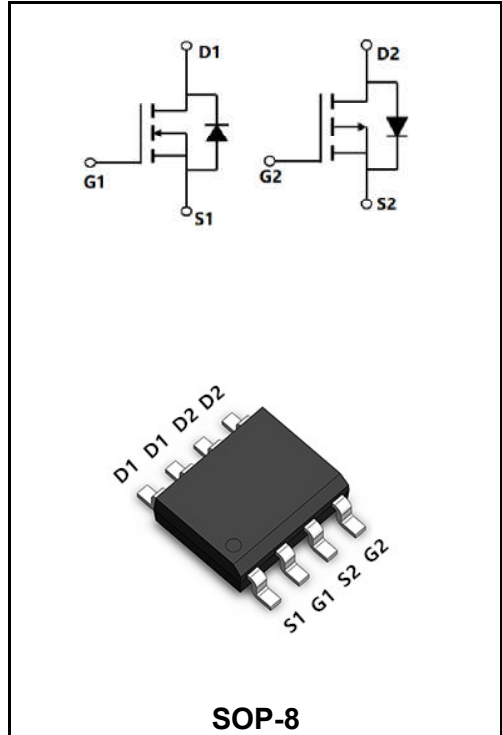


40V N+P-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

I_D	8.3A
V_{DSS}	40V
$R_{DS(on)-typ}(@V_{GS}=10V)$	< 26mΩ (Type:18 mΩ)
I_D	-6.3A
V_{DSS}	-40V
$R_{DS(on)-typ}(@V_{GS}=-10V)$	< 50mΩ (Type:42 mΩ)



Application

- ◆ Wireless charging
- ◆ Boost driver
- ◆ Brushless motor

Product Specification Classification

Part Number	Package	Marking	Pack
YFW8G04S	SOP-8	YFW 8G04S XXXXX	3000PCS/Tape

Maximum Ratings at Tc=25°C unless otherwise specified

Characteristics	Symbols	Value		Units
		N-Ch	P-Ch	
Drain-Source Voltage	VDS	40	-40	V
Gate - Source Voltage	VGS	±20	±20	V
Continuous Drain Current, $V_{GS} @ 10V^1 @ T_A=25^\circ C$	I_D	8.3	6.3	A
Continuous Drain Current, $V_{GS} @ 10V^1 @ T_A=70^\circ C$	I_D	4.2	-3.8	A
Pulsed Drain Current ²	I_{DM}	26	-24	A
Single Pulse Avalanche Energy ³	E_{AS}	16.2	39	mJ
Total Power Dissipation ⁴ @ $T_A=25^\circ C$	P_D	1.67	1.67	W
Storage Temperature Range	T_{STG}	-55 to +150		°C
Operating Junction Temperature Range	T_J	-55 to +150		°C
Thermal Resistance Junction-Ambient ¹	R_{θJA}	57		°C/W
Thermal Resistance Junction-Case ¹	R_{θJC}	30		°C/W

N-Channel Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	BV_{DSS}	40	44	-	V
BVDSS Temperature Coefficient	Reference to 25 °C , I _D =1mA	ΔBV_{DSS}/ΔT_J	-	0.034	-	V/°C
Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =5A	R_{DS(ON)}	-	18	26	mΩ
	V _{GS} =4.5V, I _D =4A		-	25.0	35	
Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	V_{GS(th)}	1.2	1.6	2.5	V
V _{GS(th)} Temperature Coefficient		ΔV_{GS(th)}	-	-4.56	-	mV/°C
Drain-Source Leakage Current	V _{DS} =32V, V _{GS} =0V T _J =25°C	I_{DSS}	-	-	1	uA
	V _{DS} =32V, V _{GS} =0V, T _J =55°C		-	-	5	
Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	I_{GSS}	-	-	±100	nA
Forward Transconductance	V _{DS} = 5V, I _D = 5A	g_{fs}	-	14	-	S
Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	R_g	-	2.6	-	Ω
Total Gate Charge(4.5V)	V _{DS} =20V V _{GS} =4.5V I _D =5A	Q_g	-	5.5	-	nC
Gate-Source Charge		Q_{gs}	-	1.25	-	
Gate-Drain Charge		Q_{gd}	-	2.5	-	
Turn-on delay time	V _{DD} =20V V _{GS} =10V R _G = 3.3Ω I _D = 1A	t_{d(on)}	-	8.9	-	ns
Rise Time		T_r	-	2.2	-	
Turn-Off Delay Time		t_{d(OFF)}	-	41	-	
Fall Time		t_f	-	2.7	-	
Input Capacitance	V _{DS} =15V V _{GS} =0V f=1MHz	C_{iss}	-	593	-	pF
Output Capacitance		C_{oss}	-	76	-	
Reverse Transfer Capacitance		C_{rss}	-	56	-	
Continuous Source Current ^{1,5}	V _G =V _D =0V, Force Current	I_S	-	-	6.1	A
Pulsed Source Current ^{2,5}		I_{SM}	-	-	23	A
Diode Forward Voltage ²	V _{GS} =0V, I _S =1A, T _J =25°C	V_{SD}	-	-	1.2	V

Note :

- 1、 The data tested by surface mounted on a 1 inch² 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}=10A
- 4、 The power dissipation is limited by 150°C 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 °C, unless otherwise noted)

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250uA	BV_{DSS}	-40	-	-	V
BVDSS Temperature Coefficient	Reference to 25 °C, I _D =-1mA	ΔBV_{DSS}/ΔT_J	-	-0.02	-	V/°C
Static Drain-Source On-Resistance ²	V _{GS} =-10V, I _D =-5A	R_{DS(ON)}	-	42	50	mΩ
	V _{GS} =-4.5V, I _D =-3A		-	48	60	
Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250uA	V_{GS(th)}	-1.0	-1.6	-2.5	V
V _{GS(th)} Temperature Coefficient		ΔV_{GS(th)}	-	3.72	-	mV/°C
Drain-Source Leakage Current	V _{DS} =-32V, V _{GS} =0V, T _J =25 °C	I_{DSS}	-	-	1	uA
	V _{DS} =-32V, V _{GS} =0V, T _J =55 °C		-	-	5	
Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	I_{GSS}	-	-	±100	nA
Total Gate Charge(-4.5V)	V _{DS} =-20V V _{GS} =-4.5V I _D =-6A	Q_g	-	15.8	-	nC
Gate-Source Charge		Q_{gs}	-	3.5	-	
Gate-Drain Charge		Q_{gd}	-	3.2	-	
Turn-on delay time	V _{DD} =-15V V _{GS} =-10V R _G =3.3Ω I _D =-1A	t_{d(on)}	-	5.2	-	ns
Rise Time		T_r	-	7	-	
Turn-Off Delay Time		t_{d(OFF)}	-	23	-	
Fall Time		t_f	-	8	-	
Input Capacitance	V _{DS} =-15V V _{GS} =0V f=1MHz	C_{iss}	-	1000	-	pF
Output Capacitance		C_{oss}	-	160	-	
Reverse Transfer Capacitance		C_{rss}	-	100	-	
Continuous Source Current ^{1,5}	V _G =V _D =0V, Force Current	I_S	-	-	-5.7	A
Diode Forward Voltage ²	V _{GS} =0V, I _S =-1A, T _J =25 °C	V_{SD}	-	-	-1.2	V

Note :

- 1、 The data tested by surface mounted on a 1 inch² 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}=-7A
- 4、 The power dissipation is limited by 150 °C 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.

Ratings and Characteristic Curves

N-Channel Typical Characteristics

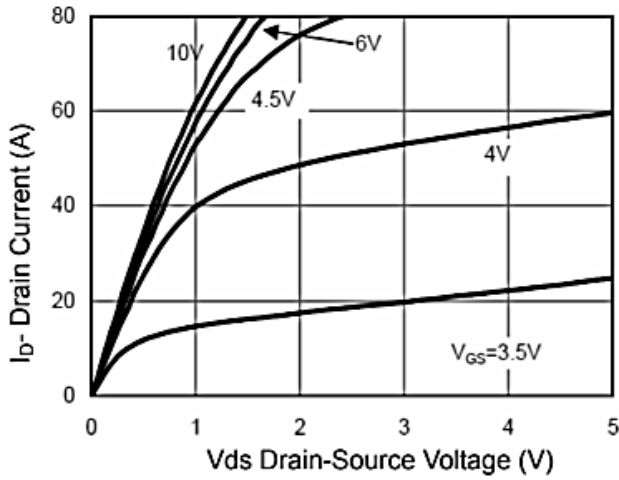


Figure 1 Output Characteristics

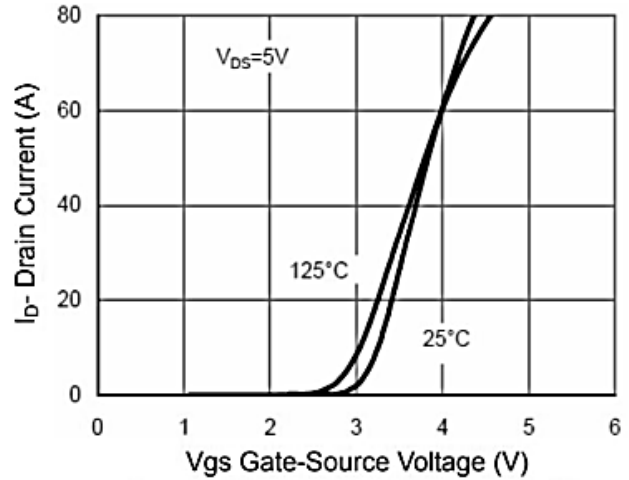


Figure 2 Transfer Characteristics

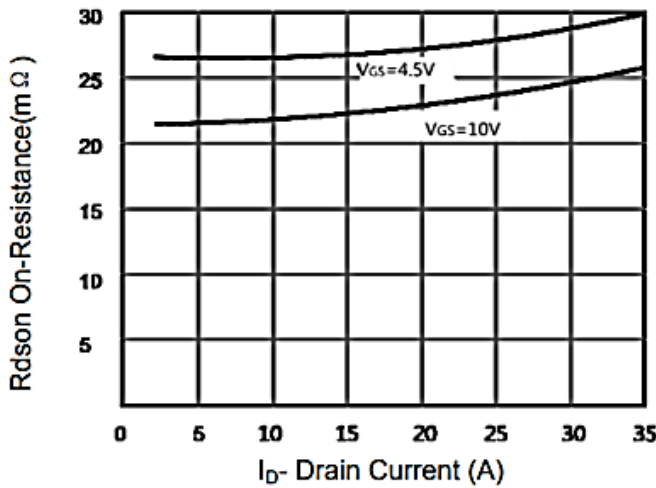


Figure 3 $R_{DS(on)}$ - Drain Current

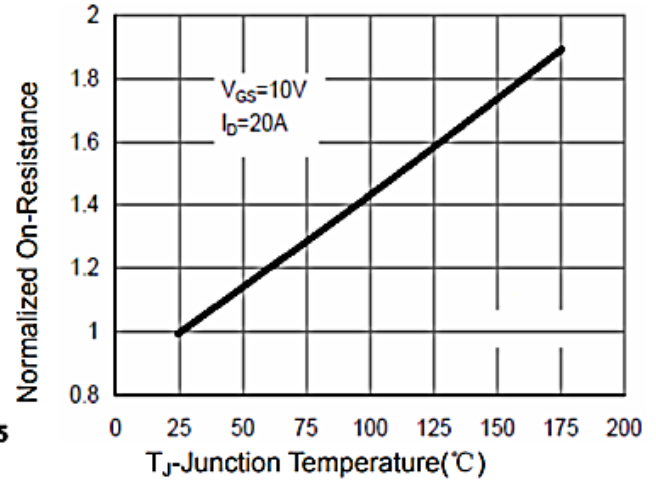


Figure 4 $R_{DS(on)}$ -Junction Temperature

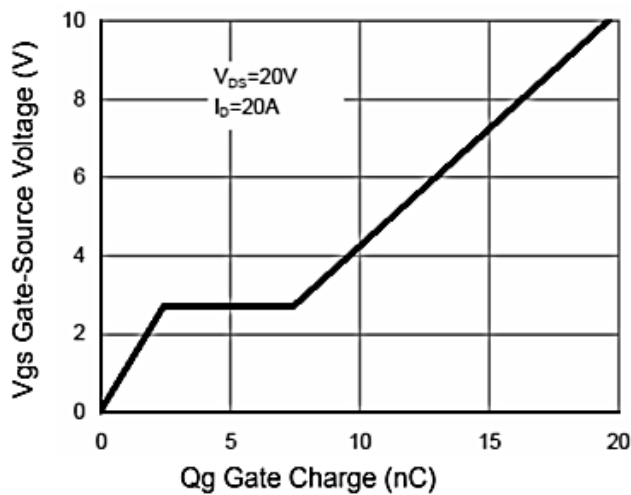


Figure 5 Gate Charge

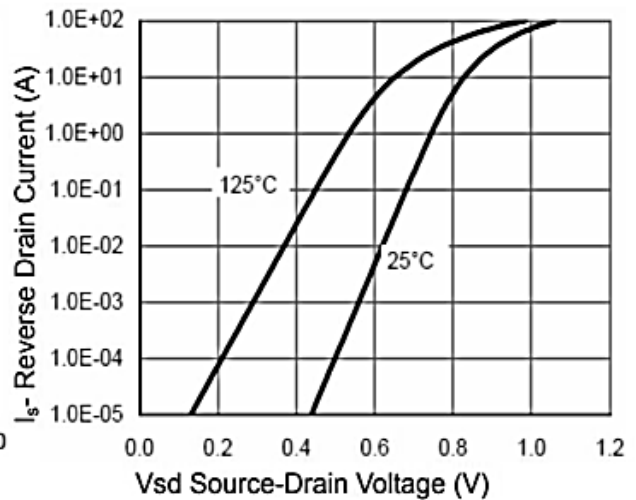


Figure 6 Source- Drain Diode Forward

Ratings and Characteristic Curves

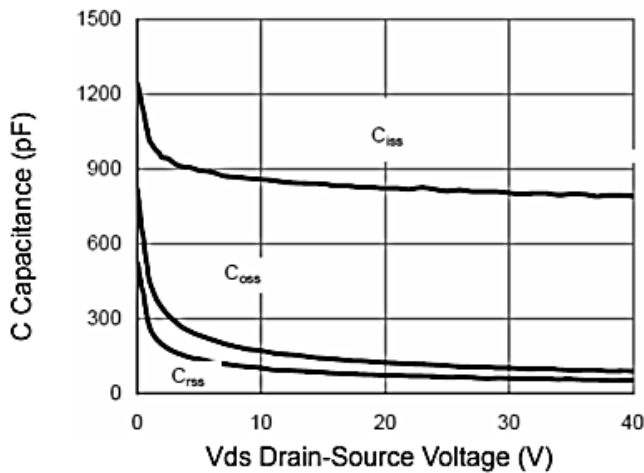


Figure 7 Capacitance vs Vds

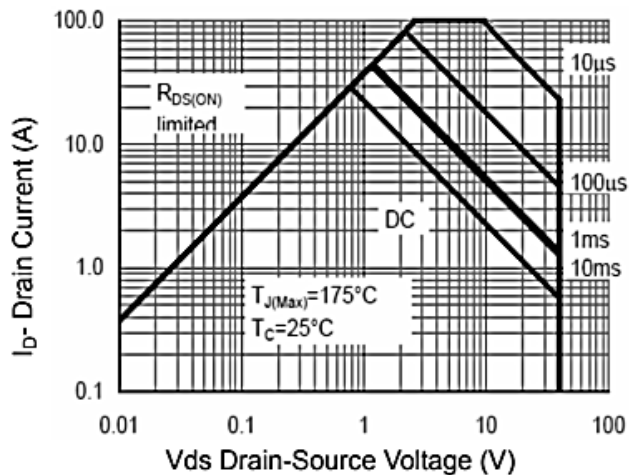


Figure 8 Safe Operation Area

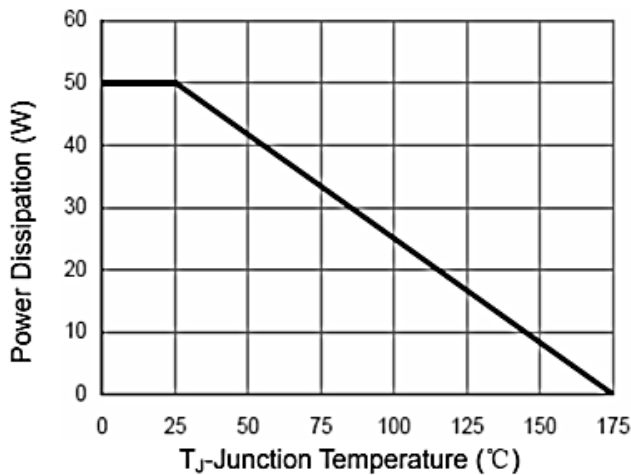


Figure 9 Power De-rating

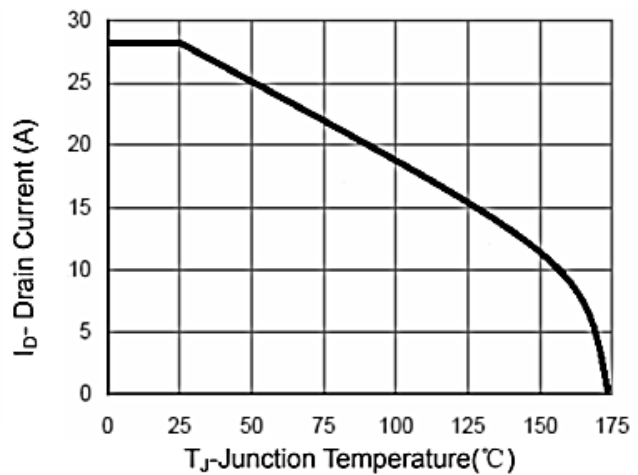


Figure 10 Id Current De-rating

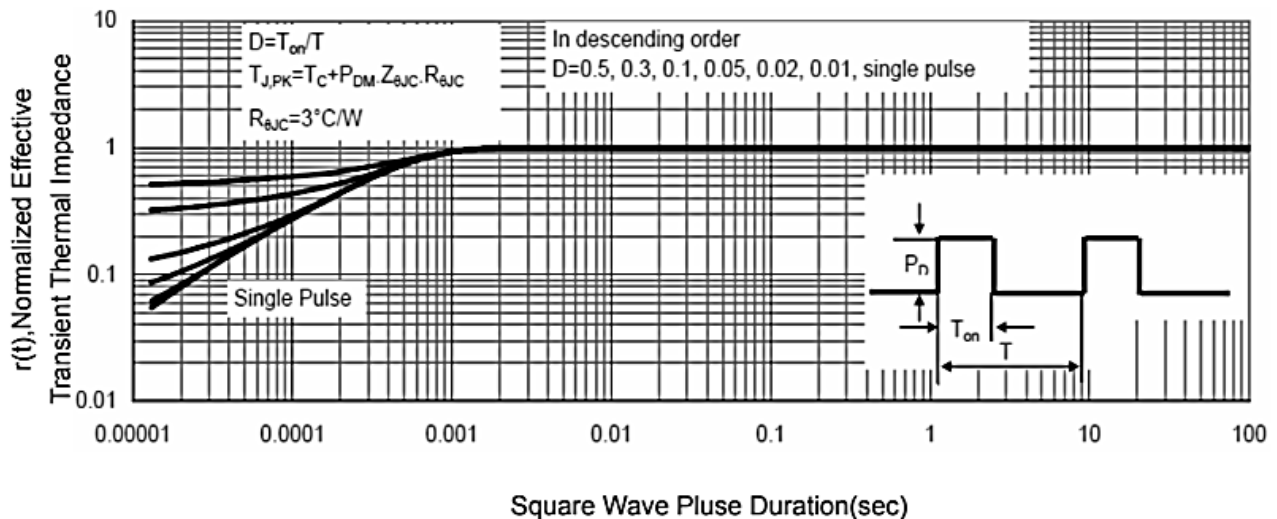


Figure 11 Normalized Maximum Transient Thermal Impedance

Ratings and Characteristic Curves

P-Channel Typical Characteristics

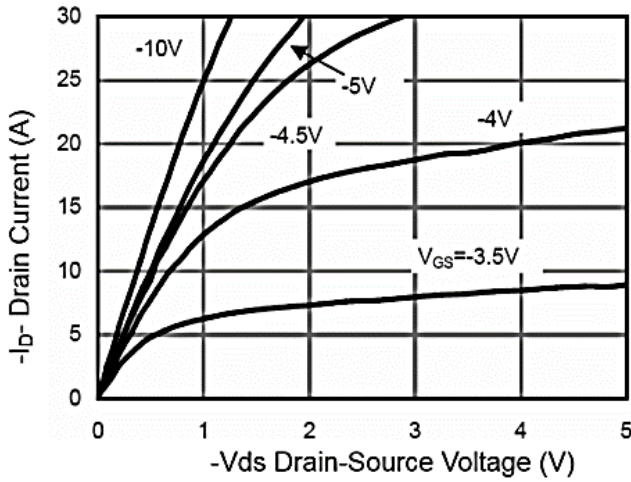


Figure 1 Output Characteristics

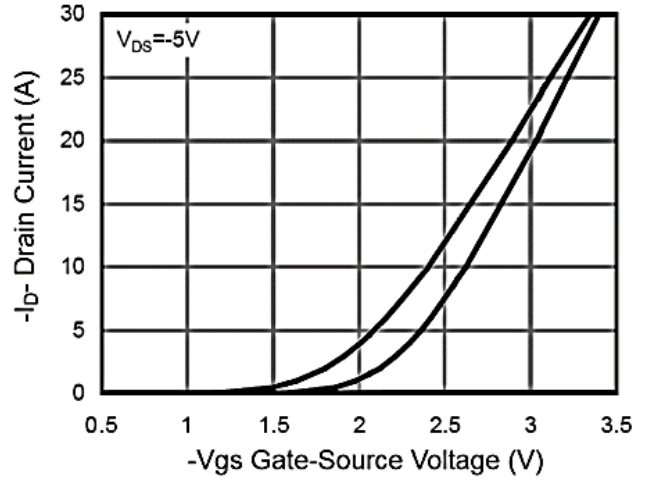


Figure 2 Transfer Characteristics

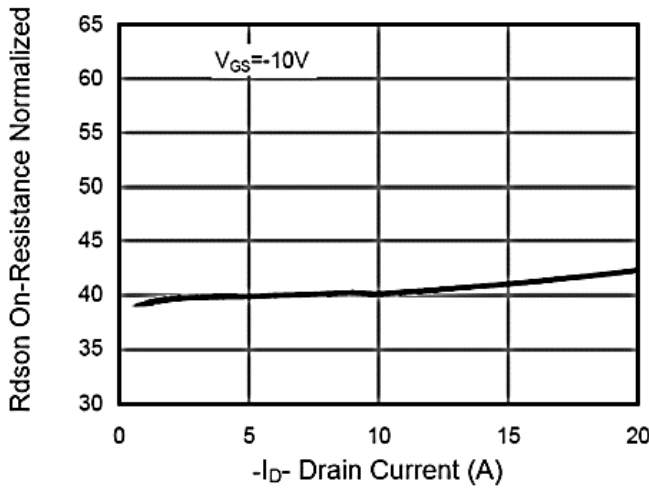


Figure 3 Rdson- Drain Current

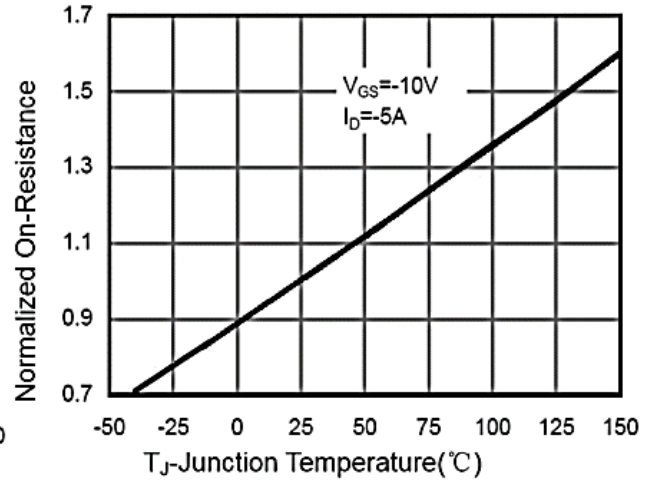


Figure 4 Rdson-Junction Temperature

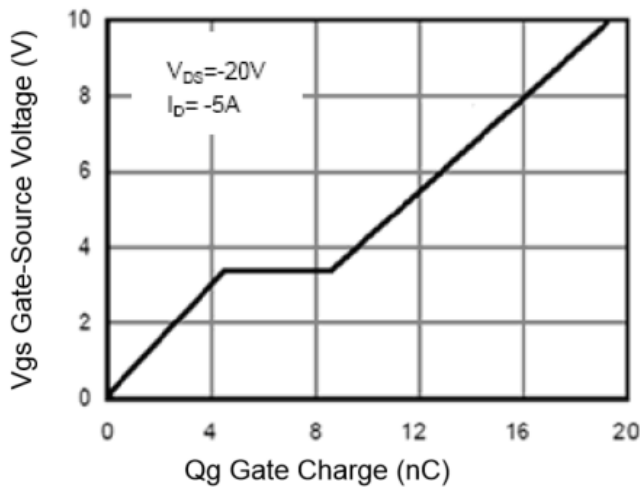


Figure 5 Gate Charge

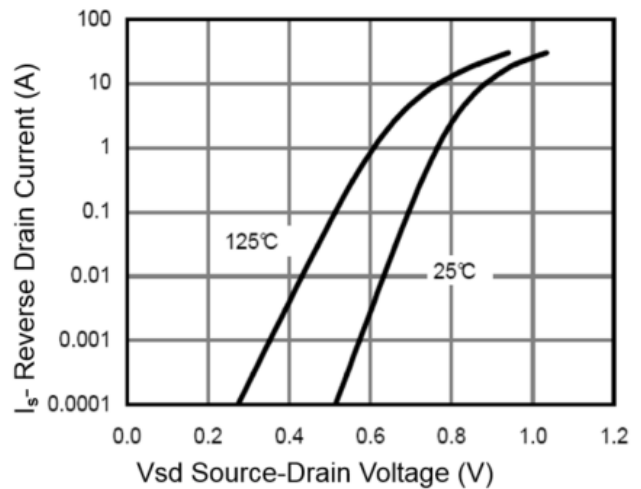


Figure 6 Source- Drain Diode Forward

Ratings and Characteristic Curves

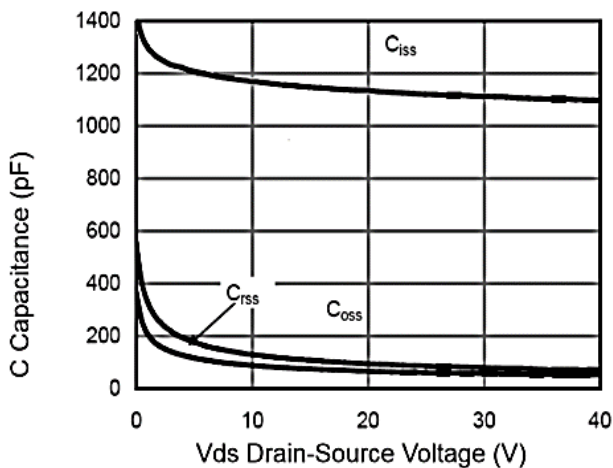


Figure 7 Capacitance vs Vds

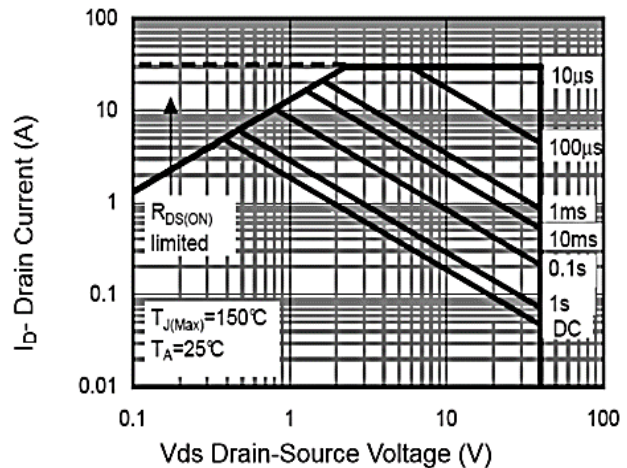


Figure 8 Safe Operation Area

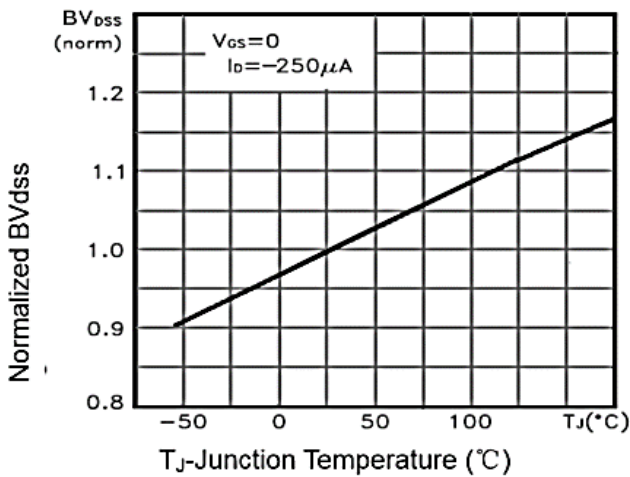


Figure 9 BV_{DSS} vs Junction Temperature

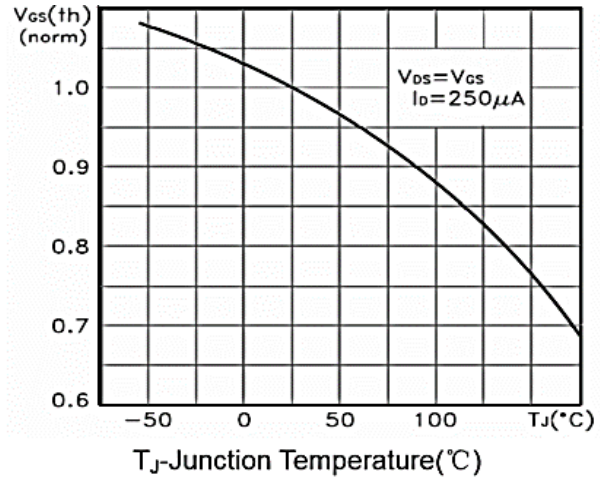


Figure 10 V_{GS(th)} vs Junction Temperature

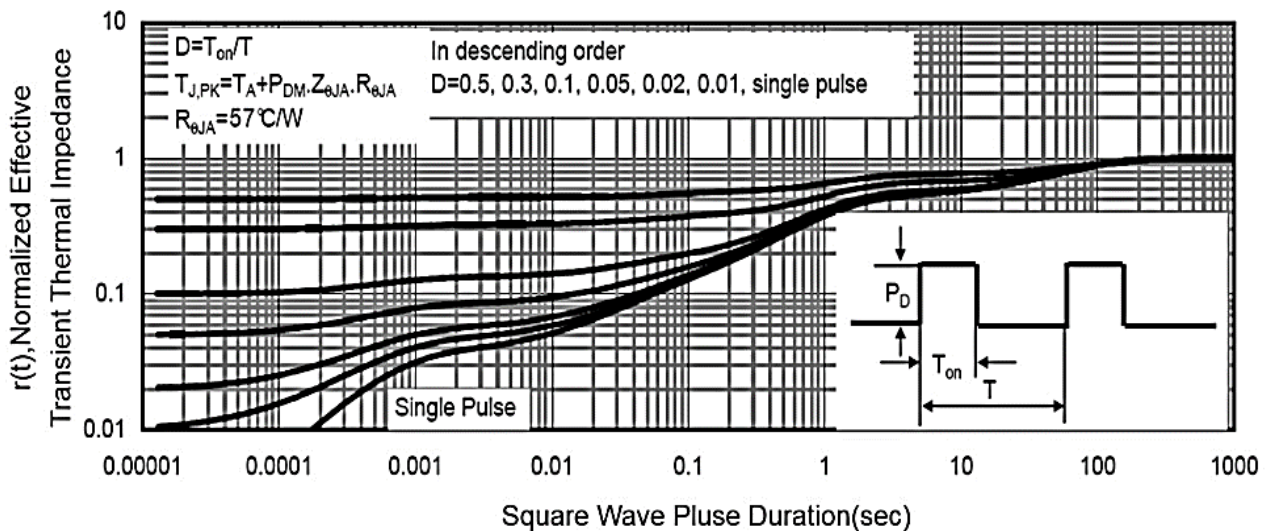
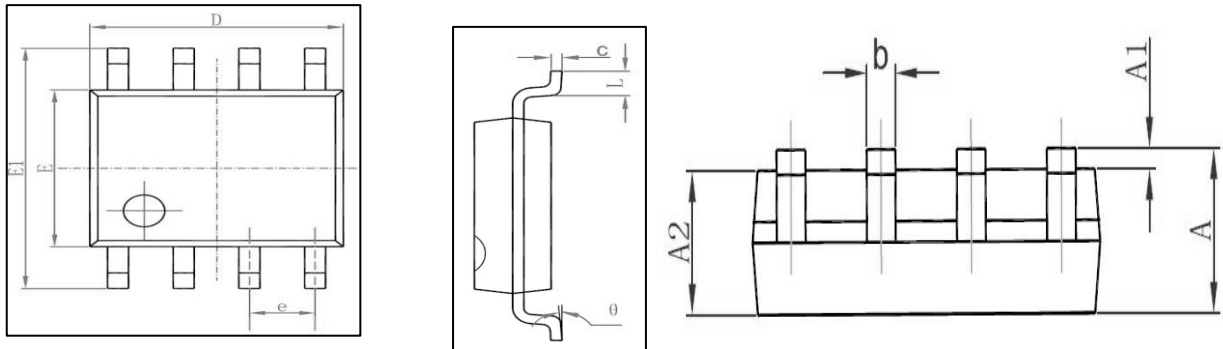
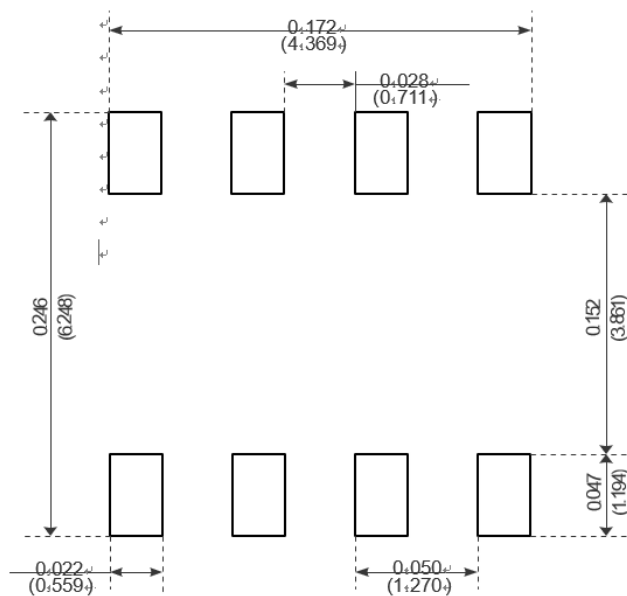


Figure 11 Normalized Maximum Transient Thermal Impedance

SOP-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°



Recommended Minimum Pads