Description

The 6706A uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used to form a level shifted high side switch, and a wide variety of applications.

General Features

- **N-Channel**

V_{DSS}	$R_{DS(ON)}$ @10V (typ)	I_D
30V	20mΩ	6.5A

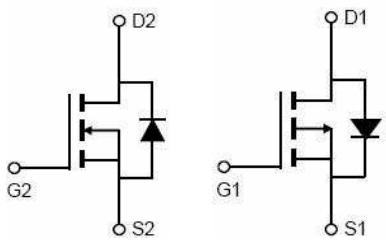
- **P-Channel**

V_{DSS}	$R_{DS(ON)}$ @10V (typ)	I_D
-30V	42mΩ	-5A

- High power and current handing capability
- RoHS Compliant

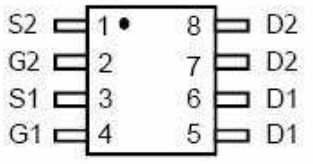
Application

- PWM applications
- Load switch
- Power management

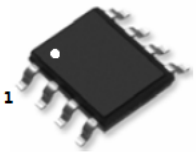


N-channel **P-channel**

Schematic diagram



Marking and pin assignment



SOP-8

Ordering Information

Part Number	Marking	Case	Packaging
6706A	6706A	SOP-8	4000pcs/Reel

Absolute Maximum Ratings (T_A=25℃unless otherwise noted)

Parameter		Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage		V_{DS}	30	-30	V
Gate-Source Voltage		V_{GS}	±20	±20	V
Drain Current-Continuous	T_A=25℃	I_D	6.5	-5	A
	T_A=70℃		5.4	-4.1	A
Drain Current-Pulsed (Note 1)		I_{DM}	26	-20	A
Maximum Power Dissipation		P_D	2.0	2.0	W
Operating Junction and Storage Temperature Range		T_J,T_{STG}	-55 To 150	-55 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	N-Ch	62.5	℃/W
Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	P-Ch	62.5	℃/W

N-CH Electrical Characteristics (T_A=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	30	33	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	1.2	1.6	2.4	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=5A	-	20	30	mΩ
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=5A	-	30	40	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=5A	-	15	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=15V,V_{GS}=0V, F=1.0MHz	-	255	-	PF
Output Capacitance	C_{oss}		-	45	-	PF
Reverse Transfer Capacitance	C_{rss}		-	35	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=15V, R_L=2.5Ω V_{GS}=10V,R_G=3Ω	-	4.5	-	nS
Turn-on Rise Time	t_r		-	2.5	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	14.5	-	nS
Turn-Off Fall Time	t_f		-	3.5	-	nS
Total Gate Charge	Q_g	V_{DS}=15V,I_D=5A, V_{GS}=10V	-	5.2		nC
Gate-Source Charge	Q_{gs}		-	0.85	-	nC
Gate-Drain Charge	Q_{gd}		-	1.3	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=5A	-	-	1.2	V

P-CH Electrical Characteristics (T_A=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=-250μA	-30	-33	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-30V,V_{GS}=0V	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=-250μA	-1	-1.6	-2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-4A	-	42	60	mΩ
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-4.5V, I_D=-4A	-	62	90	mΩ
Forward Transconductance	g_{FS}	V_{DS}=-5V,I_D=-5A	-	8	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=-15V,V_{GS}=0V, F=1.0MHz	-	520	-	PF
Output Capacitance	C_{oss}		-	100	-	PF
Reverse Transfer Capacitance	C_{rss}		-	65	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-15V, R_L=2.3Ω V_{GS}=-10V,R_G=6Ω	-	7.5	-	nS
Turn-on Rise Time	t_r		-	5.5	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	19	-	nS
Turn-Off Fall Time	t_f		-	7	-	nS
Total Gate Charge	Q_g	V_{DS}=-15V,I_D=-5A, V_{GS}=-10V	-	9.2		nC
Gate-Source Charge	Q_{gs}		-	1.6	-	nC
Gate-Drain Charge	Q_{gd}		-	2.2	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=-5A	-	-	-1.2	V

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

N-Channel Typical Electrical and Thermal Characteristics (Curves)

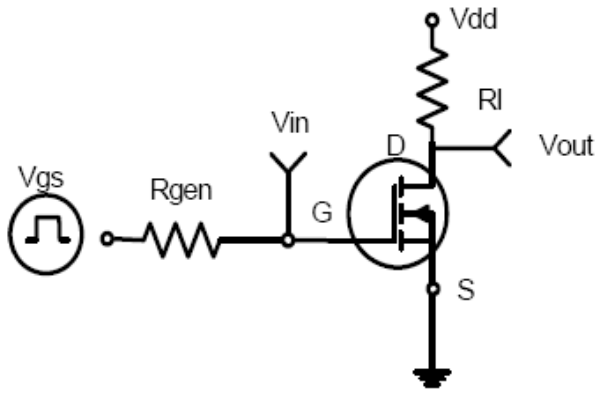


Figure 1 Switching Test Circuit

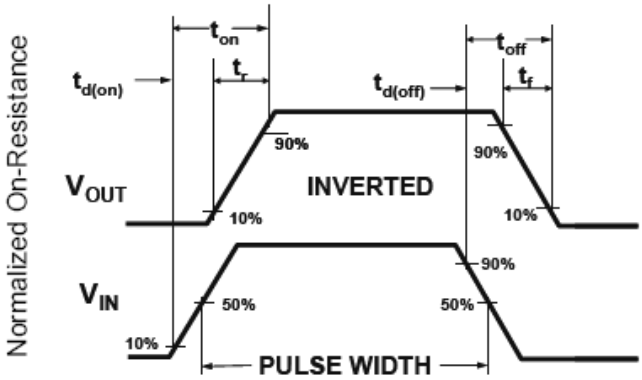


Figure 2 Switching Waveforms

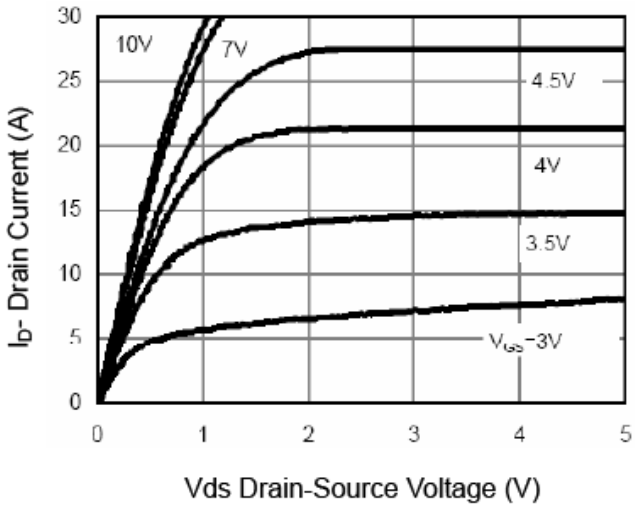


Figure 3 Output Characteristics

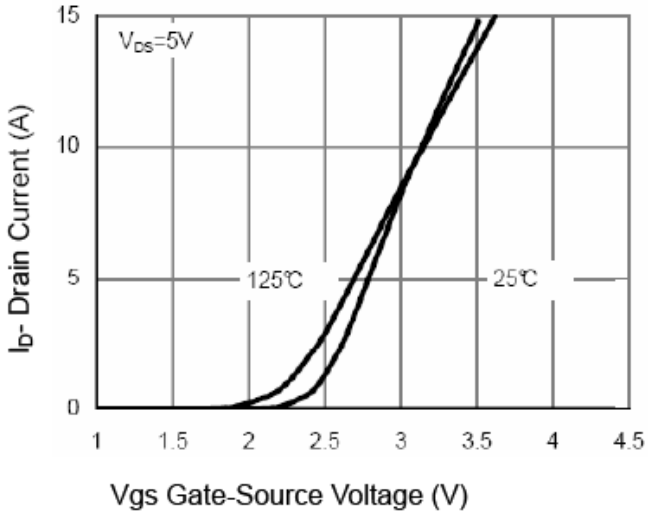


Figure 4 Transfer Characteristics

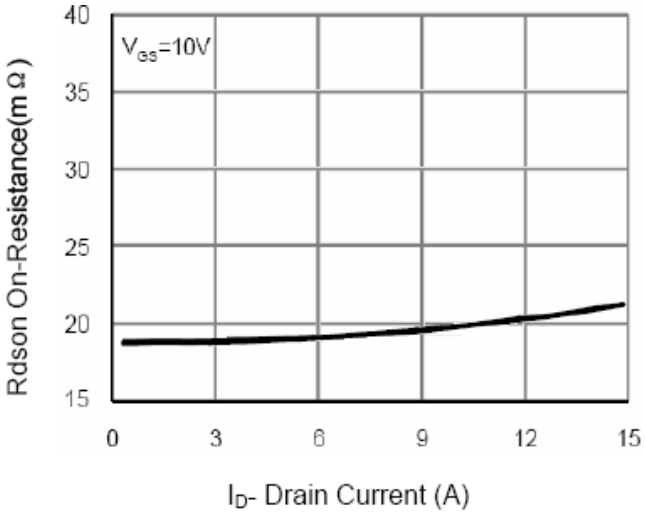


Figure 5 Rdson- Drain Current

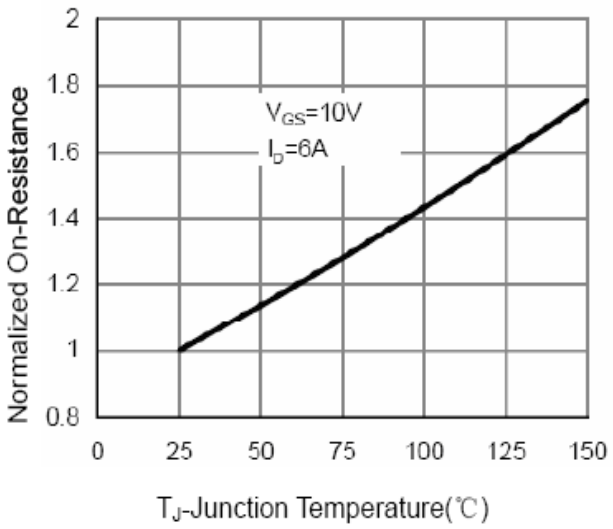


Figure 6 Source- Drain Diode Forward

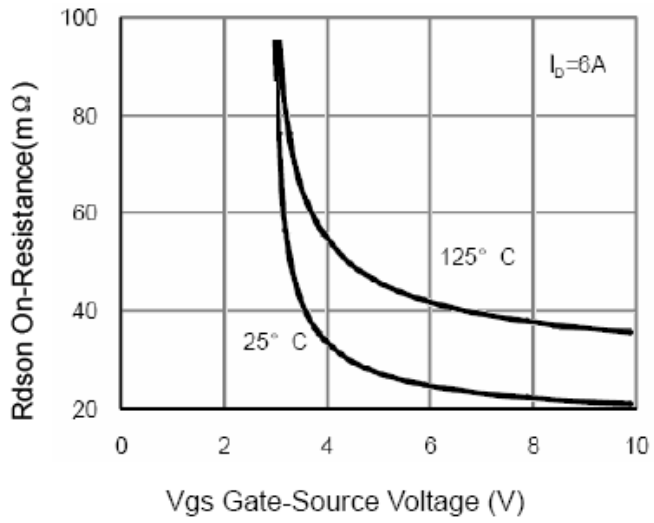


Figure 7 Rdson vs Vgs

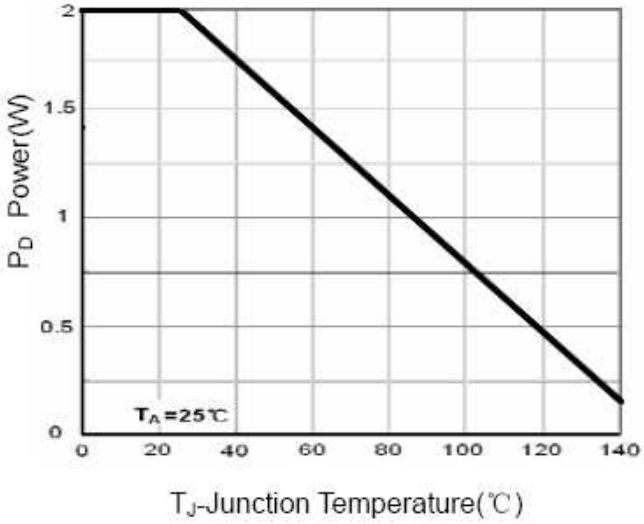


Figure 8 Power Dissipation

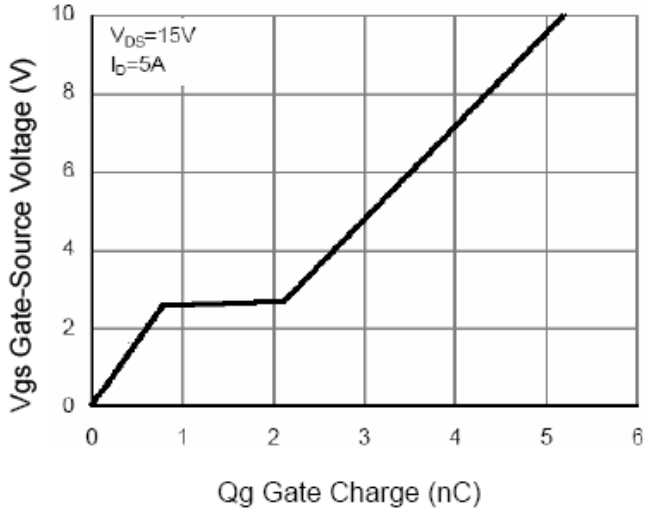


Figure 8 Gate Charge

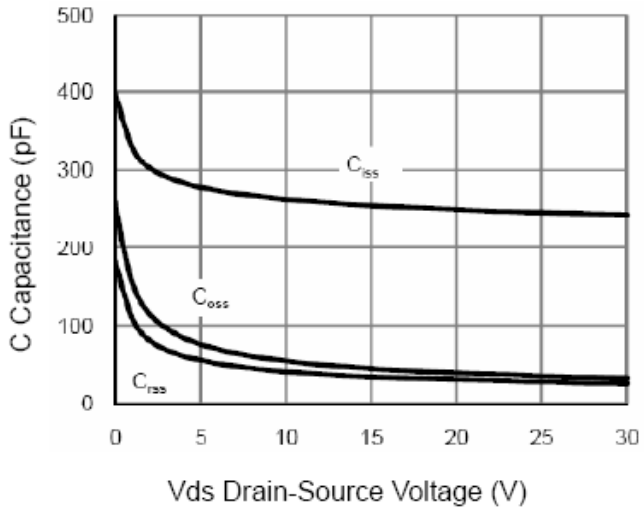


Figure 9 Capacitance vs Vds

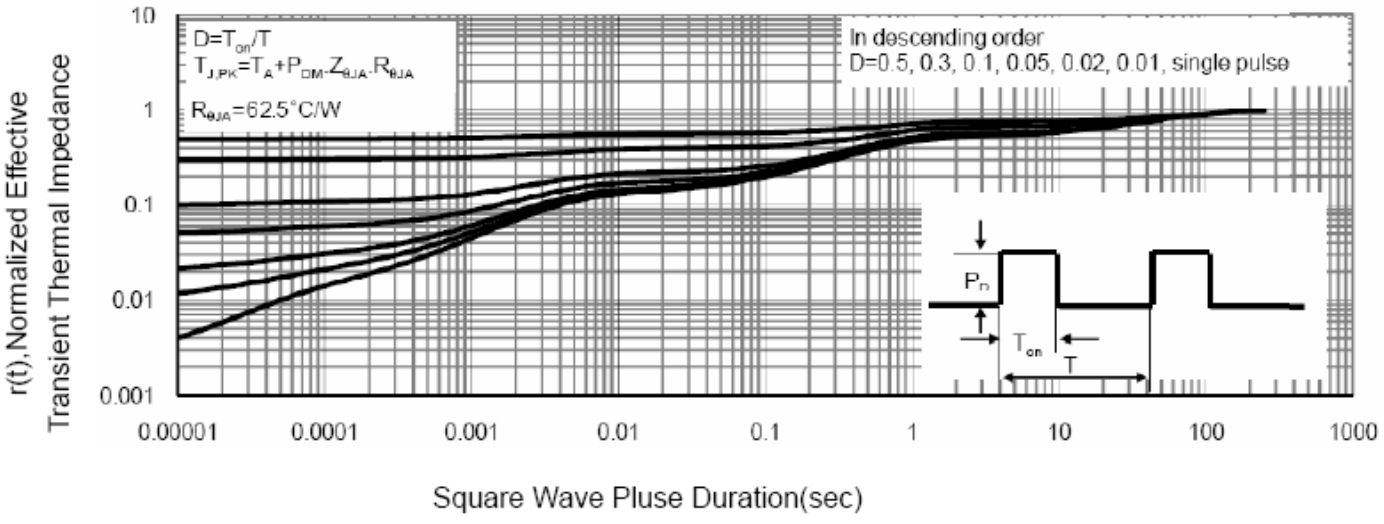


Figure 10 Normalized Maximum Transient Thermal Impedance

P-Channel Typical Electrical and Thermal Characteristics (Curves)

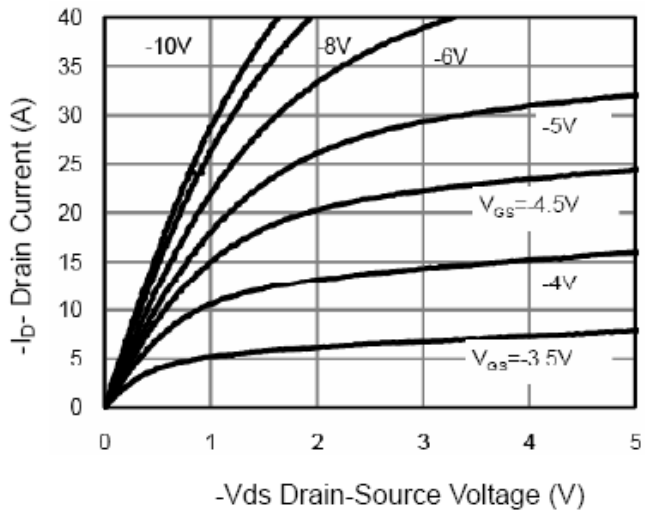


Figure 1 Output Characteristics

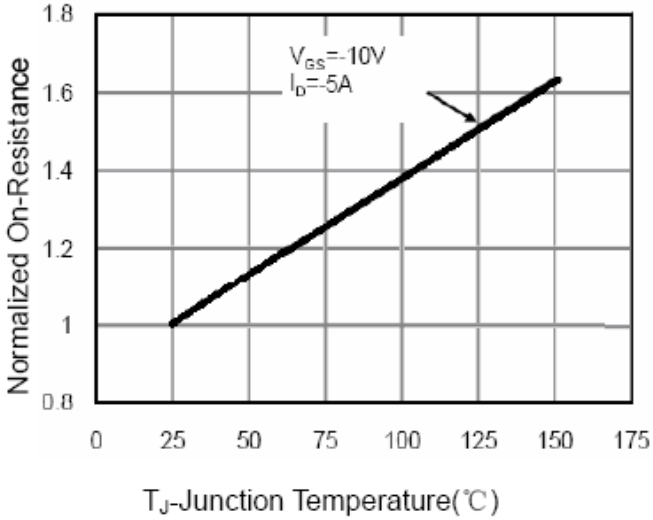


Figure 2 Rdson-Junction Temperature

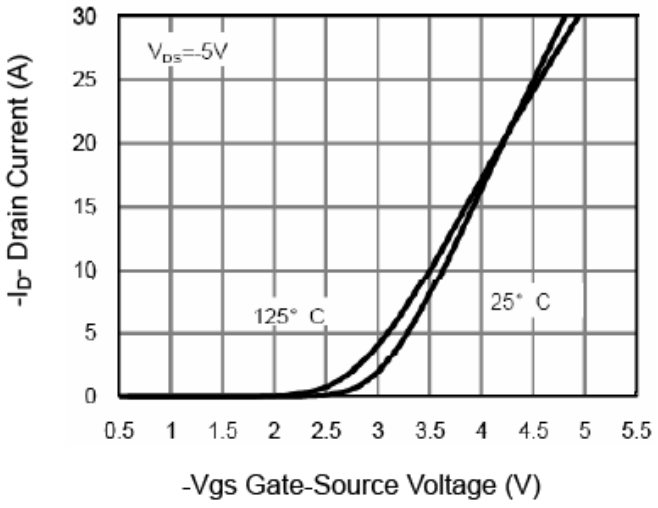


Figure 3 Transfer Characteristics

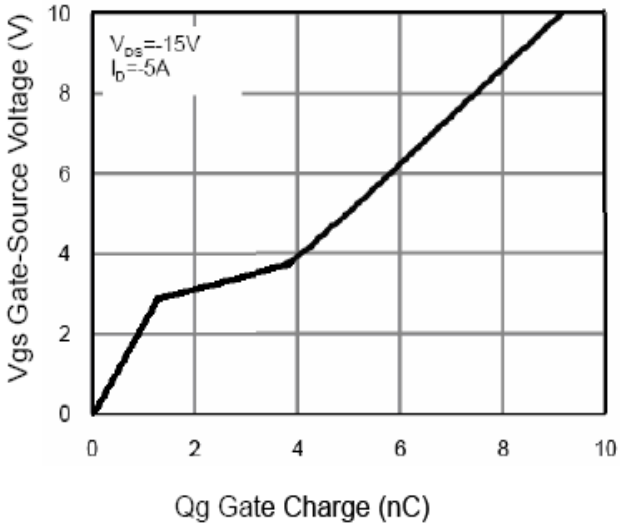


Figure 4 Gate Charge

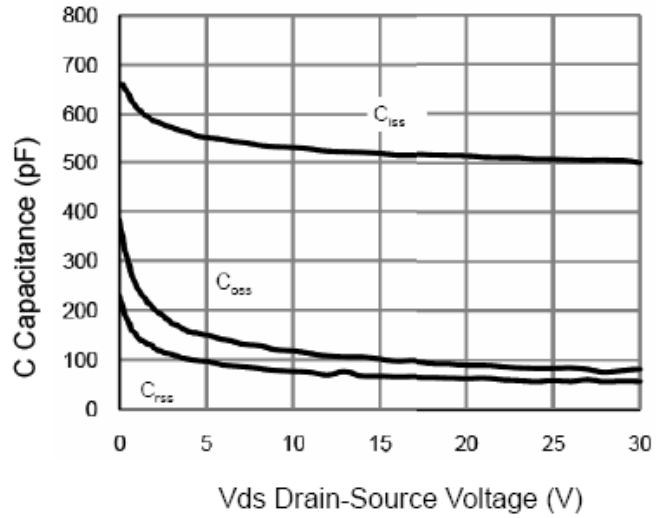


Figure 5 Capacitance vs Vds

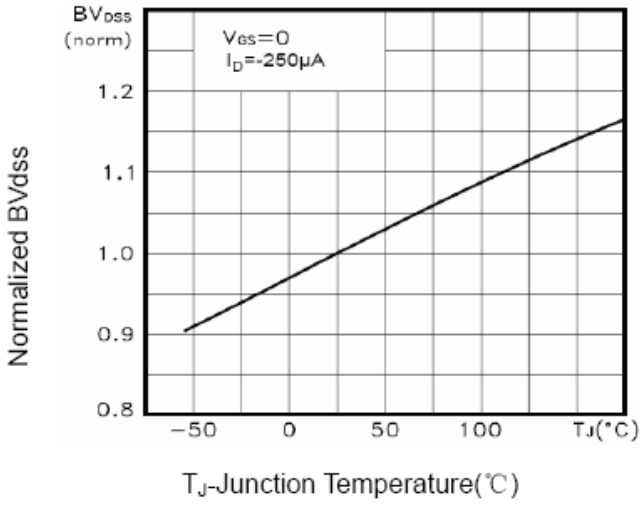


Figure 6 BVdss vs Junction Temperature

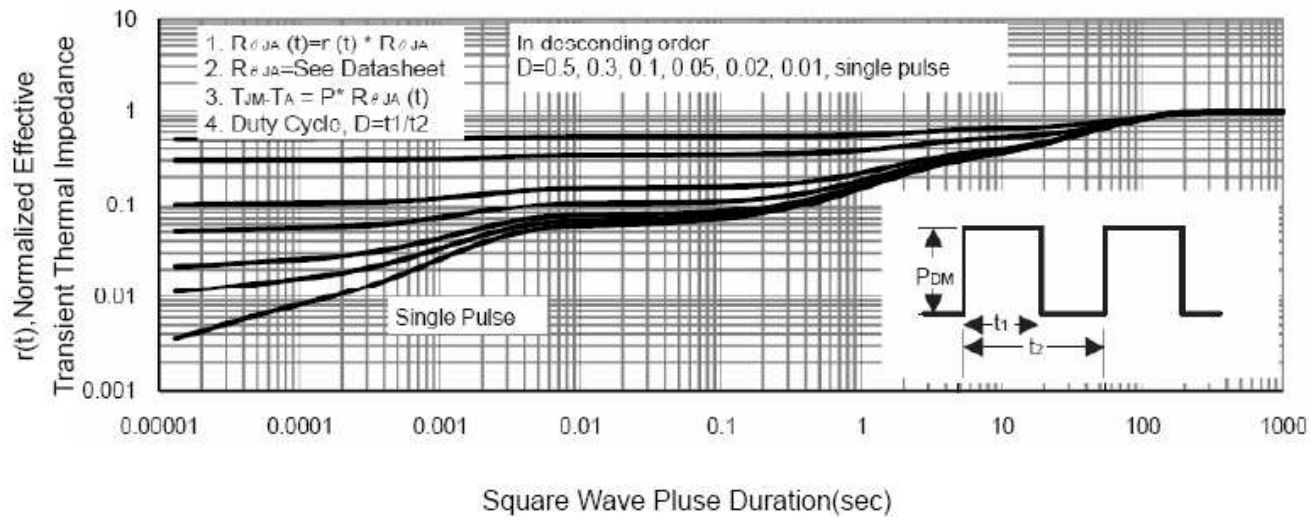
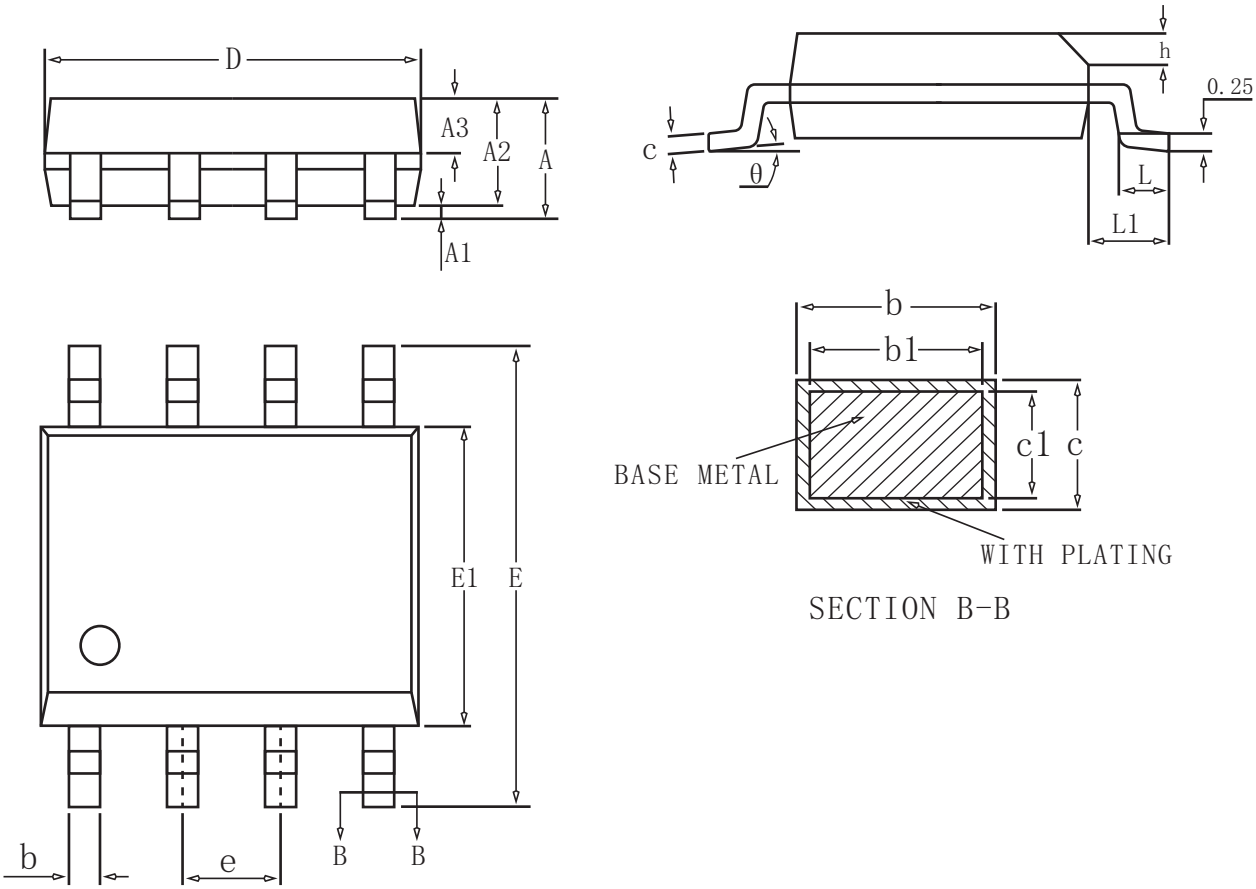


Figure 7 Normalized Maximum Transient Thermal Impedance

Package information



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	–	–	1.75
A1	0.10	–	0.225
A2	1.30	1.40	1.50
A3	0.60	0.65	0.70
b	0.39	–	0.47
b1	0.38	0.41	0.44
c	0.20	–	0.24
c1	0.19	0.20	0.21
D	4.80	4.90	5.00
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e	1.27BSC		
h	0.25	–	0.50
L	0.50	–	0.80
L1	1.05REF		
θ	0	–	8°