Features

- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology
- ★ 100% EAS Guaranteed

Product Summery

RoHS

BVDSS	RDSON	ID
30V	18mΩ	7A
-30V	35mΩ	-6A

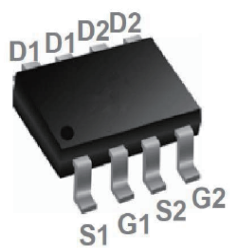
Applications

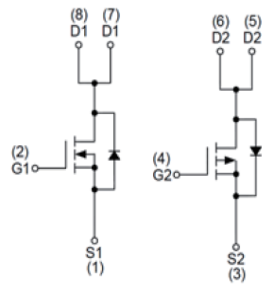
- ★ Power management in half bridge and inverters
- ★ DC-DC Converter
- ★ Load Switch

Description

THE 4606A is the highest performance trench N-ch and P-ch MOSFETs with extreme high cell density , which provide excellent RDSON and gate charge for most of the synchronous buck converter applications .
THE 4606A meet the RoHS and Green Product requirement , 100% EAS guaranteed with full function reliability approved.

SOP8 Pin Configuration





Absolute Maximum Ratings

Symbol	Parameter	Rating N-Channel	Rating P-Channel	Units
V_{DS}	Drain-Source Voltage	30	-30	V
V_{GS}	Gate-Source Voltage	±20	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	7	-6	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	6	-4	A
I_{DM}	Pulsed Drain Current[2]	20	-12	A
E_{AS}	Single Pulse Avalanche Energy[3]	72	59	mJ
I_{AS}	Avalanche Current	21	-19	A
P_D@T_C=25℃	Total Power Dissipation[4]	2.5	2.08	W
T_{STG}	Storage Temperature Range	-55 to 150	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	-	85	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	-	50	℃/W

Electrical Characteristics (T_J =25 °C unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	30	-	-	V
$\triangle BV_{DSS}/\triangle T_J$	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	-	0.034	-	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=6A	-	18	25	mΩ
		V_{GS}=4.5V , I_D=5A	-	25	31	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1	1.5	2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		-	-5.8	-	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=30V , V_{GS}=0V , T_J=25℃	-	-	1	uA
		V_{DS}=30V , V_{GS}=0V , T_J=55℃	-	-	5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	-	-	±100	nA
gfs	Forward Transconductance	V_{DS}=15V , I_D=5A	-	10	-	S
R_g	Gate Resistance	V_{DS}=24V , V_{GS}=0V , f=1MHz	-	2.5	-	Ω
Q_g	Total Gate Charge (4.5V)	V_{DS}=20V , V_{GS}=4.5V , I_D=6A	-	7.2	-	nC
Q_{gs}	Gate-Source Charge		-	1.4	-	
Q_{gd}	Gate-Drain Charge		-	2.2	-	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=12V , V_{GS}=10V , R_G=3.3Ω I_D=5A	-	3.9	-	ns
T_r	Rise Time		-	9.2	-	
$T_{d(off)}$	Turn-Off Delay Time		-	14.5	-	
T_f	Fall Time		-	6	-	
C_{iss}	Input Capacitance	V_{DS}=25V , V_{GS}=0V , f=1MHz	-	370	-	pF
C_{oss}	Output Capacitance		-	54	-	
C_{rss}	Reverse Transfer Capacitance		-	40	-	

Guaranteed Avalanche Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
EAS	Single Pulse Avalanche Energy[5]	V_{DD}=25V , L=0.1mH , I_{AS}=10A	16	---	---	mJ

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,6]	V_G=V_D=0V , Force Current	---	---	7	A
I_{SM}	Pulsed Source Current[2,6]		---	---	20	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=5A , T_J=25℃	---	---	1.2	V

Note :
1.The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper,t<10sec.
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3.The EAS data shows Max. rating . The test condition is V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=10A.
4.The power dissipation is limited by 150°C junction temperature .
5.The Min. value is 100% EAS tested guarantee.
6.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Electrical Characteristics (T_J =25 °C unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}= 0V, I_D= -250μA	-30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}= -30V, V_{GS}= 0V	-	-	-1	μA
I_{GSS}	Gate-Source Leakage	V_{DS}= 0V, V_{GS}= ±20V	-	-	±100	nA
$V_{GS(th)}$	Gate-Source Threshold voltage	V_{DS}= V_{GS}, I_D= -250μA	-1	-1.5	-2.5	V
$R_{DS(on)}$	Drain-Source on-State Resistance3	V_{GS}= -10V, I_D= -4.1A	-	36	60	mΩ
		V_{GS}= -4.5V, I_D= -3A	-	50	85	
Dynamic Characteristics4						
C_{iss}	Input Capacitance	V_{GS} = 0V , V_{DS} = -15V, f = 1.0MHz	-	530	-	pF
C_{oss}	Output Capacitance			70		
C_{rss}	Reverse Transfer Capacitance			56		
Switching Characteristics4						
Q_g	Total Gate Charge	V_{GS} = -10V, V_{DS} = -15V, I_D = -4.1A		6.8		nC
Q_{gs}	Gate－Source Charge		-	1	-	
Q_{gd}	Gate－Drain Charge		-	1.4	-	
$t_{d(on)}$	Turn-on Delay Time	V_{GS}= -10V, V_{DS}= -15V , R_L= 15Ω,R_{GEN}= 2.5Ω	-	14	-	ns
t_r	Rise Time		-	61	-	
$t_{d(off)}$	Turn-off Delay time		-	19	-	
t_f	Fall Time		-	10	-	
Source-Drain Body Diode Characteristics						
V_{SD}	Diode Forward Voltage3	I_S = -4.1A, V_{GS} = 0V	-	-	-1.2	V
I_S	Continuous Source Current		-	-	-56	A

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C.
2. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
3. Pulse Test: Pulse width≤300μs, duty cycle≤2%.
4. This value is guaranteed by design hence it is not included in the production test.

N-Channel Typical Performance Characteristics

Figure1:Typical Output Characteristics

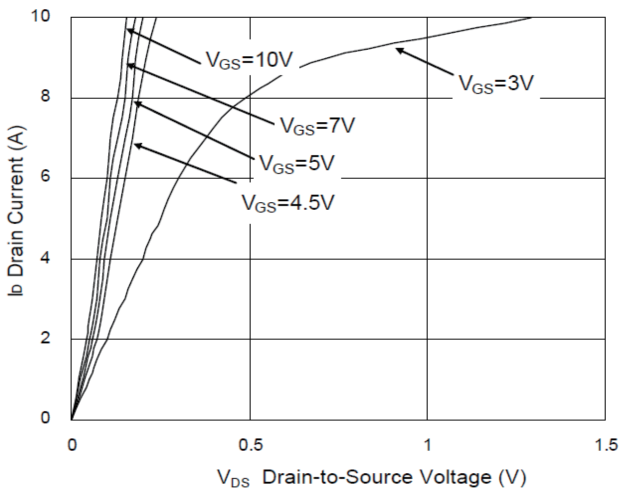


Figure 2: On-Resistance vs. G-S Voltage

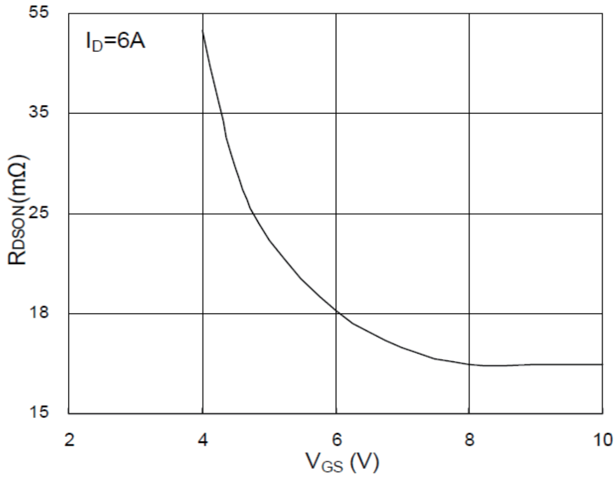


Figure 3:Forward Characteristics of Rever

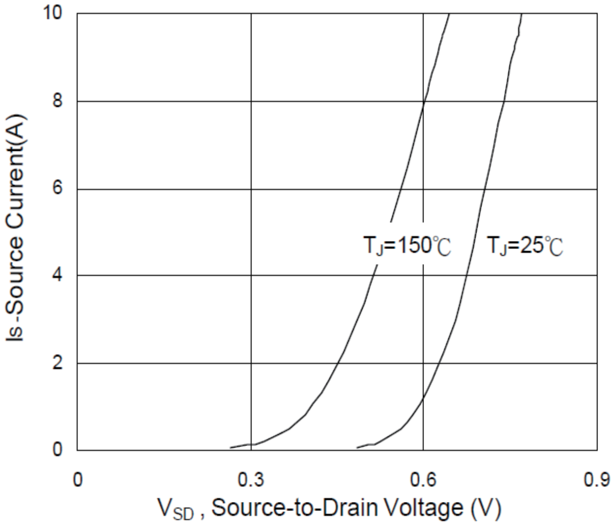


Figure 4: Gate-charge Characteristics

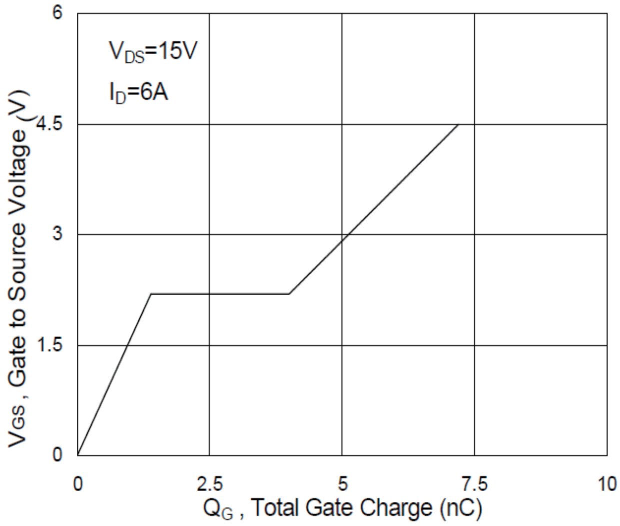


Figure 5: VGS(th) vs. TJ

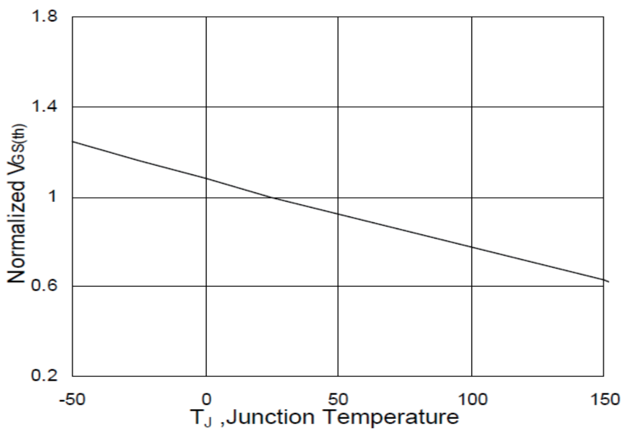
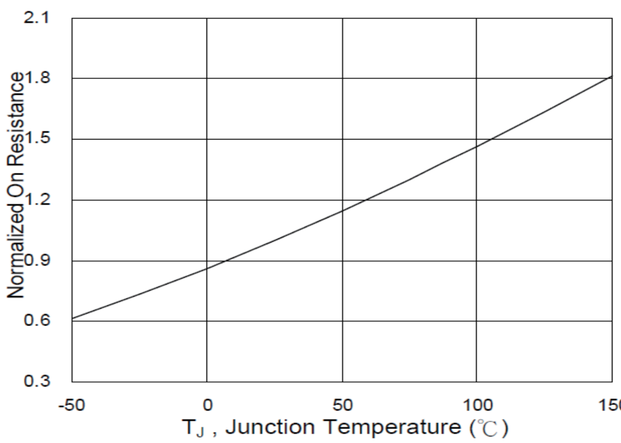


Figure 6: Normalized RDSON vs. TJ



N-Channel Typical Performance Characteristics

Figure7:Capacitance

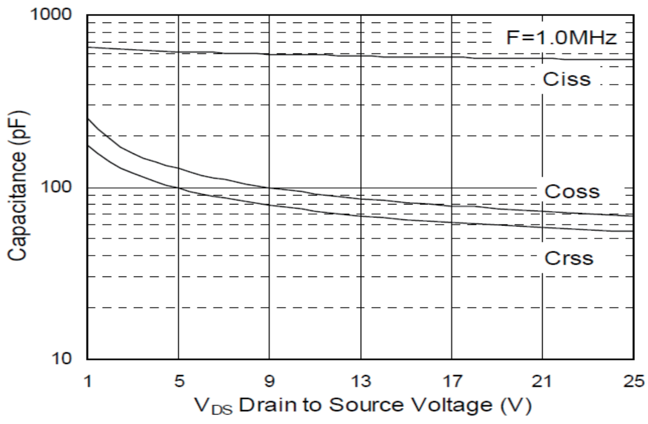


Figure 8: Safe Operating Area

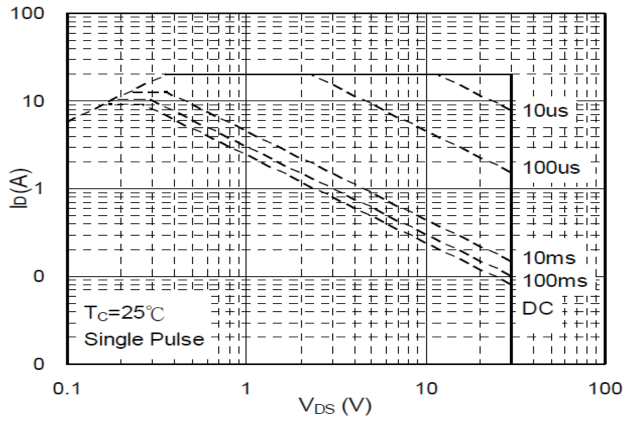


Figure9:Normalized Maximum Transient T

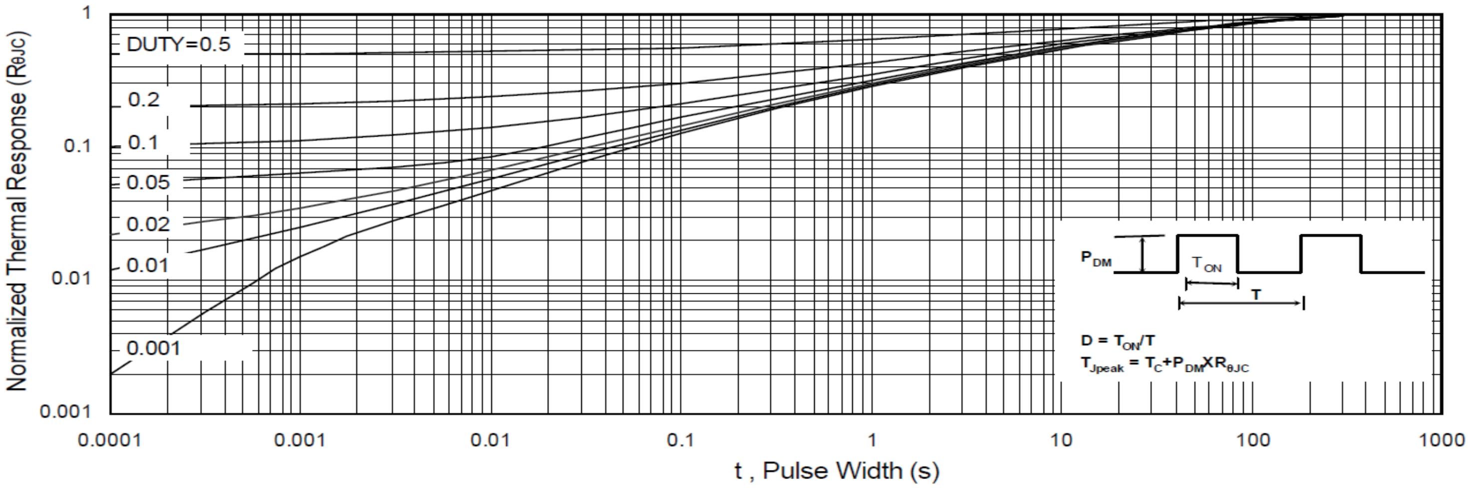


Figure10:Switching Time Waveform

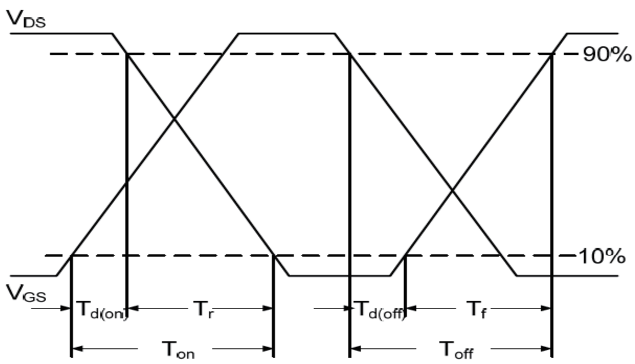
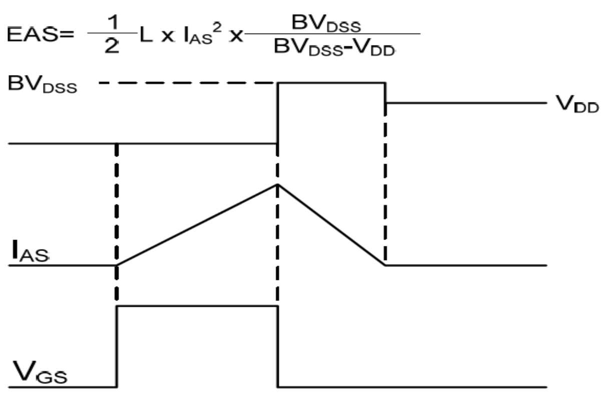


Figure 11: Unclamped Inductive Wavefor



P-Channel Typical Performance Characteristics

Figure1:Typical Output Characteristics

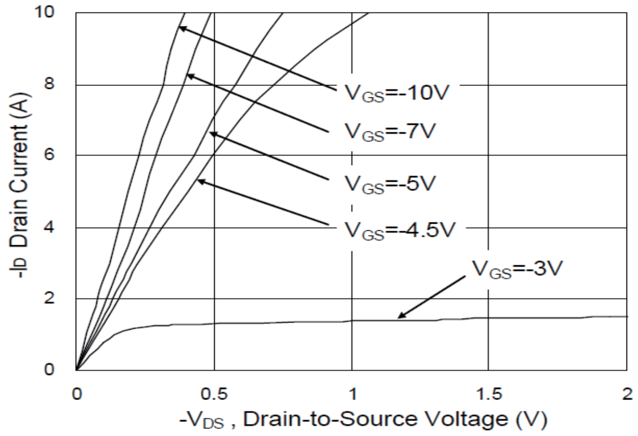


Figure 2: On-Resistance vs. G-S Voltage

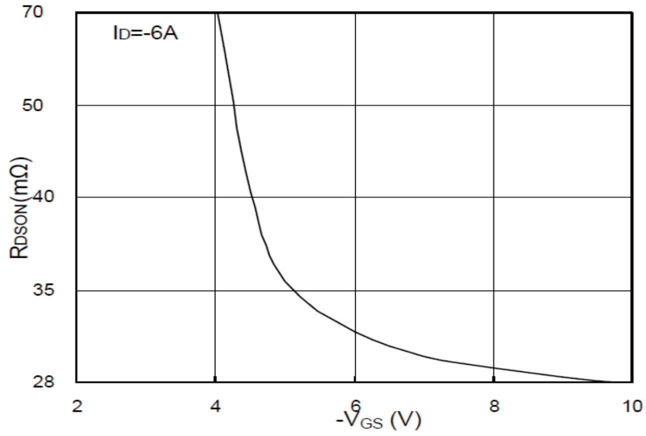


Figure 3:Forward Characteristics of Reve

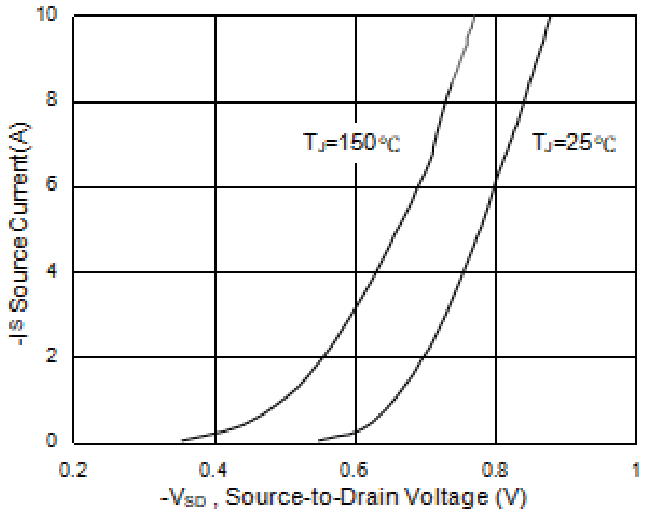


Figure 4: Gate-charge Characteristics

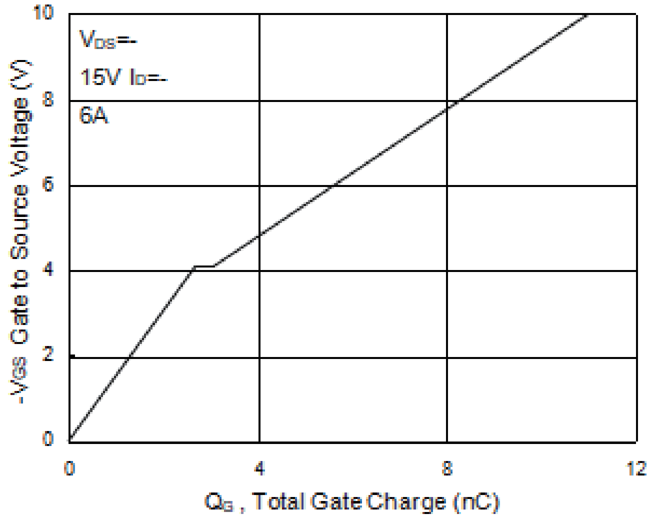


Figure 5: VGS(th) vs. TJ

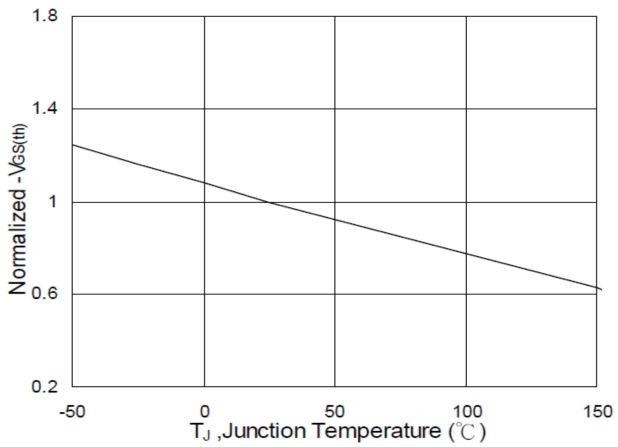
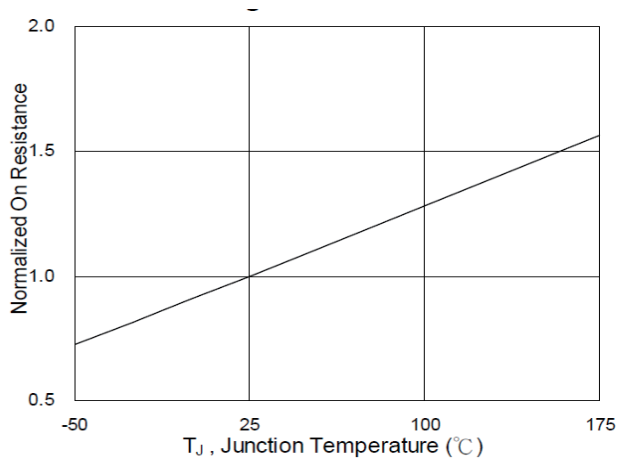


Figure 6: Normalized RDSON vs. TJ



P-Channel Typical Performance Characteristics

Figure7:Capacitance

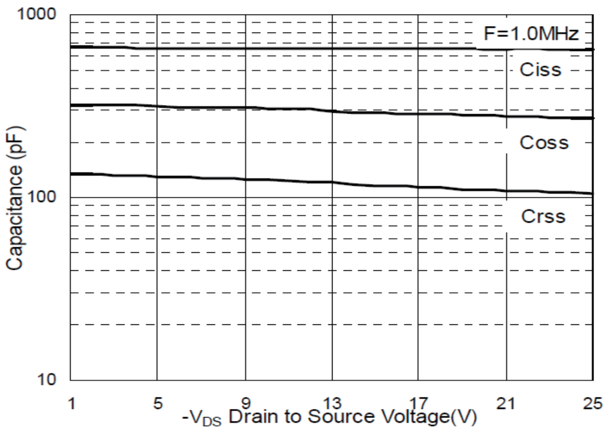


Figure 8: Safe Operating Area

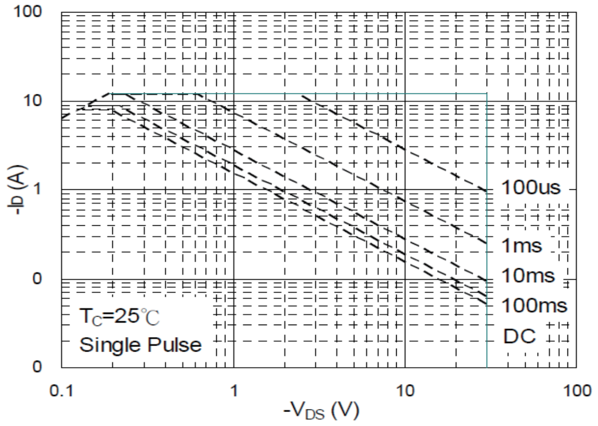


Figure9:Normalized Maximum Transient T

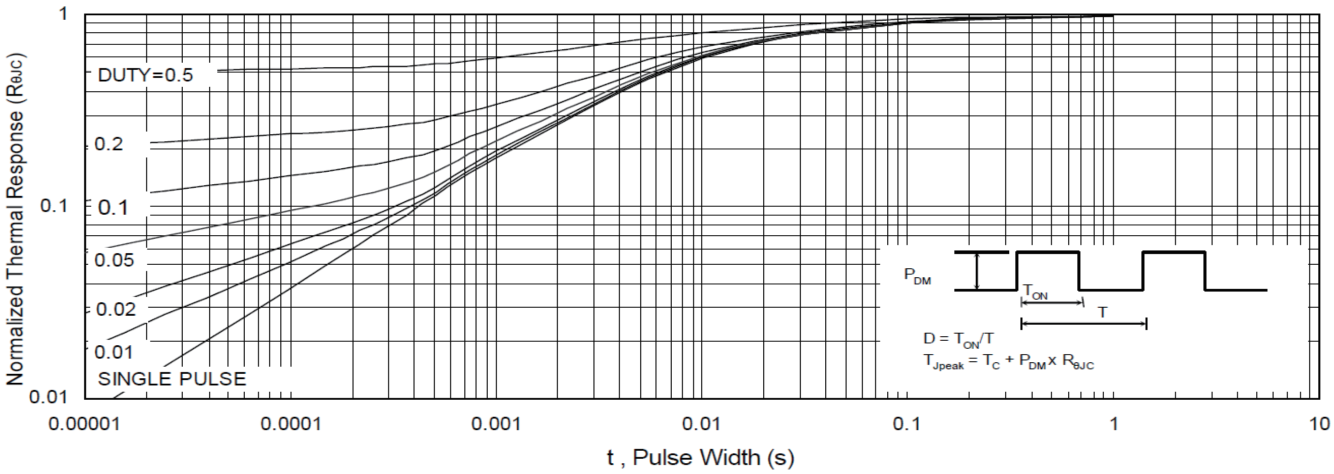


Figure10:Switching Time Waveform

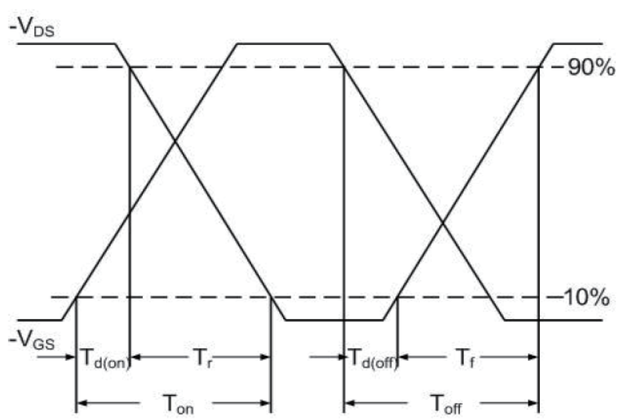


Figure 11: Unclamped Inductive Wavefor