AP8G04S

40V N+P-Channel Enhancement Mode MOSFET

Description

The AP8G04S 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} = 40V I_D =8.8A

$R_{DS(ON)}$ < 28mΩ @ V_{GS}=10V （**Type：20mΩ**）

V_{DS} = -40V I_D =-7.5A

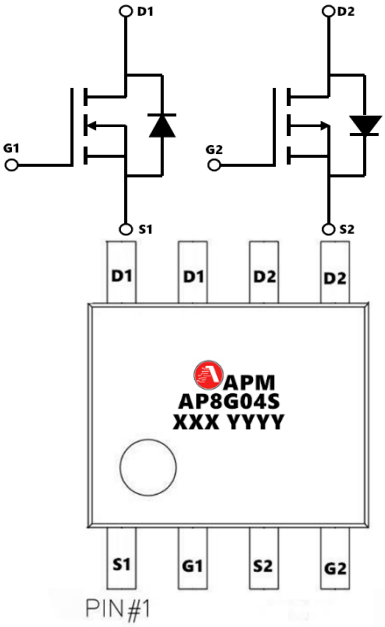
$R_{DS(ON)}$ < 42mΩ @ V_{GS}=-10V （**Type：35mΩ**）

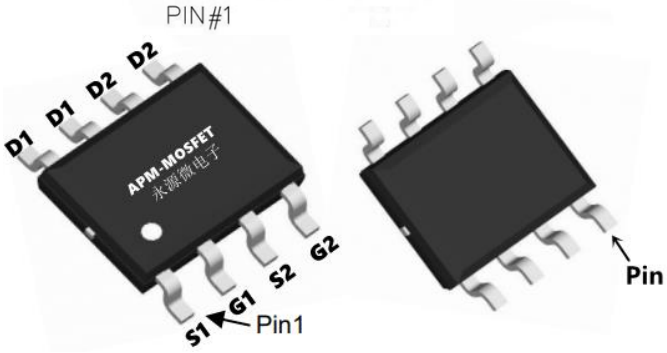
Application

Wireless charging

Boost driver

Brushless motor





Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP8G04S	SOP-8	AP8G04S XXX YYYY	3000

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

Symbol	Parameter	Rating		Units
		N-Ch	P-Ch	
VDS	Drain-Source Voltage	40	-40	V
VGS	Gate-Source Voltage	±20	±20	V
I_D@T_A=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	8.8	-7.5	A
I_D@T_A=70℃	Continuous Drain Current, V_{GS} @ 10V[1]	5.0	-4.2	A
IDM	Pulsed Drain Current[2]	20	-20	A
EAS	Single Pulse Avalanche Energy[3]	15	35	mJ
P_D@T_A=25℃	Total Power Dissipation[4]	1.67		W
TSTG	Storage Temperature Range	-55 to 150		℃
T_J	Operating Junction Temperature Range	-55 to 150		℃
$R_{\theta}JA$	Thermal Resistance Junction-Ambient [1]	85		℃/W
$R_{\theta}JC$	Thermal Resistance Junction-Case[1]	35		℃/W

N-Channel 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	40	-	-	V
IDSS	Zero Gate Voltage Drain Current	V_{DS}=40V, 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	1.0	1.5	2.5	V
RDS(on)	Static Drain-Source on-Resistance note3	V_{GS}=10V, I_D=8A	-	20	28	mΩ
		V_{GS}=4.5V, I_D=5A	-	25	35	mΩ
Ciss	Input Capacitance	V_{DS}=20V, V_{GS}=0V, f=1.0MHz	-	633	-	pF
Coss	Output Capacitance		-	67	-	pF
Crss	Reverse Transfer Capacitance		-	58	-	pF
Q_g	Total Gate Charge	V_{DS}=20V, I_D=8A, V_{GS}=10V	-	12	-	nC
Qgs	Gate-Source Charge		-	3.2	-	nC
Qgd	Gate-Drain(“Miller”) Charge		-	3.1	-	nC
td(on)	Turn-on Delay Time	V_{DD}= 20V, R_L=2.5Ω V_{GS}=10V,R_{REN}=3Ω	-	4	-	ns
tr	Turn-on Rise Time		-	3	-	ns
td(off)	Turn-off Delay Time		-	15	-	ns
t_f	Turn-off Fall Time		-	2	-	ns
IS	Maximum Continuous Drain to Source Diode Forward Current		-	-	8	A
ISM	Maximum Pulsed Drain to Source Diode Forward Current		-	-	32	A
VSD	Drain to Source Diode Forward Voltage	V_{GS}=0V, I_S= 8A	-	-	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 ≦ 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}=8A

4、The power dissipation is limited by 150℃ junction temperature

5 、The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

P-Channel 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	-40	-	-	V
IDSS	Zero Gate Voltage Drain Current	V_{DS}= -40V, V_{GS}=0V	-	-	-1	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	-1.0	-1.6	-2.5	V
RDS(on)	Static Drain-Source on-Resistance	V_{GS}= -10V, I_D= -8A	-	35	42	mΩ
		V_{GS}= -4.5V, I_D= -5A	-	46	62	
Ciss	Input Capacitance	V_{DS}= -20V, V_{GS}=0V, f=1.0MHz	-	1034	-	pF
Coss	Output Capacitance		-	107	-	pF
Crss	Reverse Transfer Capacitance		-	79.5	-	pF
Q_g	Total Gate Charge	V_{DS}= -20V, I_D= -5A, V_{GS}= -10V	-	20	-	nC
Qgs	Gate-Source Charge		-	3.5	-	nC
Qgd	Gate-Drain(“Miller”) Charge		-	4.2	-	nC
td(on)	Turn-on Delay Time	V_{DD}= -20V, I_D= -5A, V_{GS}= -10V, R_{GEN}=2.5Ω	-	8	-	ns
tr	Turn-on Rise Time		-	15	-	ns
td(off)	Turn-off Delay Time		-	23	-	ns
t_f	Turn-off Fall Time		-	9	-	ns
IS	Maximum Continuous Drain to Source Diode Forward Current		-	-	-10	A
ISM	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-40	A
VSD	Drain to Source Diode Forward Voltage	V_{GS}=0V, I_S= -10A	-	-	-1.2	V
trr	Reverse Recovery Time	T_J=25℃, I_F=10A,dI/dt=100A/μs	-	29	-	ns
Qrr	Reverse Recovery Charge		-	20	-	nC

Note :

1、The data tested by surface mo unted 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 EAS data shows Max. rating . The test condition is V^{DD}=-25V,V^{GS}=-10V,L=0.1mH,I^{AS}=-8A

4、The power dissipation is limited by 150℃ junction temperature

5 、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

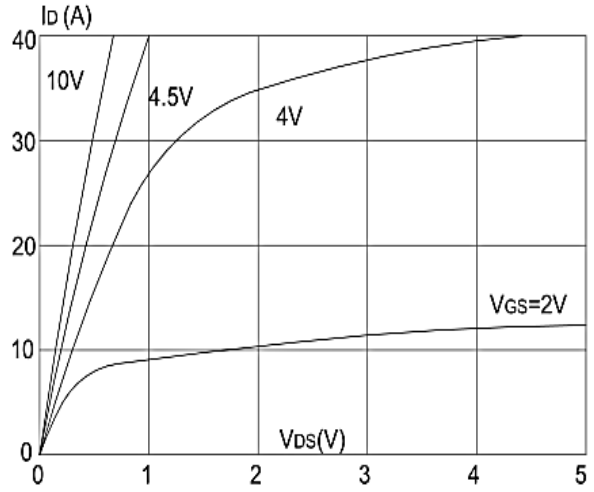


Figure1: Output Characteristics

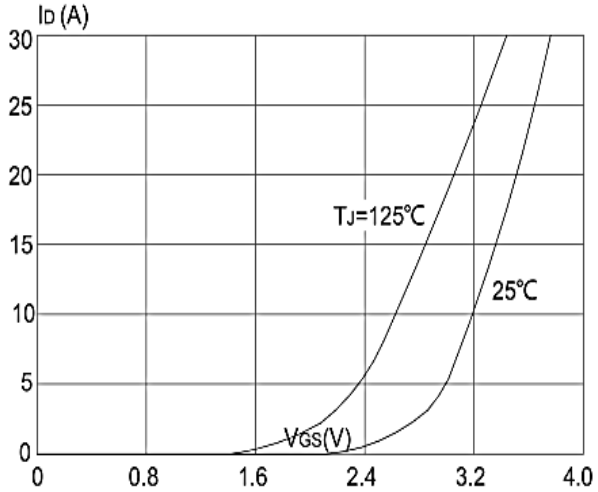


Figure 2: Typical Transfer Characteristics

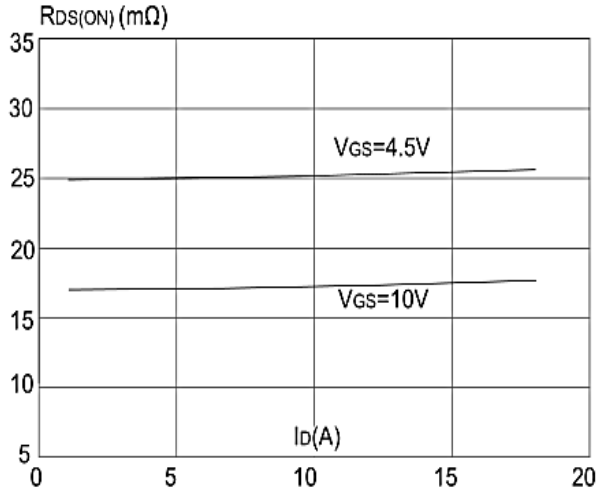


Figure 3:On-resistance vs. Drain Current

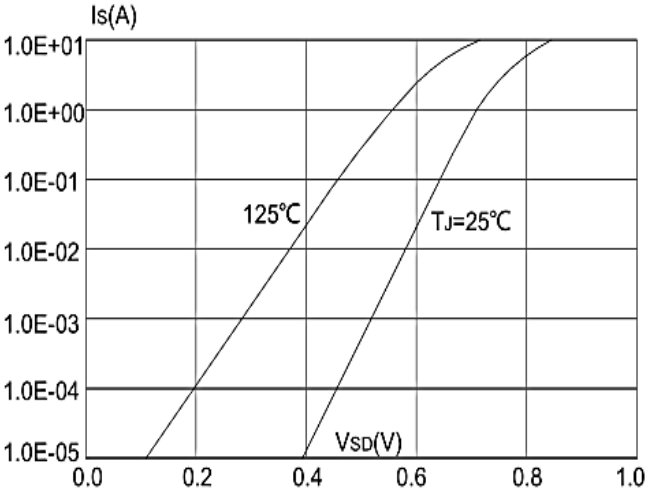


Figure 4: Body Diode Characteristics

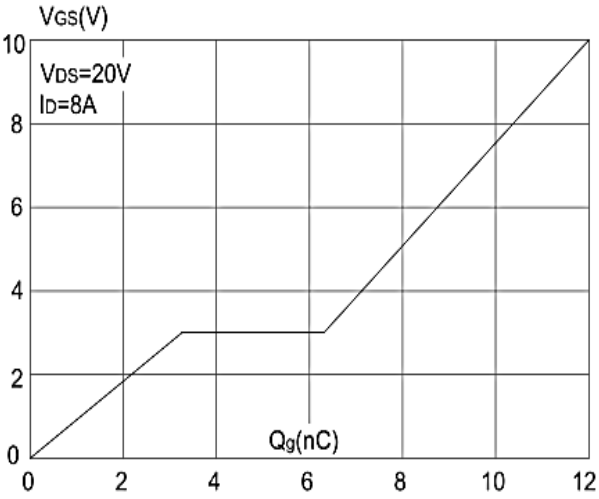


Figure 5: Gate Charge Characteristics

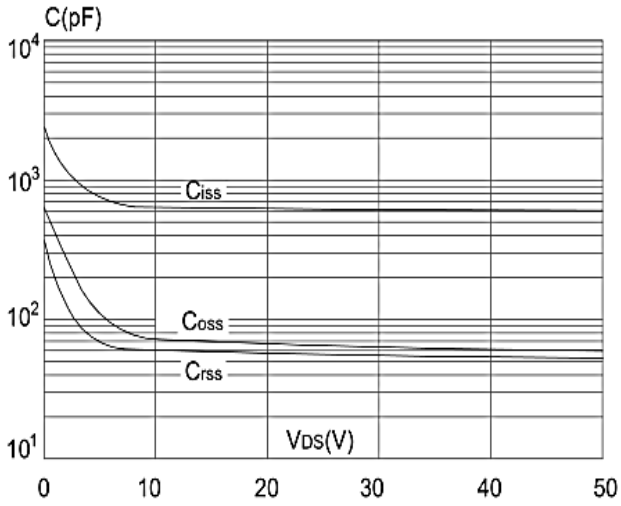


Figure 6: Capacitance Characteristics

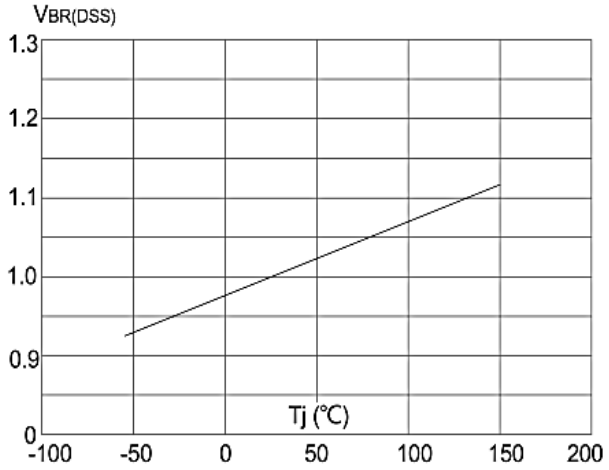


Figure 7: Normalized Breakdown Voltage vs Junction Temperature

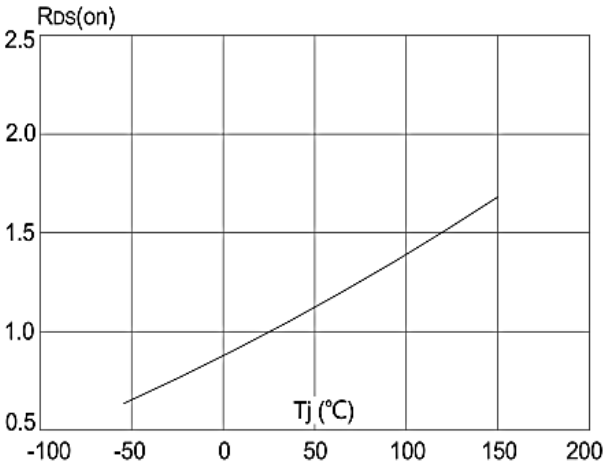


Figure 8: Normalized on Resistance vs. Junction Temperature

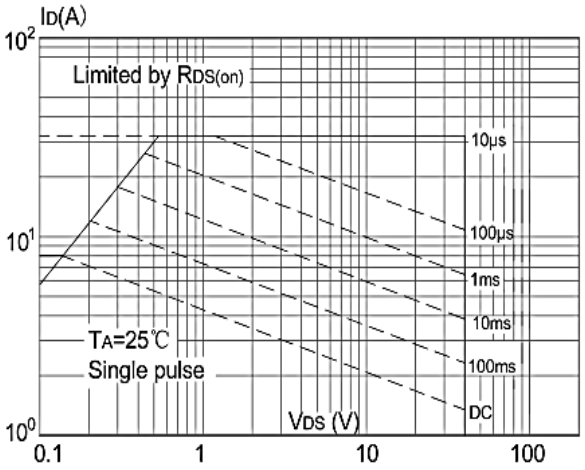


Figure 9: Maximum Safe Operating Area

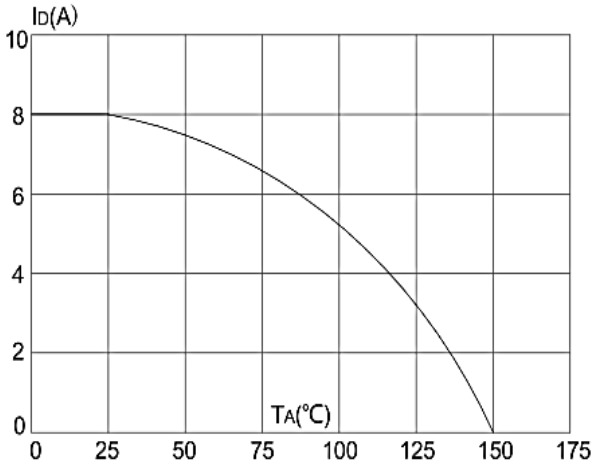


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

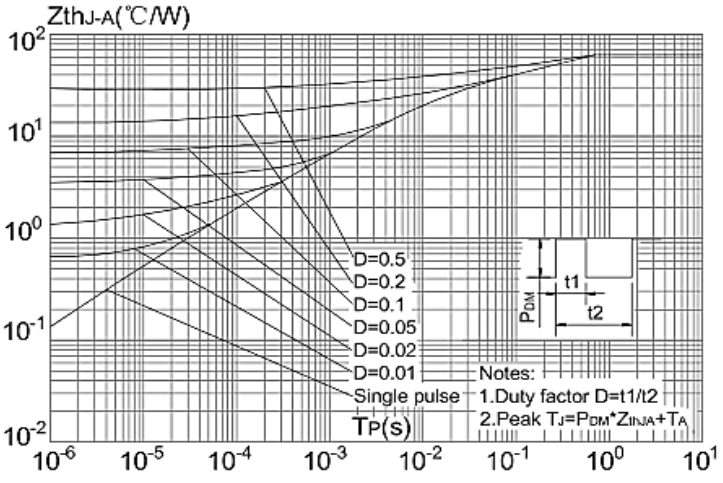


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambien

P-Typical Characteristics

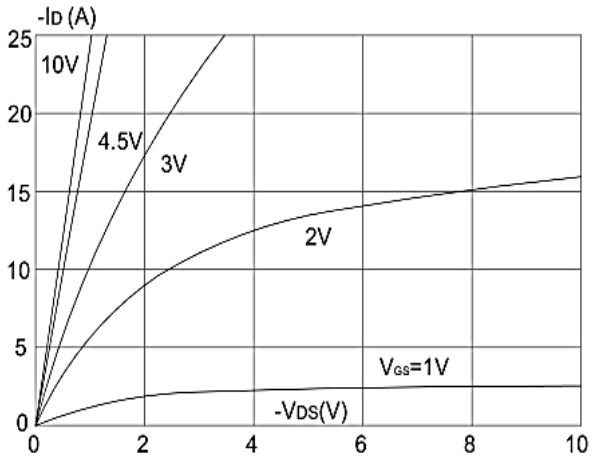
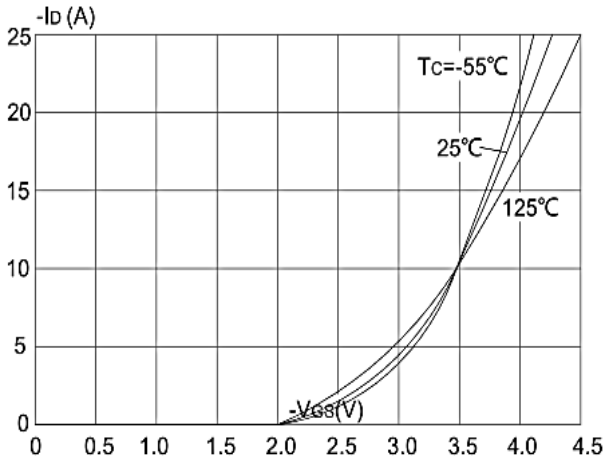


Figure1: Output Characteristics



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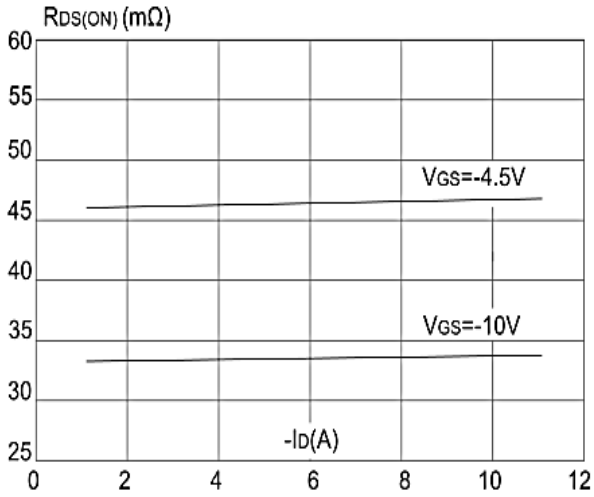

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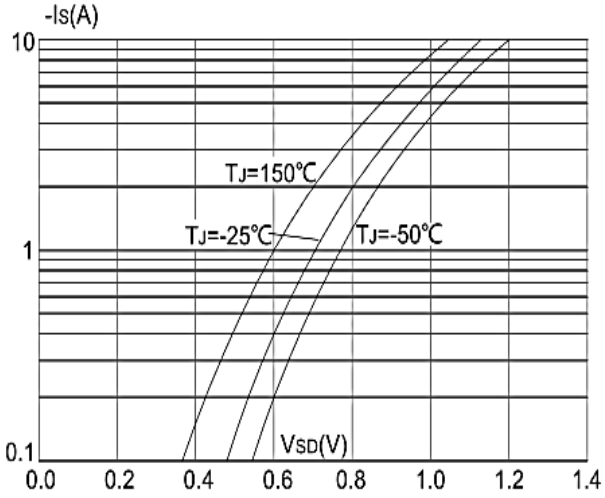


Figure 4: Body Diode Characteristics

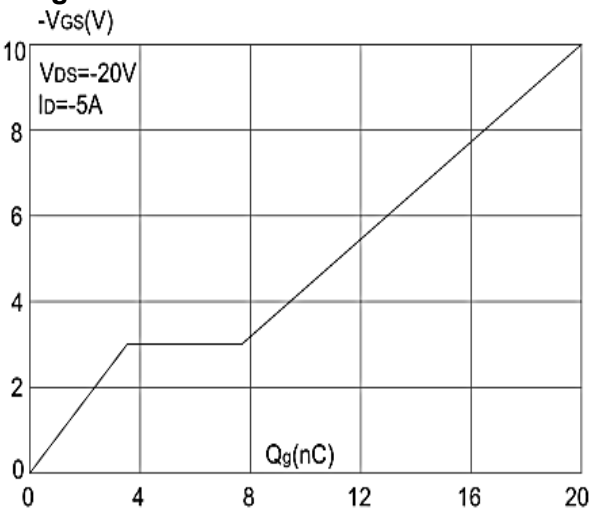


Figure 5: Gate Charge Characteristics

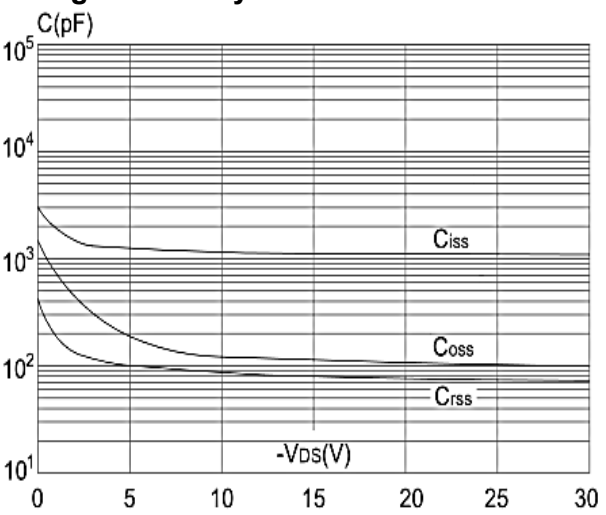


Figure 6: Capacitance Characteristics

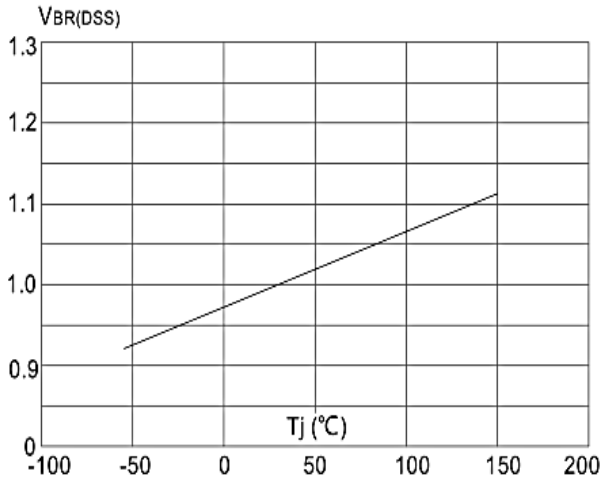


Figure 7: Normalized Breakdown Voltage vs Junction Temperature

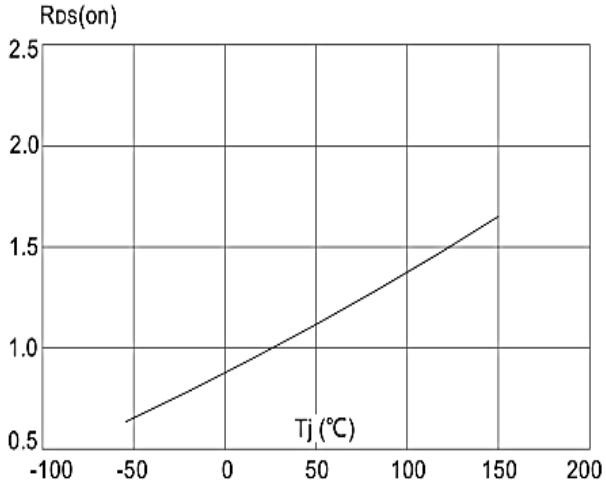
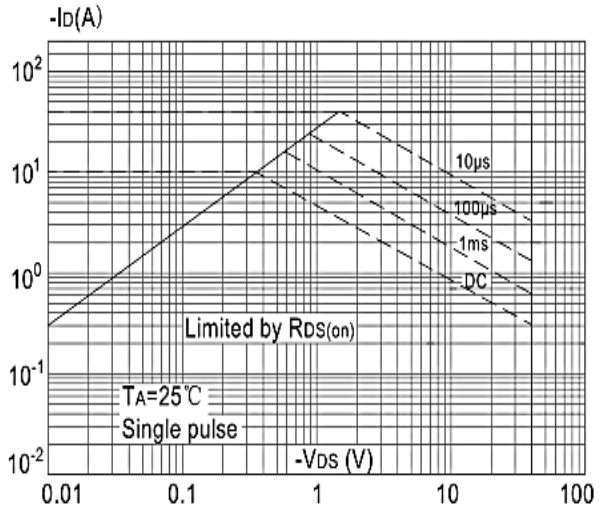


Figure 8: Normalized on Resistance vs. Junction Temperature



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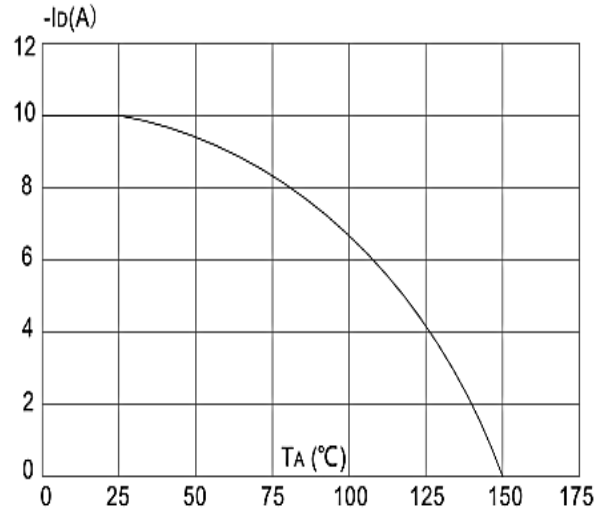

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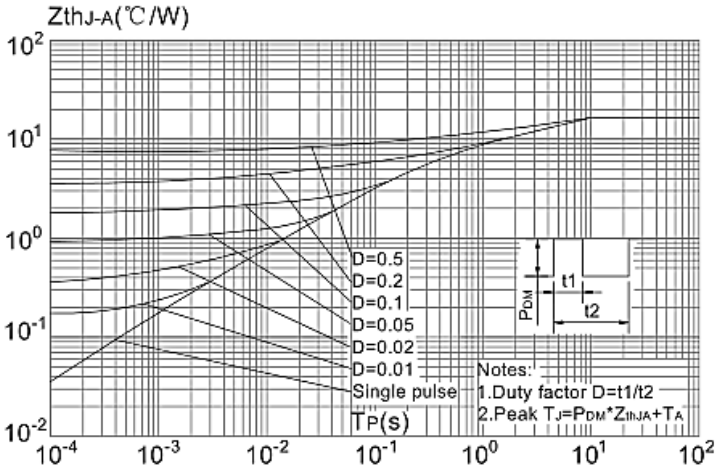
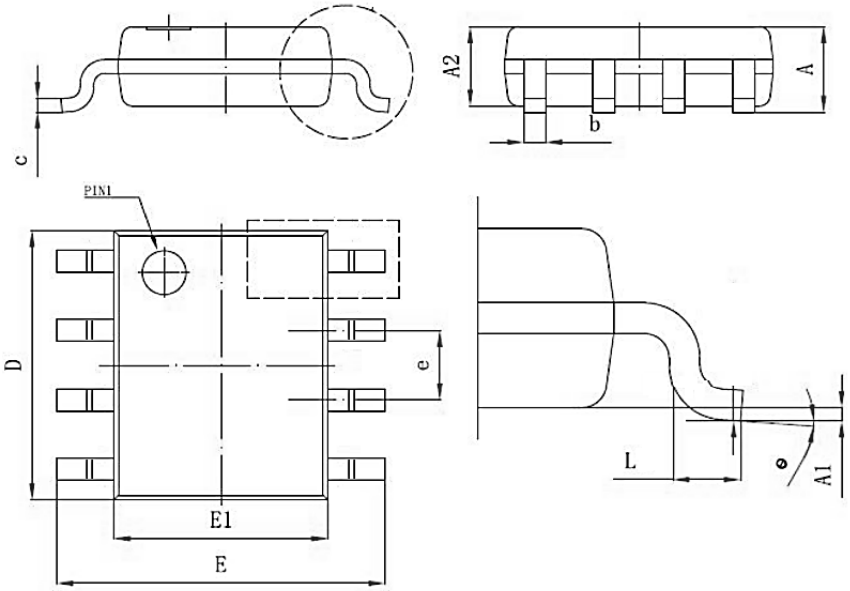


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambien

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	2019/5/31	Initial release
REV1.1	2024/5/12	Change logo and Reduce Rds