iM6309

N-Channel Enhancement Mode MOSFET

Datasheet

1. Product Information

1.1 Features

- Advanced Trench Cell Design
- RoHS Compliant and Halogen Free
- Reliable and Rugged



1.2 Package Type

TO263-3L

1.3 Quick Reference

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Limiting Values						
P_{tot}	Total Power Dissipation	T_C = 25 ℃	-	-	416	W
I_D Note3	Drain Current (Silicon Limit)	T_C= 25 ℃, V_{GS} = 10 V	-	-	520	A
	Drain Current		-	-	150	A
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown	V_{GS} = 0 V, I_{DS} = 250 μA	40	-	-	V
$R_{DS(ON)}$ Note2	On-State Resistance	V_{GS} = 10 V, I_{DS} = 30 A	-	0.85	1.06	mΩ
		V_{GS} = 6V, I_{DS} =20 A	-	1.35	1.8	

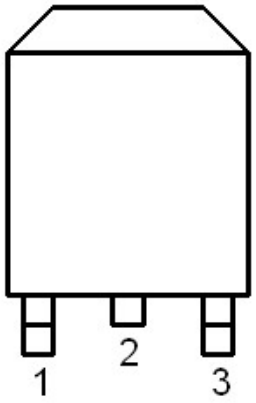
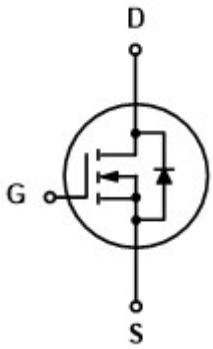
Note 1：Surface Mounted on 1 in^2 pad area, t ≤ 10 sec.
Note 2：Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
Note 3：Limited by bonding wire.

2. Ordering Code & Marking Information

Ordering Code	Marking Information
iM6309	iM6309 XXXXXX

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3. Pin Description

Pin	Description	Simplified Outline	Symbol
1	Gate		
2	Drain		
3	Source		

4. Limiting Values

Symbol	Parameter		Rating	Unit
V_{DS}	Drain-Source Voltage		40	V
V_{GS}	Gate-Source Voltage		± 20	V
I_D	Drain Current (Silicon Limit)	T_C= 25 ℃	520	A
I_D Note3	Drain Current	T_C= 25 ℃	150	A
		T_C= 100 ℃	150	A
I_{DM}	Pulsed Source Current	T_C = 25 ℃	480	A
I_S	Diode Forward Current	T_C = 25 ℃	150	A
E_{AS}	Single Pulsed Avalanche Energy	L= 1.0mH	2450	mJ
P_{tot}	Total Power Dissipation	T_C = 25 ℃	416	W
$R_{\theta JA}$ Note1	Thermal Resistance- Junction to Ambient		43	℃ / W
$R_{\theta JC}$	Thermal Resistance- Junction to Case		0.3	℃ / W
T_{stg}	Storage Temperature		-55~150	℃
T_J	Junction Temperature		150	℃

Note 1：Surface Mounted on 1 in^2 pad area, t ≤ 10 sec.
Note 2：Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
Note 3：Limited by bonding wire.

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5. Electrical Characteristics (T_A = 25 °C Unless Otherwise Noted)

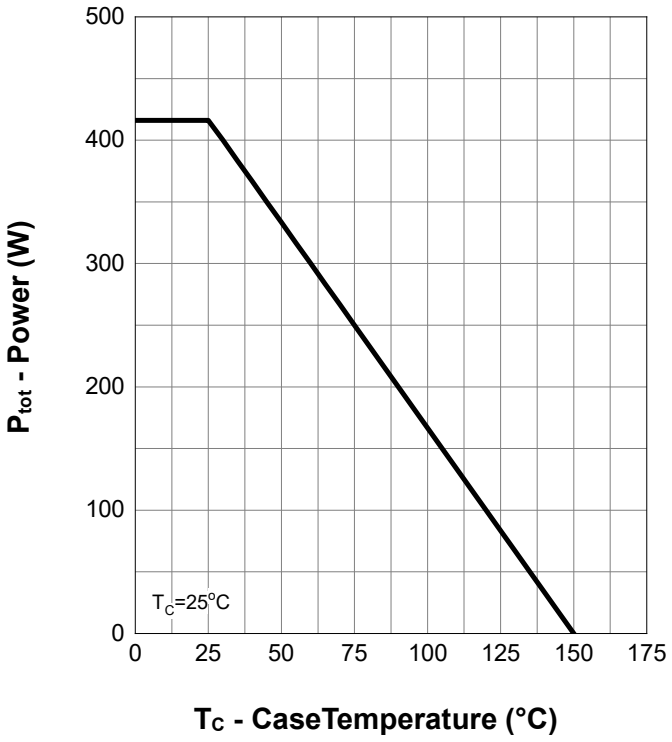
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_{DS} = 250 μA	40	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_{DS} = 250 μA	2	-	4	V
I_{DSS}	Drain Leakage Current	V_{DS} = 32V, V_{GS} = 0 V	-	-	1	μA
I_{GSS}	Gate Leakage Current	V_{DS} = 0 V, V_{GS} = ± 20 V	-	-	±100	nA
$R_{DS(ON)}$[Note1]	On-State Resistance	V_{GS} = 10 V, I_{DS} = 30A	-	0.85	1.06	mΩ
		V_{GS} =6V, I_{DS} = 20 A	-	1.35	1.8	
Diode Characteristics						
V_{SD}[Note1]	Diode Forward Voltage	I_{SD} =30A, V_{GS} = 0 V	-	-	1.3	V
t_{rr}	Reverse Recovery Time	I_{DS} = 30A, V_{GS} = 0 V	-	113	-	nS
Q_{rr}	Reverse Recovery Charge	dI_{SD}/dt = 100 A/μs	-	208	-	nC
Dynamic Characteristics[Note2]						
C_{iss}	Input Capacitance	V_{GS} = 0 V, V_{DS} = 20 V Frequency = 1 MHz	-	13625	-	pF
C_{oss}	Output Capacitance		-	6048	-	
C_{rss}	Reverse Transfer Capacitance		-	206	-	
t_d(on)	Turn-on Delay Time	V_{DS} = 20 V, V_{GEN} = 10 V, R_G = 3.9 Ω, R_L =0.66Ω, I_{DS} = 30A	-	42	-	nS
t_r	Turn-on Rise Time		-	156	-	
t_d(off)	Turn-off Delay Time		-	156	-	
t_f	Turn-off Fall Time		-	141	-	
Gate Charge Characteristics [Note2]						
Q_g	Total Gate Charge	V_{DS} =20 V, V_{GS} = 10 V, I_{DS} = 30A	-	234	-	nC
Q_{gs}	Gate-Source Charge		-	77	-	
Q_{gd}	Gate-Drain Charge		-	55	-	

Note 1: Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
Note 2: Guaranteed by design, not subject to production testing.

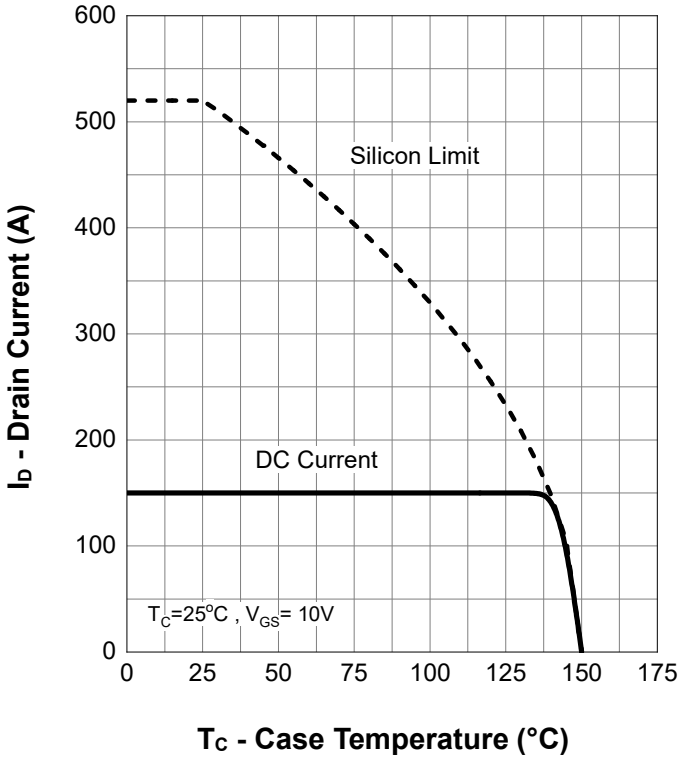
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6. Typical Characteristics

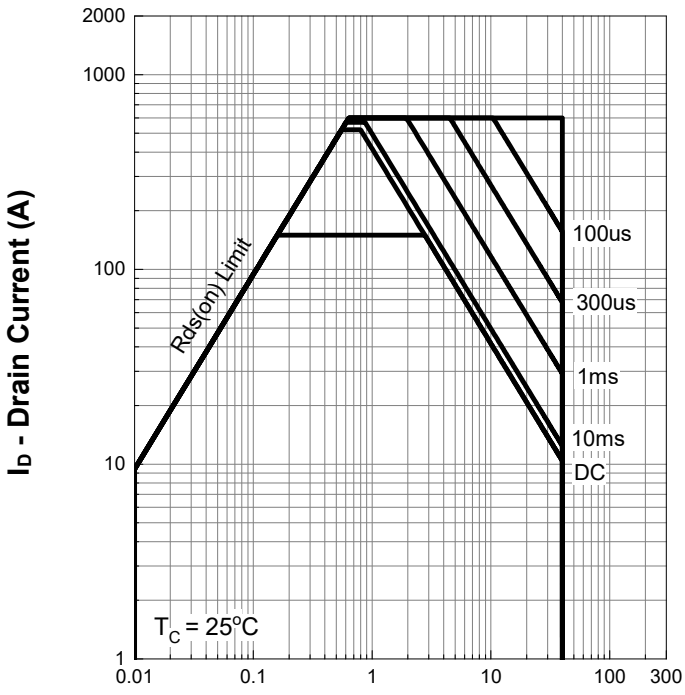
Power Capability



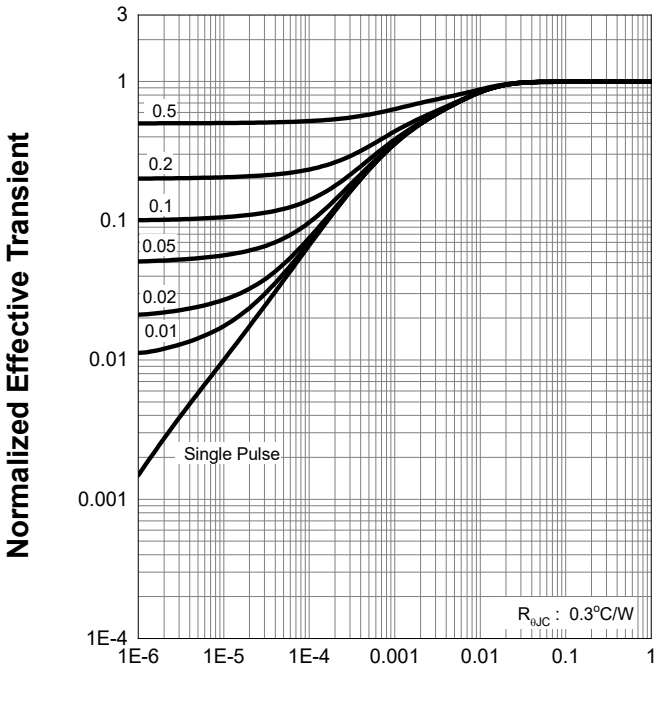
Current Capability



Safe Operating Area



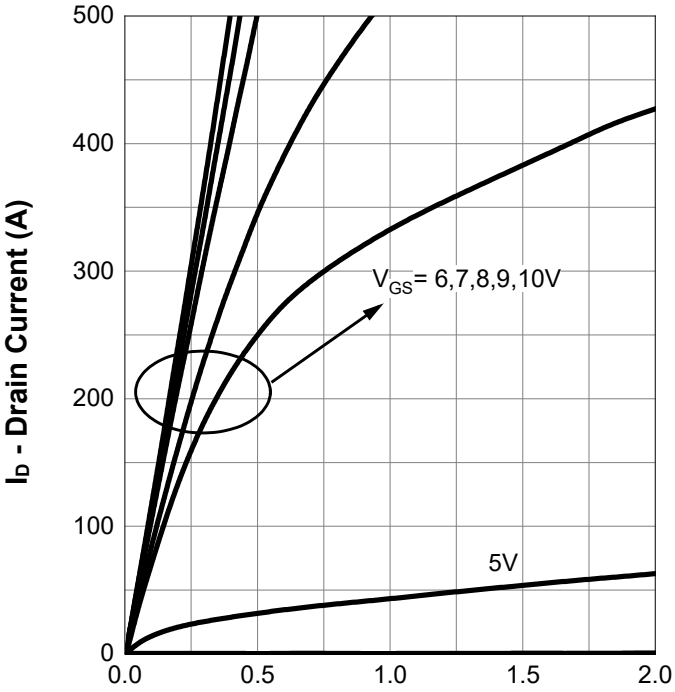
Transient Thermal Impedance



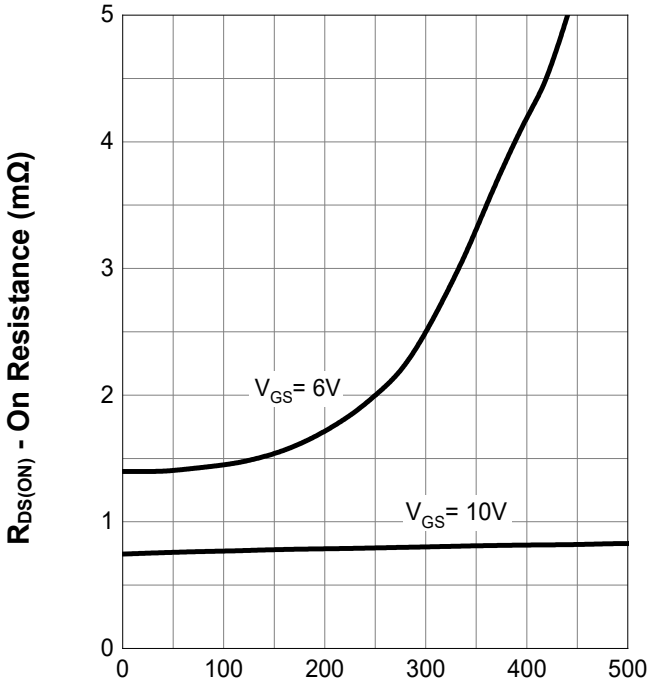
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6. Typical Characteristics

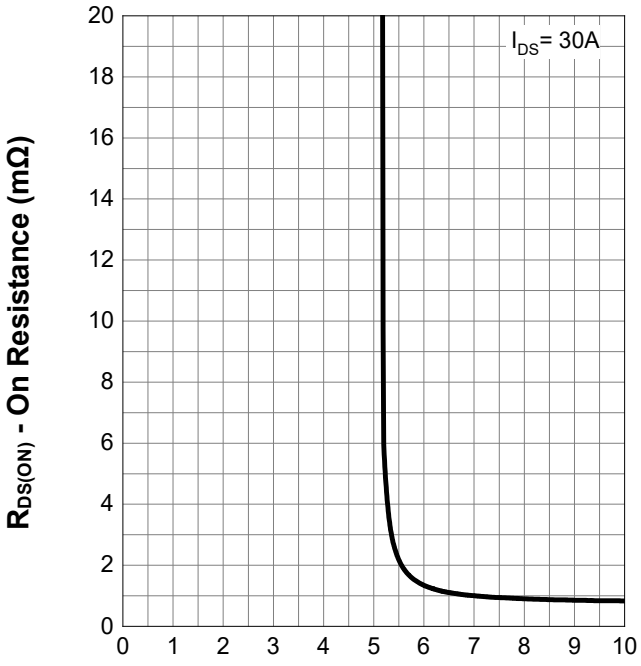
Output Characteristics



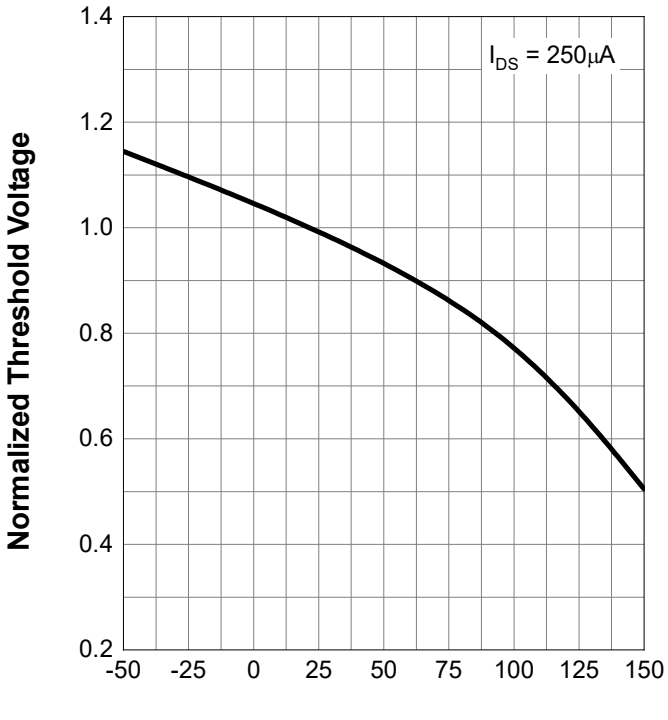
On Resistance



Transfer Characteristics



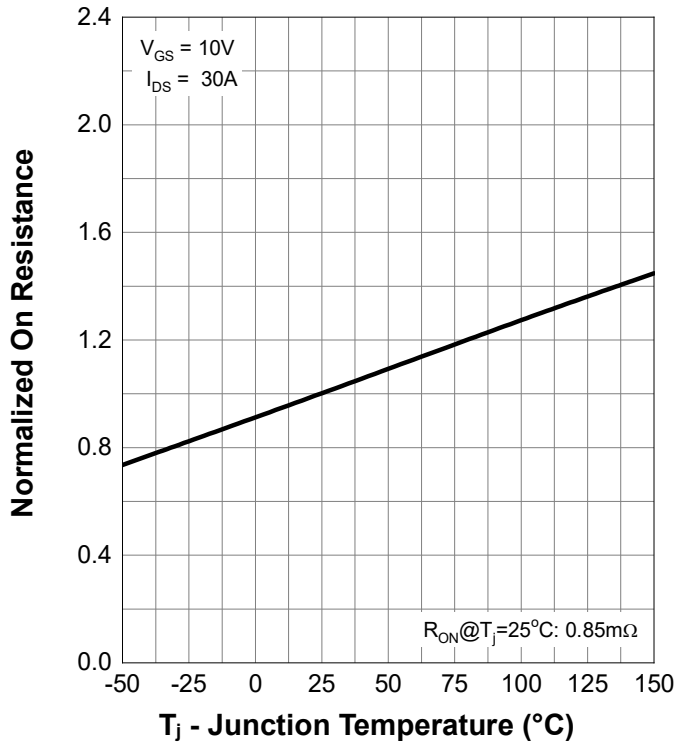
Normalized Threshold Voltage



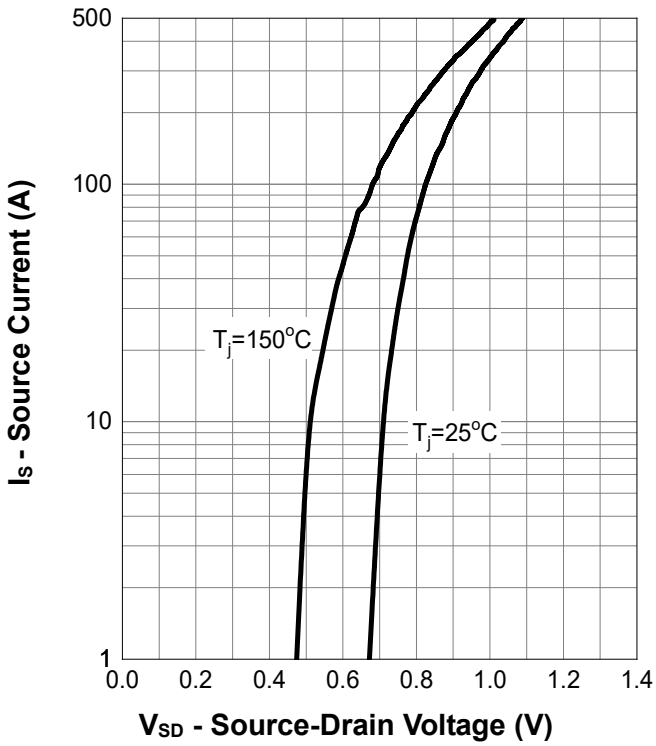
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6. Typical Characteristics

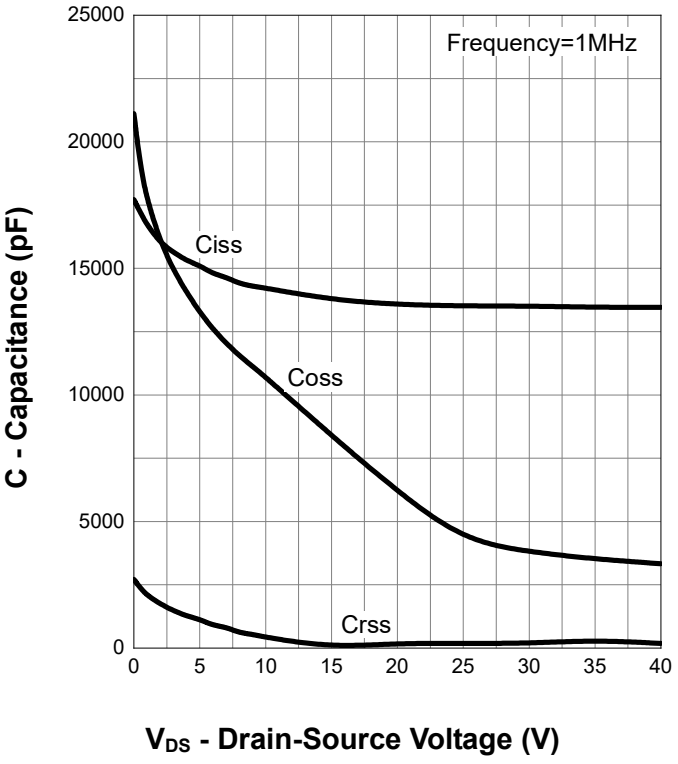
Normalized On Resistance



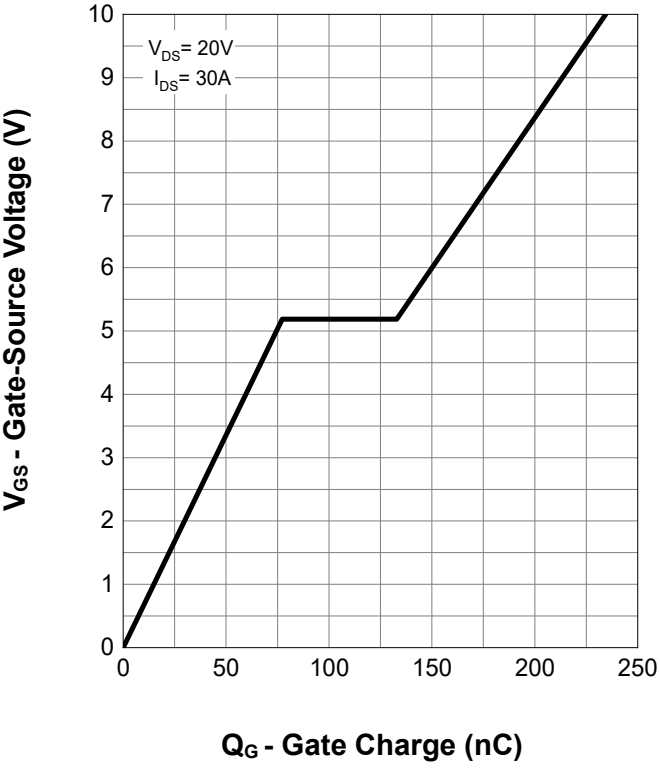
Diode Forward Current



Capacitance



Gate Charge



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