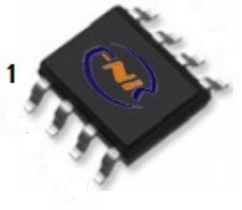
FNK4620
Complementary Enhancement Mode Field Effect Transistor

General Description

The FNK4620 uses advanced trench technology MOSFETs to provide excellent $R_{DS(ON)}$ and low gate charge. The complementary MOSFETs may be used in inverter and other applications.

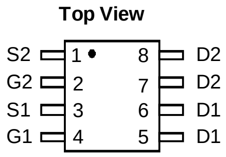
Features

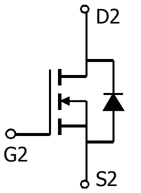
n-channel	p-channel
V_{DS} (V) = 30V	-30V
I_D = 7.2A (V_{GS}=10V)	-5.3A (V_{GS} = -10V)
$R_{DS(ON)}$	$R_{DS(ON)}$
< 21mΩ (V_{GS}=10V)	< 30mΩ (V_{GS} = -10V)
< 27mΩ (V_{GS}=4.5V)	< 44mΩ (V_{GS} = -4.5V)



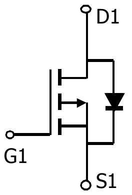
top view

Bottom View





n-channel



p-channel

Absolute Maximum Ratings T_A=25℃ unless otherwise noted

Parameter		Symbol	Max n-channel	Max p-channel	Units
Drain-Source Voltage		V_{DS}	30	-30	V
Gate-Source Voltage		V_{GS}	±20	±20	V
Continuous Drain Current [F]	T_A=25℃	I_D	7.2	-5.3	A
	T_A=70℃		6.2	-4.5	
Pulsed Drain Current [B]		I_{DM}	64	-40	
Power Dissipation [F]	T_A=25℃	P_D	2	2	W
	T_A=70℃		1.44	1.44	
Avalanche Current [B]		I_{AR}	9	17	A
Repetitive avalanche energy 0.3mH [B]		E_{AR}	12	43	mJ
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	-55 to 150	℃

Thermal Characteristics: n-channel and p-channel

Parameter		Symbol	Device	Typ	Max	Units
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	n-ch	50	62.5	℃/W
Maximum Junction-to-Ambient [A]	Steady-State		n-ch	80	100	℃/W
Maximum Junction-to-Lead [C]	Steady-State	$R_{\theta JL}$	n-ch	32	40	℃/W
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	p-ch	50	62.5	℃/W
Maximum Junction-to-Ambient [A]	Steady-State		p-ch	80	100	℃/W
Maximum Junction-to-Lead [C]	Steady-State	$R_{\theta JL}$	p-ch	32	40	℃/W

N-CHANNEL Electrical Characteristics (T_J=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	I_D=250µA, V_{GS}=0V	30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V, V_{GS}=0V			1	µA
		T_J=55℃			5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}= ±20V			100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} I_D=250µA	1.5	2.1	2.6	V
$I_{D(ON)}$	On state drain current	V_{GS}=10V, V_{DS}=5V	64			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=7.2A		17	21	mΩ
		T_J=125℃		21	27	
		V_{GS}=4.5V, I_D=5A		23	27	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=7.2A		20		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V		0.74	1	V
I_S	Maximum Body-Diode Continuous Current				2.5	A
I_{SM}	Pulsed Body-Diode Current^B				64	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, f=1MHz		373	448	pF
C_{oss}	Output Capacitance			67		pF
C_{rss}	Reverse Transfer Capacitance			41		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		1.8	2.8	Ω
SWITCHING PARAMETERS						
Q_g(10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=15V, I_D=7.2A		7.2	11	nC
Q_g(4.5V)	Total Gate Charge			3.5		nC
Q_{gs}	Gate Source Charge			1.3		nC
Q_{gd}	Gate Drain Charge			1.7		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=15V, R_L=2.1Ω, R_{GEN}=3Ω		4.5		ns
t_r	Turn-On Rise Time			2.7		ns
$t_{D(off)}$	Turn-Off DelayTime			14.9		ns
t_f	Turn-Off Fall Time			2.9		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=7.2A, dI/dt=100A/µs		10.5	12.6	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=7.2A, dI/dt=100A/µs		4.5		nC

N-CHANNEL TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

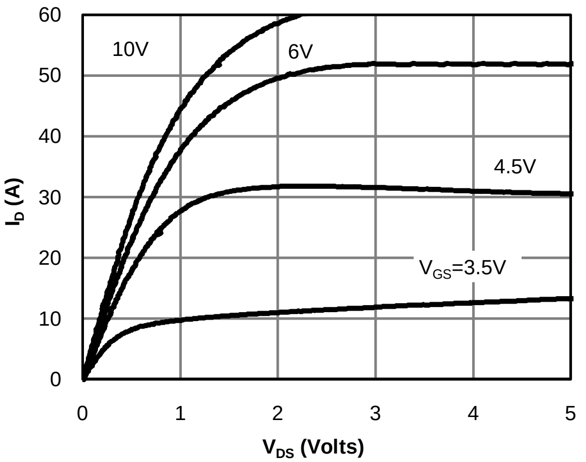


Fig 1: On-Region Characteristics

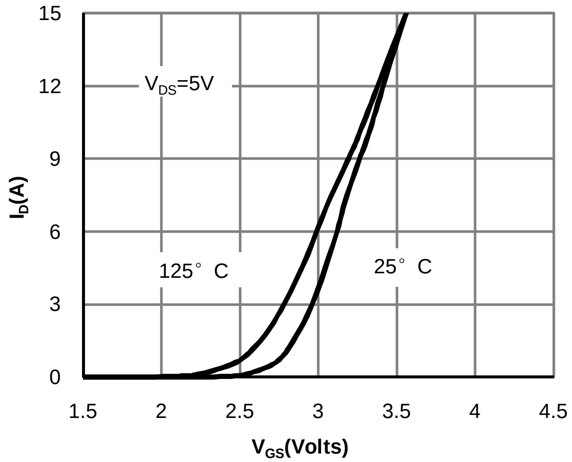


Figure 2: Transfer Characteristics

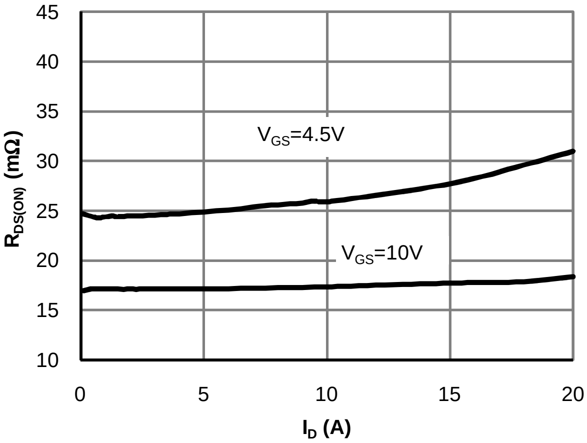


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

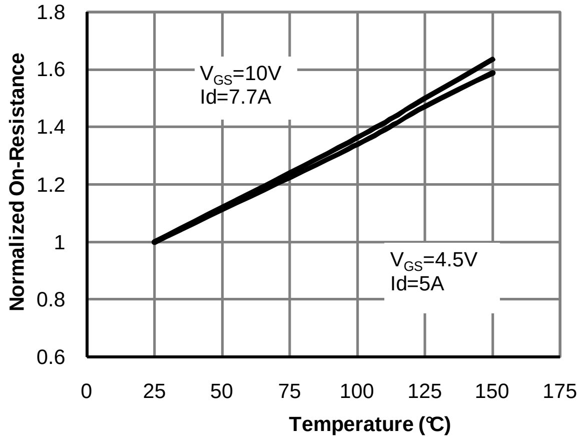


Figure 4: On-Resistance vs. Junction Temperature

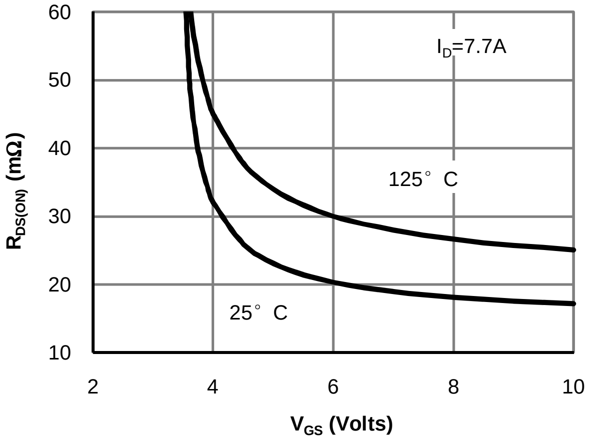


Figure 5: On-Resistance vs. Gate-Source Voltage

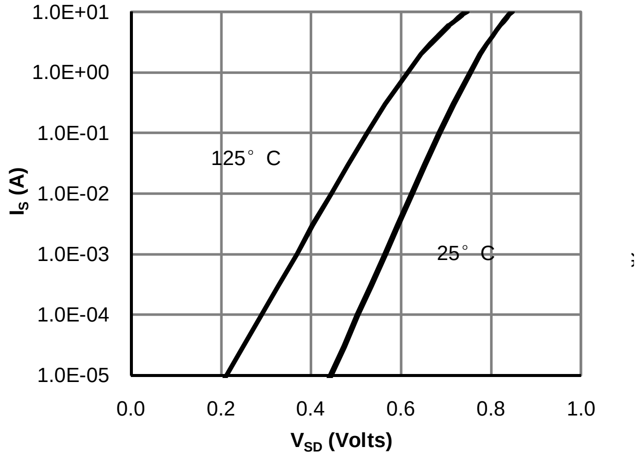


Figure 6: Body-Diode Characteristics

N-CHANNEL TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

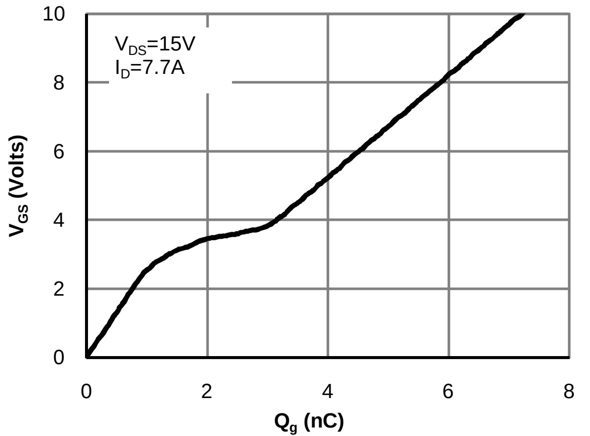


Figure 7: Gate-Charge Characteristics

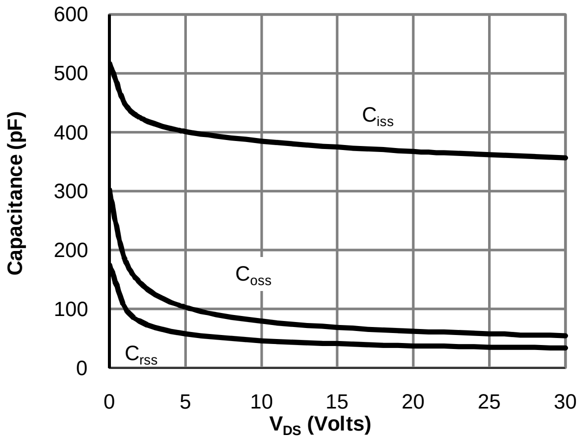


Figure 8: Capacitance Characteristics

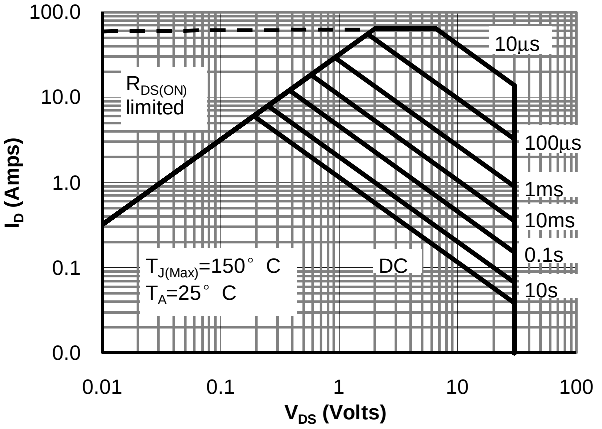


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

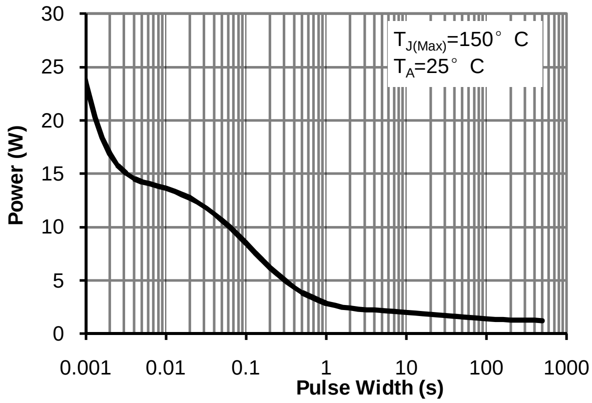


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

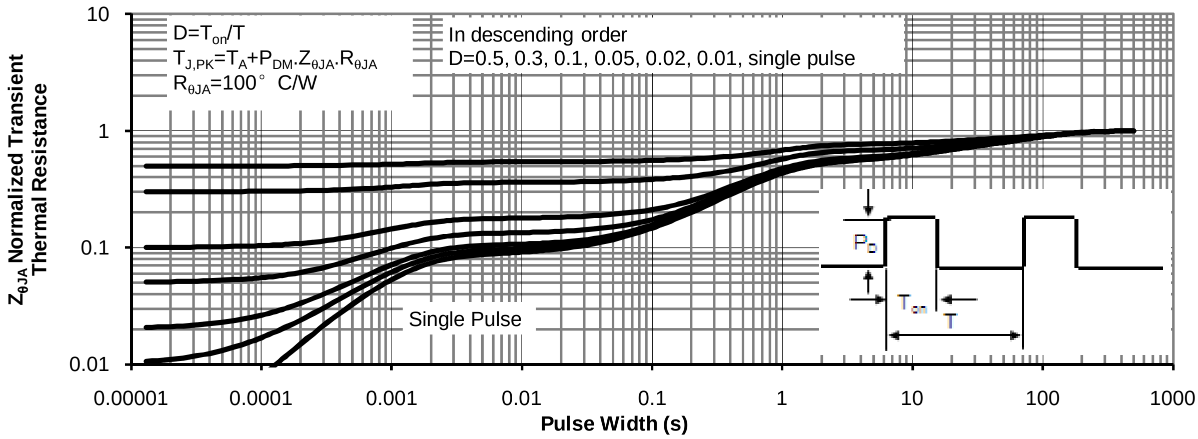
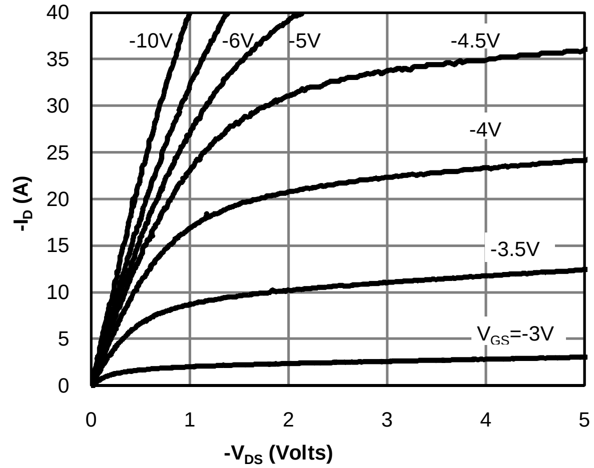


Figure 11: Normalized Maximum Transient Thermal Impedance

P-CHANNEL Electrical Characteristics (T_J=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	I_D=-250µA, V_{GS}=0V	-30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-30V, V_{GS}=0V			-1	µA
		T_J=55℃			-5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}=±20V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} I_D=-250µA	-1.3	-1.85	-2.4	V
$I_{D(ON)}$	On state drain current	V_{GS}=-10V, V_{DS}=-5V	-40			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-10V, I_D=-5.3A		26	30	mΩ
		T_J=125℃		34	39	
		V_{GS}=-4.5V, I_D=-4.5A		39	44	mΩ
g_{FS}	Forward Transconductance	V_{DS}=-5V, I_D=-5.3A		19		S
V_{SD}	Diode Forward Voltage	I_S=-1A,V_{GS}=0V		-0.8	-1	V
I_S	Maximum Body-Diode Continuous Current				-3.5	A
I_{SM}	Pulsed Body-Diode Current^B				-40	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=-15V, f=1MHz		760		pF
C_{oss}	Output Capacitance			140		pF
C_{rss}	Reverse Transfer Capacitance			95		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		3.2	5	Ω
SWITCHING PARAMETERS						
Q_g(10V)	Total Gate Charge (10V)	V_{GS}=-10V, V_{DS}=-15V, I_D=-5.3A		13.6	16	nC
Q_g(4.5V)	Total Gate Charge (4.5V)			6.7		nC
Q_{gs}	Gate Source Charge			2.5		nC
Q_{gd}	Gate Drain Charge			3.2		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=-10V, V_{DS}=-15V, R_L=2.8Ω, R_{GEN}=3Ω		8		ns
t_r	Turn-On Rise Time			6		ns
$t_{D(off)}$	Turn-Off DelayTime			17		ns
t_f	Turn-Off Fall Time			5		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=-5.3A, dI/dt=100A/µs		15		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=-5.3A, dI/dt=100A/µs		9.7		nC

P-CHANNEL TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



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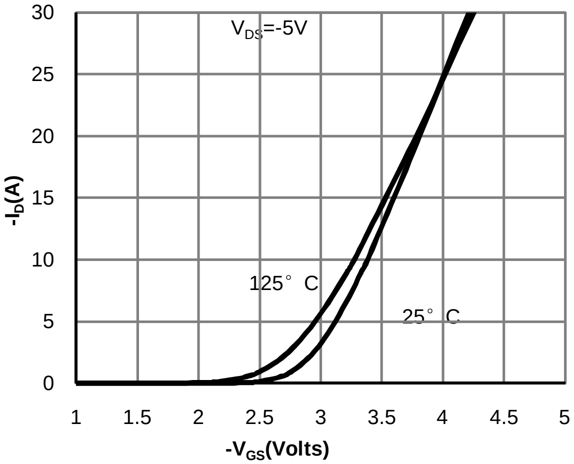


Figure 2: Transfer Characteristics

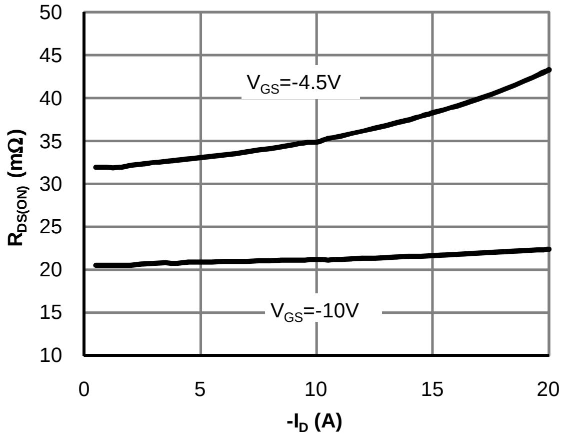


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

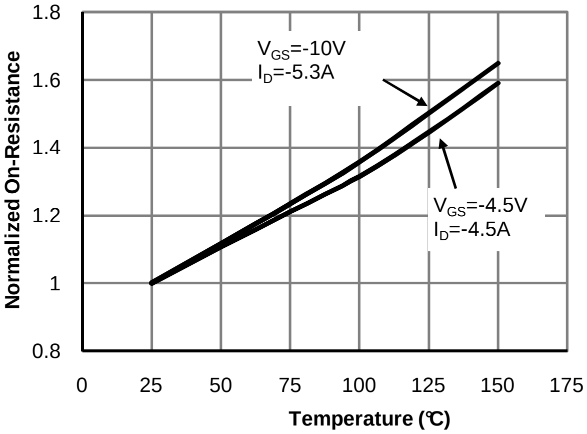


Figure 4: On-Resistance vs. Junction Temperature

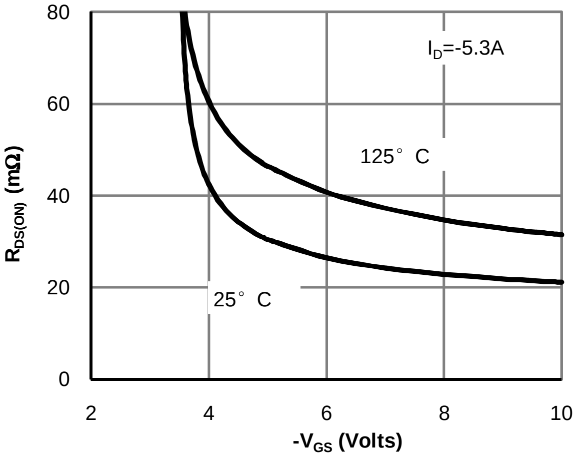


Figure 5: On-Resistance vs. Gate-Source Voltage

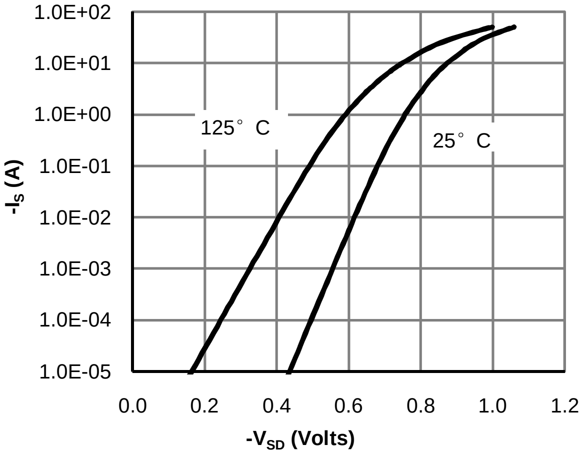
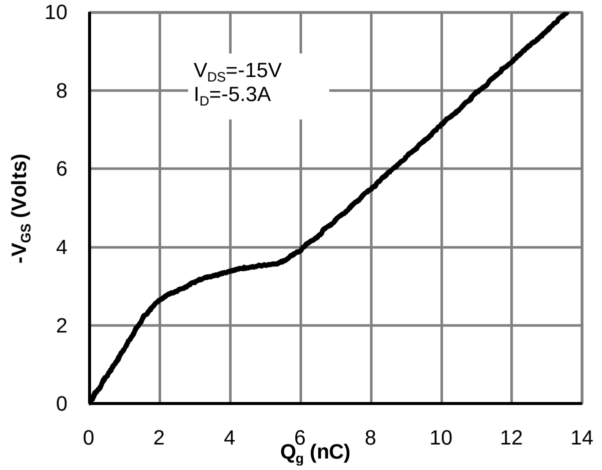
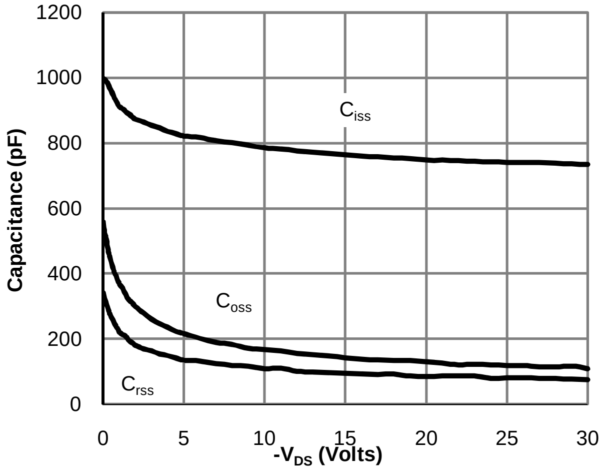


Figure 6: Body-Diode Characteristics

P-CHANNEL TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS





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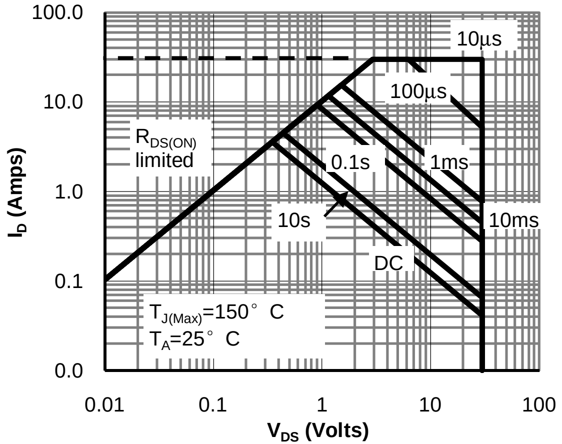


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

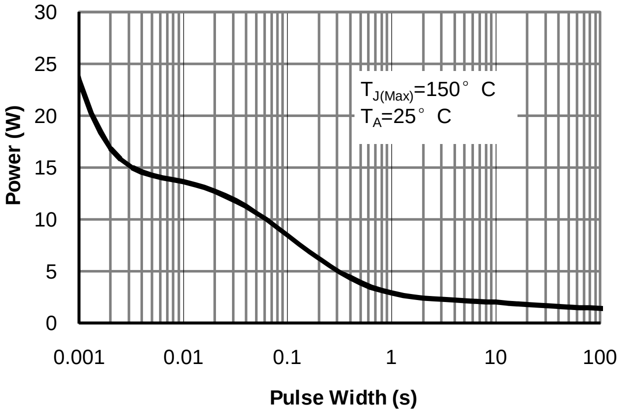


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

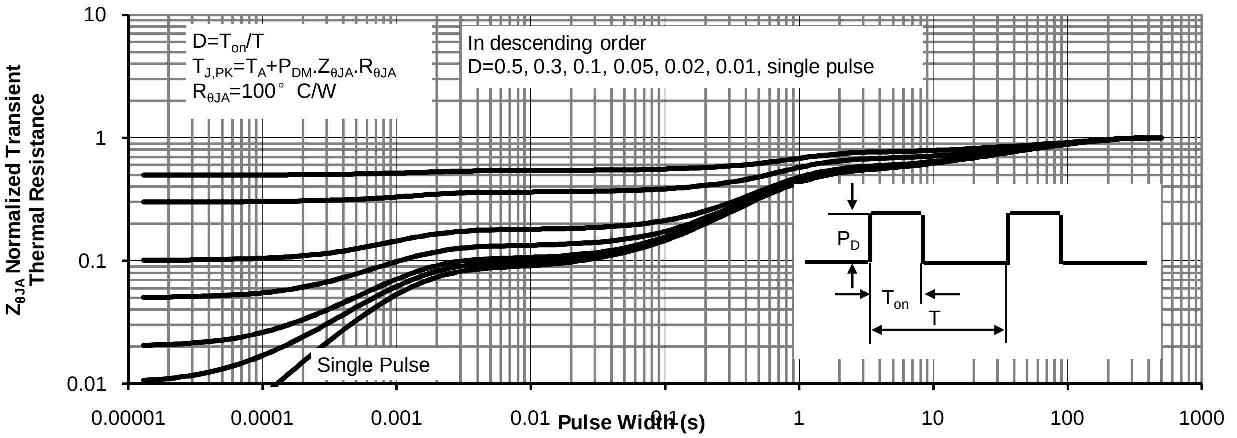
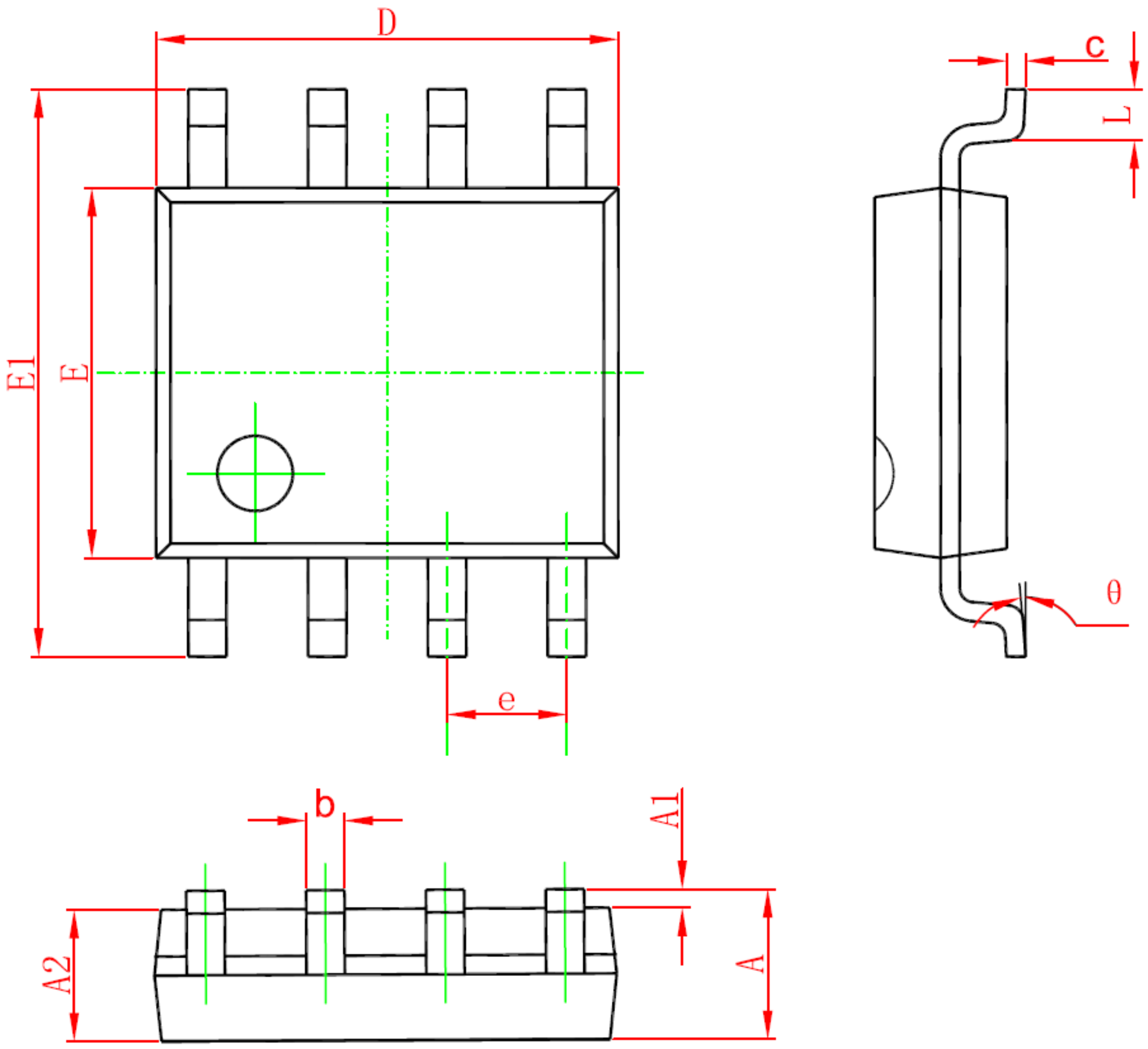


Figure 11: Normalized Maximum Transient Thermal Impedance

SOP-8 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

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- FNK will supply the best possible product for customers!