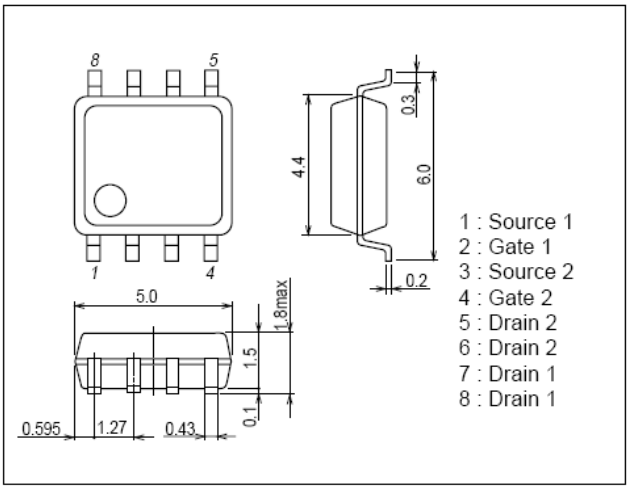
Si4606

Features

- Low On resistance.
- ±4.5V drive.
- RoHS compliant.

Package Dimensions

unit : mm
SOP-8

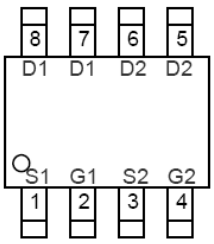


Specifications

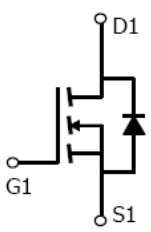
Absolute Maximum Ratings at T_a=25^{0}C

Parameter	Symbol	Conditions	Ratings		Unit
			N-Ch	P-Ch	
Drain-to-Source Voltage	V_{DSS}		30	-30	V
Gate-to-Source Voltage	V_{GSS}		±20	±20	V
Drain Current (DC)	I_D		6.9	-6	A
Drain Current (Pulse)	I_{DP}	PW≤10uS, duty cycle≤1%	30	-30	A
Allowable Power Dissipation	P_D	Mounted on a ceramic board (1000mm^2×0.8mm) 1unit	1.3	1.3	W
Total Dissipation	P_T	Mounted on a ceramic board (1000mm^2×0.8mm)	1.7	1.7	W
Channel Temperature	T_{ch}		150		^{0}C
Storage Temperature	T_{stg}		-55~+150		^{0}C

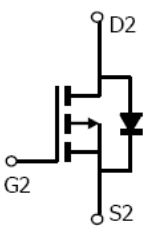
Pin Description



TOP VIEW
SOP-8



n-channel



p-channel

N-Channel Electrical Characteristics at T_a=25^{0}C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=250uA, V_{GS}=0V	30			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=24V, V_{GS}=0V			1	uA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}= V_{GS}, I_D=250uA	1.0	1.6	2.0	V
Static Drain-to-Source On-State Resistance	$R_{DS(ON)}$	I_D=6.9A, V_{GS}=10V		18	30	mΩ
	$R_{DS(ON)}$	I_D=5A, V_{GS}=4.5V		28	38	mΩ
Input Capacitance	C_{iss}	V_{DS}=15V, V_{GS}=0V, f=1MHz		680	820	pF
Output Capacitance	C_{oss}	V_{DS}=15V, V_{GS}=0V, f=1MHz		102		pF
Reverse Transfer Capacitance	C_{rss}	V_{DS}=15V, V_{GS}=0V, f=1MHz		77		pF
Turn-on Delay Time	$t_{d(on)}$	V_{GS}=10V, V_{DS}=15V, R_L=2.2Ω, R_{GEN}=3Ω		4.6	7	nS
Rise Time	t_r			4.1	6	nS
Turn-off Delay Time	$t_{d(off)}$			20.6	30	nS
Fall Time	t_f			5.2	8	nS
Total Gate Charge	Q_g	V_{DS}=15V, V_{GS}=10V, I_D=6.9A		6.74	8.1	nC
Gate-to-Source Charge	Q_{gs}			1.82		nC
Gate-to-Drain “Miller” Charge	Q_{gd}			3.2		nC
Diode Forward Voltage	V_{SD}	I_S=1A, V_{GS}=0V		0.76	1.3	V

N-Channel Typical Characteristics at T_a=25^{0}C

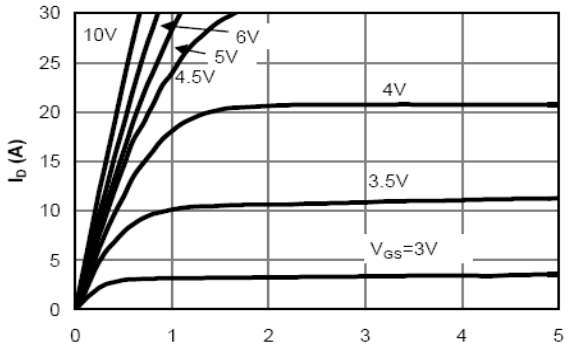


Fig 1: On-Region Characteristics

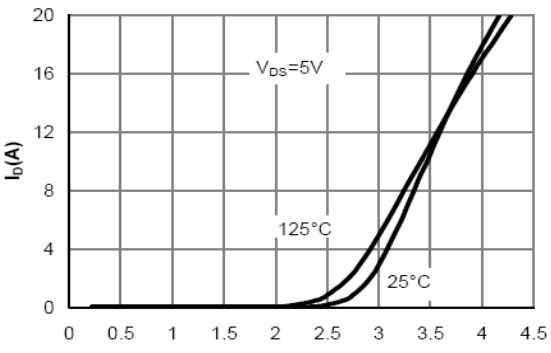


Figure 2: Transfer Characteristics

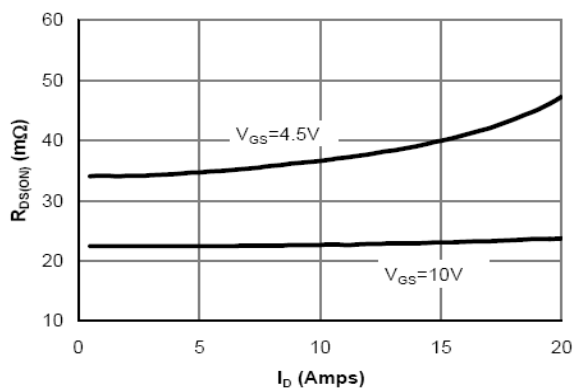


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

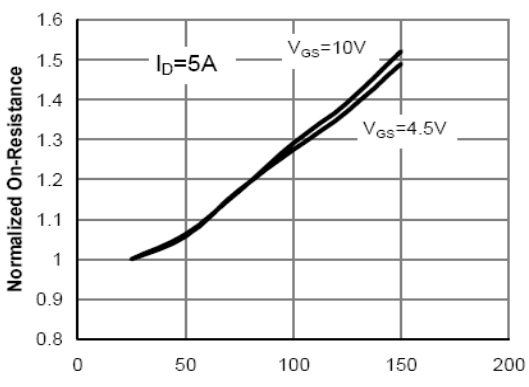


Figure 4: On-Resistance vs. Junction Temperature

N-Channel Typical Characteristics at T_a=25^{0}C (Continues)

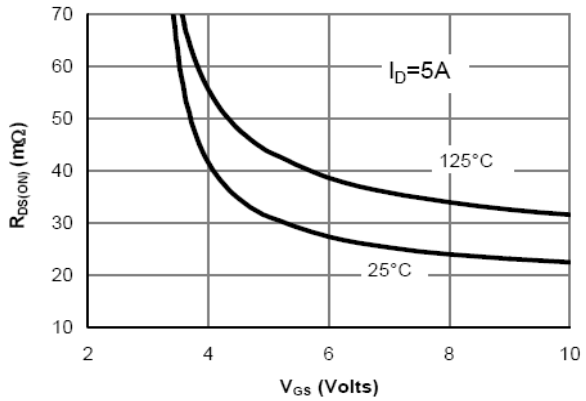


Figure 5: On-Resistance vs. Gate-Source Voltage

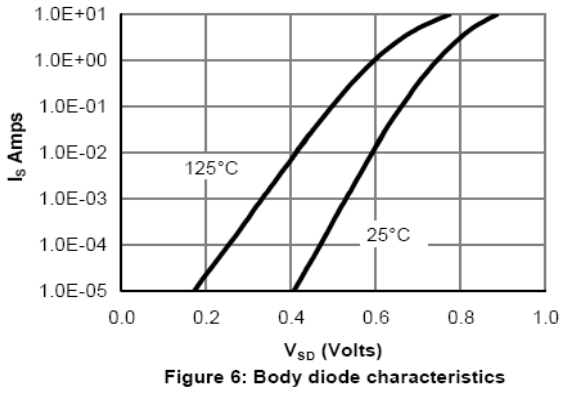


Figure 6: Body diode characteristics

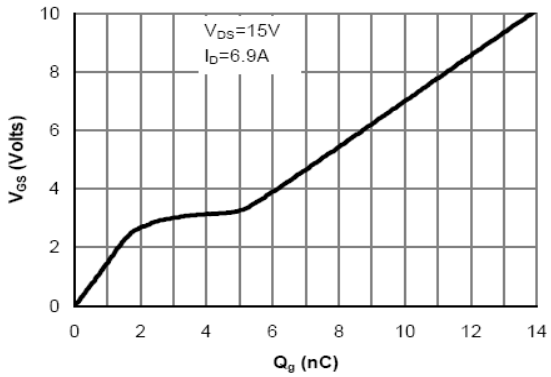


Figure 7: Gate-Charge characteristics

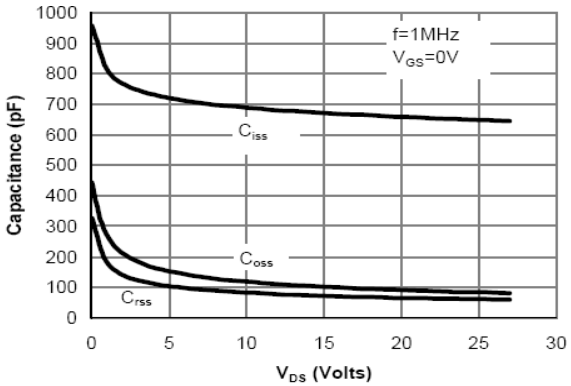


Figure 8: Capacitance Characteristics

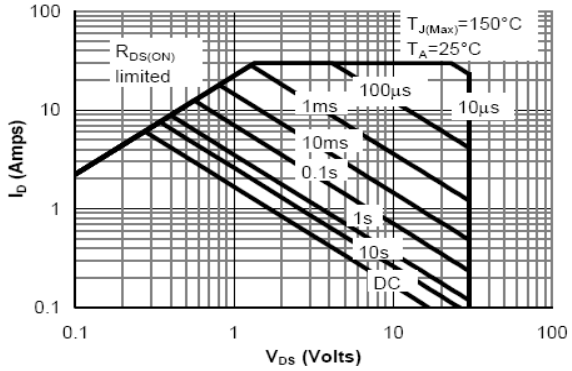


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

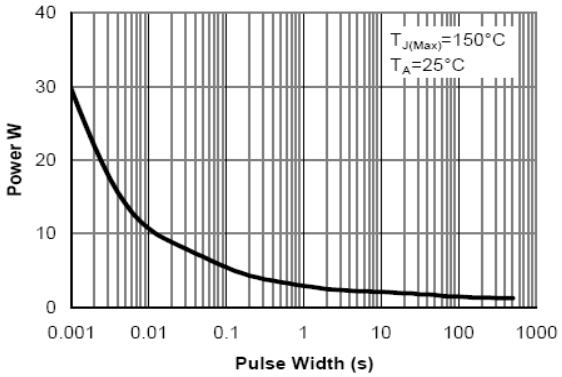


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

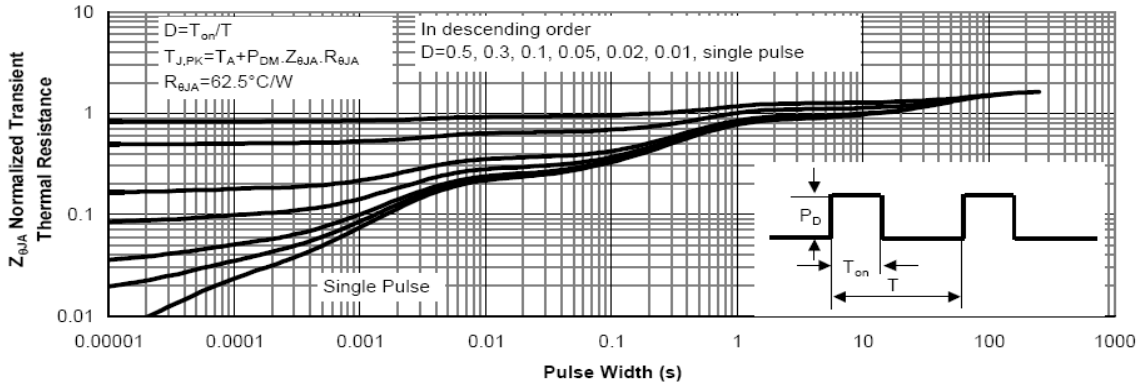


Figure 11: Normalized Maximum Transient Thermal Impedance

P-Channel Electrical Characteristics at T_a=25^{0}C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=-250uA, V_{GS}=0V	-30			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=-24V, V_{GS}=0V			-1	uA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}= V_{GS}, I_D=250uA	-1.0	-1.4	-2.0	V
Static Drain-to-Source On-State Resistance	$R_{DS(ON)}$	I_D=-6A, V_{GS}=-10V		38	46	mΩ
	$R_{DS(ON)}$	I_D=-5A, V_{GS}=-4.5V		56	72	mΩ
Input Capacitance	C_{iss}	V_{DS}=-15V, V_{GS}=0V, f=1MHz		920	1100	pF
Output Capacitance	C_{oss}	V_{DS}=-15V, V_{GS}=0V, f=1MHz		190		pF
Reverse Transfer Capacitance	C_{rss}	V_{DS}=-15V, V_{GS}=0V, f=1MHz		122		pF
Turn-on Delay Time	$t_{d(on)}$	V_{GS}=-10V, V_{DS}=-15V, R_L=2.7Ω, R_{GEN}=3Ω		7.7	11.5	nS
Rise Time	t_r			5.7	8.5	nS
Turn-off Delay Time	$t_{d(off)}$			20.2	30	nS
Fall Time	t_f			9.5	14	nS
Total Gate Charge	Q_g	V_{DS}=-15V, V_{GS}=-10V, I_D=-6A		9.6	11.6	nC
Gate-to-Source Charge	Q_{gs}			2.7	11.6	nC
Gate-to-Drain “Miller” Charge	Q_{gd}			4.5		nC
Diode Forward Voltage	V_{SD}	I_S=-1A, V_{GS}=0V		-0.8	-1.3	V

P-Channel Typical Characteristics at T_a=25^{0}C

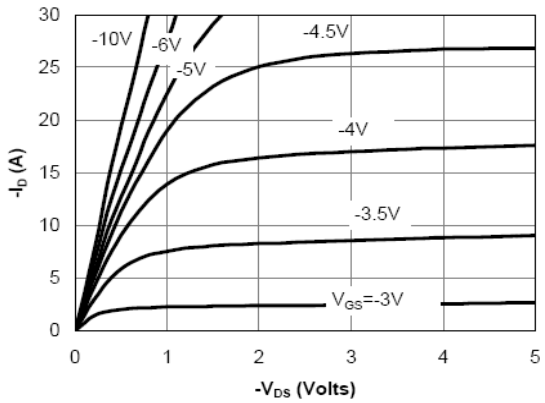


Fig 1: On-Region Characteristics

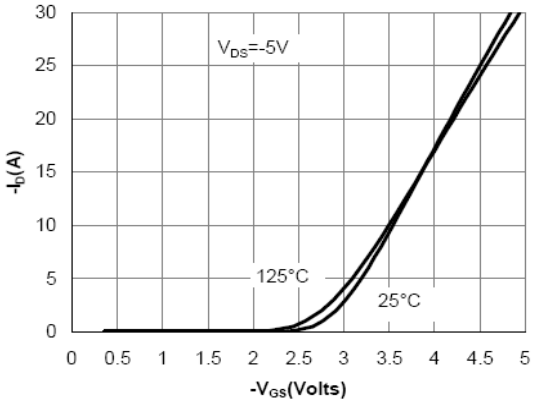


Figure 2: Transfer Characteristics

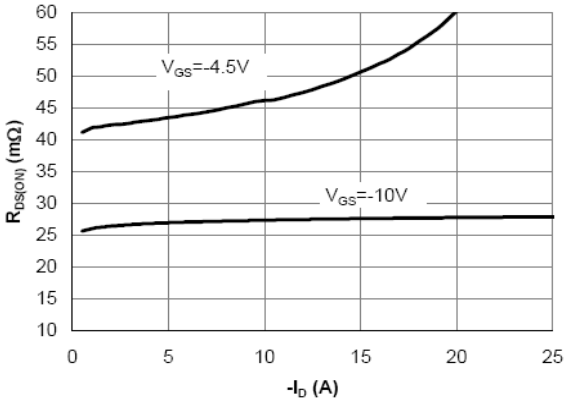


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

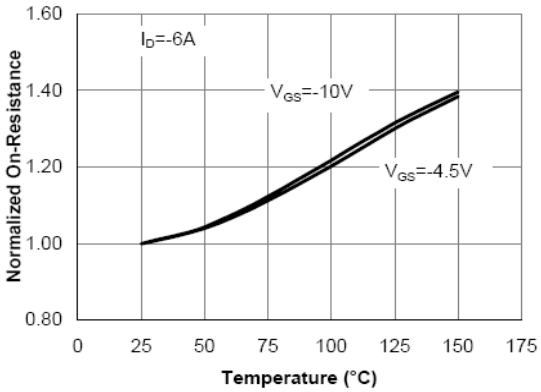


Figure 4: On-Resistance vs. Junction Temperature

P-Channel Typical Characteristics at T_a=25°C (Continues)

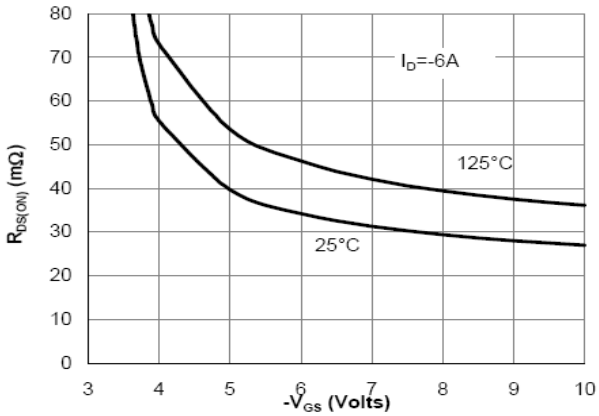


Figure 5: On-Resistance vs. Gate-Source Voltage

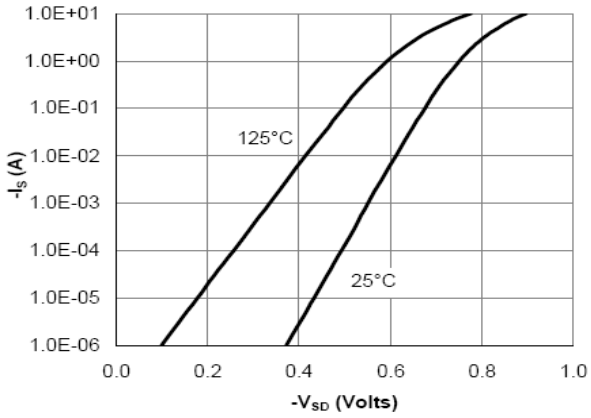


Figure 6: Body-Diode Characteristics

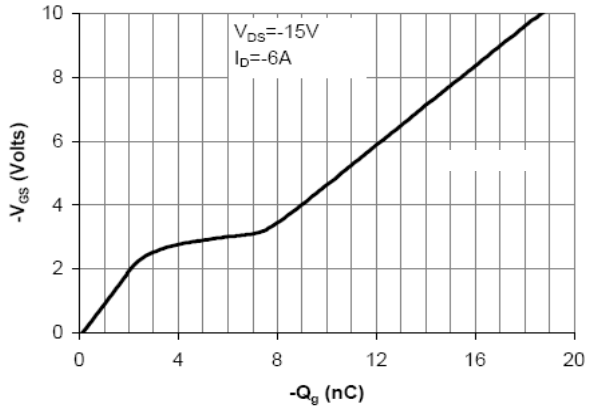


Figure 7: Gate-Charge Characteristics

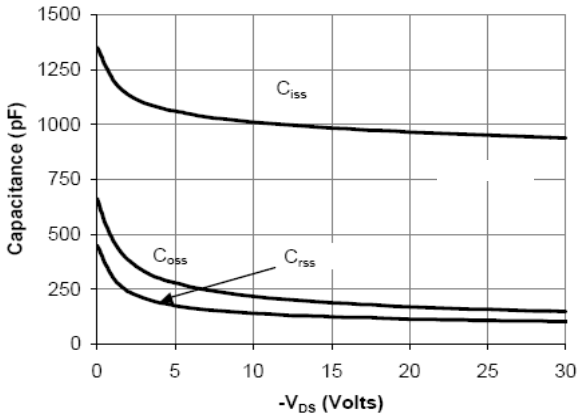


Figure 8: Capacitance Characteristics

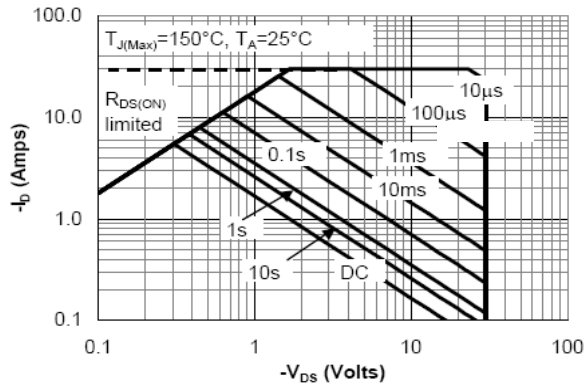


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

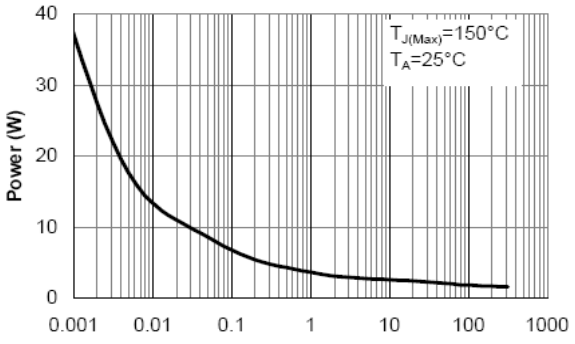


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

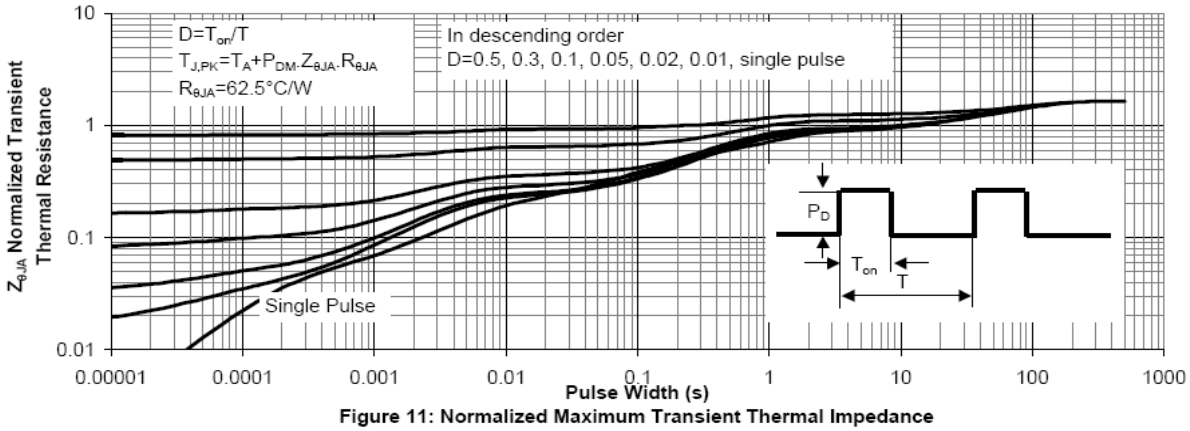


Figure 11: Normalized Maximum Transient Thermal Impedance