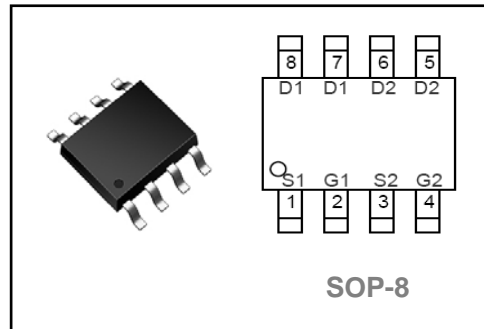


N- Channel and P-Channel Silicon MOSFETs

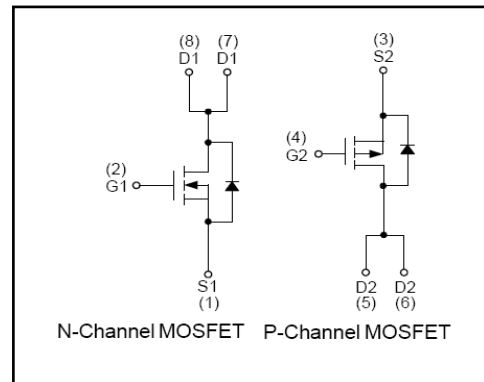
Features

- Low On-resistance.
- Composite type with an N-channel MOSFET and a P-channel MOSFET driving from a 4.5V/-4.5V supply voltage contained in a single package.
- High-density mounting.
- RoHS compliant.



Applications

- General-Purpose Switching Device
- For motor drives, inverters.



Absolute Maximum Ratings at Ta=250C

Parameter	Symbol	Conditions	Ratings		Unit
			N-Ch	P-Ch	
Drain-to-Source Voltage	V_{DSS}	Drain-Source Voltage	30	-30	V
Gate-to-Source Voltage	V_{GSS}	Gate-Source Voltage	±20	±20	V
Drain Current (DC)	I_D	Continuous Drain Current	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}	Maximum Junction Temperature	150		°C
Storage Temperature	T_{stg}	Storage Temperature Range	-55~+150		°C

N-Channel Electrical Characteristics at Ta=250C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=250\mu A, V_{GS}=0V$	30	-	-	V
Zero-Gate Voltage Drain Current	I_{DSS}	$V_{DS}=24V, V_{GS}=0V$	-	-	1	μA
Gate-to-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.6	2.0	V
Static Drain-to-Source On-State Resistance	$R_{DS(ON)}$	$I_D=6.9A, V_{GS}=10V$	-	17	25	$m\Omega$
	$R_{DS(ON)}$	$I_D=5A, V_{GS}=4.5V$	-	24	40	$m\Omega$
Input Capacitance	C_{iss}	$V_{DS}=15V,$ $V_{GS}=0V,$ $f=1MHz$	-	680	820	pF
Output Capacitance	C_{oss}		-	102	-	
Reverse Transfer Capacitance	C_{rss}		-	77	-	
Turn-on Delay Time	$t_{d(on)}$	$V_{GS}=10V,$ $V_{DS}=15V,$ $R_L=2.2\Omega,$ $R_{GEN}=3\Omega$	-	4.6	7	nS
Rise Time	t_r		-	4.1	6	
Turn-off Delay Time	$t_{d(off)}$		-	20.6	30	
Fall Time	t_f		-	5.2	8	
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	-	
Gate-to-Drain "Miller" Charge	Q_{gd}		-	3.2	-	
Diode Forward Voltage	V_{SD}	$I_S=1A, V_{GS}=0V$	-	0.76	1.3	V

N-Channel Typical Characteristics at $T_a=25^\circ\text{C}$

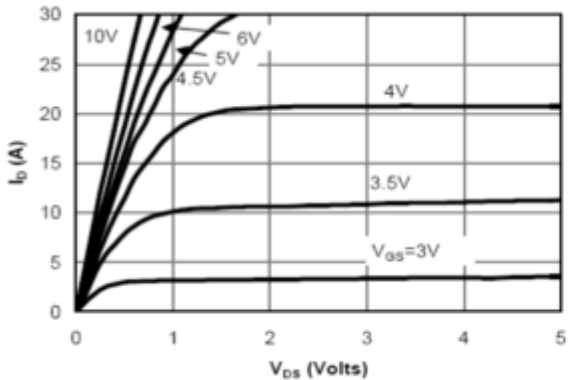


Fig 1: On-Region Characteristics

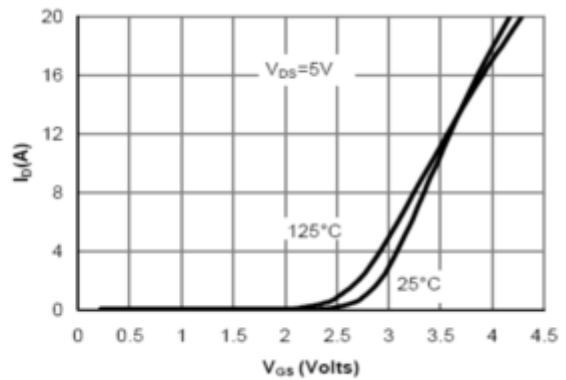


Figure 2: Transfer Characteristics

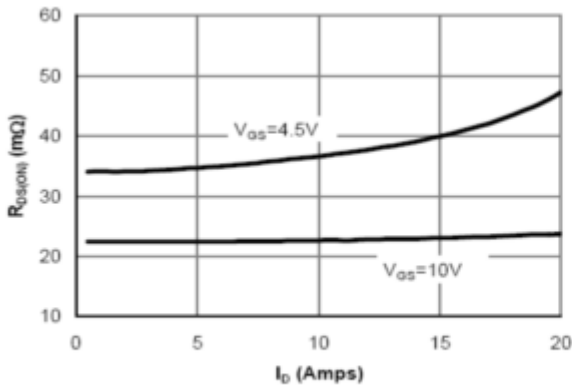


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

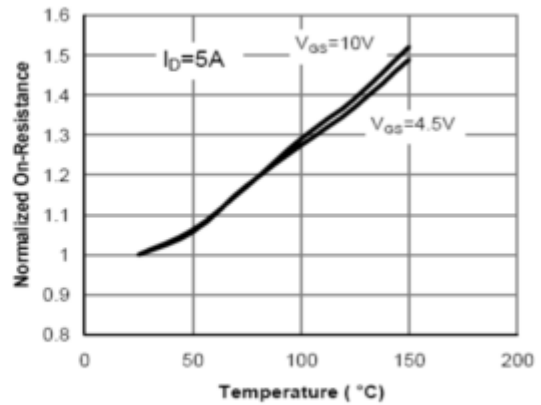


Figure 4: On-Resistance vs. Junction Temperature

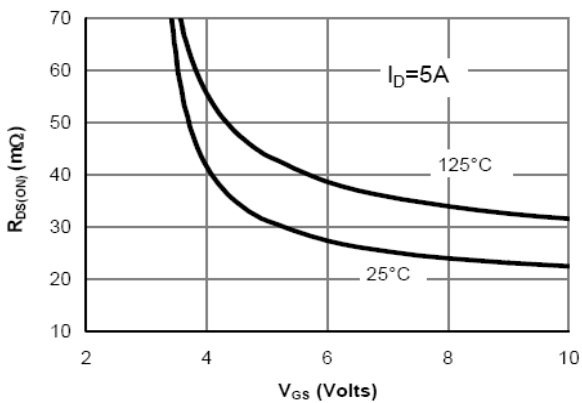


Figure 5: On-Resistance vs. Gate-Source Voltage

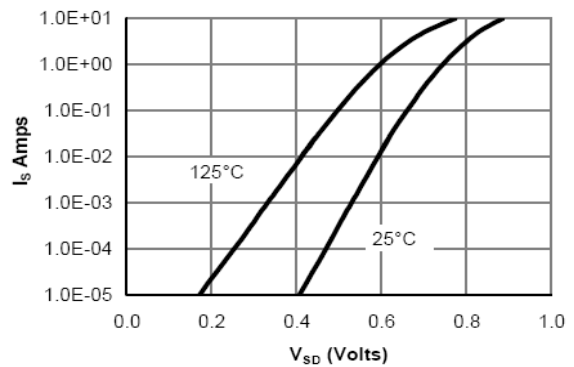


Figure 6: Body diode characteristics

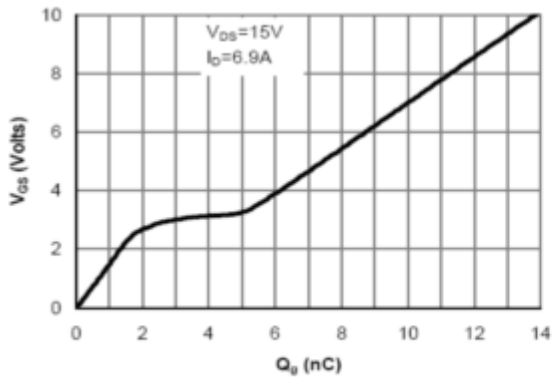


Figure 7: Gate-Charge characteristics

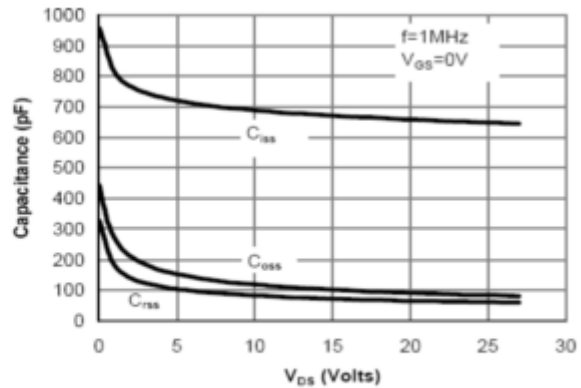


Figure 8: Capacitance Characteristics

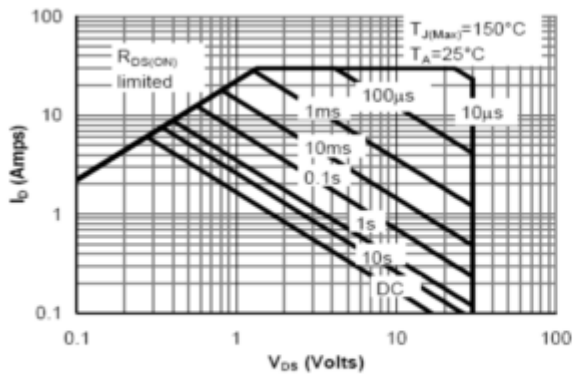


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

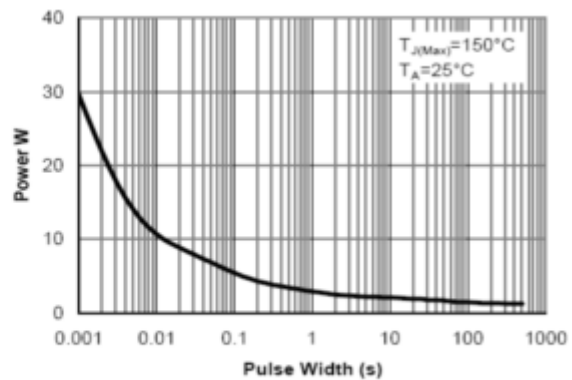


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

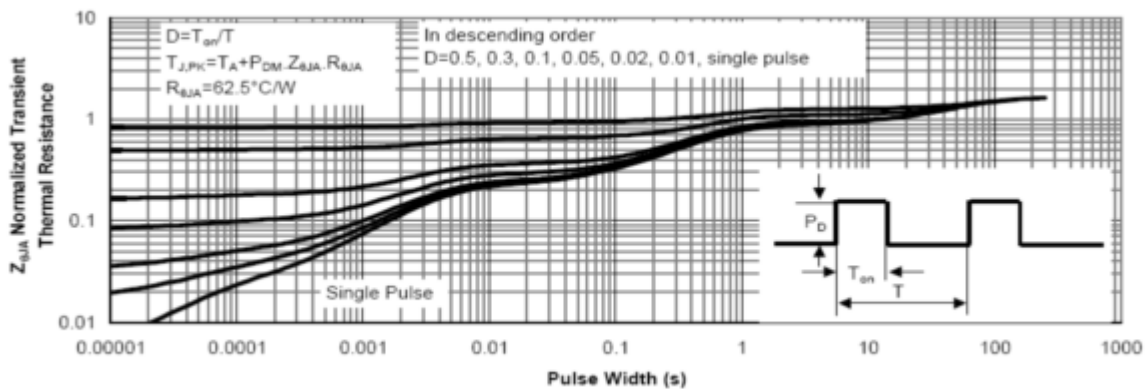


Figure 11: Normalized Maximum Transient Thermal Impedance

P-Channel Electrical Characteristics at $T_a=25^{\circ}\text{C}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=-250\mu\text{A}$, $V_{GS}=0\text{V}$	-30	-	-	V
Zero-Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-24\text{V}$, $V_{GS}=0\text{V}$	-	-	-1	μA
Gate-to-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20\text{V}$, $V_{DS}=0\text{V}$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	-1.0	-1.4	-2.0	V
Static Drain-to-Source On-State Resistance	$R_{DS(on)}$	$I_D=-6\text{A}$, $V_{GS}=-10\text{V}$	-	40	50	$\text{m}\Omega$
	$R_{DS(on)}$	$I_D=-5\text{A}$, $V_{GS}=-4.5\text{V}$	-	60	76	$\text{m}\Omega$
Input Capacitance	C_{iss}	$V_{DS}=-15\text{V}$,	-	920	1100	pF
Output Capacitance	C_{oss}	$V_{GS}=0\text{V}$,	-	190	-	
Reverse Transfer Capacitance	C_{rss}	$f=1\text{MHz}$	-	122	-	
Turn-on Delay Time	$t_{d(on)}$	$V_{GS}=-10\text{V}$,	-	7.7	11.5	nS
Rise Time	t_r	$V_{DS}=-15\text{V}$,	-	5.7	8.5	
Turn-off Delay Time	$t_{d(off)}$	$R_L=2.7\Omega$,	-	20.2	30	
Fall Time	t_f	$R_{GEN}=3\Omega$	-	9.5	14	
Total Gate Charge	Q_g	$V_{DS}=-15\text{V}$,	-	9.6	11.6	nC
Gate-to-Source Charge	Q_{gs}	$V_{GS}=-10\text{V}$,	-	2.7	11.6	
Gate-to-Drain "Miller" Charge	Q_{gd}	$I_D=-6\text{A}$	-	4.5	-	
Diode Forward Voltage	V_{SD}	$I_S=-1\text{A}$, $V_{GS}=0\text{V}$	-	-0.8	-1.3	V

P-Channel Typical Characteristics at $T_a=25^\circ\text{C}$

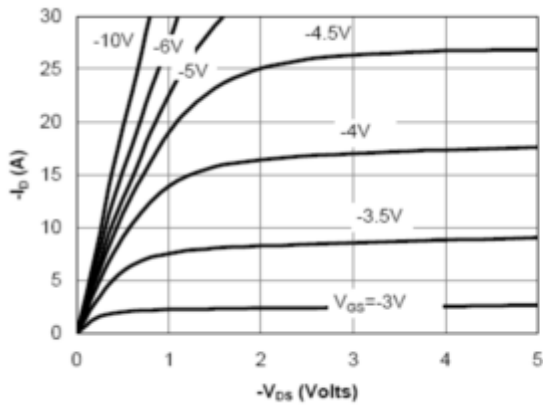


Fig 1: On-Region Characteristics

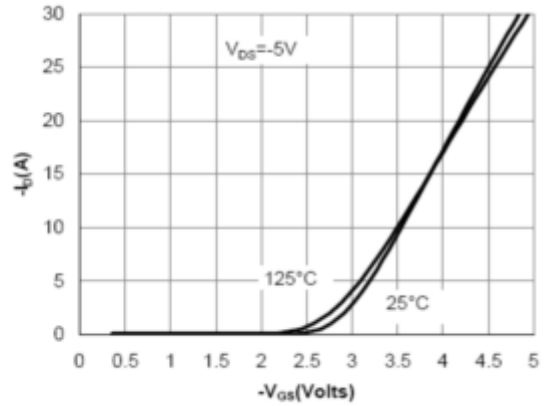


Figure 2: Transfer Characteristics

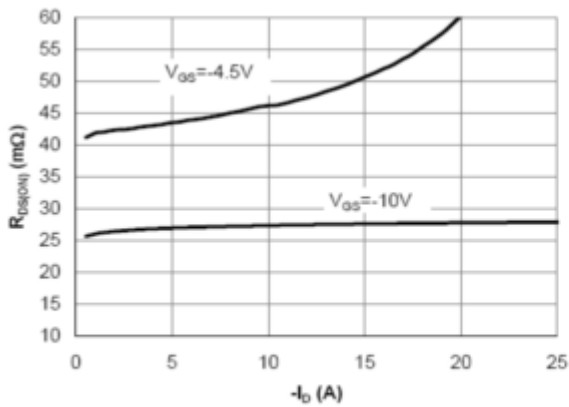


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

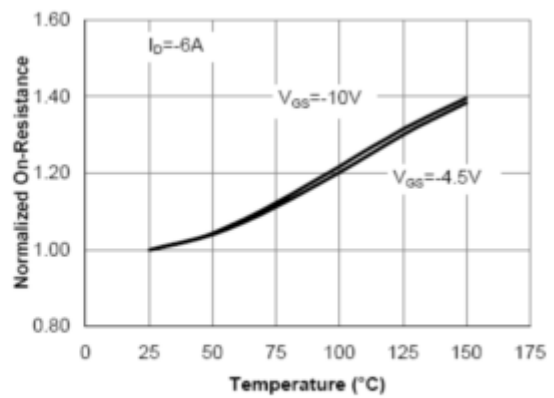


Figure 4: On-Resistance vs. Junction Temperature

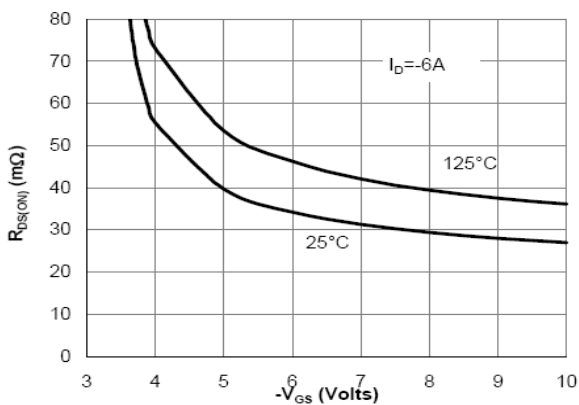


Figure 5: On-Resistance vs. Gate-Source Voltage

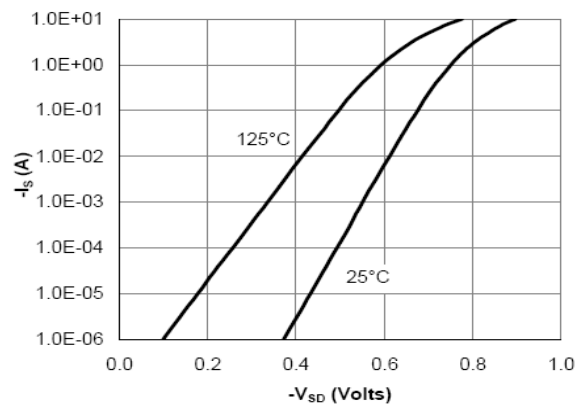


Figure 6: Body-Diode Characteristics

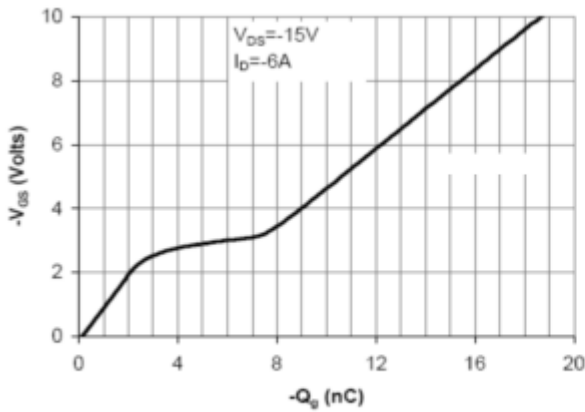


Figure 7: Gate-Charge Characteristics

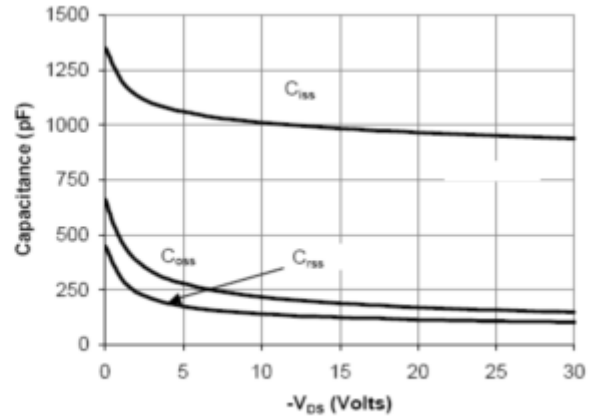


Figure 8: Capacitance Characteristics

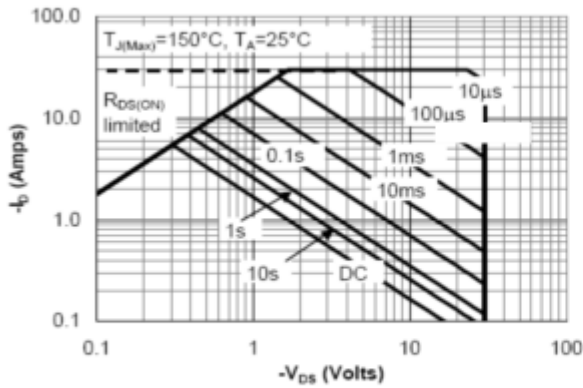


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

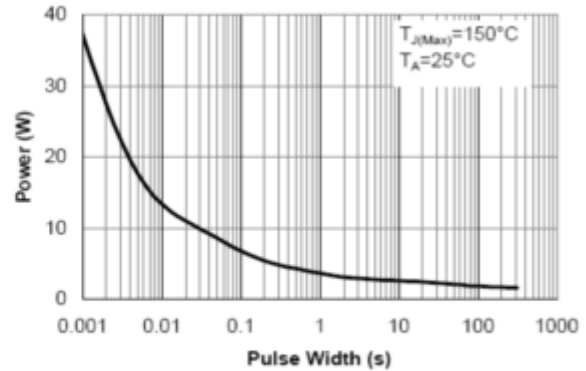


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

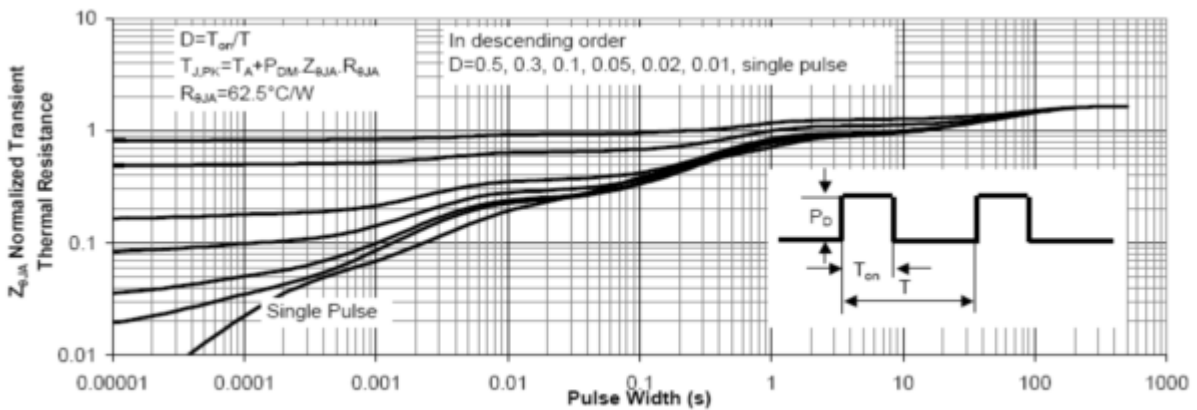
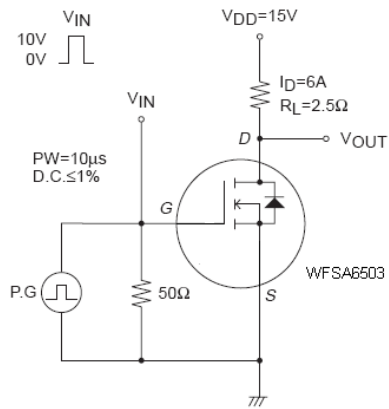
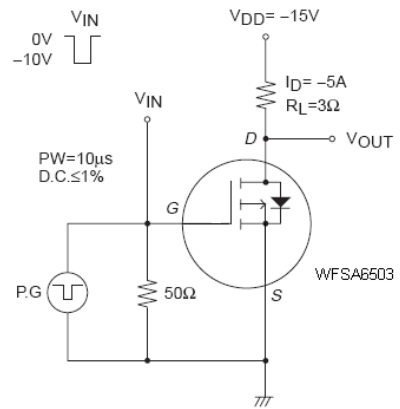


Figure 11: Normalized Maximum Transient Thermal Impedance

[N-channel]



[P-channel]



Switching Time Test Circuit

