

Description

The 6706 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 for a host of other applications.

General Features● **N-Channel**

V_{DSS}	$R_{DS(ON)}$ @ 4.5V(typ)	I_D
20V	12 m Ω	6.5A

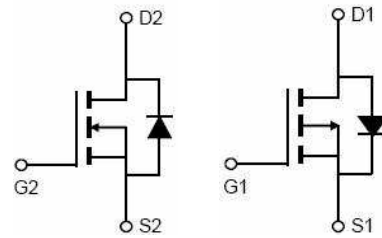
● **P-Channel**

V_{DSS}	$R_{DS(ON)}$ @ 4.5V(typ)	I_D
-20V	23 m Ω	-5 A

- High power and current handling capability
- RoHS Compliant
- Surface mount package

Application

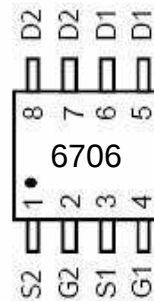
- PWM applications
- Load switch
- Power management



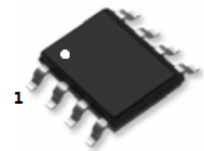
N-channel

P-channel

Schematic diagram



Marking and pin assignment



SOP-8

Ordering Information

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

Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter		Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage		V_{DS}	20	-20	V
Gate-Source Voltage		V_{GS}	± 20	± 20	V
Drain Current-Continuous	$T_A=25^\circ\text{C}$	I_D	6.5	-5	A
	$T_A=70^\circ\text{C}$		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	$^\circ\text{C}$

Thermal Characteristic

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

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	20		-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =20V, 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	0.5	0.7	1	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =4.5V, b=5A	-	12	18	m Ω
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =2.5V, I _D =5A	-	15	20	m Ω
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =5A	-	15	-	S
Dynamic Characteristics ^(Note4)						
Input Capacitance	C _{ISS}	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 ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-20	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-20V, V_{GS}=0V$	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.5	-0.7	-1	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-4.5V, I_D=-4A$	-	23	28	m Ω
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-2.5V, I_D=-4A$	-	30	45	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=-5V, I_D=-5A$	-	8	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{ISS}	$V_{DS}=-15V, V_{GS}=0V,$ $F=1.0MHz$	-	520	-	PF
Output Capacitance	C_{OSS}		-	100	-	PF
Reverse Transfer Capacitance	C_{RSS}		-	65	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-15V, R_L=2.3\Omega$ $V_{GS}=-10V, R_G=6\Omega$	-	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, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

N-Channel Typical Electrical and Thermal Characteristics (Curves)

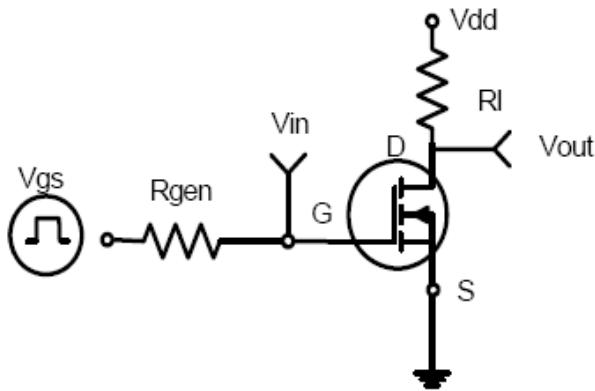


Figure 1 Switching Test Circuit

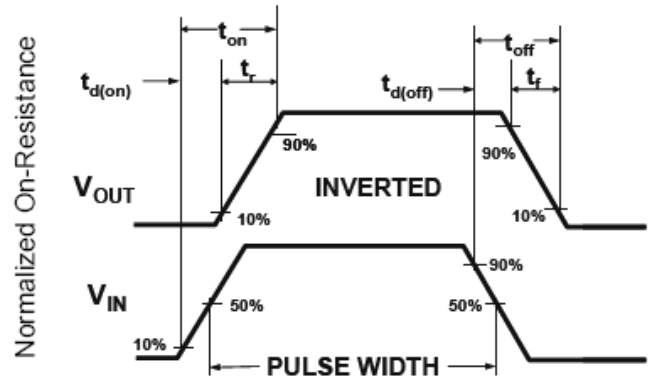


Figure 2 Switching Waveforms

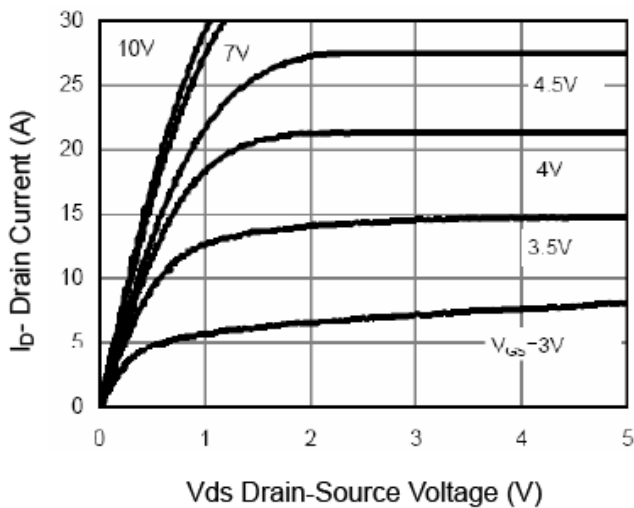


Figure 3 Output Characteristics

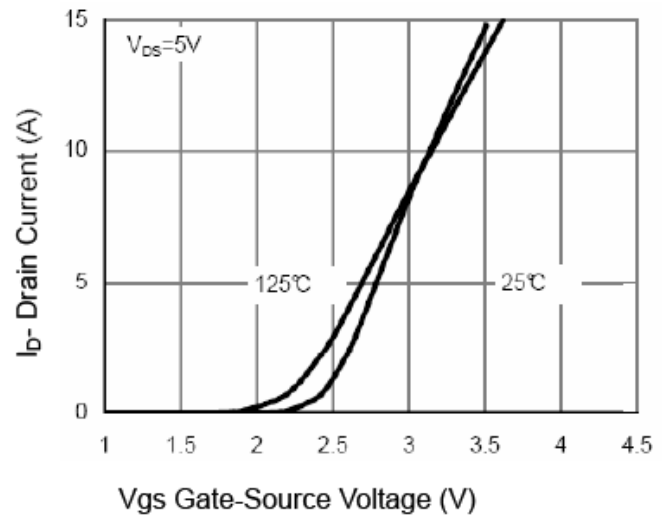


Figure 4 Transfer Characteristics

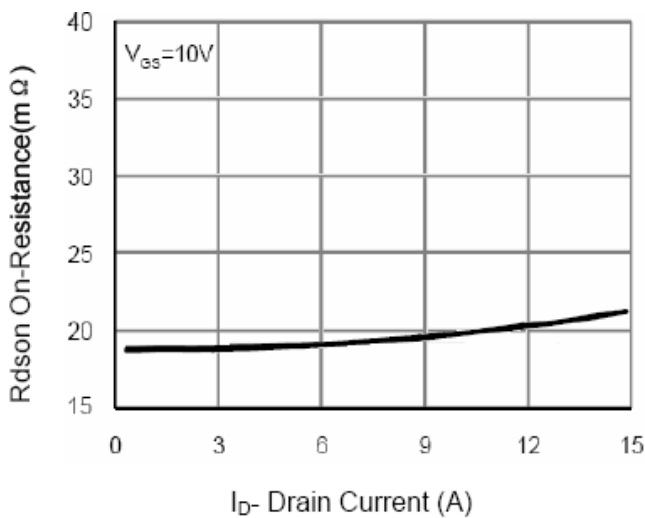


Figure 5 Rdson- Drain Current

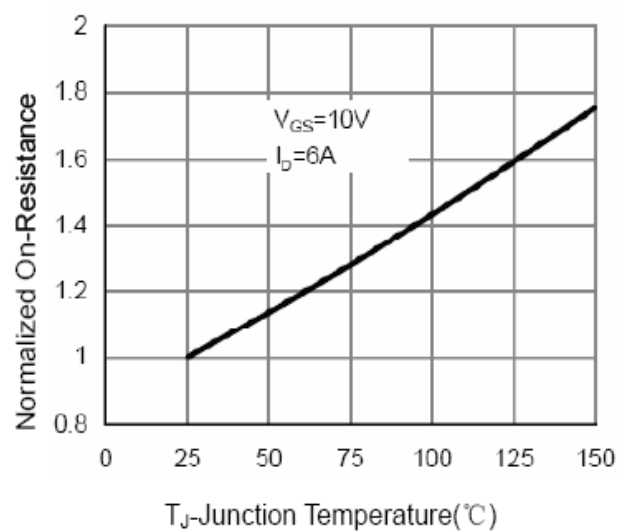


Figure 6 Source- Drain Diode Forward

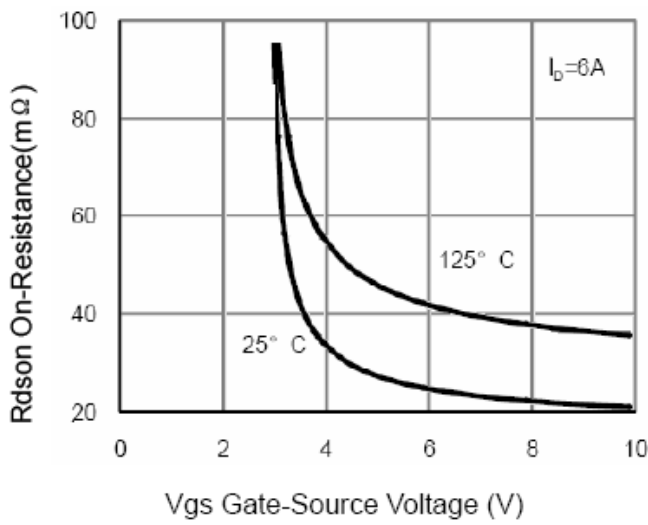


Figure 7 Rdson vs Vgs

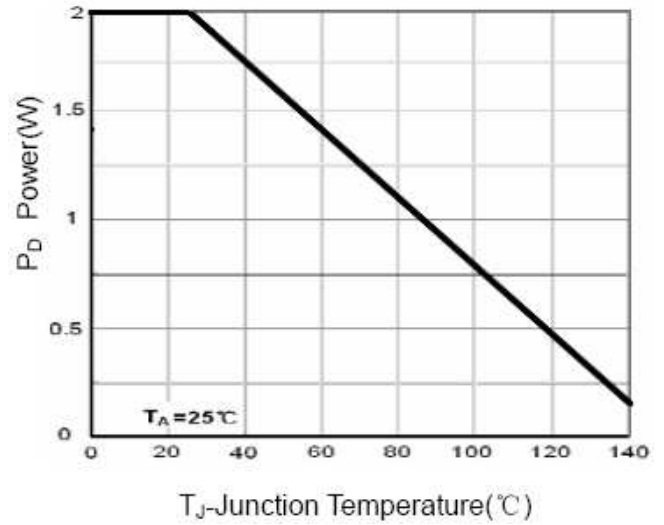


Figure 8 Power Dissipation

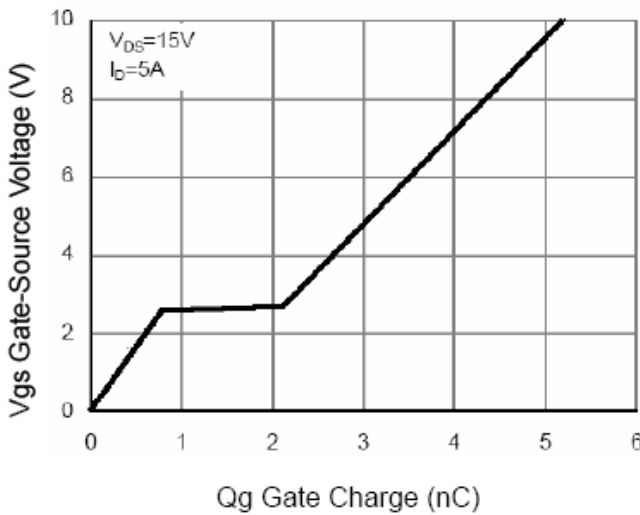


Figure 8 Gate Charge

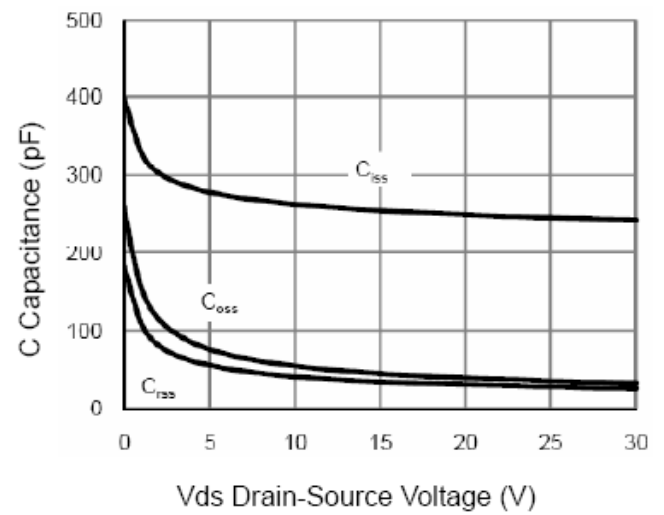


Figure 9 Capacitance vs Vds

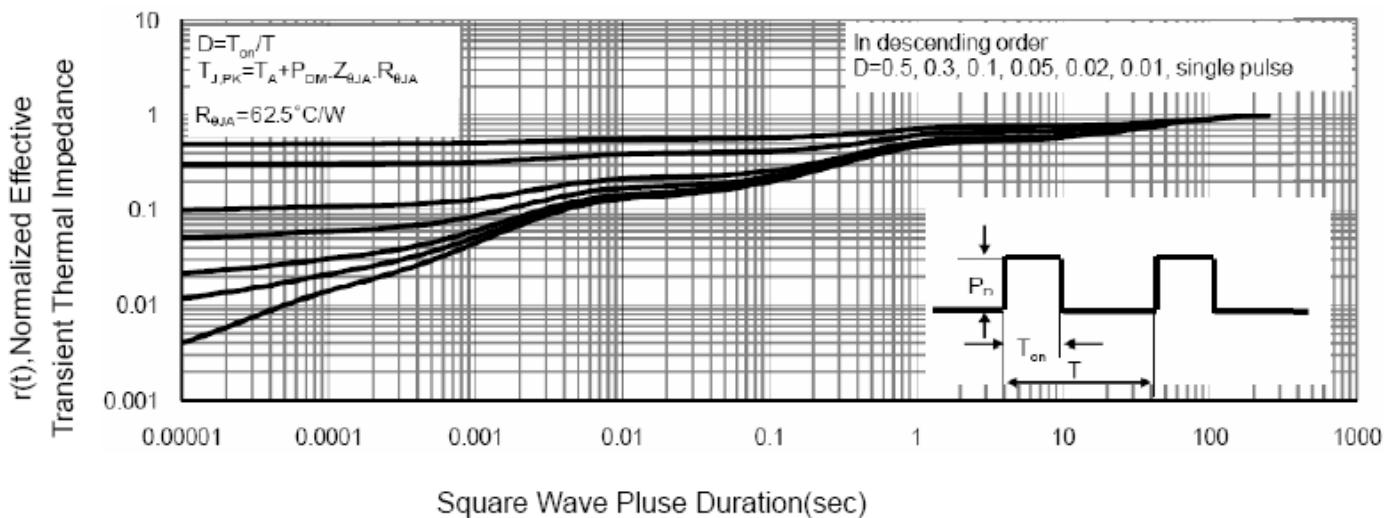


Figure 10 Normalized Maximum Transient Thermal Impedance

P-Channel Typical Electrical and Thermal Characteristics (Curves)

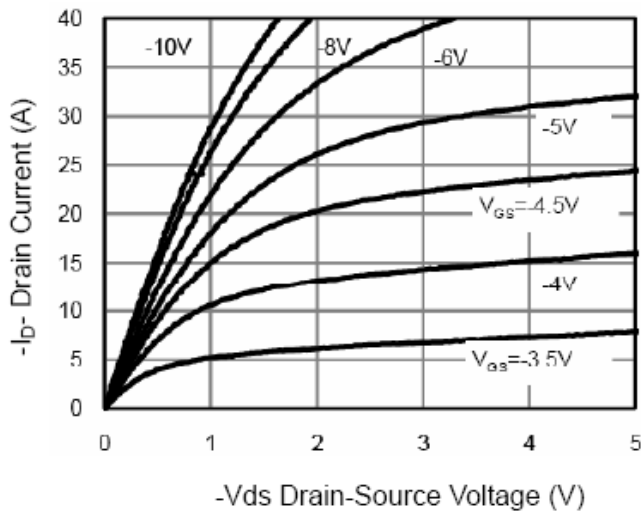


Figure 1 Output Characteristics

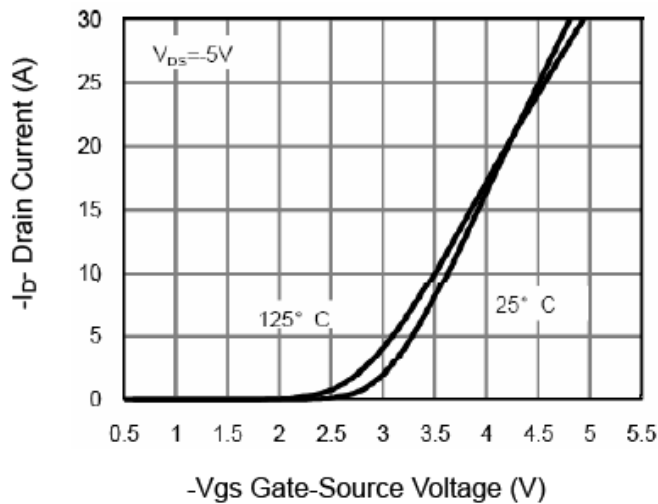


Figure 3 Transfer Characteristics

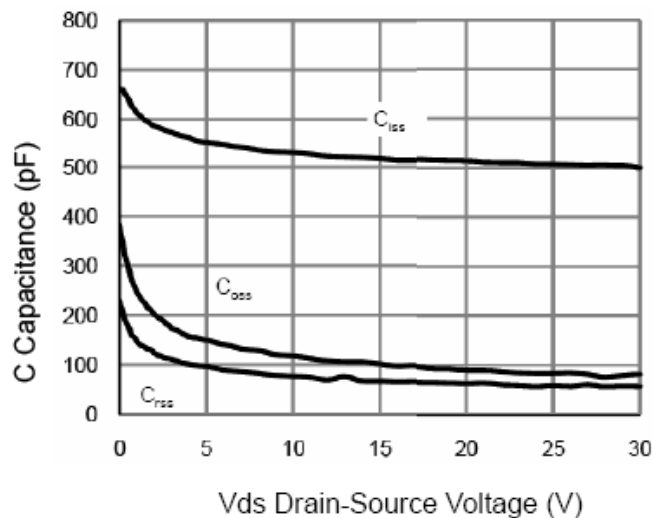


Figure 5 Capacitance vs VDS

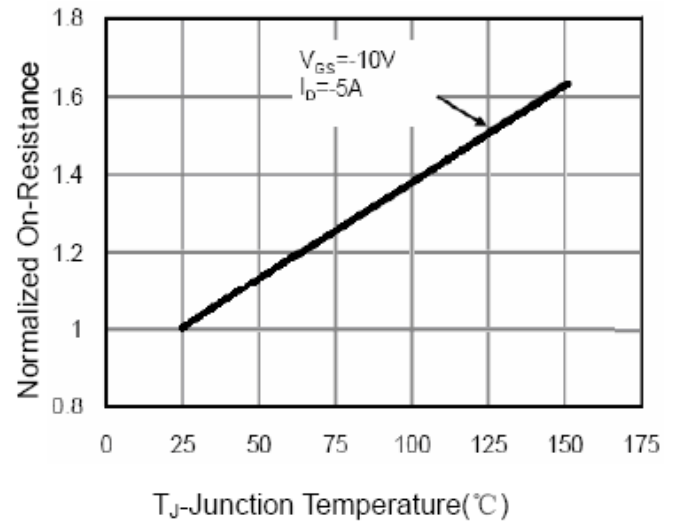


Figure 2 Rdson-Junction Temperature

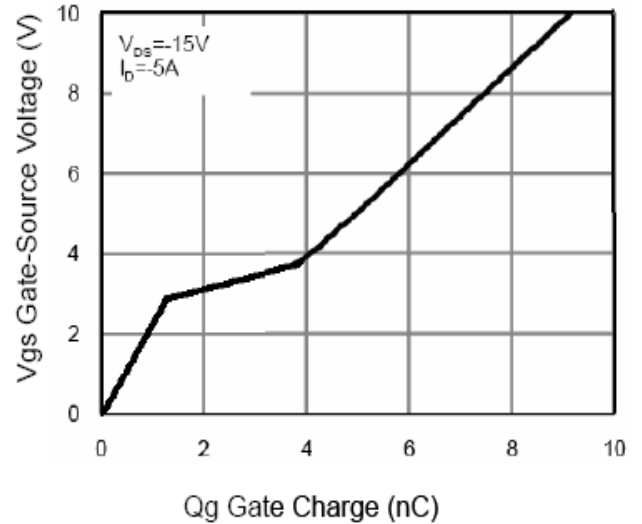


Figure 4 Gate Charge

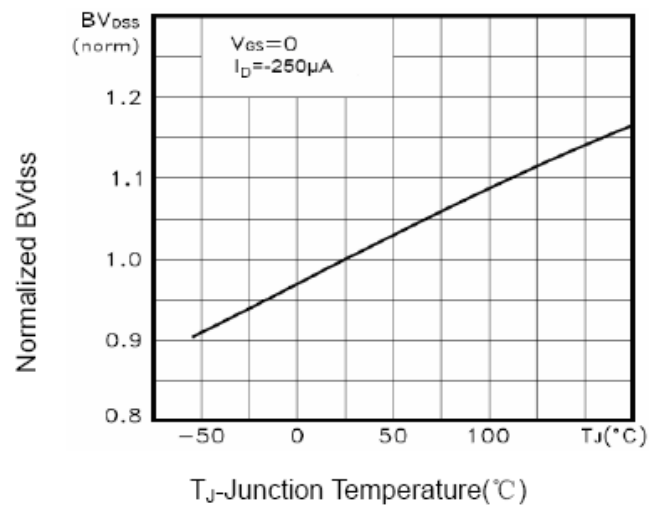


Figure 6 BVdss vs Junction Temperature

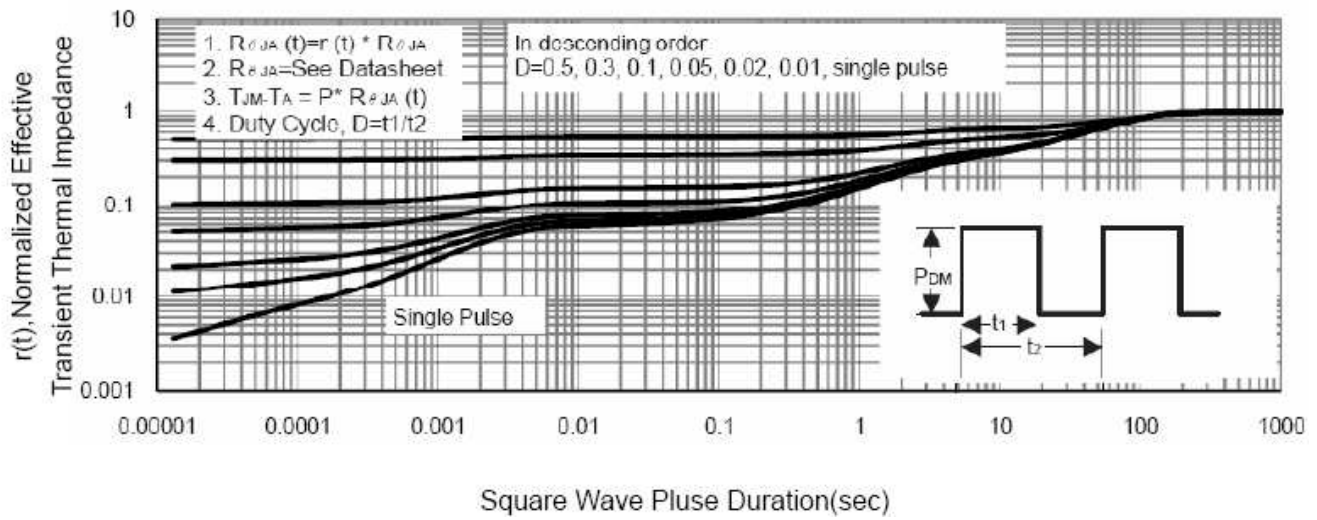
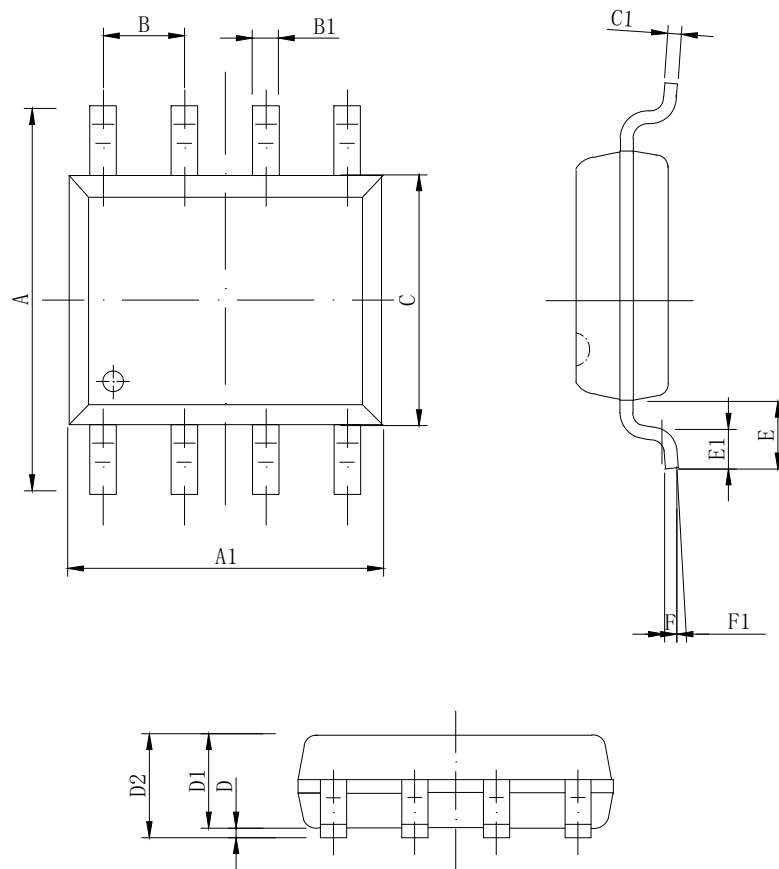


Figure 7 Normalized Maximum Transient Thermal Impedance

SOP-8 Package information



DIM	MIN	NOM	MAX
A	5.800	6.000	6.200
A1	4.800	4.900	5.000
B	1.270BSC		
B1	0.35 ^ 8x	0.40 ^ 8x	0.45 ^ 8x
C	3.780	3.880	3.980
C1	—	0.203	0.253
D	0.050	0.150	0.250
D1	1.350	1.450	1.550
D2	1.500	1.600	1.700
E	1.060 REF		
E1	0.400	0.700	0.100
F	0.250BSC		
F1	2°	4°	6°

All Dimensions in mm