Power MOSFETS

DATASHEET

LM8958CAQ8A

N-Channel AND P-Channel
Enhancement Mode MOSFET

Leadpower-semiconductor Corp., Ltd

sales@leadpower-semi.com

(03) 6577339 FAX：(03) 6577229

www.leadpower-semi.com

Quality Management Systems

ISO 9001:2015 Certificate

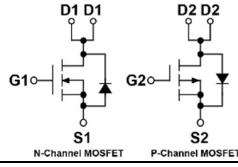
LM8958CAQ8A

N-Channel AND P-Channel Enhancement Mode MOSFET

Pin Description

SOP-8L (TOP view)

Symbol



Odering Information

Symbol	N-Channel	P-Channel	Unit
V_{DSS}	30	-30	V
$R_{DS(ON)}$	19	48	mΩ
I_D	7.4	-4.7	A

Feature

- Complementary N and P Channel MOSFET
- Fast switching speed
- Surface mount package
- Reliable and Rugged
- ROHS Compliant & Halogen-Free
- 100% UIS Tested

Applications

- DC-DC Converters
- Motor Control

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM8958CAQ8A	SOP-8L	Tape & Reel	3000 / Tape & Reel	8958 □□□□□□

Note：□□□□□□ = Lot Code

Absolute Maximum Ratings (T_J=25°C Unless Otherwise Noted)

Symbol	Parameter		N-Channel	P- Channel	Unit
V_{DSS}	Drain-Source Voltage		30	-30	V
V_{GSS}	Gate-Source Voltage		±20	±20	
T_J	Maximum Junction Temperature		150	150	°C
T_{STG}	Storage Temperature Range		-55 to 150	-55 to 150	°C
I_S	Diode Continuous Forward Current		2	-2	A
I_{DM}①	Pulse Drain Current Tested	T_A=25°C	18	-11	A
I_D	Continuous Drain Current	T_A=25°C	7.4	-4.7	A
		T_A=70°C	5.9	-3.8	
P_D	Maximum Power Dissipation	T_A=25°C	1.6		W
		T_A=70°C	1.0		
I_{AS}	Avalanche Current, Single pulse	L=0.5mH	7.8	-6.8	A
E_{AS}②	Avalanche Energy, Single pulse	L=0.5mH	15	11	mJ

Thermal Characteristics

Symbol	Parameter		Rating	Unit
$R_{\theta JA}$③	Thermal Resistance-Junction to Ambient	t ≤ 10s	50	°C/W
		Steady State	78	

Note ①：Max. current is limited by bonding wire.
Note ②：UIS tested and pulse width are limited by maximum junction temperature 150°C
Note ③：Surface Mounted on 1in^2 FR-4 board with 1oz.

N-Channel Electrical Characteristics (T_J=25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Electrical Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250uA	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=24V, V_{GS}=0V	-	-	1	uA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250uA	1	-	2	V
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
$R_{DS(ON)}$④	Drain-Source On-state Resistance	V_{GS}=10V, I_{DS}=6.9A	-	16	19	mΩ
		V_{GS}=4.5V, I_{DS}=5A	-	20	26	
gfs	Forward Transconductance	V_{DS}=10V, I_{DS}=1A	-	3.6	-	S
Dynamic Characteristics ⑤						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V, Freq.=1MHz	-	5.4	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, Freq.=1MHz	-	508	-	pF
C_{oss}	Output Capacitance		-	76	-	
C_{rss}	Reverse Transfer Capacitance		-	60	-	
$td_{(ON)}$	Turn-on Delay Time	V_{GS}=10V,V_{DS}=15V, I_D=1A,R_{GEN}=6Ω	-	6	-	nS
t_r	Turn-on Rise Time		-	17	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	35	-	
t_f	Turn-off Fall Time		-	9	-	
Q_g	Total Gate Charge	V_{GS}=4.5V,V_{DS}=15V I_D=7A	-	5.8	-	nC
Q_g	Total Gate Charge	V_{GS}=10V,V_{DS}=15V, I_D=7A	-	13	-	
Qgs	Gate-Source Charge		-	1.6	-	
Qgd	Gate-Drain Charge		-	2.4	-	
Source-Drain Characteristics						
V_{SD}④	Diode Forward Voltage	I_{SD}=2A, V_{GS}=0V	-	0.75	1.2	V
t_{rr}	Reverse Recovery Time	I_F=5A, V_R=0V dI$_F$/dt=100A/μs	-	8	-	nS
Q_{rr}	Reverse Recovery Charge		-	3	-	nC

Note ④ : Pulse test (pulse width≤300us, duty cycle≤2%).
Note ⑤ : Guaranteed by design, not subject to production testing.

N-Channel Typical Characteristics

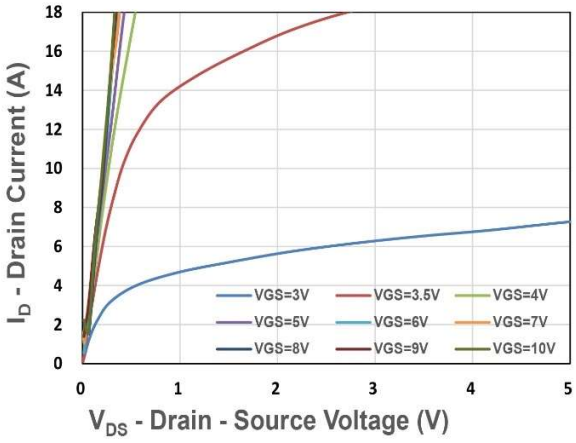


Figure 1. Output Characteristics

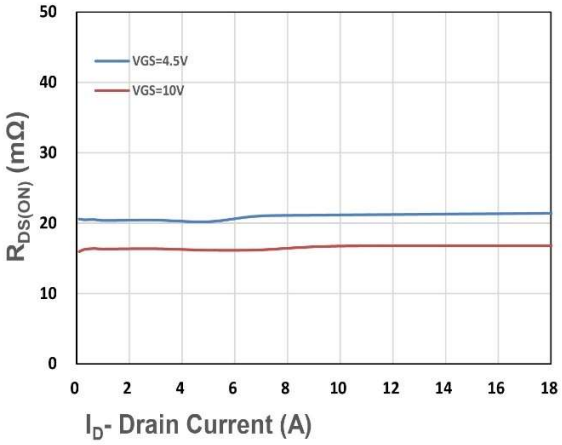


Figure 2. On-Resistance vs. ID

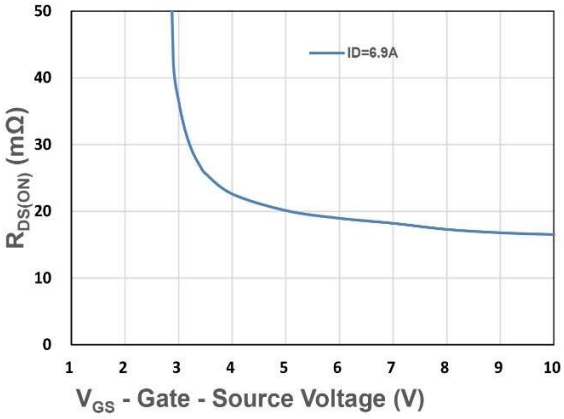


Figure 3. On-Resistance vs. VGS

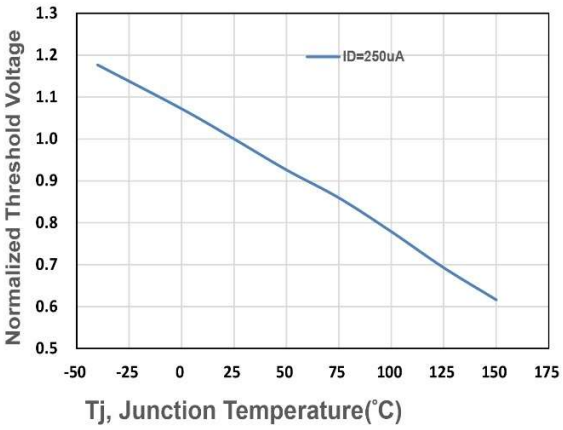


Figure 4. Gate Threshold Voltage

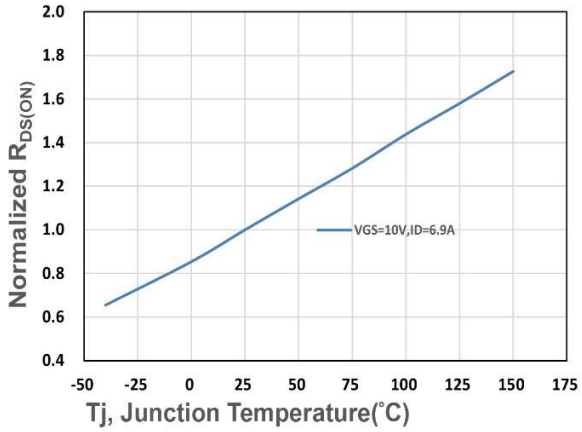


Figure 5. Drain-Source On Resistance

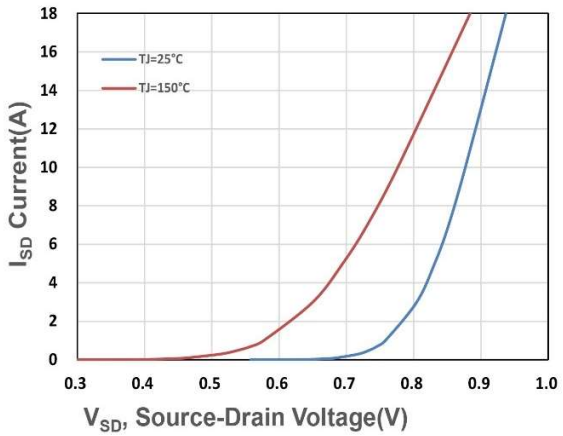


Figure 6. Source-Drain Diode Forward

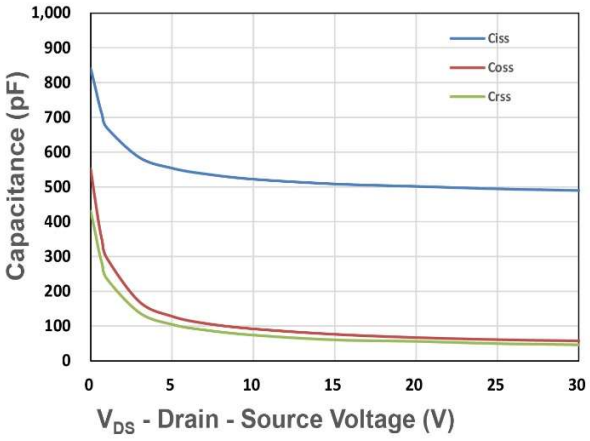


Figure 7. Capacitance

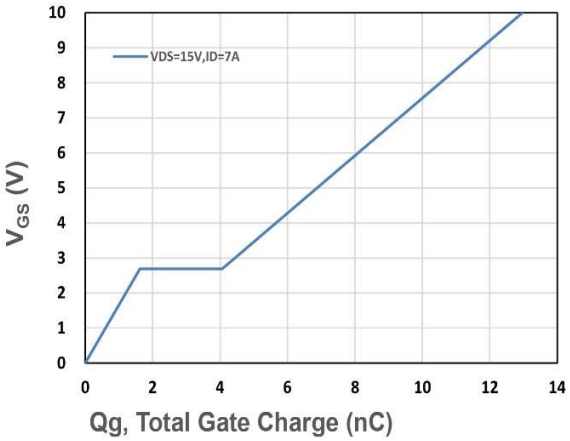


Figure 8. Gate Charge Characteristics

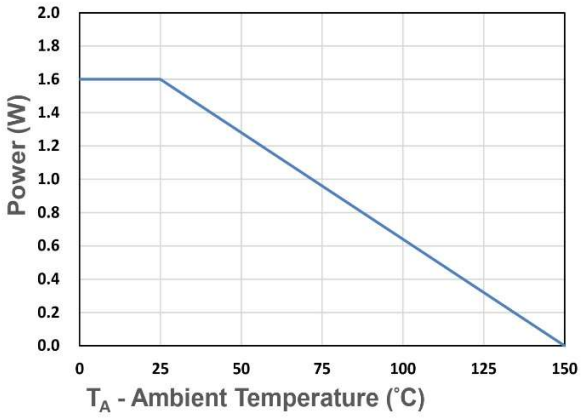


Figure 9. Power Dissipation

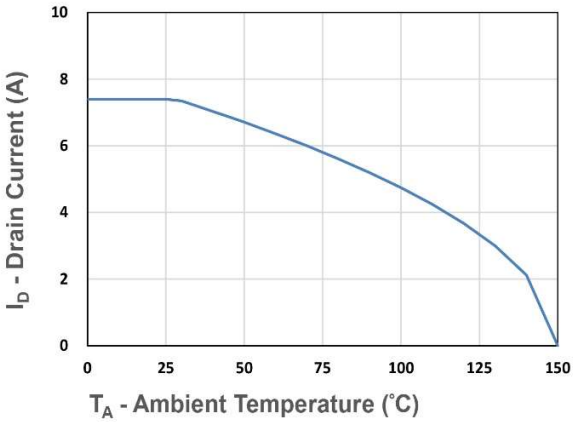


Figure 10. Drain Current

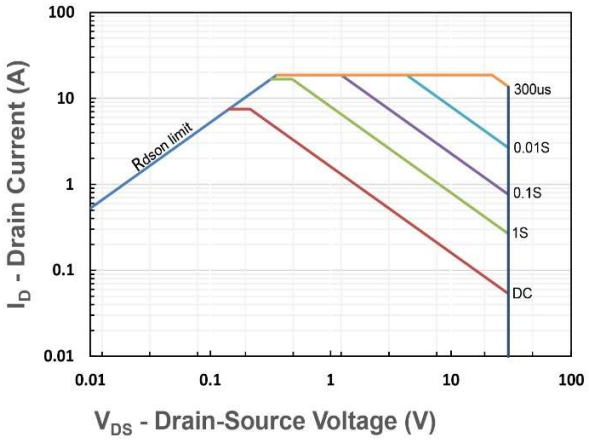


Figure 11. Safe Operating Area

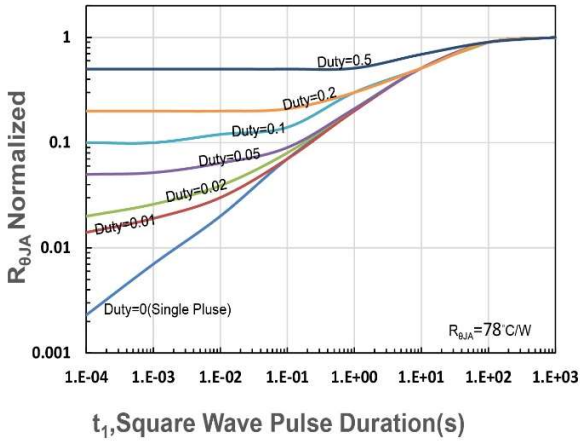


Figure 12. RθJA Transient Thermal Impedance

P-Channel Electrical Characteristics (T_J=25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Electrical Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=-250uA	-30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-24V, V_{GS}=0V	-	-	-1	uA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=-250uA	-1	-	-2	V
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
$R_{DS(ON)}$④	Drain-Source On-state Resistance	V_{GS}=-10V, I_{DS}=-5.2A	-	40	48	mΩ
		V_{GS}=-4.5V, I_{DS}=-4A	-	54	70	
gfs	Forward Transconductance	V_{DS}=-10V, I_{DS}=-1A	-	3.7	-	S
Dynamic Characteristics ⑤						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V, Freq.=1MHz	-	28	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=-15V, Freq.=1MHz	-	619	-	pF
C_{oss}	Output Capacitance		-	78	-	
C_{rss}	Reverse Transfer Capacitance		-	65	-	
$td_{(ON)}$	Turn-on Delay Time	V_{GS}=-10V,V_{DS}=-15V, I_D=-1A,R_{GEN}=6Ω	-	6	-	nS
t_r	Turn-on Rise Time		-	17	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	65	-	
t_f	Turn-off Fall Time		-	35	-	
Q_g	Total Gate Charge	V_{GS}=-4.5V,V_{DS}=-15V I_D=-6A	-	5.9	-	nC
Q_g	Total Gate Charge	V_{GS}=-10V,V_{DS}=-15V, I_D=-6A	-	13.1	-	
Qgs	Gate-Source Charge		-	1.6	-	
Qgd	Gate-Drain Charge		-	2.6	-	
Source-Drain Characteristics						
V_{SD}④	Diode Forward Voltage	I_{SD}=-1.7A, V_{GS}=0V	-	-0.78	-1.2	V
t_{rr}	Reverse Recovery Time	I_F=-4.5A, V_R=0V dI$_F$/dt=100A/μs	-	8	-	nS
Q_{rr}	Reverse Recovery Charge		-	3	-	nC

P-Channel Typical Characteristics

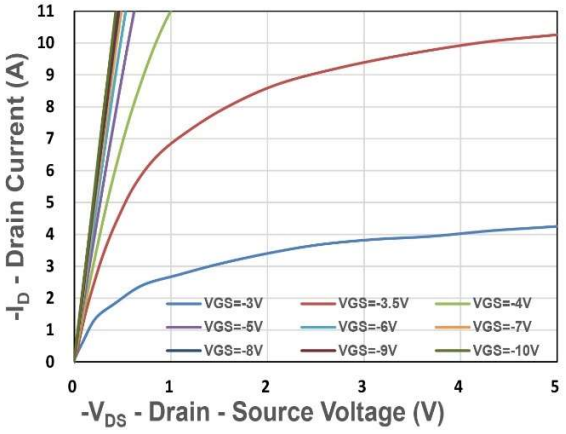


Figure 1. Output Characteristics

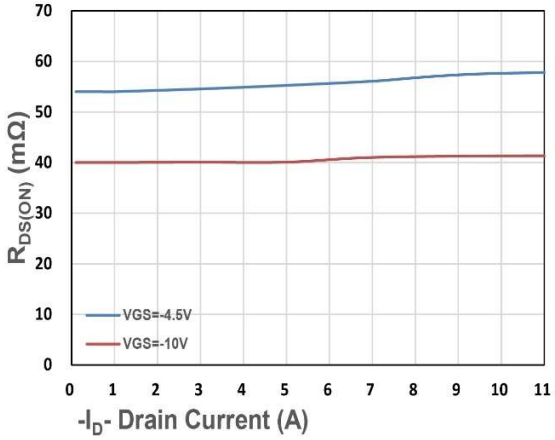


Figure 2. On-Resistance vs. ID

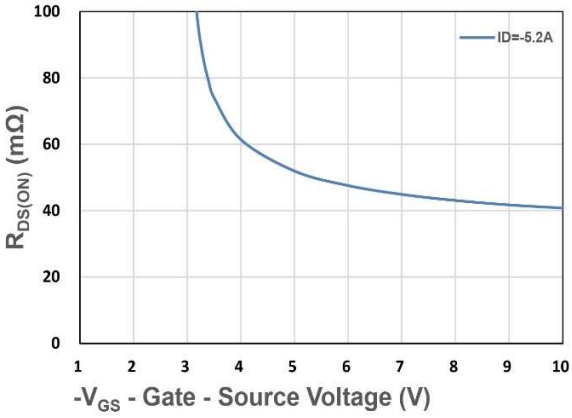


Figure 3. On-Resistance vs. VGS

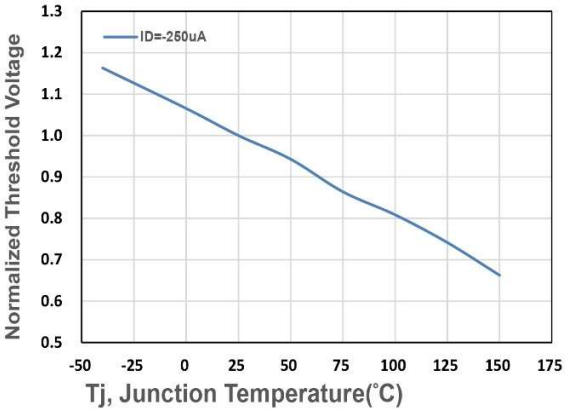


Figure 4. Gate Threshold Voltage

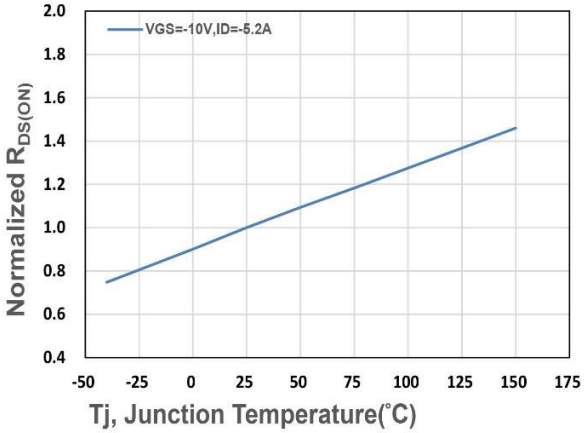


Figure 5. Drain-Source On Resistance

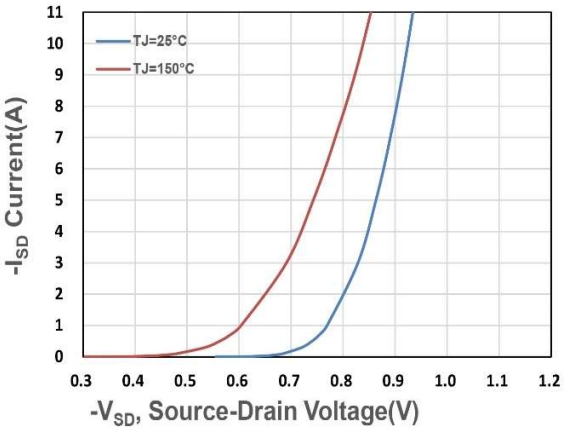


Figure 6. Source-Drain Diode Forward

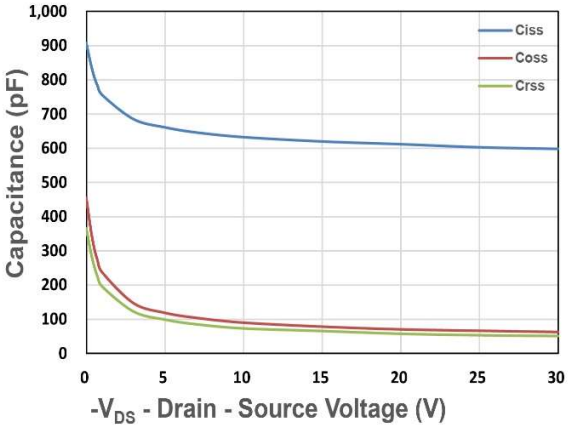


Figure 7. Capacitance

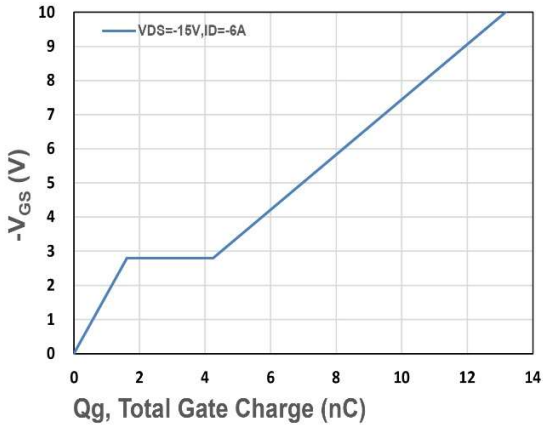


Figure 8. Gate Charge Characteristics

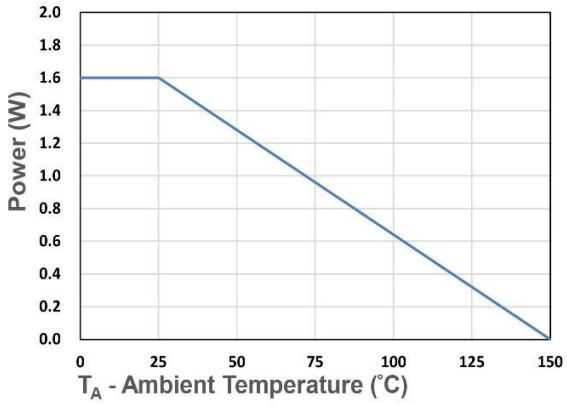


Figure 9. Power Dissipation

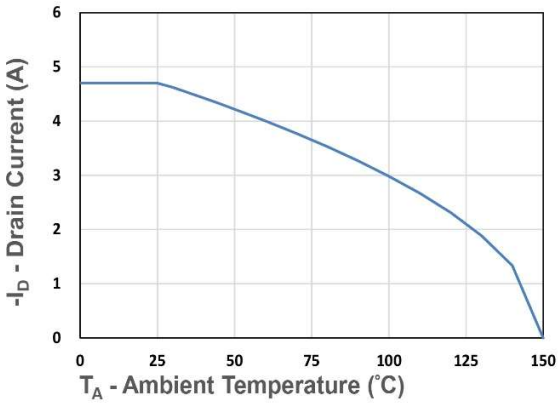


Figure 10. Drain Current

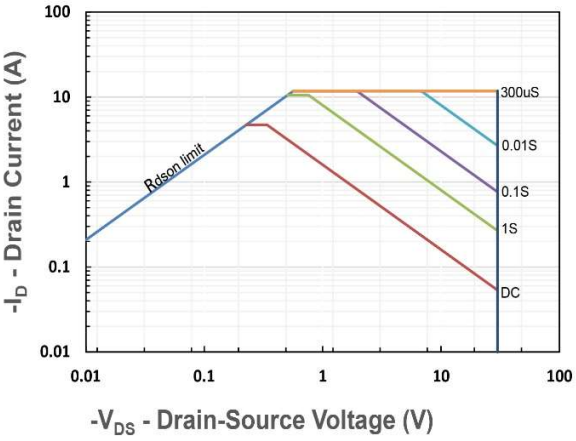


Figure 11. Safe Operating Area

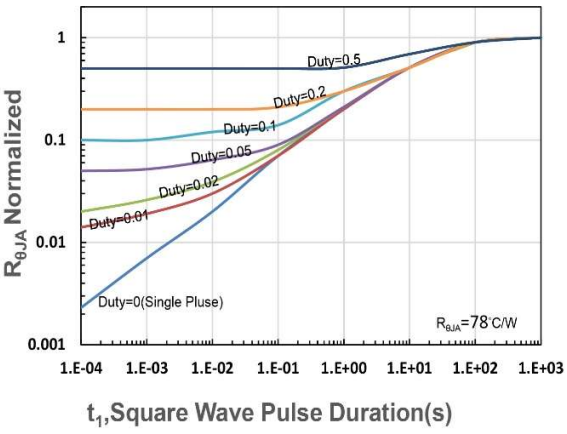


Figure 12. RθJA Transient Thermal Impedance