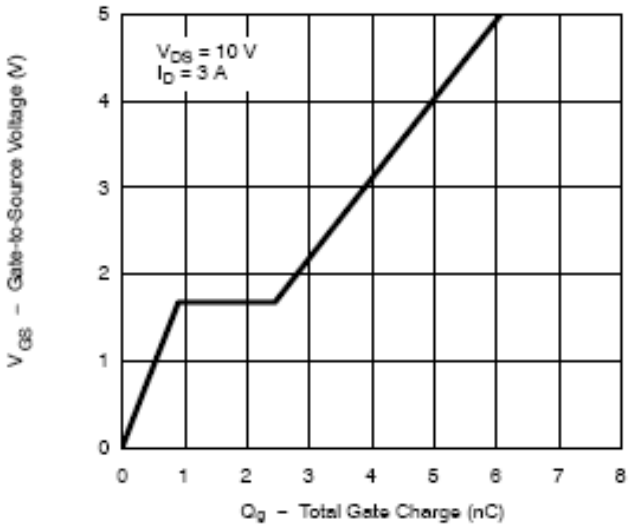




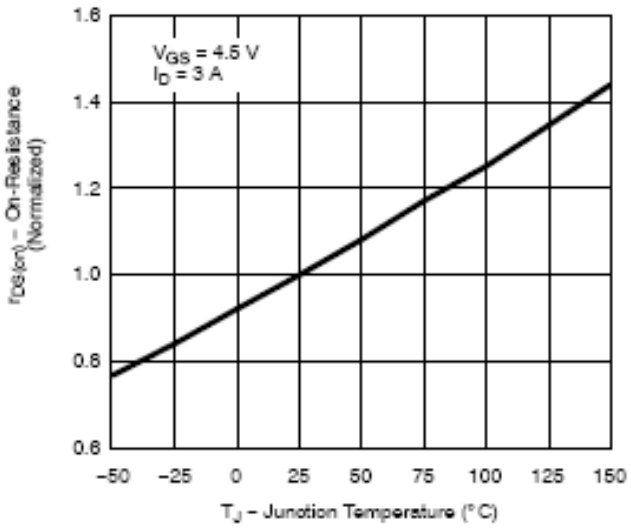


TYPICAL CHARACTERISTICS (P-Channel MOSFET)

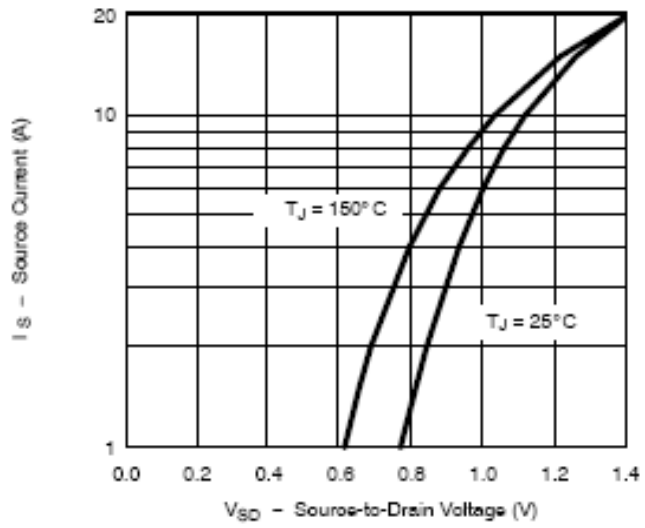
Gate Charge



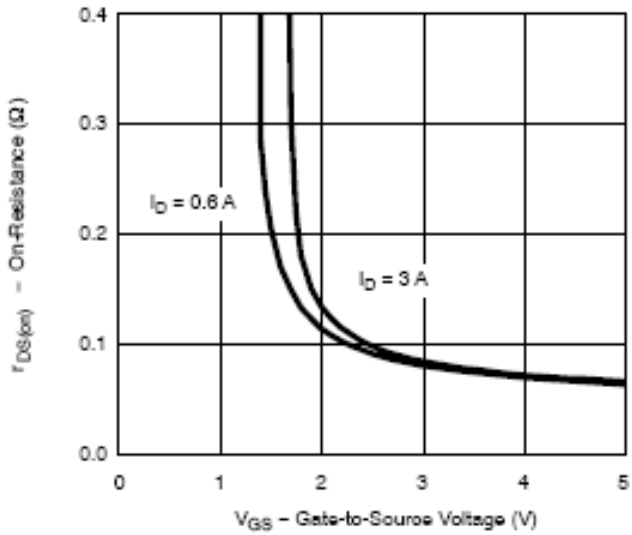
On-Resistance vs. Junction Temperature



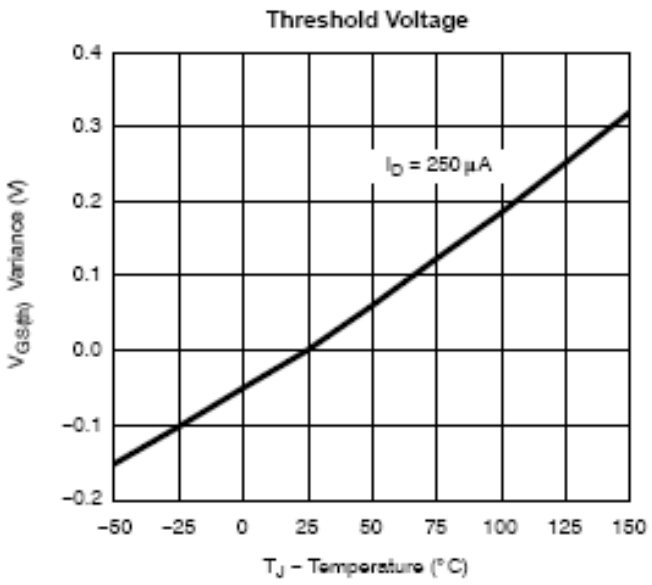
Source-Drain Diode Forward Voltage

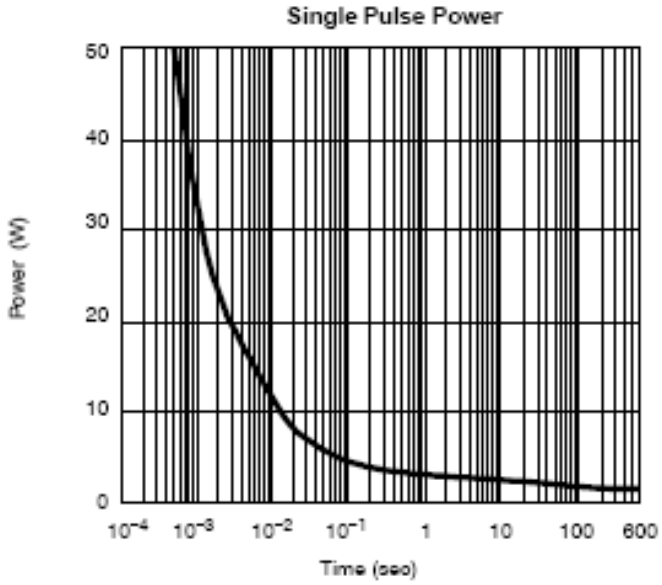


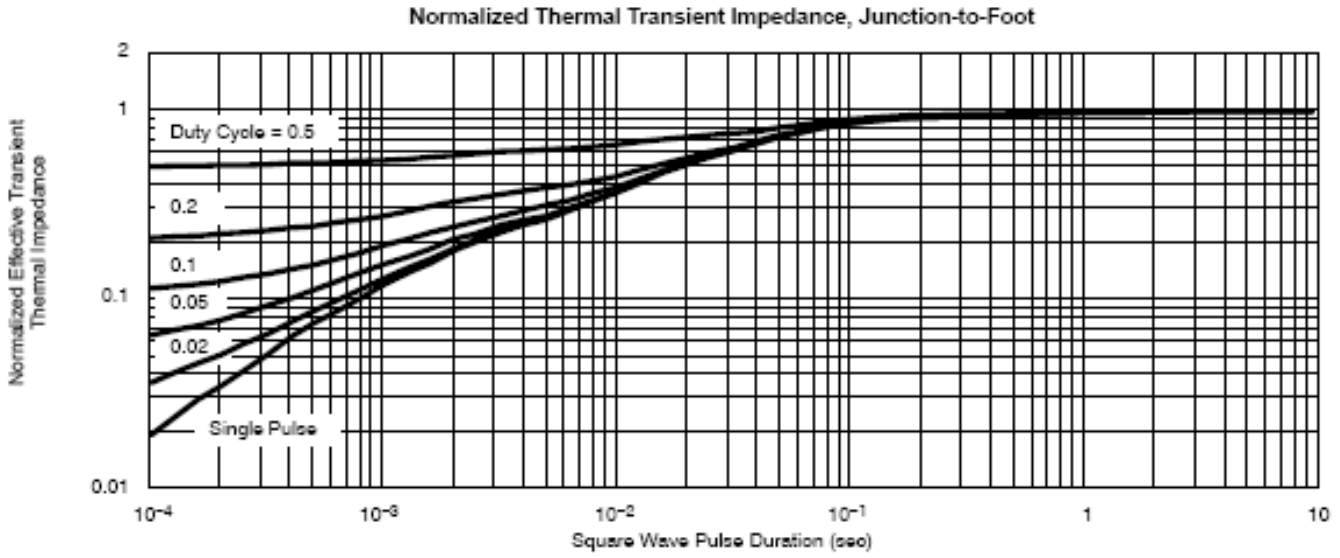
On-Resistance vs. Gate-to-Source Voltage



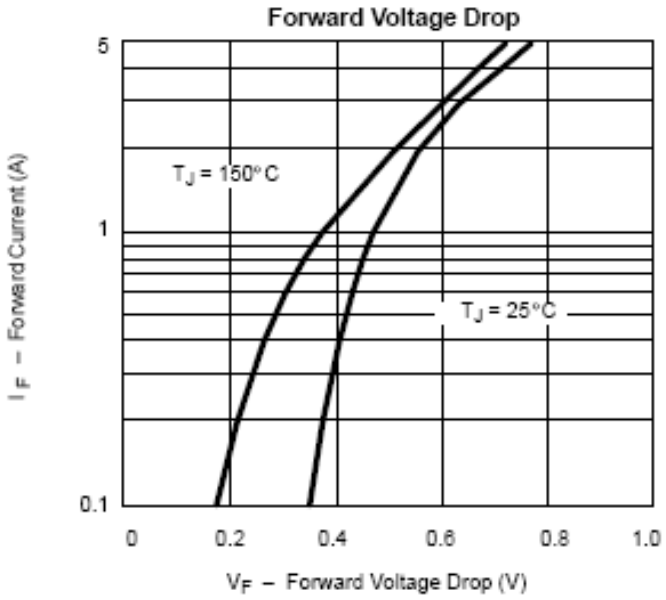
TYPICAL CHARACTERISTICS (P-Channel MOSFET)

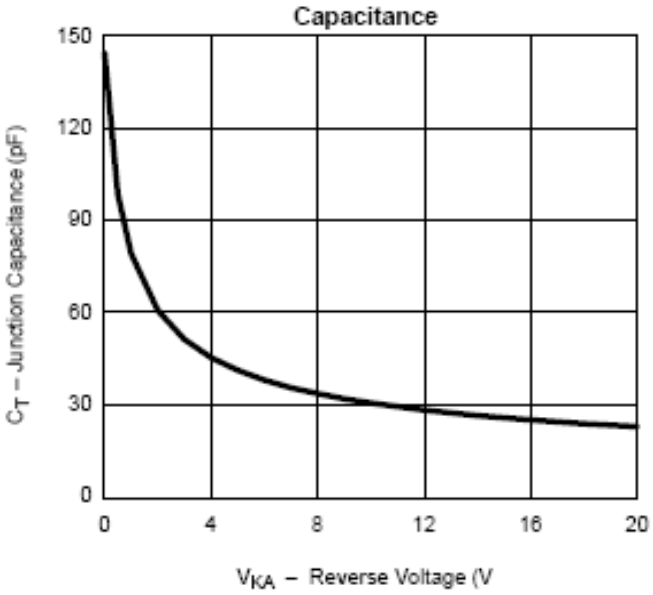


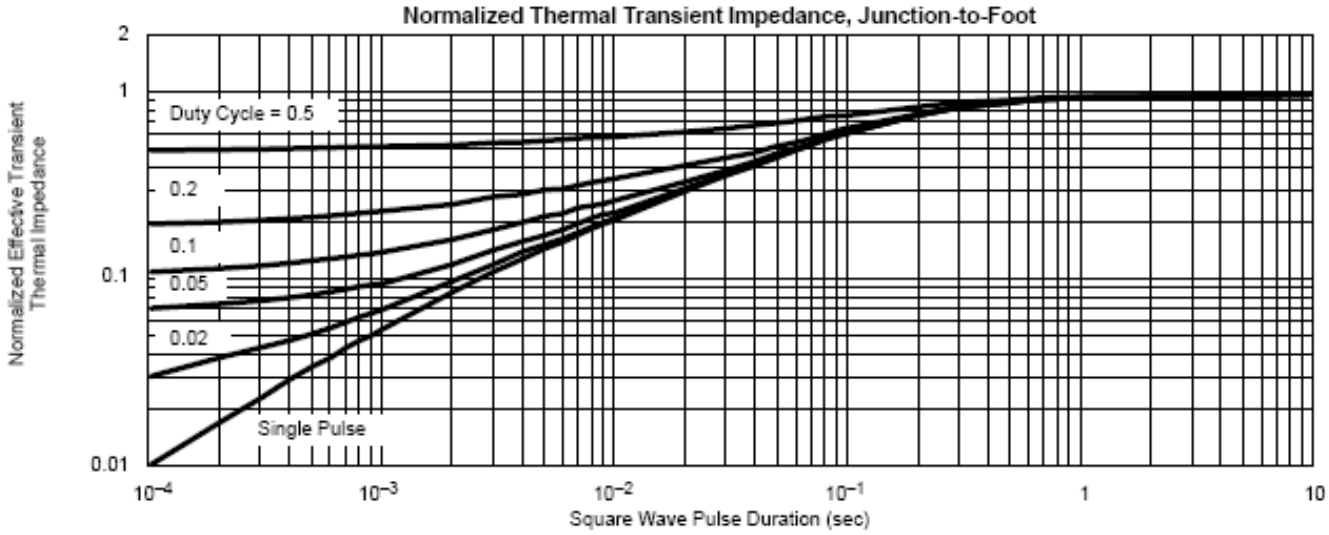




TYPICAL CHARACTERISTICS (Schottky)

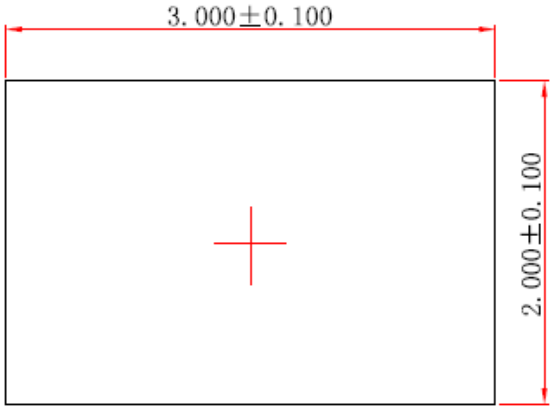




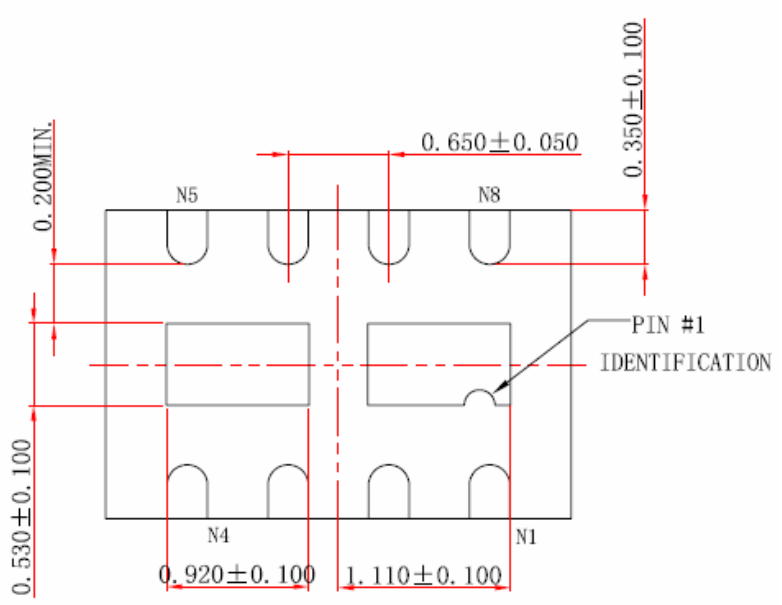


DFN3X2-8L PACKAGE OUTLINE

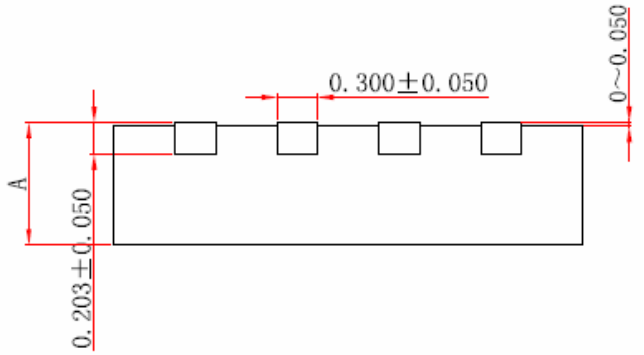
Top View



Bottom View



Side View



	MIN.	NORM.	MAX.
A	0.700	0.750	0.800
	0.800	0.850	0.900

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