AP6G06S

60V N+P-Channel Enhancement Mode MOSFET

Description

The AP6G06S uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

V_{DS} = 60V I_D =6.5A

$R_{DS(ON)}$ < 55mΩ @ V_{GS}=10V（**Type：40mΩ**）

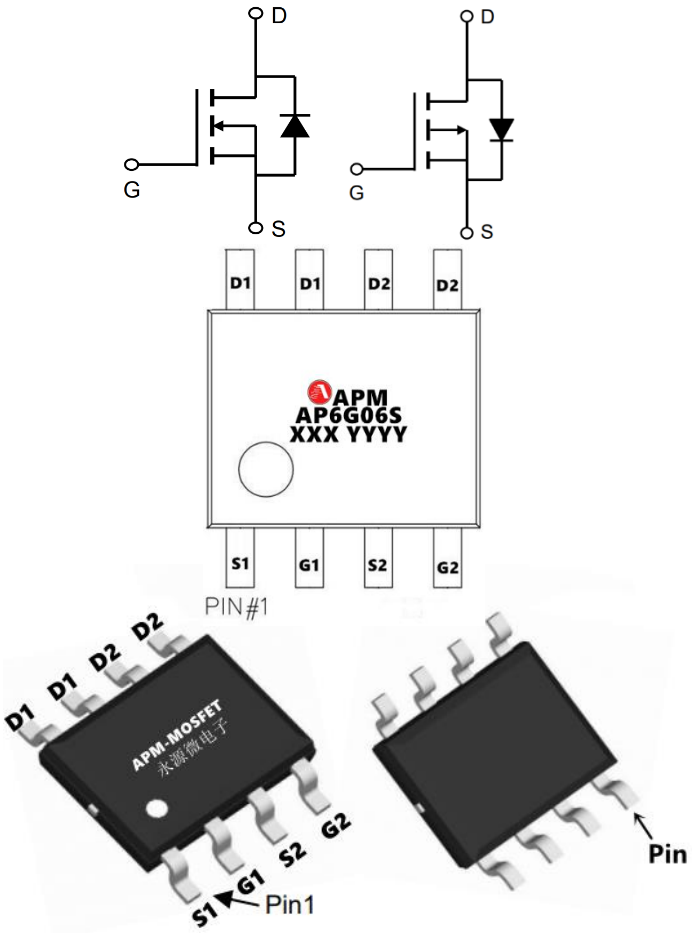
V_{DS} = -60V I_D =-6.2A

$R_{DS(ON)}$ < 90mΩ @ V_{GS}=-10V（**Type：70mΩ**）

Application

Boost driver

Brushless motor



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP6G06S	SOP-8L	AP6G06S XXX YYYY	3000

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

Symbol	Parameter	Rating		Units
		N-Channel	P-Channel	
VDS	Drain-Source Voltage	60	-60	V
VGS	Gate-Source Voltage	±20	±20	V
I_D@T_A=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	6.5	-6.2	A
I_D@T_A=70℃	Continuous Drain Current, V_{GS} @ 10V[1]	3.1	-2.8	A
IDM	Pulsed Drain Current[2]	27	25.5	A
EAS	Single Pulse Avalanche Energy[3]	21	21.8	mJ
P_D@T_A=25℃	Total Power Dissipation[4]	1.5	1.3	W
TSTG	Storage Temperature Range	-55 to 150		℃
T_J	Operating Junction Temperature Range	-55 to 150		℃

N-Electrical Characteristics (T_J=25℃, unless otherwise noted)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	60	65	-	V
IDSS	Zero Gate Voltage Drain Current	V_{DS}=60V, V_{GS}=0V,	-	-	1.0	μA
IGSS	Gate to Body Leakage Current	V_{DS}=0V, V_{GS}=±20V	-	-	±100	nA
VGS(th)	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	1.2	1.6	2.5	V
RDS(on)	Static Drain-Source on-Resistance	V_{GS}=10V, I_D=15A	-	40	50	mΩ
		V_{GS}=4.5V, I_D=10A	-	45	55	mΩ
Ciss	Input Capacitance	V_{DS}=25V, V_{GS}=0V, f=1.0MHz	-	825	-	pF
Coss	Output Capacitance		-	49	-	pF
Crss	Reverse Transfer Capacitance		-	41	-	pF
Q_g	Total Gate Charge	V_{DS}=30V, I_D=4.5A, V_{GS}=10V	-	14	-	nC
Qgs	Gate-Source Charge		-	2.9	-	nC
Qgd	Gate-Drain(“Miller”) Charge		-	5.2	-	nC
td(on)	Turn-on Delay Time	V_{DS}=30V,I_D=2A, R_L=6.7Ω,R_G=3Ω, V_{GS}=10V	-	5	-	ns
tr	Turn-on Rise Time		-	2.6	-	ns
td(off)	Turn-off Delay Time		-	16.1	-	ns
t_f	Turn-off Fall Time		-	2.3	-	ns
IS	Maximum Continuous Drain to Source Diode Forward Current		-	-	6.5	A
ISM	Maximum Pulsed Drain to Source Diode Forward Current		-	-	20	A
VSD	Drain to Source Diode Forward Voltage	V_{GS}=0V, I_S=15A	-	-	1.2	V

Note :

1、The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2、The data tested by pulsed , pulse width .The EAS data shows Max. rating .
3、The test cond≦ 300us duty cycle ≦ 2%, duty cycle ition is TJ =25℃, VDD =48V, VG =10V, RG =25Ω, L=0.1mH, IAS =9.8A
4、The power dissipation is limited by 175℃ junction temperature
5、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

P-Electrical Characteristics (TJ =25 ℃, unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
VDSS	Drain-Source Breakdown Voltage	VGS=0V, ID=-250μA	-60	-	-	V
IGSS	Gate-body Leakage current	VDS=0V, VGS=±20V	-	-	±100	nA
IDSS	Zero Gate Voltage Drain Current TJ= 25°C	VDS=-60V, VGS=0V	-	-	-1	μA
	Zero Gate Voltage Drain Current TJ= 25°C		-	-	-100	
VGS(th)	Gate-Threshold Voltage	VDS=VGS, ID=-250μA	-1	-1.6	-2.5	V
RDS(on)	Drain-Source On-Resistance4	VGS=-10V, ID=-10A	-	70	85	mΩ
		VGS=-4.5V, ID=-5A		81	95	
gfs	Forward Transconductance4	VDS=-10V, ID=-10A	-	30	-	S
Ciss	Input Capacitance	VDS=-30V, VGS=0V, f = 1MHz	-	1022	-	pF
Coss	Output Capacitance		-	47	-	
Crss	Reverse Transfer Capacitance		-	39	-	
Rg	Gate Resistance	f=1MHz	-	11	-	Ω
Qg	Total Gate Charge	VGS=-10V, VDS=-30V, ID=-10A	-	17	-	nC
Qgs	Gate-Source Charge		-	2.9	-	
Qgd	Gate-Drain Charge		-	7.4	-	
td(on)	Turn-On Delay Time	VGS=-10V, VDD=-30V, RG=3Ω, ID=-10A	-	8.5	-	ns
tr	Rise Time		-	19.9	-	
td(off)	Turn-Off Delay Time		-	44	-	
tf	Fall Time		-	12.2	-	
VSD	Diode Forward Voltage4	IS=-1A, VGS=0V	-	-	-1.2	V
IS	Continuous Source Current TC= 25°C	-	-	-	-6.2	A

Note :
1、The data tested by surface mounted on a 1 inch 2 FR-4 board with 2OZ copper.
2、The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3、The power dissipation is limited by 150℃ junction temperature
4、The data is theoretically the same as I D and I DM , in real applications , should be limited by total power dissipation.

N-Typical Characteristics

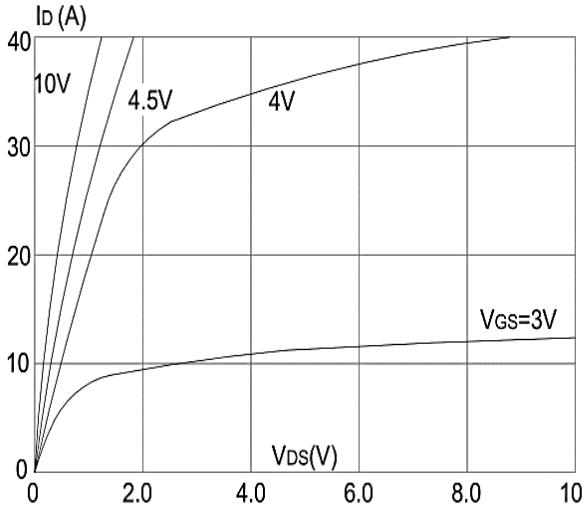


Figure1: Output Characteristics

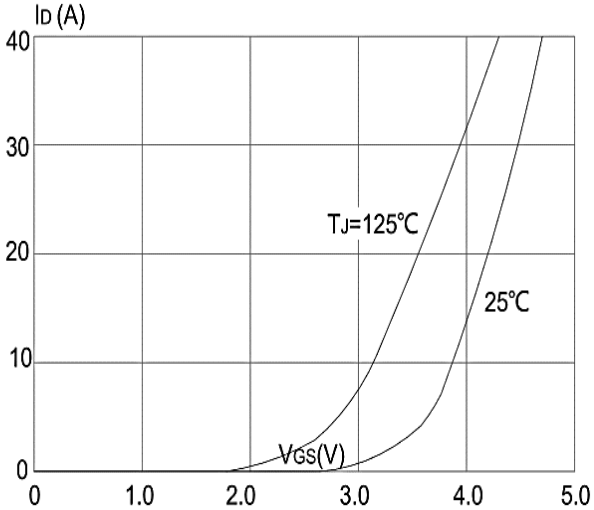


Figure 2: Typical Transfer Characteristics

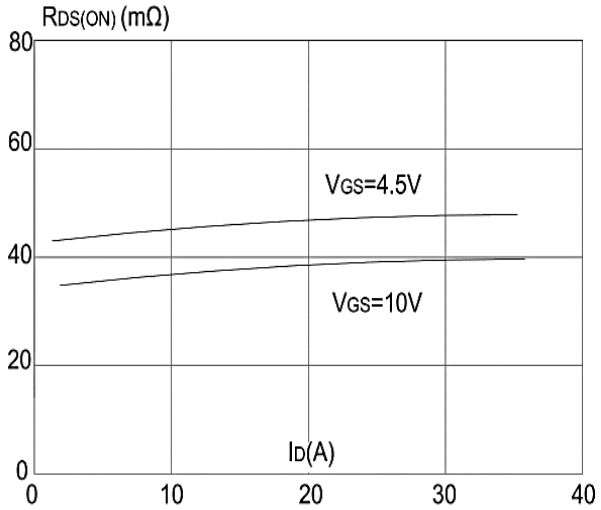


Figure 3:On-resistance vs. Drain Current

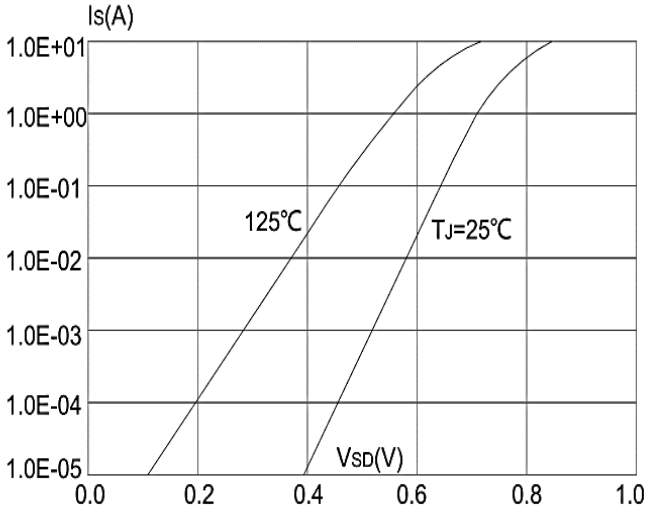


Figure 4: Body Diode Characteristics

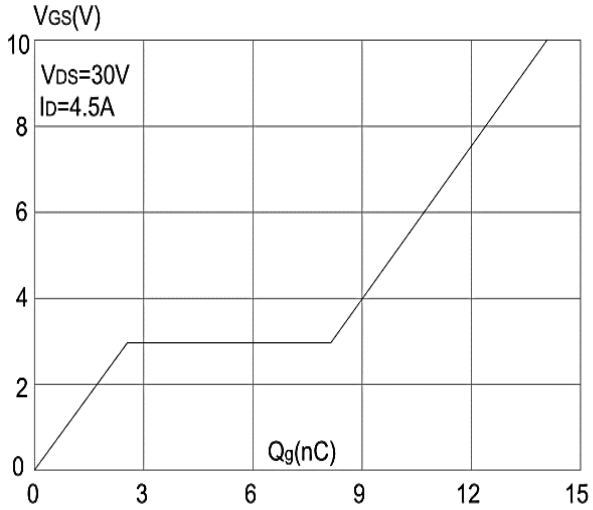


Figure 5: Gate Charge Characteristics

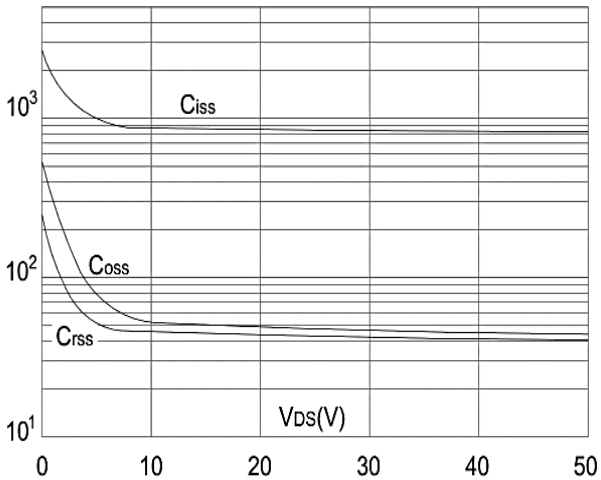


Figure 6: Capacitance Characteristics

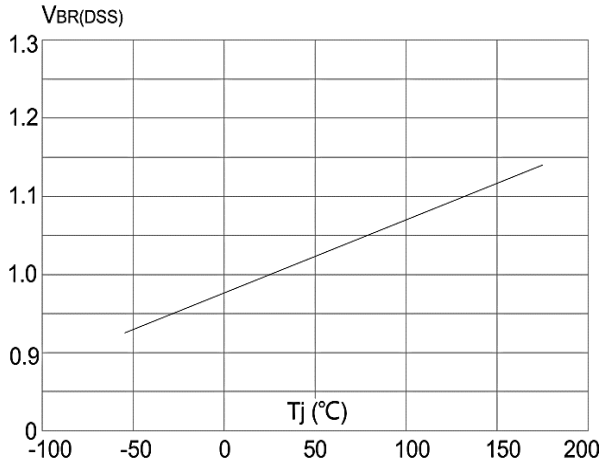


Figure 7: Normalized Breakdown Voltage vs Junction Temperature

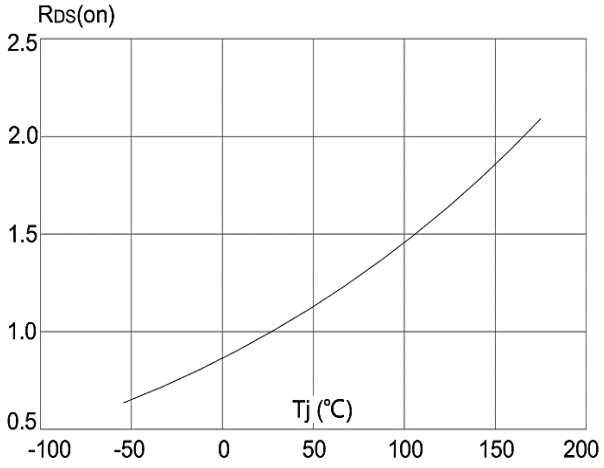


Figure 8: Normalized on Resistance vs. Junction Temperature

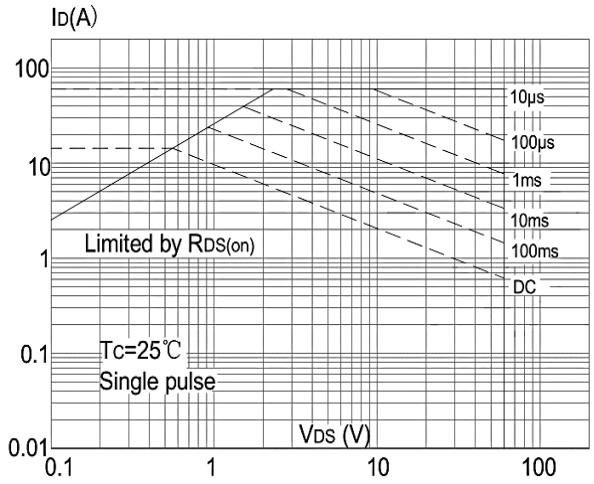


Figure 9: Maximum Safe Operating Area vs. Ambient Temperature

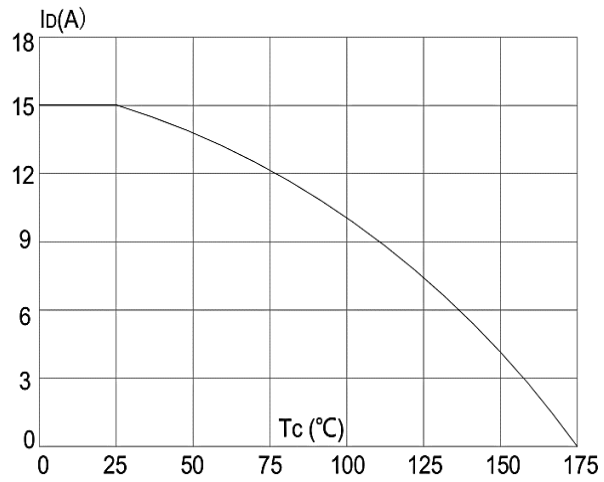


Figure 10: Maximum Continuous Drain Current

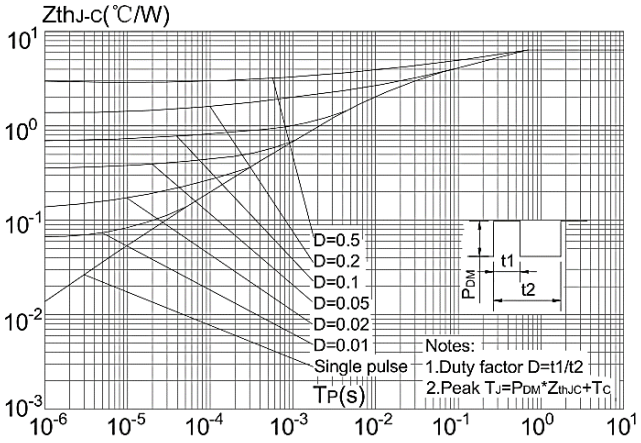


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambien

P-Channel Typical Characteristic

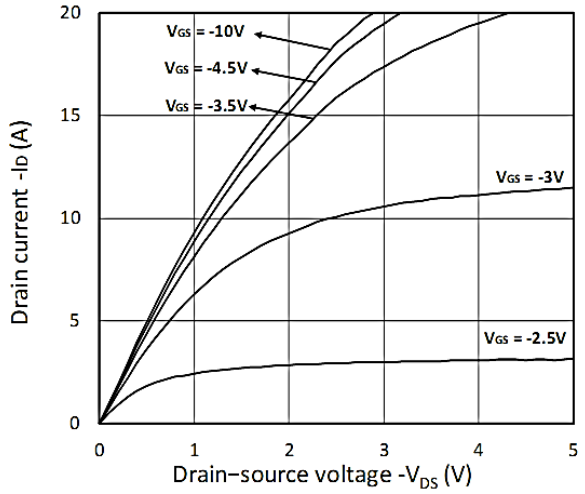


Figure 1. Output Characteristics

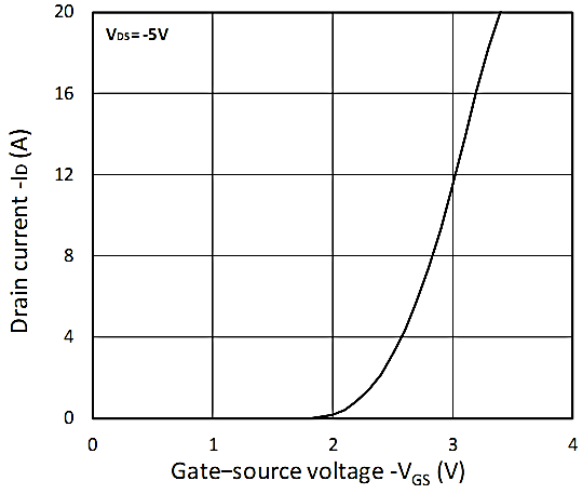


Figure 2. Transfer Characteristics

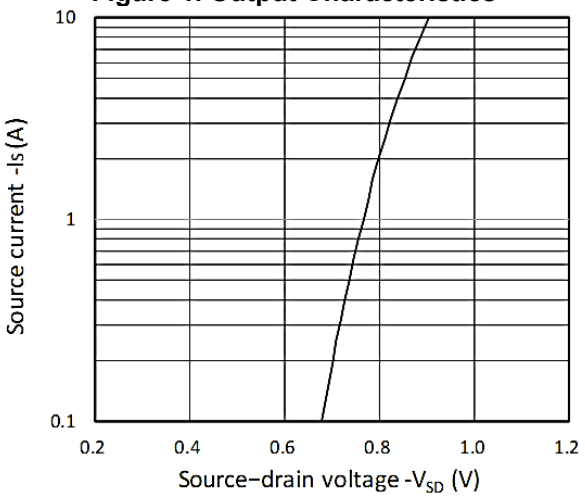


Figure 3. Forward Characteristics of Reverse

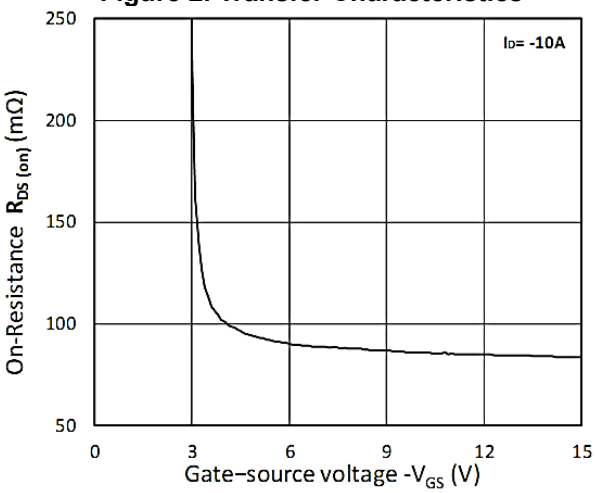


Figure 4. RDS(ON) vs. VGS

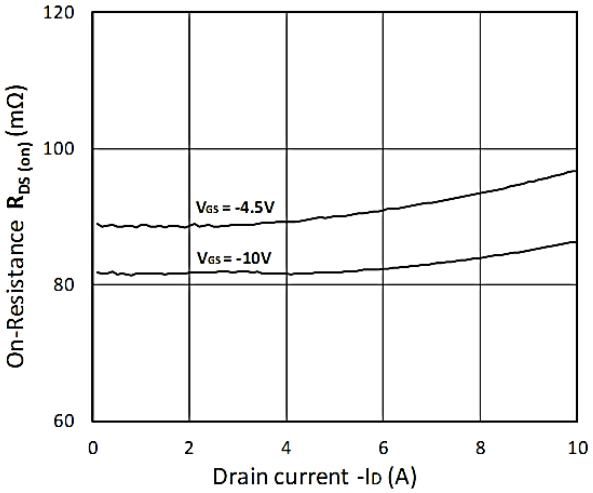


Figure 5. RDS(ON) vs. ID

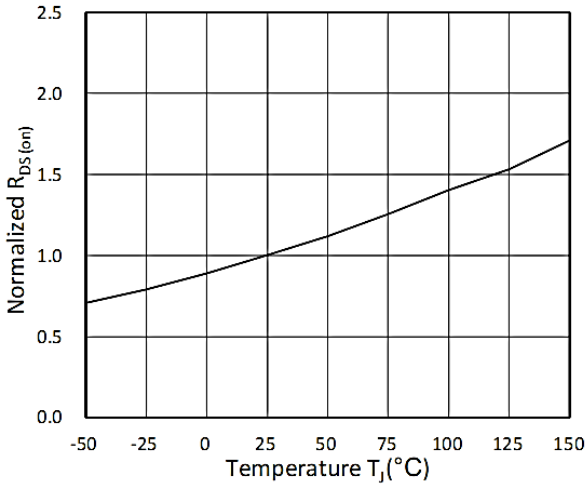


Figure 6. Normalized RDS(on) vs. Temperature

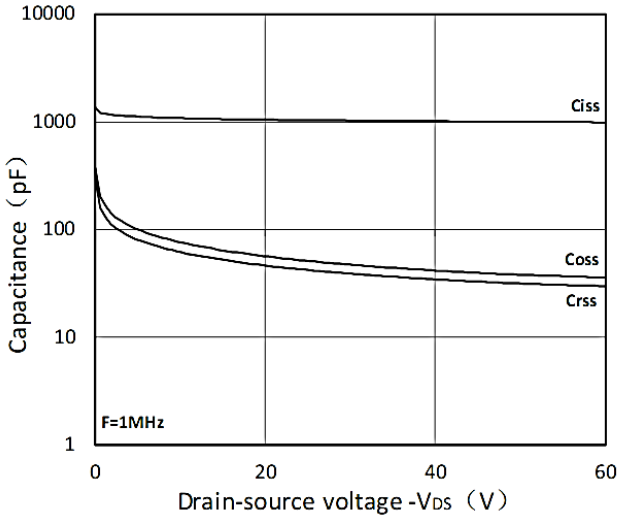


Figure 7. Capacitance Characteristics

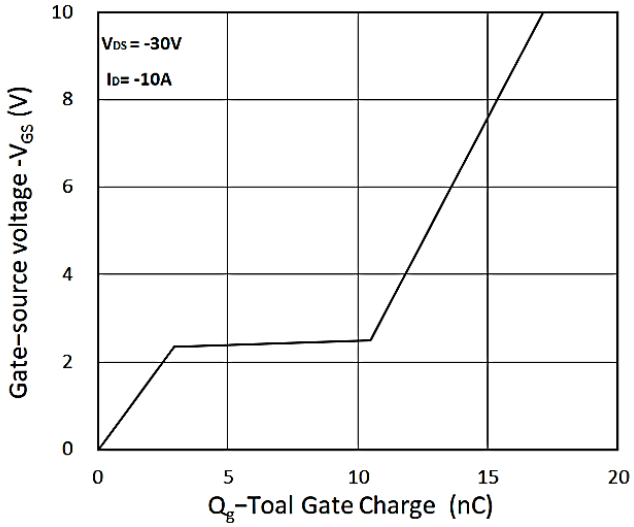


Figure 8. Gate Charge Characteristics

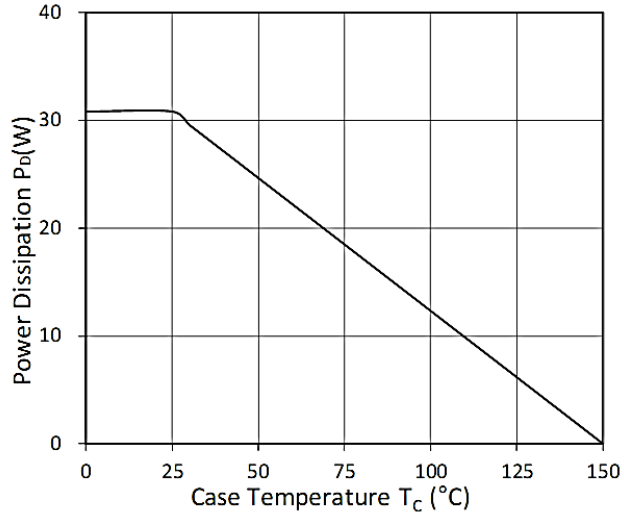


Figure 9. Power Dissipation

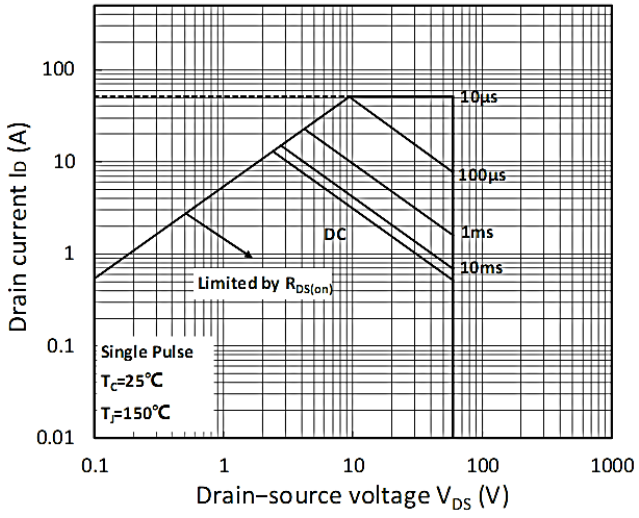


Figure10. Safe Operating Area

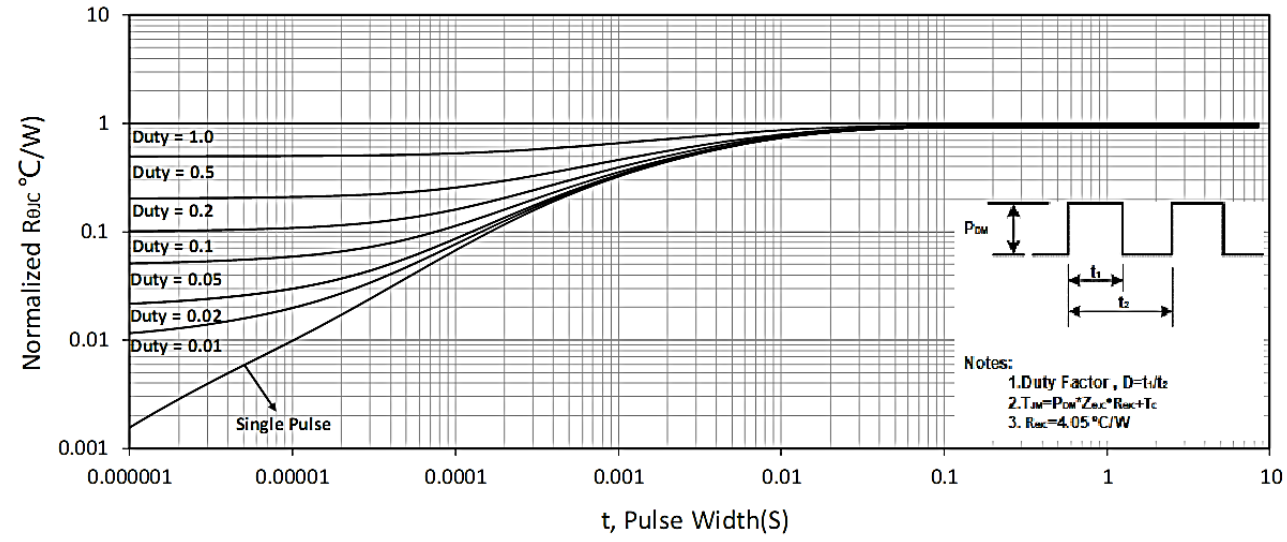
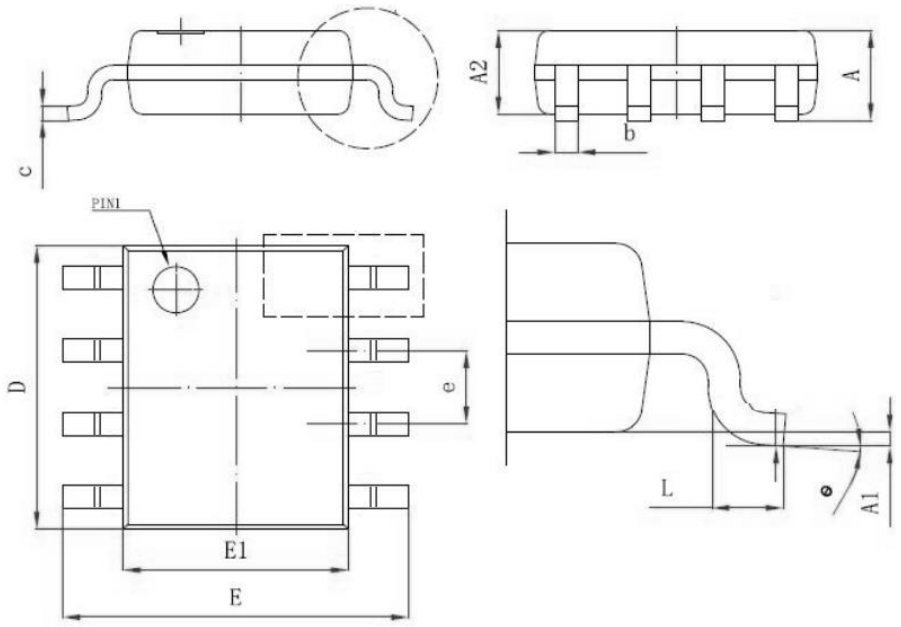


Figure 11 Normalized Maximum Transient Thermal Impedance

Package Mechanical Data-SOP-8L



Symbol	Dim in mm		
	Min	Typ	Max
A	1.35	1.55	1.75
A1	0.02	0.15	0.25
A2	1.425	1.45	1.475
b	0.3	0.4	0.5
c	0.15	0.2	0.25
D	4.8	5	5.2
E	5.8	6	6.2
E1	3.8	4	4.2
e	1.27BSC		
L	0.4		1.27
θ	0°		8°

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Edition	Date	Change
REV1.0	2023/5/31	Initial release