Power MOSFETS

DATASHEET

LM20480CLG6A

N-Channel AND P-Channel
Enhancement Mode MOSFET

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Quality Management Systems

ISO 9001:2015 Certificate

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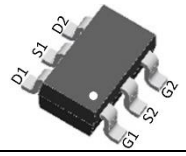
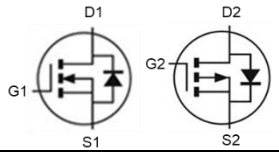
N-Channel AND P-Channel Enhancement Mode MOSFET

Pin Description

SOT-23-6L (TOP view)



Symbol



Odering Information

Symbol	N-Channel	P-Channel	Unit
V_{DSS}	**20**	**-20**	**V**
$R_{DS(ON)}$	**38**	**76**	**mΩ**
I_D	**4.2**	**-3**	**A**

Feature

- Reliable and Rugged
- ROHS Compliant & Halogen-Free

Applications

- Load/Power Switching with Level Shift
- Single or Dual Cell Li-Ion Battery Supplied Devices

Ordering Information

Orderable Part Number	Package Type	Form	Shipping	Marking
LM20480CLG6A	SOT-23-6L	Tape & Reel	3000 / Tape & Reel	02□□□

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

Symbol	Parameter		N-Channel	P- Channel	Unit
V_{DSS}	Drain-Source Voltage		20	-20	V
V_{GSS}	Gate-Source Voltage		±12	±12	
T_J	Maximum Junction Temperature		150	150	°C
T_{STG}	Storage Temperature Range		-55 to 150	-55 to 150	°C
I_{DM}①	Pulse Drain Current Tested	T_A=25°C	11	-7.5	A
I_D	Continuous Drain Current	T_A=25°C	4.2	-3	A
		T_A=100°C	3.4	-2.4	
P_D	Maximum Power Dissipation	T_A=25°C	1		W
		T_A=100°C	0.64		
I_{AS}	Avalanche Current, Single pulse	L=0.1mH	8	-10	A
E_{AS}②	Avalanche Energy, Single pulse	L=0.1mH	3.2	5	mJ

Thermal Characteristics

Symbol	Parameter		Rating	Unit
$R_{\theta JA}$③	Thermal Resistance-Junction to Ambient	Steady State	125	°C/W

Note ①：Max. current is limited by junction temperature.
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	20	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=16V, V_{GS}=0V	-	-	1	uA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250uA	0.4	0.6	1	V
I_{GSS}	Gate Leakage Current	V_{GS}=±12V, V_{DS}=0V	-	-	100	nA
$R_{DS(ON)}$④	Drain-Source On-state Resistance	V_{GS}=4.5V, I_{DS}=5A	-	30	38	mΩ
		V_{GS}=2.5V, I_{DS}=4A	-	37	48	
		V_{GS}=1.8V, I_{DS}=1A	-	43	65	
gfs	Forward Transconductance	V_{DS}=5V, I_{DS}=2.5A	-	7	-	S
Dynamic Characteristics ⑤						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V, Freq.=1MHz	-	2	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=10V, Freq.=1MHz	-	280	-	pF
C_{oss}	Output Capacitance		-	45	-	
C_{rss}	Reverse Transfer Capacitance		-	40	-	
$td_{(ON)}$	Turn-on Delay Time	V_{GS}=4.5V,V_{DS}=10V, I_D=1A,R_{GEN}=6Ω	-	3.5	-	nS
t_r	Turn-on Rise Time		-	19.5	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	22.8	-	
t_f	Turn-off Fall Time		-	24.2	-	
Q_g	Total Gate Charge	V_{GS}=2.5V,V_{DS}=10V I_D=5A	-	3.1	-	nC
Q_g	Total Gate Charge	V_{GS}=4.5V,V_{DS}=10V, I_D=5A	-	5.3	-	
Qgs	Gate-Source Charge		-	0.8	-	
Qgd	Gate-Drain Charge		-	1.5	-	
Source-Drain Characteristics						
V_{SD}④	Diode Forward Voltage	I_{SD}=2.5A, V_{GS}=0V	-	0.75	1.1	V
t_{rr}	Reverse Recovery Time	I_F=2.5A, V_R=10 dI$_F$/dt=100A/μs	-	10.8	-	nS
Q_{rr}	Reverse Recovery Charge		-	2.9	-	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

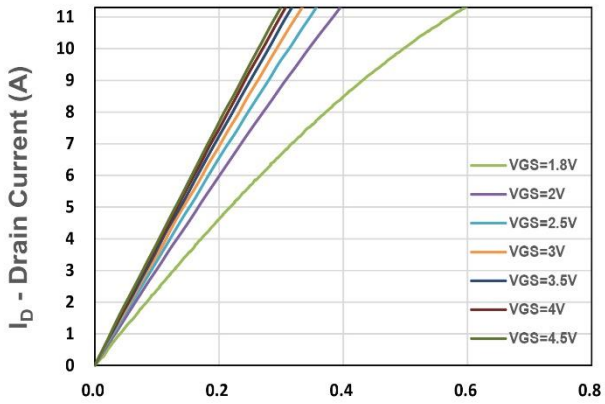


Figure 1. Output Characteristics

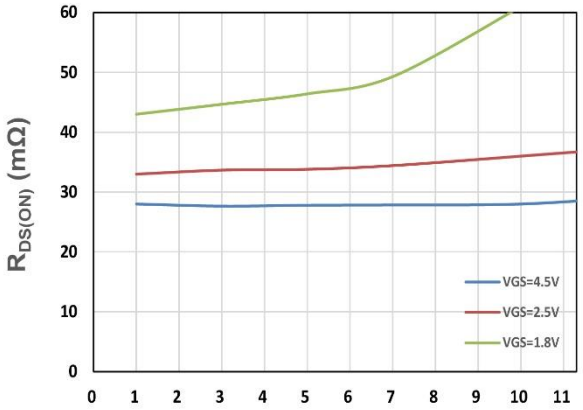


Figure 2. On-Resistance vs. ID

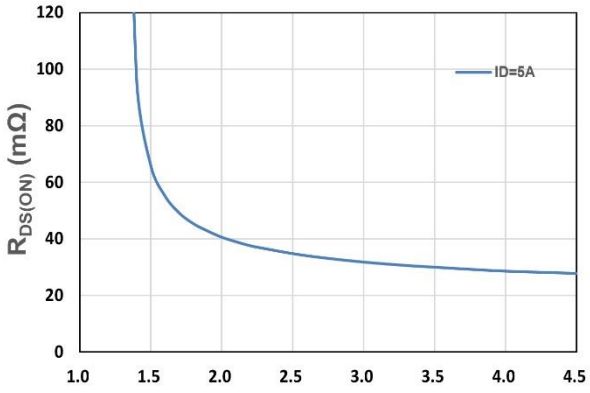


Figure 3. On-Resistance vs. VGS

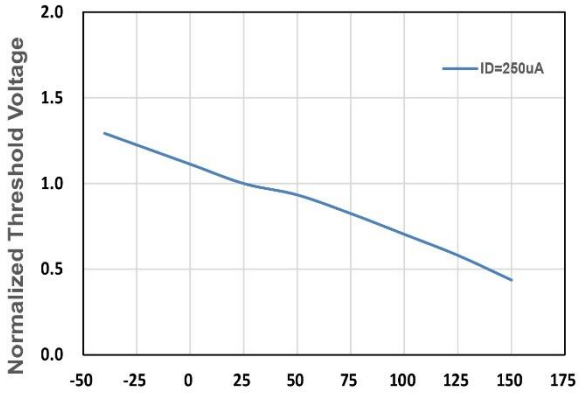


Figure 4. Gate Threshold Voltage

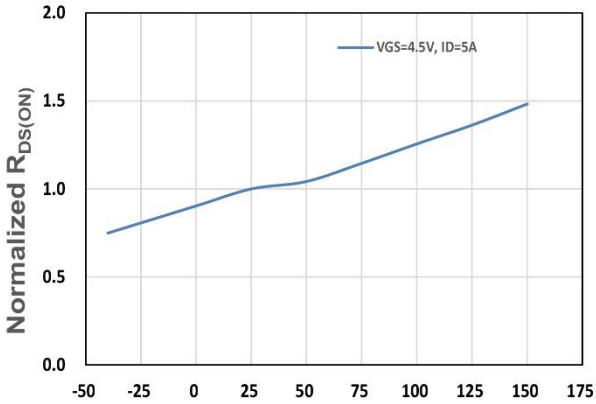


Figure 5. Drain-Source On Resistance

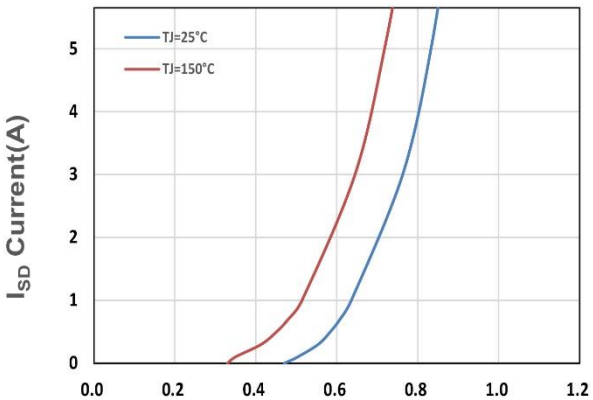


Figure 6. Source-Drain Diode Forward

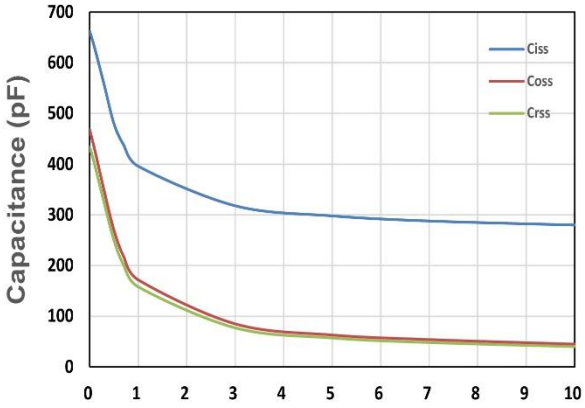


Figure 7. Capacitance

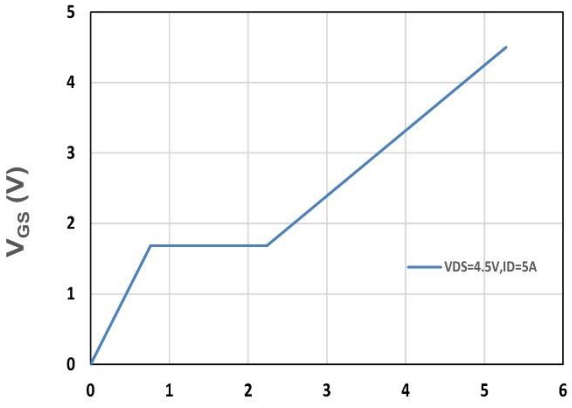


Figure 8. Gate Charge Characteristics

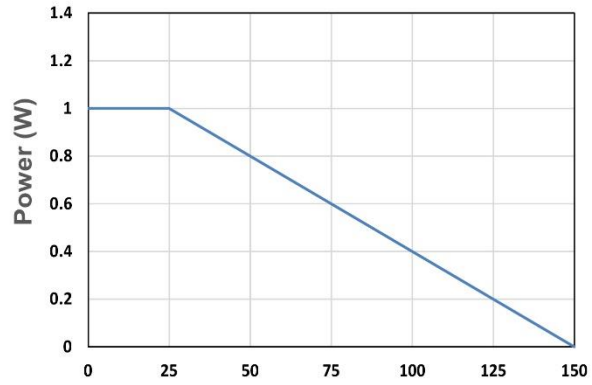


Figure 9. Power Dissipation

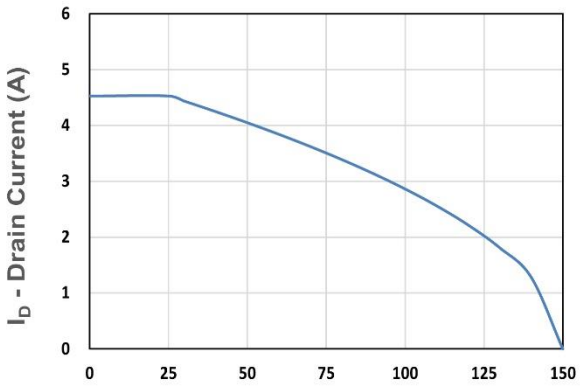


Figure 10. Drain Current

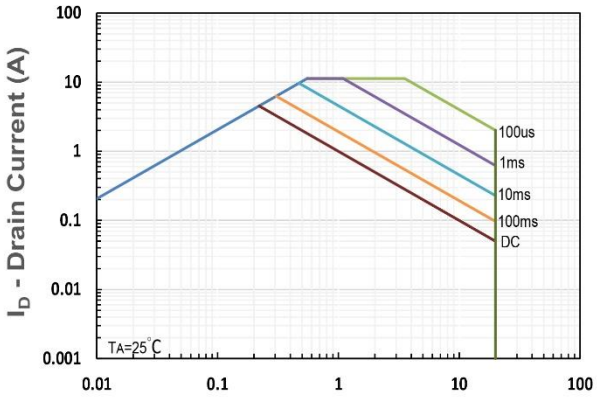


Figure 11. Safe Operating Area

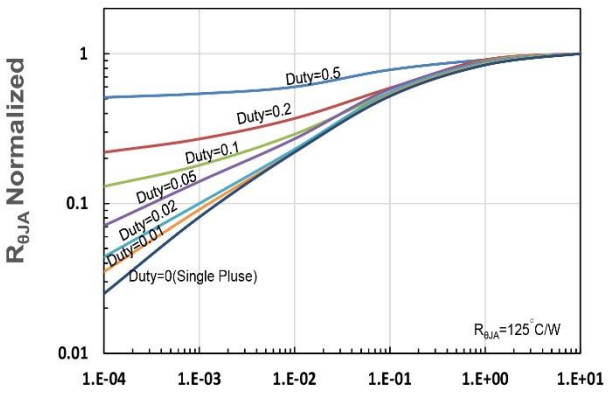


Figure 12. RθJA Transient Thermal Impedance

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	-20	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-16V, V_{GS}=0V	-	-	-1	uA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=-250uA	-0.45	-0.7	-1	V
I_{GSS}	Gate Leakage Current	V_{GS}=±12V, V_{DS}=0V	-	-	±100	nA
$R_{DS(ON)}$④	Drain-Source On-state Resistance	V_{GS}=-4.5V, I_{DS}=-3.3A	-	63	76	mΩ
		V_{GS}=-2.5V, I_{DS}=-2.1A	-	80	104	
		V_{GS}=-1.8V, I_{DS}=-1A		100	150	
gfs	Forward Transconductance	V_{DS}=-5V, I_{DS}=-1.6A	-	6.7	-	S
Dynamic Characteristics ⑤						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V, Freq.=1MHz	-	6.7	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=-10V, Freq.=1MHz	-	602	-	pF
C_{oss}	Output Capacitance		-	53	-	
C_{rss}	Reverse Transfer Capacitance		-	48	-	
$td_{(ON)}$	Turn-on Delay Time	V_{GS}=-4.5V,V_{DS}=-10V, I_D=-1A,R_{GEN}=6Ω	-	5.9	-	nS
t_r	Turn-on Rise Time		-	20.1	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	39.4	-	
t_f	Turn-off Fall Time		-	25.3	-	
Q_g	Total Gate Charge	V_{GS}=-2.5V,V_{DS}=-10V I_D=-3.3A	-	4.7	-	nC
Q_g	Total Gate Charge	V_{GS}=-4.5V,V_{DS}=-10V, I_D=-3.3A	-	8.4	-	
Qgs	Gate-Source Charge		-	1.4	-	
Qgd	Gate-Drain Charge		-	1.9	-	
Source-Drain Characteristics						
V_{SD}④	Diode Forward Voltage	I_{SD}=-1.6A, V_{GS}=0V	-	-0.85	-1.1	V
t_{rr}	Reverse Recovery Time	I_F=-1.6A, V_R=-10V dI$_F$/dt=100A/μs	-	10.1	-	nS
Q_{rr}	Reverse Recovery Charge		-	4.1	-	nC

P-Channel Typical Characteristics

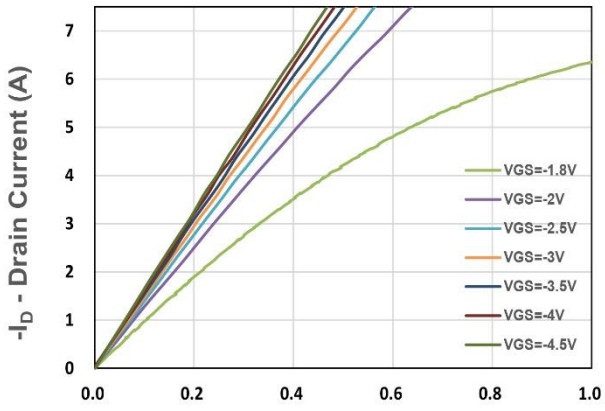


Figure 1. Output Characteristics

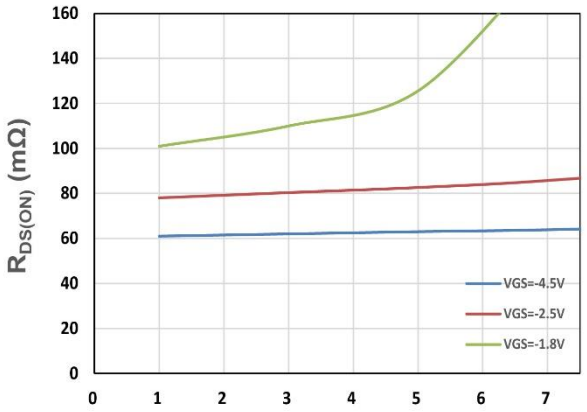


Figure 2. On-Resistance vs. ID

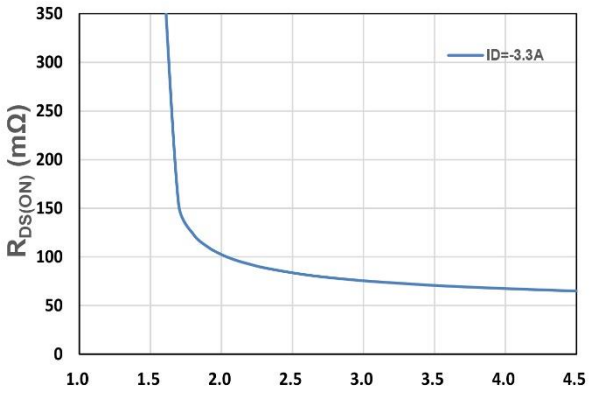


Figure 3. On-Resistance vs. VGS

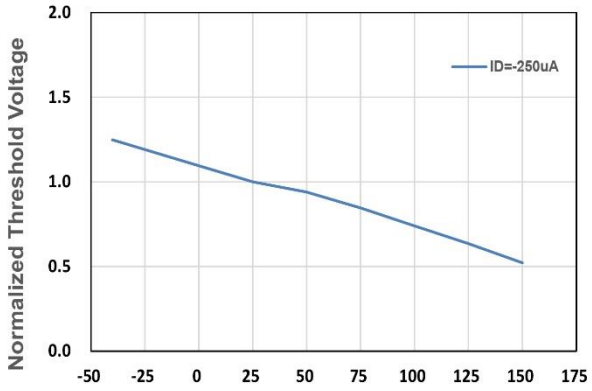


Figure 4. Gate Threshold Voltage

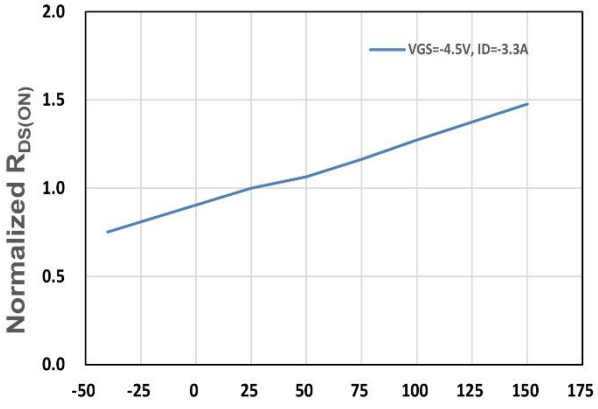


Figure 5. Drain-Source On Resistance

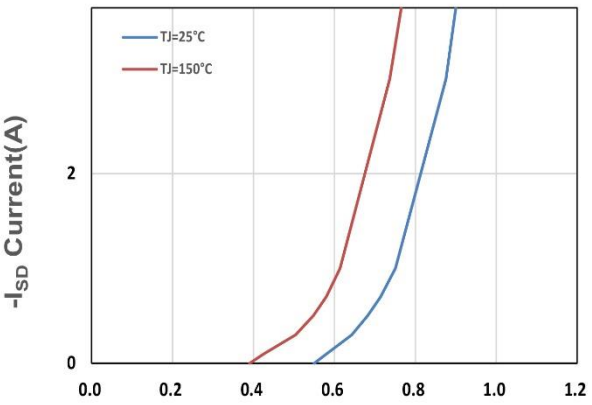


Figure 6. Source-Drain Diode Forward

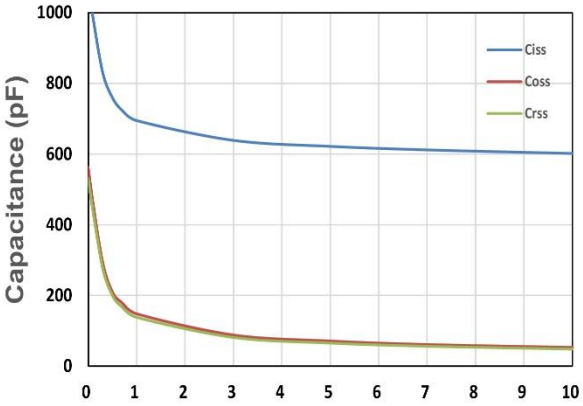


Figure 7. Capacitance

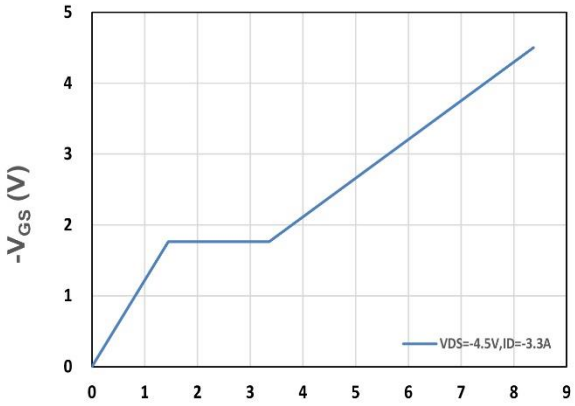


Figure 8. Gate Charge Characteristics

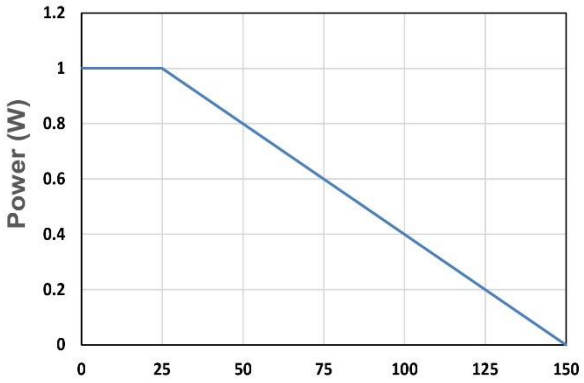


Figure 9. Power Dissipation

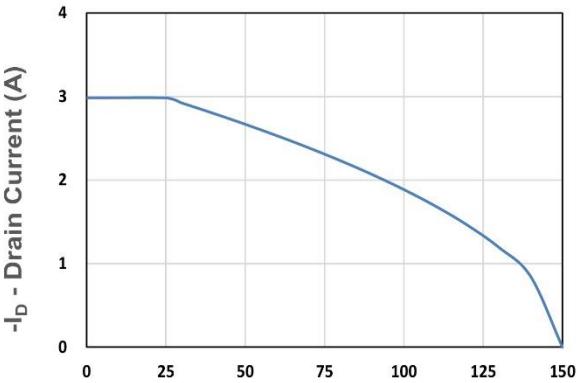


Figure 10. Drain Current

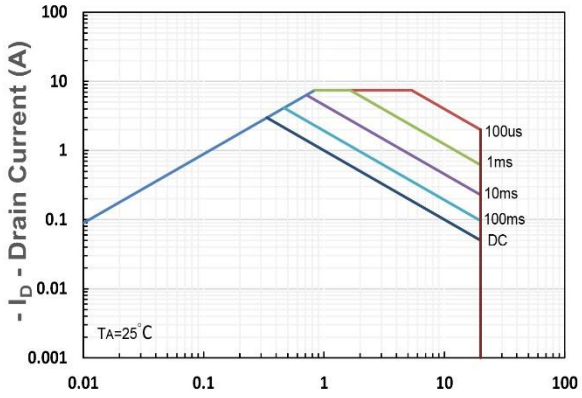


Figure 11. Safe Operating Area

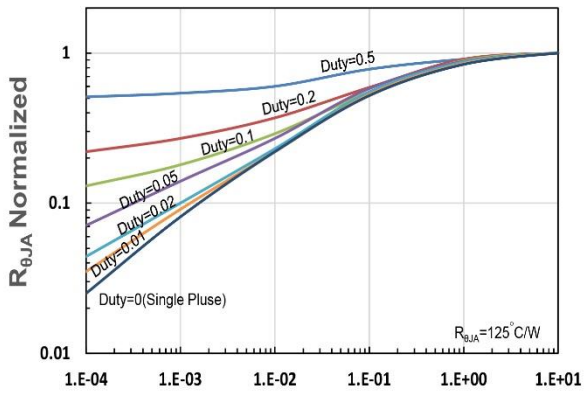


Figure 12. RθJA Transient Thermal Impedance