AP8G04BS

40V N+P-Channel Enhancement Mode MOSFET

Description

The AP8G04BS 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

$R_{DS(ON)}$ < 35mΩ @ V_{GS}=10V （**Type：28mΩ**）

V_{DS} = -40V I_D =-7.2A

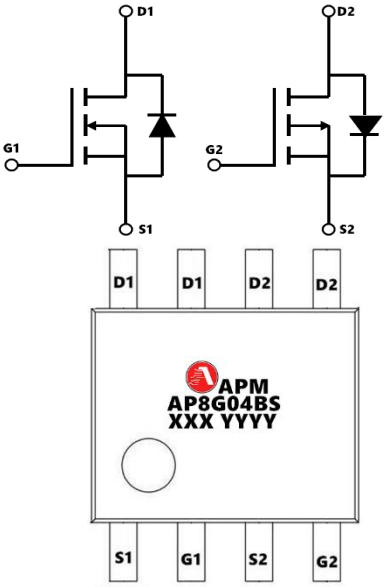
$R_{DS(ON)}$ < 50mΩ @ V_{GS}=-10V （**Type：42mΩ**）

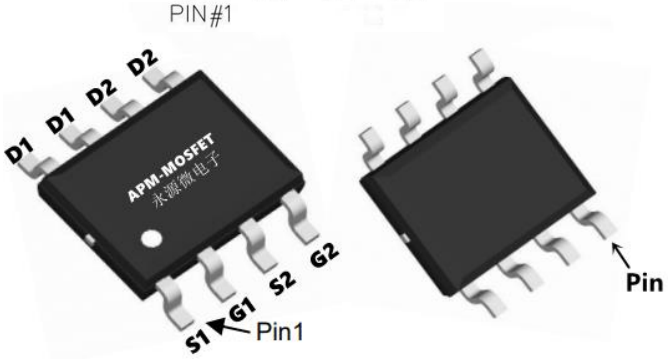
Application

Wireless charging

Boost driver

Brushless motor





Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP8G04BS	SOP-8L	AP8G04BS 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	-7.2	A
I_D@T_A=70℃	Continuous Drain Current, V_{GS} @ 10V[1]	5.0	-4.1	A
IDM	Pulsed Drain Current[2]	20	-19	A
EAS	Single Pulse Avalanche Energy[3]	15	32	mJ
P_D@T_A=25℃	Total Power Dissipation[4]	1.65		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	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	40	44	---	V
△BVDSS/△TJ	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.032	---	V/℃
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=4A	---	30	37	mΩ
		V_{GS}=4.5V , I_D=3A	---	40	50	
VGS(th)	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.0	1.5	2.5	V
△$V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4.5	---	mV/℃
IDSS	Drain-Source Leakage Current	V_{DS}=32V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=32V , V_{GS}=0V , T_J=55℃	---	---	5	
IGSS	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=4A	---	8	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	2.4	4.8	Ω
Q_g	Total Gate Charge (4.5V)	V_{DS}=15V , V_{GS}=4.5V , I_D=3A	---	5	---	nC
Qgs	Gate-Source Charge		---	1.54	---	
Qgd	Gate-Drain Charge		---	1.84	---	
Td(on)	Turn-On Delay Time	V_{DD}=15V , V_{GS}=10V , R_G=3.3Ω I_D=1A	---	7.8	---	ns
T_r	Rise Time		---	2.1	---	
Td(off)	Turn-Off Delay Time		---	29	---	
T_f	Fall Time		---	2.1	---	
Ciss	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	452	---	pF
Coss	Output Capacitance		---	51	---	
Crss	Reverse Transfer Capacitance		---	38	---	
IS	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	4.5	A
ISM	Pulsed Source Current[2,4]		---	---	14	A
VSD	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	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 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.

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V(BR)DSS	Drain-Source Breakdown Voltage	I_D = -250mA, V_{GS} = 0V	-40	-	-	V
IDSS	Zero Gate Voltage Drain Current	V_{DS} = -40V, V_{GS} = 0V	-	-	1.0	mA
IGSS	Gate-Body Leakage Current	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
VGS(th)	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = -250mA	-1.1	-1.6	-2.1	V
RDS(ON)	Static Drain-Source ON-Resistance(5)	V_{GS} = -10V, I_D = -3A	-	42	55	mW
		V_{GS} = -4.5V, I_D = -2A	-	60	78	mW
R_g	Gate Resistance	f = 1MHz	-	8	-	W
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = -20V, f = 1MHz	-	546	-	pF
Coss	Output Capacitance		-	52	-	pF
C_{rss}	Reverse Transfer Capacitance		-	43	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to -10V V_{DS} = -20V, I_D = -2A	-	11	-	nC
Q_{gs}	Gate Source Charge		-	1.8	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	1.9	-	nC
td(on)	Turn-On DelayTime	V_{GS} = -10V, V_{DD} = -20V I_D= -2A, R_{GEN} = 3W	-	8.1	-	ns
t_r	Turn-On Rise Time		-	13	-	ns
td(off)	Turn-Off DelayTime		-	16	-	ns
t_f	Turn-Off Fall Time		-	6	-	ns
IS	Maximum Continuous Body Diode Forward Current		-	-	-5	A
ISM	Maximum Pulsed Body Diode Forward Current		-	-	-19	A
VSD	Body Diode Forward Voltage	V_{GS} = 0V, I_S = -3A	-		-1.2	V
trr	Body Diode Reverse Recovery Time	I_F = -2A, di/dt = 100A/us	-	10	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	4.8	-	nC

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

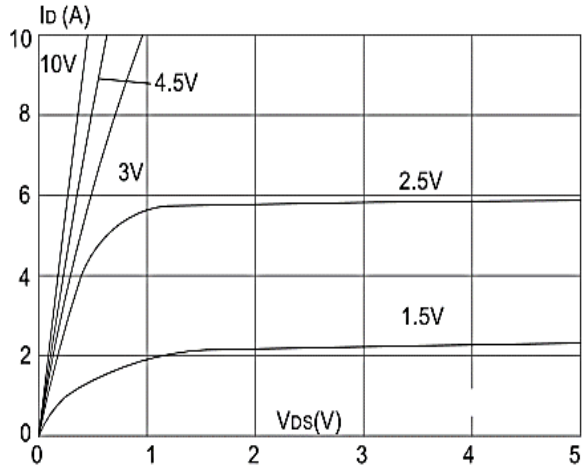


Figure1: Output Characteristics

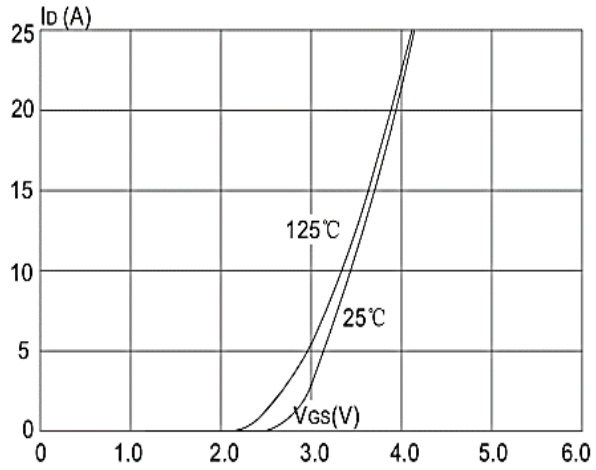


Figure 2: Typical Transfer Characteristics

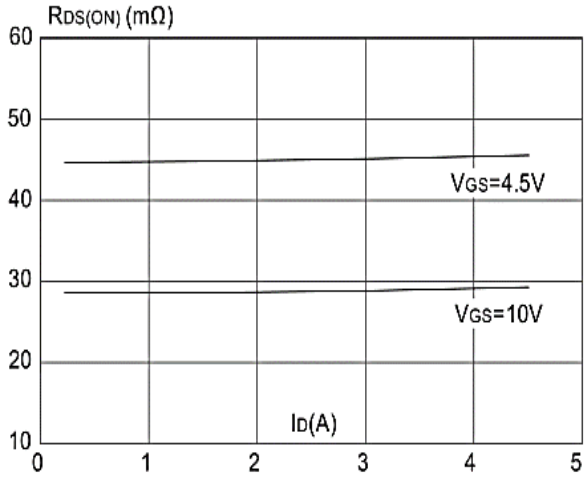


Figure 3:On-resistance vs. Drain Current

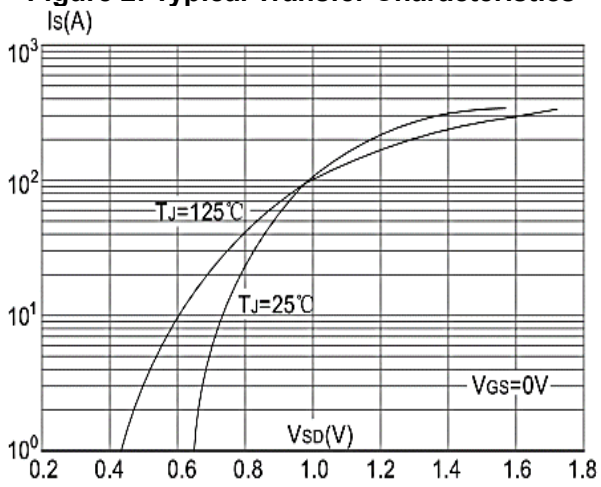


Figure 4: Body Diode Characteristics

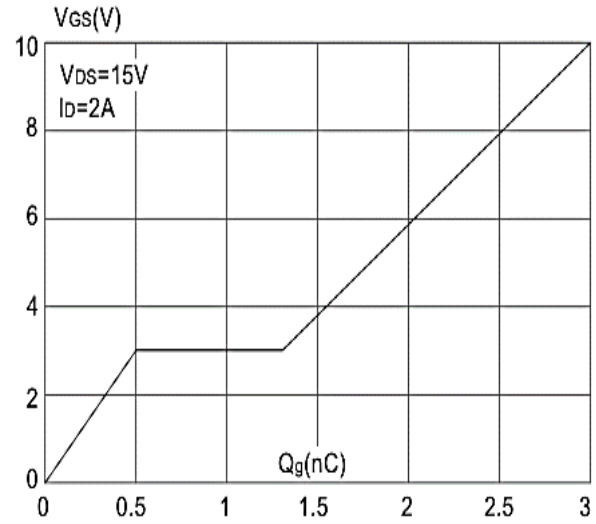


Figure 5: Gate Charge Characteristics

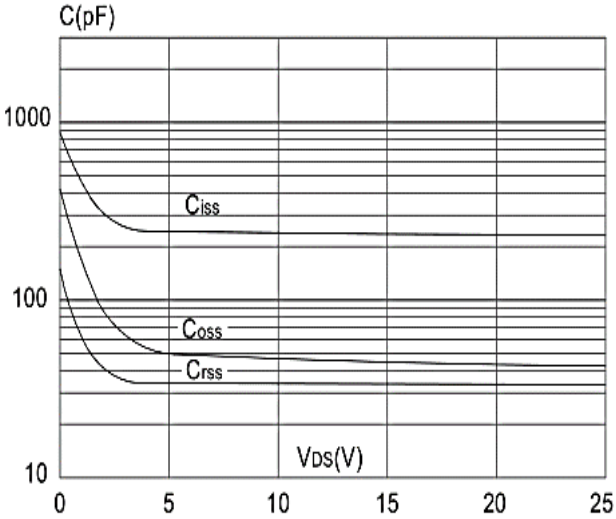


Figure 6: Capacitance Characteristics

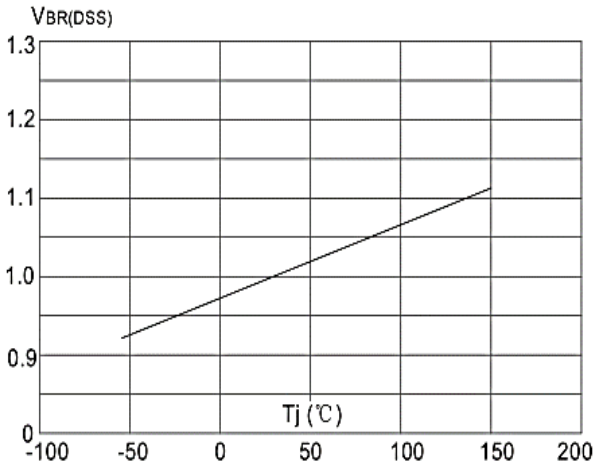


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

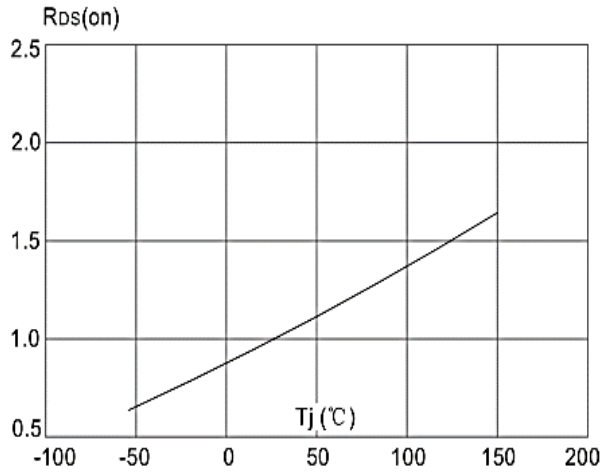


Figure 8: Normalized on Resistance vs Junction Temperature

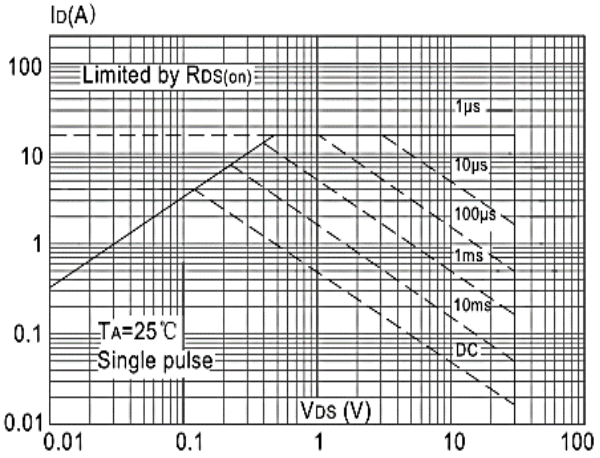


Figure 9: Maximum Safe Operating Area vs. Case Temperature

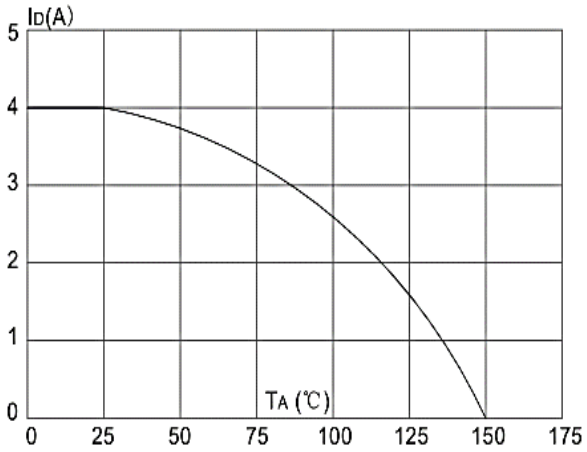


Figure 10: Maximum Continuous Drain Current

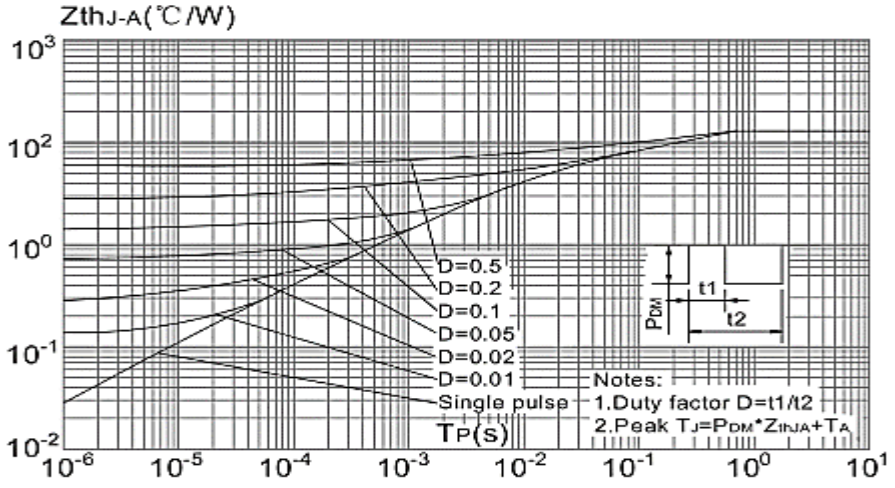


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

P-Typical Characteristics

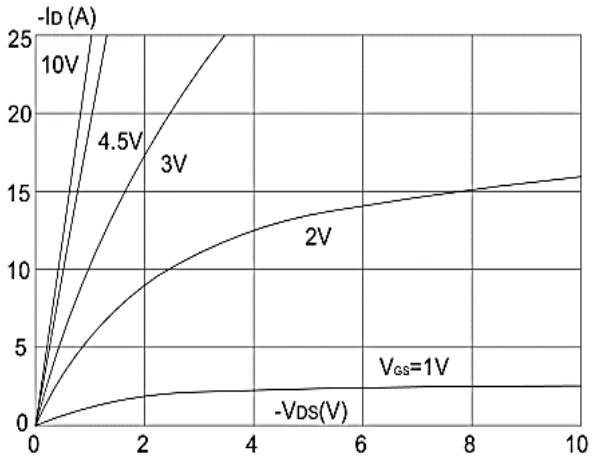


Figure1: Output Characteristics

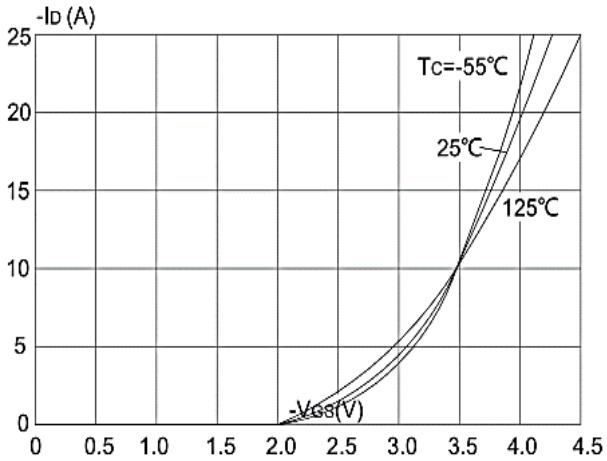


Figure 2: Typical Transfer Characteristics

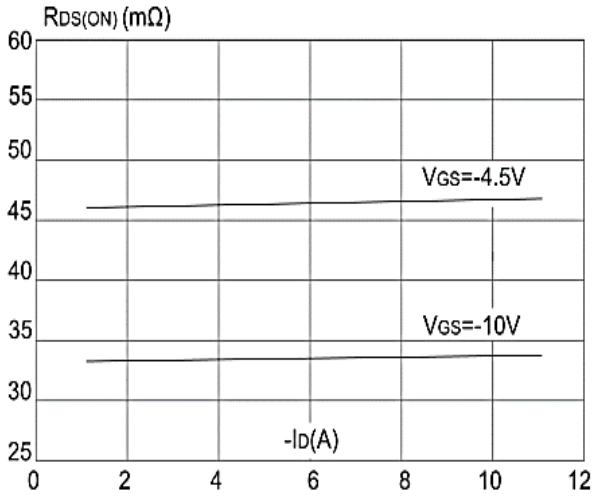


Figure 3:On-resistance vs. Drain Current

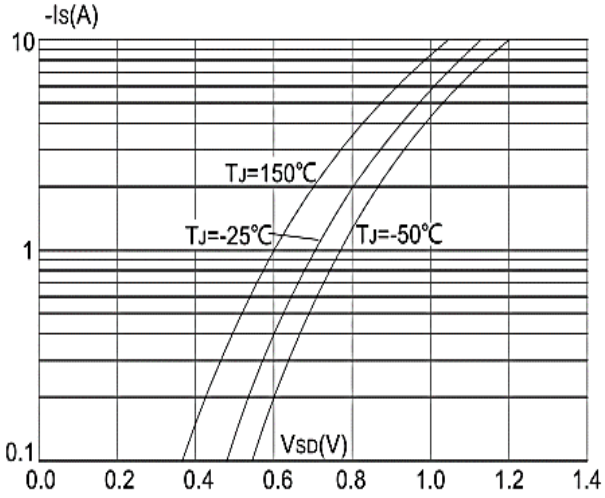


Figure 4: Body Diode Characteristics

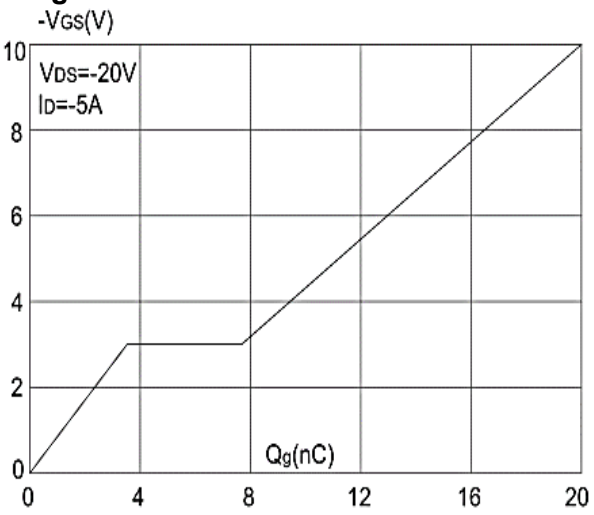


Figure 5: Gate Charge Characteristics

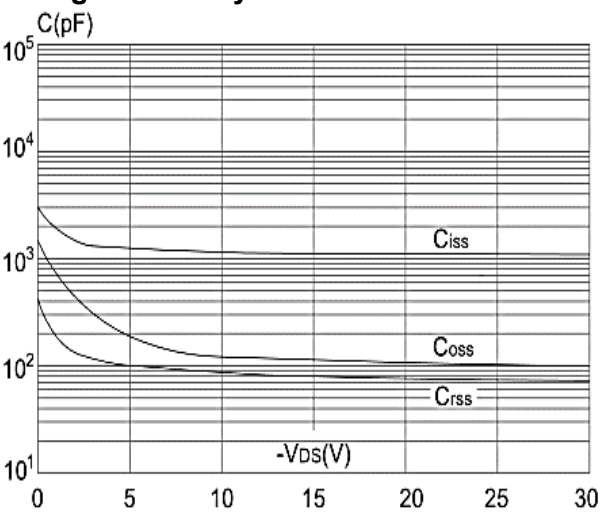


Figure 6: Capacitance Characteristics

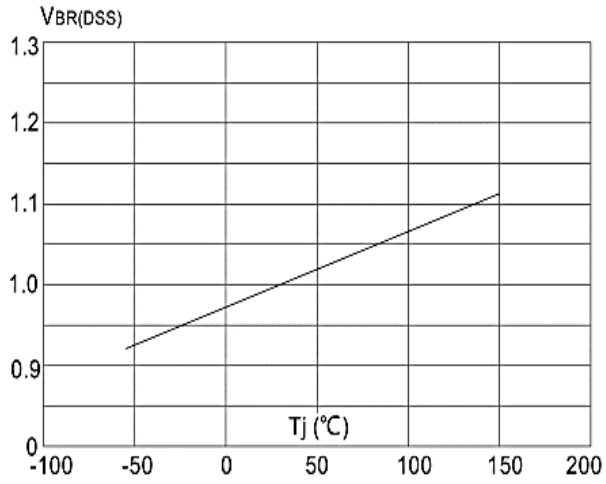


Figure 7: Normalized Breakdown Voltage vs Junction Temperature

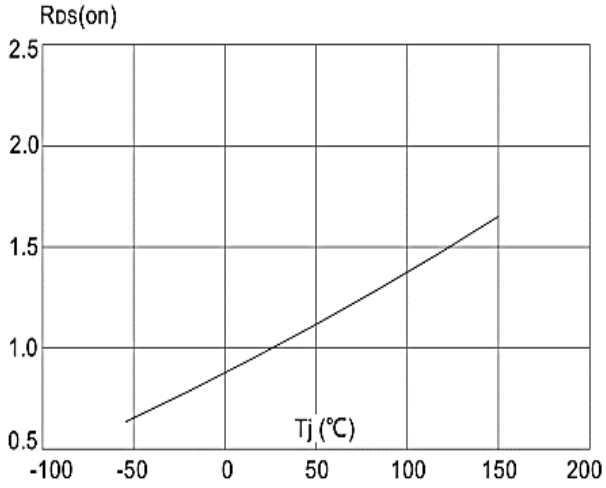


Figure 8: Normalized on Resistance vs. Junction Temperature

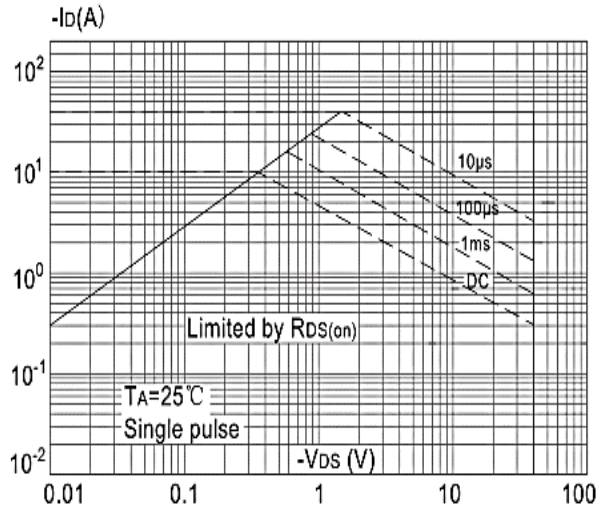


Figure 9: Maximum Safe Operating Area

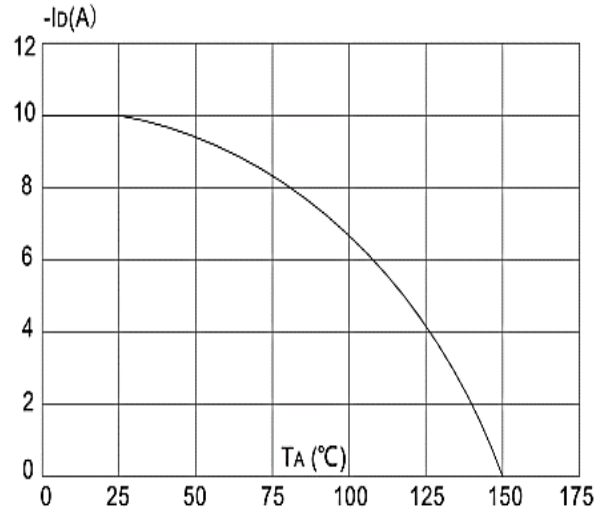


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

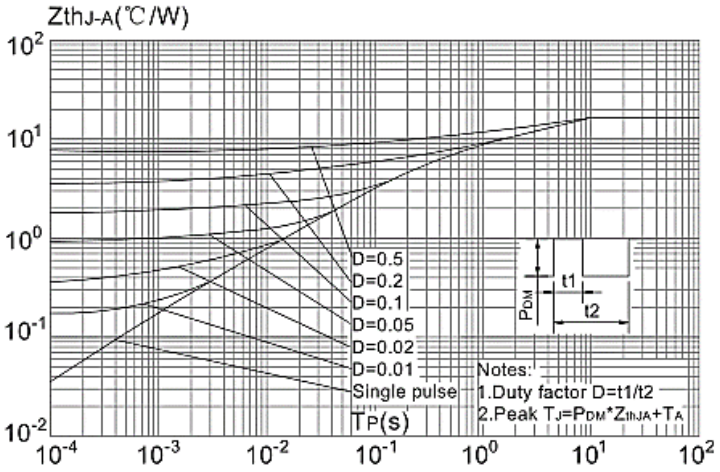
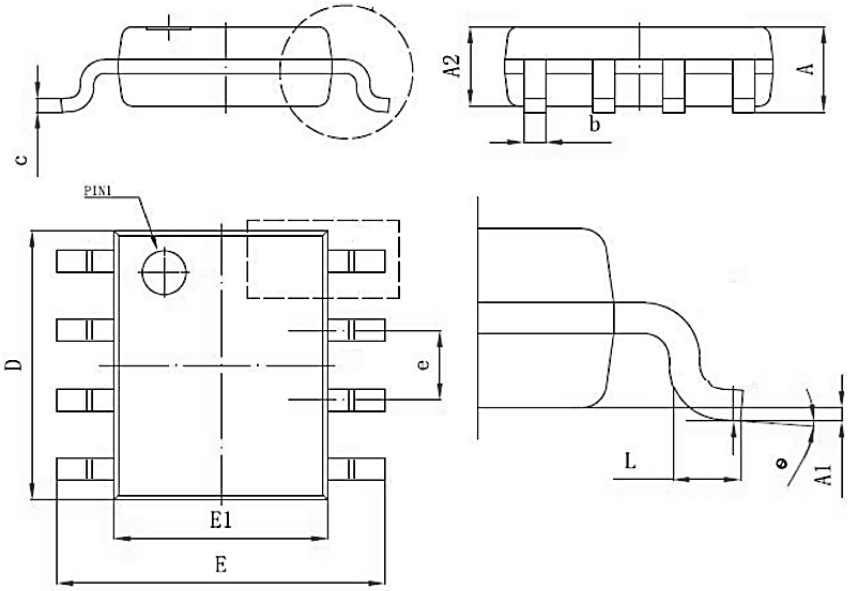


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambien

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