iMN1R5N03Q

N-Channel Enhancement Mode MOSFET

Datasheet

1. Product Information

1.1 Features

- Surface-mounted Package
- Advanced Trench Cell Design
- RoHS Compliant and Halogen Free
- Reliable and Rugged
- Key Applications: Motor Drivers, DC - DC Converter



1.2 Package Type

PDFN3.3x3.3A-EP1-8L

1.3 Quick Reference

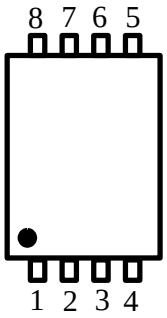
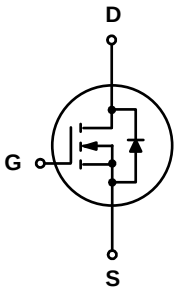
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Limiting Values						
P_{tot}	Total Power Dissipation	T_C = 25 ℃	-	-	75	W
I_{DS}	Drain-Source Current	T_C = 25 ℃, V_{GS} = 10 V	-	-	161	A
		T_C = 100 ℃, V_{GS} = 10 V	-	-	113	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 μA	30	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_{DS} = 250 μA	1	-	2	
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS} = 10 V, I_{DS} = 20 A	-	1.35	1.7	mΩ
		V_{GS} = 4.5 V, I_D = 10 A	-	2.1	2.8	

2. Ordering Code & Marking Information

Ordering Code	Marking Information
iMN1R5N03Q	1R5N03 XXXXXX X : Date Code

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3. Pin Description

Pin	Description	Simplified Outline	Symbol
1,2,3	Source(S)		
4	Gate(G)		
5,6,7,8	Drain(D)		

4. Limiting Values

Symbol	Parameter		Rating	Unit
V_{DS}	Drain-Source Voltage		30	V
V_{GS}	Gate-Source Voltage		± 20	
I_{DS}	Drain-Source Current	T_C = 25 ℃, V_{GS} = 10 V	161	A
		T_C = 100 ℃, V_{GS} = 10 V	113	
I_{DM} Note1	Pulsed Drain-Source Current	T_C = 25 ℃, V_{GS} = 10 V	300	A
I_S	Diode Forward Current	T_C = 25 ℃, V_{GS} = 0 V	161	A
E_{AS}	Single Pulsed Avalanche Energy	V_{DD} = 30 V, L = 1.0 mH	364	mJ
P_{tot}	Total Power Dissipation	T_C = 25 ℃	75	W
$R_{\theta JA}$ Note2	Thermal Resistance- Junction to Ambient		65	℃ / W
$R_{\theta JC}$	Thermal Resistance- Junction to Case		2	
T_{stg}	Storage Temperature		- 55 ~ 175	℃
T_J	Junction Temperature		175	℃

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

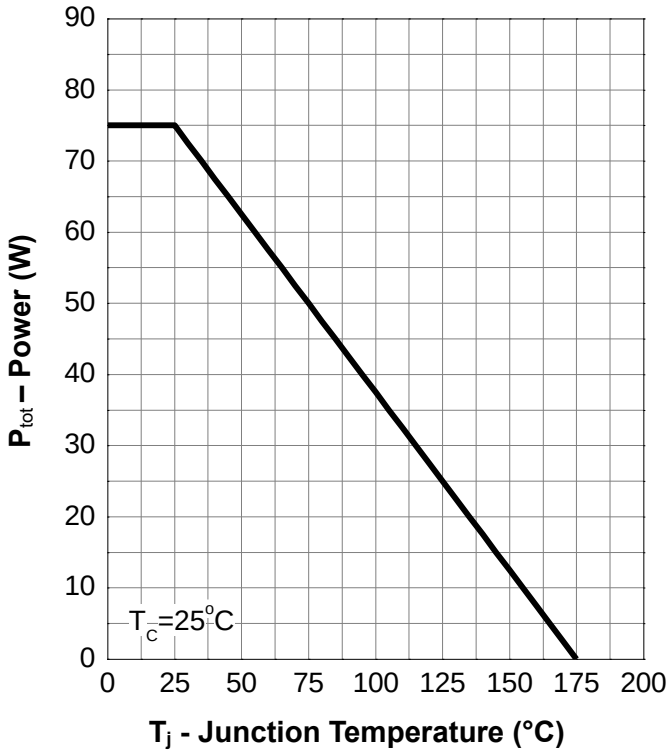
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_{DS} = 250 μA	30	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_{DS} = 250 μA	1	-	2	
I_{DSS}	Drain Leakage Current	V_{DS} = 24 V, V_{GS} = 0 V	-	-	1	μA
I_{GSS}	Gate Leakage Current	V_{GS} = ± 20 V, V_{DS} = 0 V	-	-	± 100	nA
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS} = 10 V, I_{DS} = 20 A	-	1.35	1.7	mΩ
		V_{GS} = 4.5 V, I_{DS} = 10 A	-	2.1	2.8	
Diode Characteristics						
V_{SD}	Diode Forward Voltage	I_{SD} = 20 A, V_{GS} = 0 V	-	-	1.3	V
t_{rr} Note3	Reverse Recovery Time	I_{SD} = 20 A, dI_{SD}/dt = 100 A/μs	-	30	-	nS
Q_{rr} Note3	Reverse Recovery Charge		-	15	-	nC
Dynamic Characteristics Note3						
C_{iss}	Input Capacitance	V_{GS} = 0 V, V_{DS} = 15 V f = 1 MHz	-	2537	-	pF
C_{oss}	Output Capacitance		-	965	-	
C_{rss}	Reverse Transfer Capacitance		-	190	-	
$R_{g(int)}$	Internal Gate Resistance	V_{GS} = 0 V, V_{DS} = 0 V, f = 1 MHz	-	1.8	-	Ω
t_d(on)	Turn-on Delay Time	V_{DS} = 15 V, V_{GEN} = 10 V, $R_{g(ext)}$ = 3.9 Ω, R_L = 0.75 Ω, I_{DS} = 20 A	-	8.7	-	nS
t_r	Turn-on Rise Time		-	55	-	
t_d(off)	Turn-off Delay Time		-	51	-	
t_f	Turn-off Fall Time		-	36	-	
Gate Charge Characteristics Note3						
Q_g	Total Gate Charge	V_{DS} = 15 V, V_{GS} = 10 V, I_{DS} = 20 A	-	51	-	nC
Q_{gs}	Gate-Source Charge		-	9.3	-	
Q_{gd}	Gate-Drain Charge		-	9.9	-	

Note 1: Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
Note 2: Surface Mounted on 1 in^2 pad area, t ≤ 10 sec.
Note 3: Guaranteed by design, not subject to production testing.

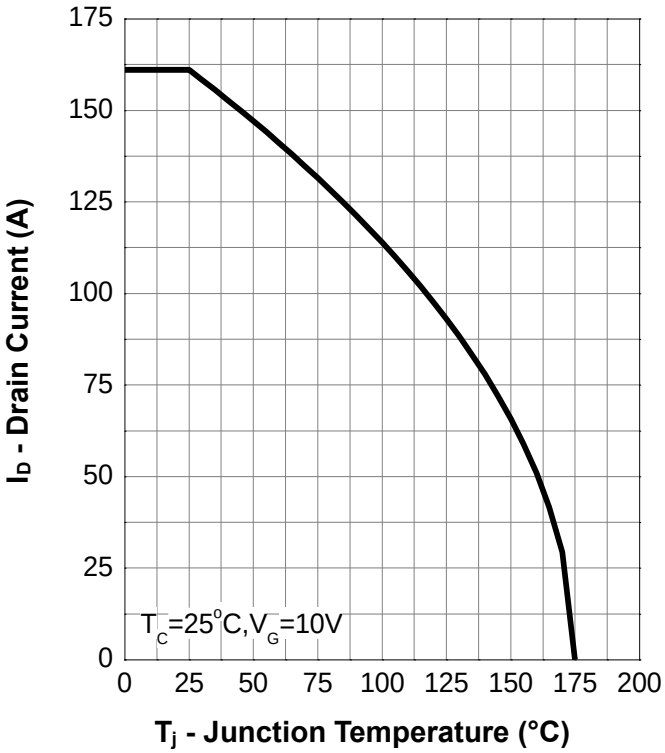
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6. Typical Characteristics

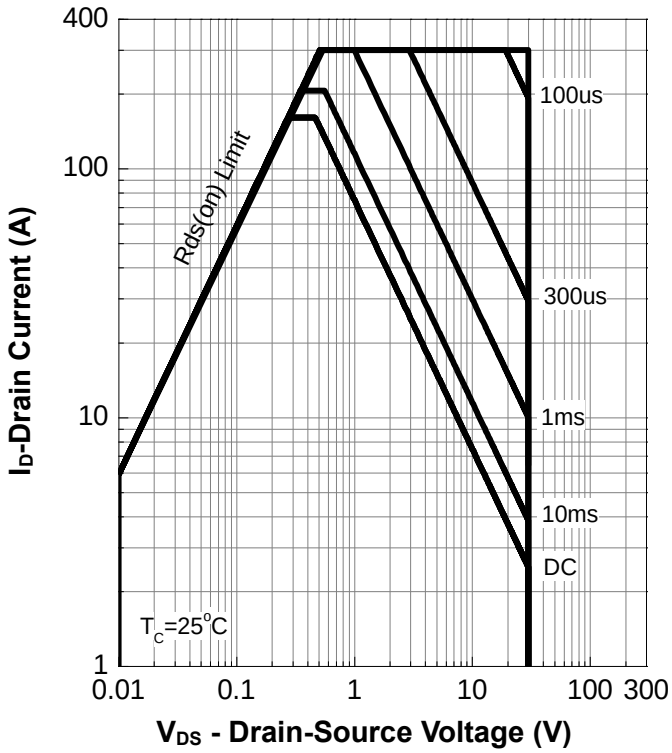
Power Capability



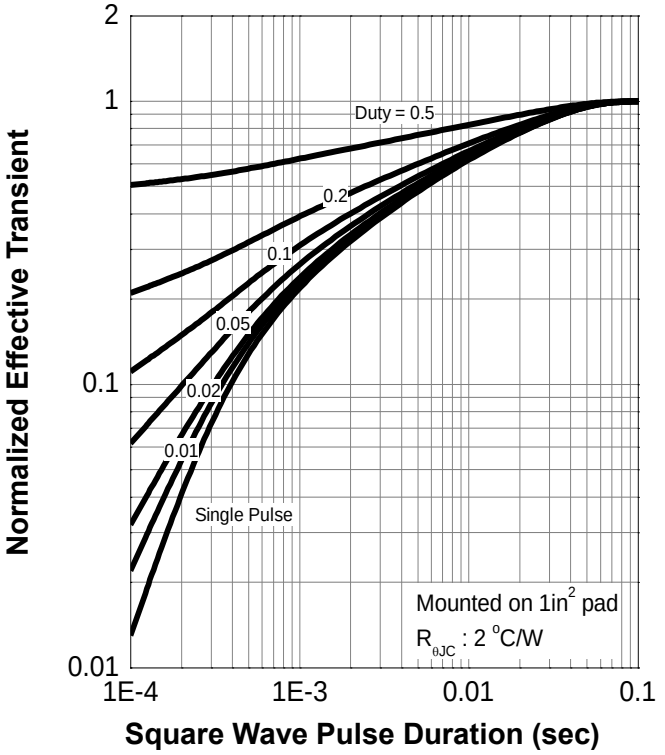
Current Capability



Safe Operation Area



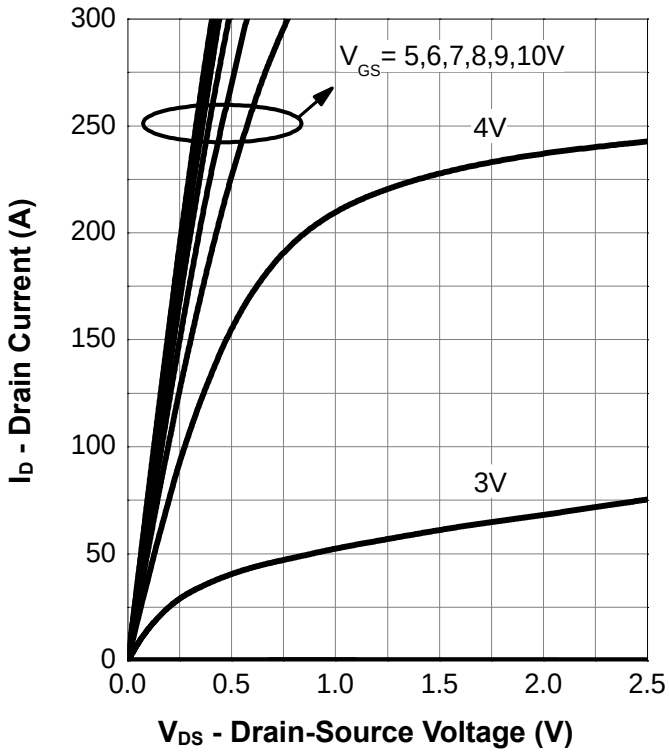
Transient Thermal Impedance



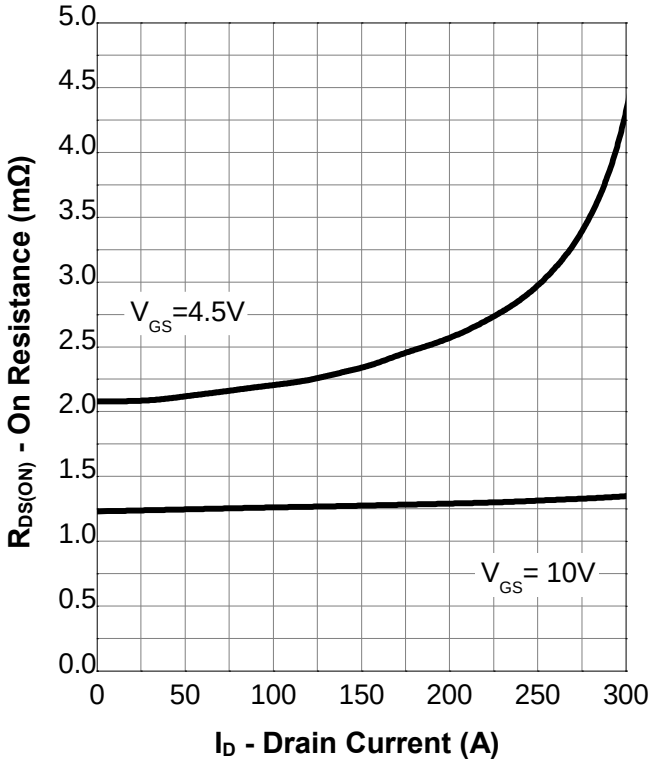
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6. Typical Characteristics (cont.)

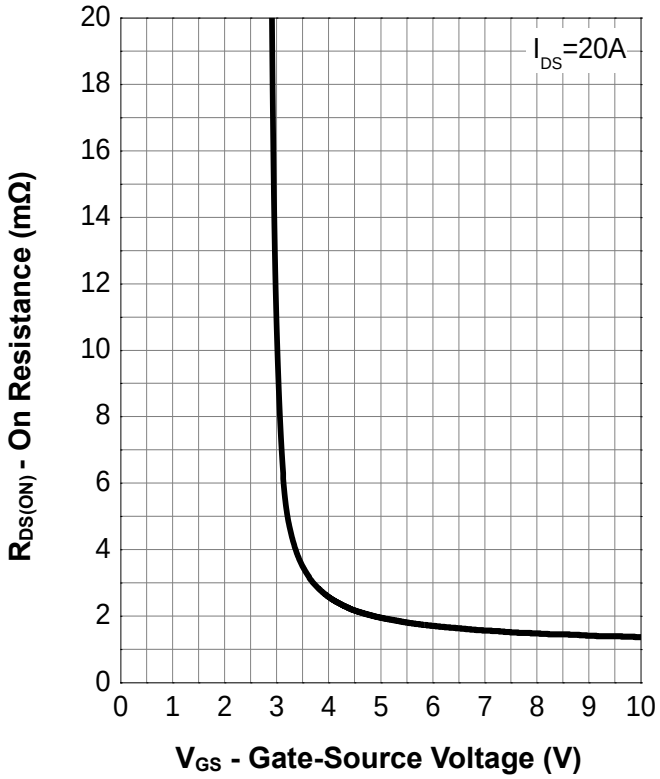
Output Characteristics



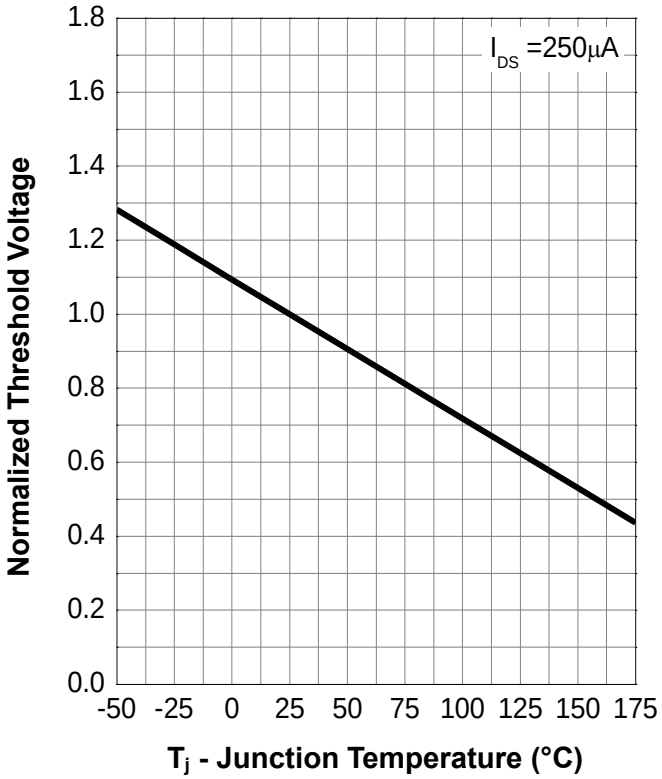
On Resistance



Transfer Characteristics

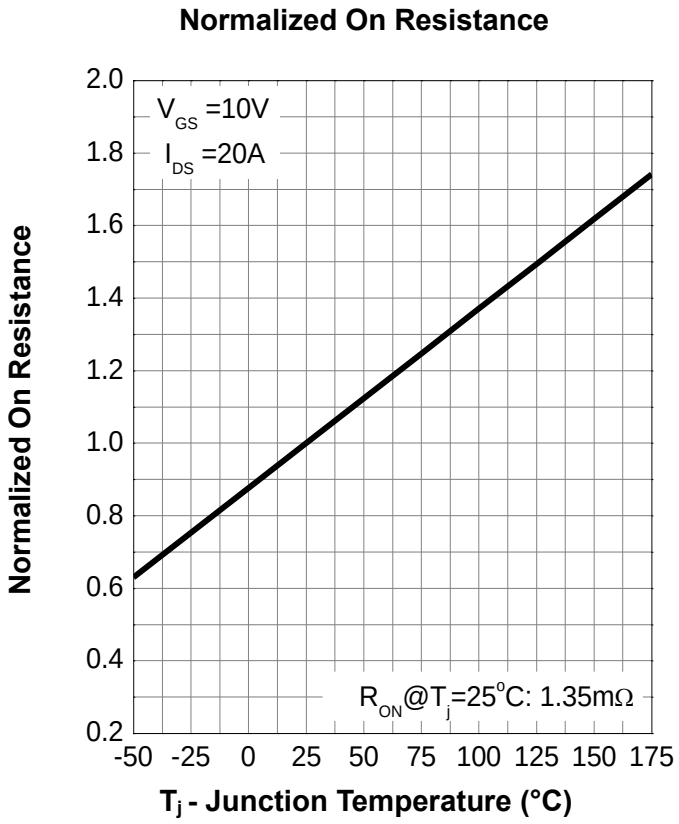


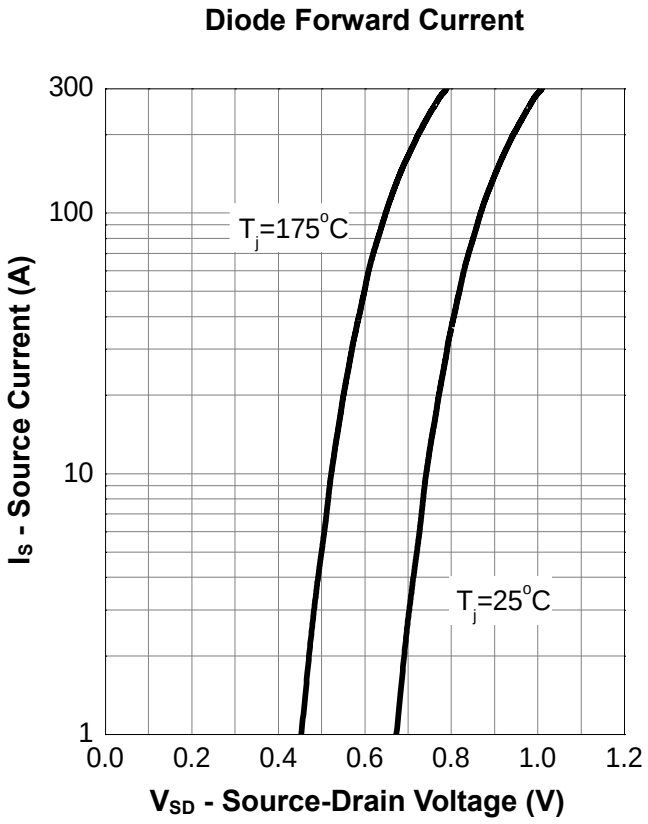
Normalized Threshold Voltage

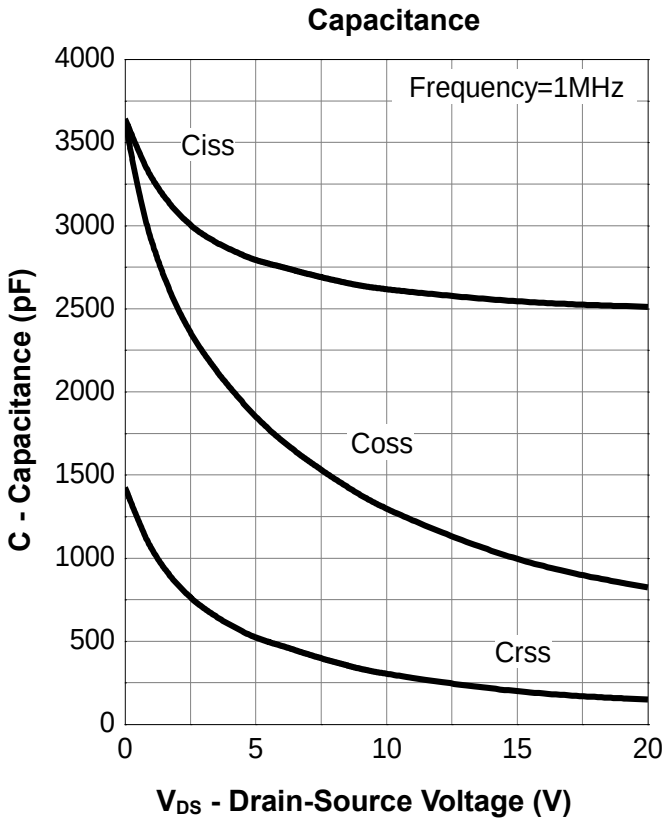


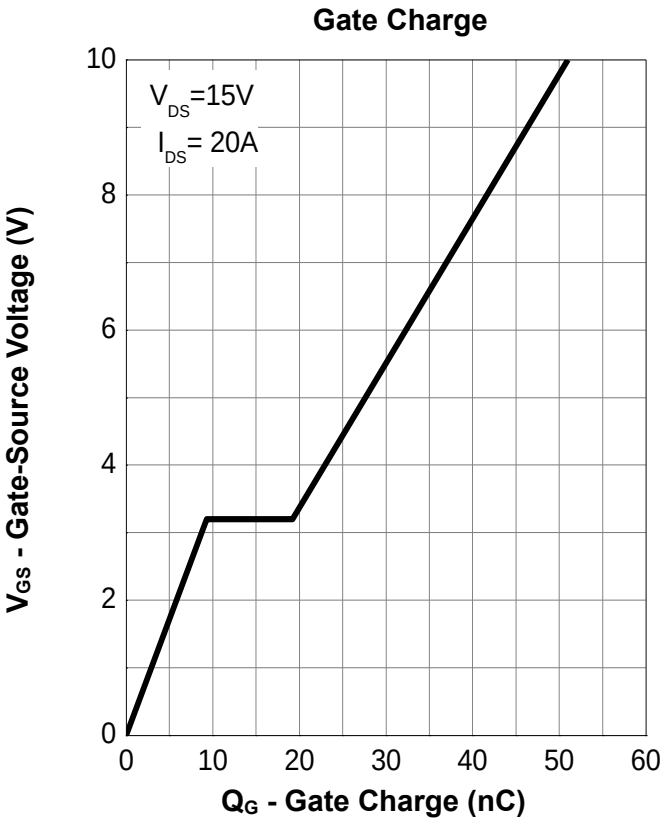
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6. Typical Characteristics (cont.)









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