CSD19535KCS 100V N-Channel NexFET™ Power MOSFET

1 Features

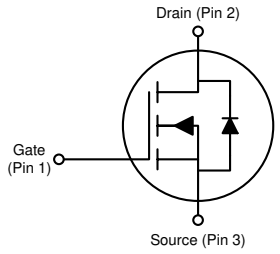
- Ultra-low Q_g and Q_{gd}
- Low thermal resistance
- Avalanche rated
- Pb-free terminal plating
- RoHS compliant
- Halogen free
- TO-220 plastic package

2 Applications

- Secondary side synchronous rectifier
- Motor control

3 Description

This 100V, 3.1mΩ, TO-220 NexFET™ power MOSFET is designed to minimize losses in power conversion applications.



Product Summary

T_A = 25°C		TYPICAL VALUE		UNIT
V_{DS}	Drain-to-Source Voltage	100		V
Q_g	Gate Charge Total (10V)	78		nC
Q_{gd}	Gate Charge Gate to Drain	13		nC
$R_{DS(on)}$	Drain-to-Source On Resistance	V_{GS} = 6V	3.4	mΩ
		V_{GS} = 10V	3.1	mΩ
$V_{GS(th)}$	Threshold Voltage	2.7		V

Ordering Information

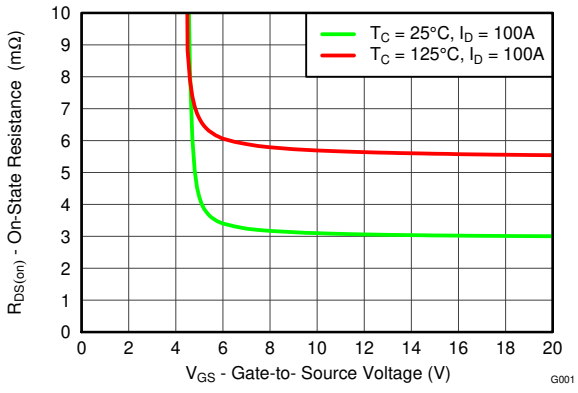
Device	Package[1]	Media	Qty	Ship
CSD19535KCS	TO-220 Plastic Package	Tube	50	Tube

(1) For all available packages, see the orderable addendum at the end of the data sheet.

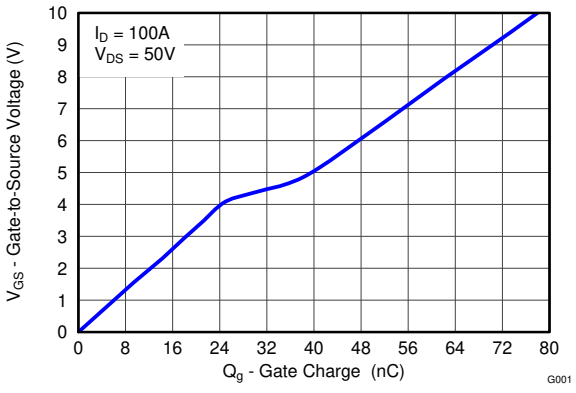
Absolute Maximum Ratings

T_A = 25°C		VALUE	UNIT
V_{DS}	Drain-to-Source Voltage	100	V
V_{GS}	Gate-to-Source Voltage	±20	V
I_D	Continuous Drain Current (Package limited)	150	A
	Continuous Drain Current (Silicon limited), T_C = 25°C	187	
	Continuous Drain Current (Silicon limited), T_C = 100°C	133	
I_{DM}	Pulsed Drain Current [1]	400	A
P_D	Power Dissipation	300	W
T_J, T_{stg}	Operating Junction and Storage Temperature Range	–55 to 175	°C
E_{AS}	Avalanche Energy, single pulse I_D = 95A, L = 0.1mH, R_G = 25Ω	451	mJ

(1) Max $R_{\theta JC}$ = 0.5°C/W, pulse duration ≤100µs, duty cycle ≤1%



$R_{DS(on)}$ vs V_{GS}



Gate Charge

Table of Contents

4 Specifications

4.1 Electrical Characteristics

(T_A = 25°C unless otherwise stated)

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
STATIC CHARACTERISTICS						
BV_{DSS}	Drain-to-Source Voltage	V_{GS} = 0V, I_D = 250µA	100			V
I_{DSS}	Drain-to-Source Leakage Current	V_{GS} = 0V, V_{DS} = 80V			1	µA
I_{GSS}	Gate-to-Source Leakage Current	V_{DS} = 0V, V_{GS} = 20V			100	nA
$V_{GS(th)}$	Gate-to-Source Threshold Voltage	V_{DS} = V_{GS}, I_D = 250µA	2.2	2.7	3.4	V
$R_{DS(on)}$	Drain-to-Source On-Resistance	V_{GS} = 6V, I_D = 100A		3.4	4.4	mΩ
		V_{GS} = 10V, I_D = 100A		3.1	3.6	mΩ
g_{fs}	Transconductance	V_{DS} = 10V, I_D = 100A		274		S
DYNAMIC CHARACTERISTICS						
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 50V, f = 1MHz		6100	7930	pF
C_{oss}	Output Capacitance			1160	1500	pF
C_{rss}	Reverse Transfer Capacitance			29	38	pF
R_G	Series Gate Resistance			1.4	2.8	Ω
Q_g	Gate Charge Total (10V)	V_{DS} = 50V, I_D = 100A		78	101	nC
Q_{gd}	Gate Charge Gate to Drain			13		nC
Q_{gs}	Gate Charge Gate to Source			25		nC
$Q_{g(th)}$	Gate Charge at V_{th}			16		nC
Q_{oss}	Output Charge	V_{DS} = 40V, V_{GS} = 0V		196		nC
$t_{d(on)}$	Turn On Delay Time	V_{DS} = 50V, V_{GS} = 10V, I_{DS} = 100A, R_G = 0Ω		32		ns
t_r	Rise Time			15		ns
$t_{d(off)}$	Turn Off Delay Time			60		ns
t_f	Fall Time			5		ns
DIODE CHARACTERISTICS						
V_{SD}	Diode Forward Voltage	I_{SD} = 100A, V_{GS} = 0V		0.9	1.1	V
Q_{rr}	Reverse Recovery Charge	V_{DS}= 50V, I_F = 100A, di/dt = 300A/µs		421		nC
t_{rr}	Reverse Recovery Time			89		ns

4.2 Thermal Information

(T_A = 25°C unless otherwise stated)

THERMAL METRIC		MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction-to-Case Thermal Resistance			0.5	°C/W
$R_{\theta JA}$	Junction-to-Ambient Thermal Resistance			62	

4.3 Typical MOSFET Characteristics

(T_A = 25°C unless otherwise stated)

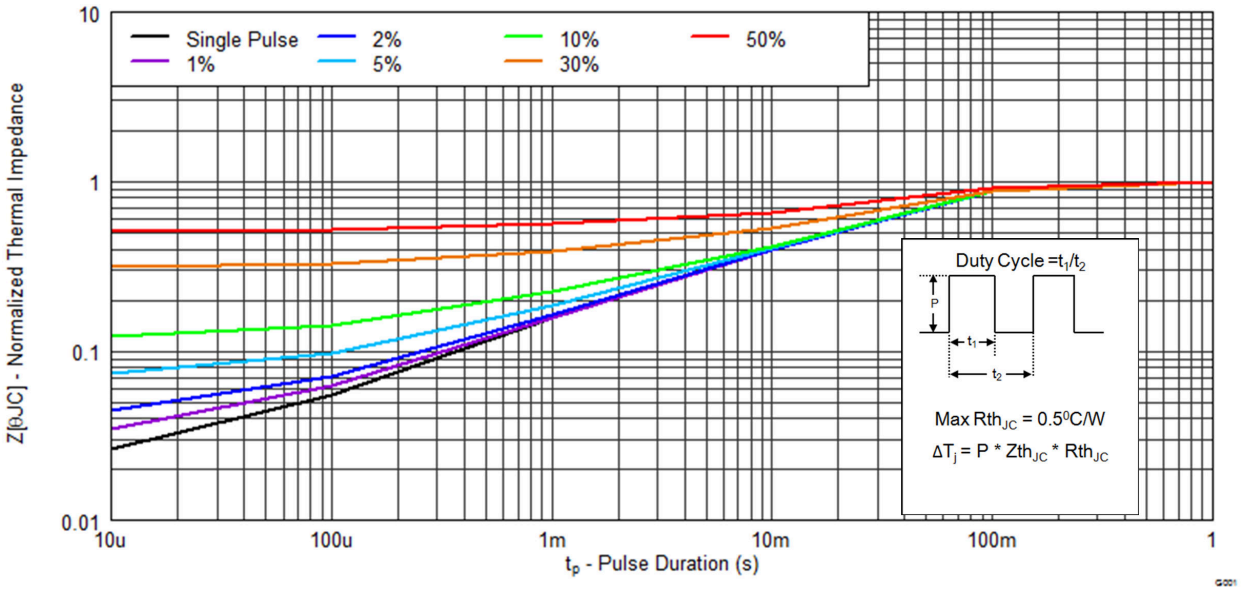


Figure 4-1. Transient Thermal Impedance

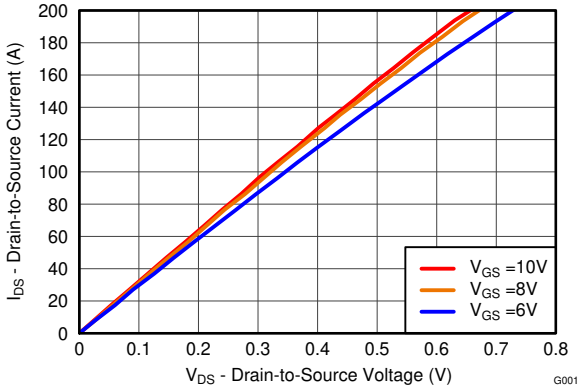


Figure 4-2. Saturation Characteristics

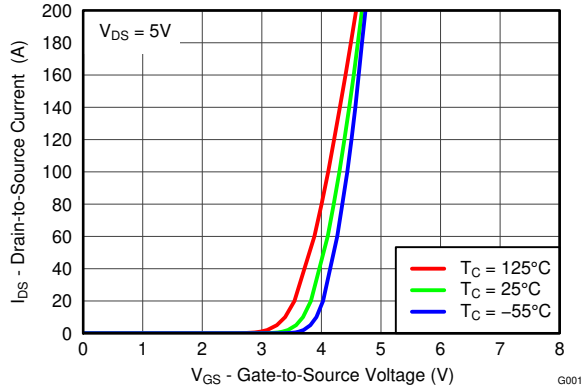


Figure 4-3. Transfer Characteristics

4.3 Typical MOSFET Characteristics (continued)

(T_A = 25°C unless otherwise stated)

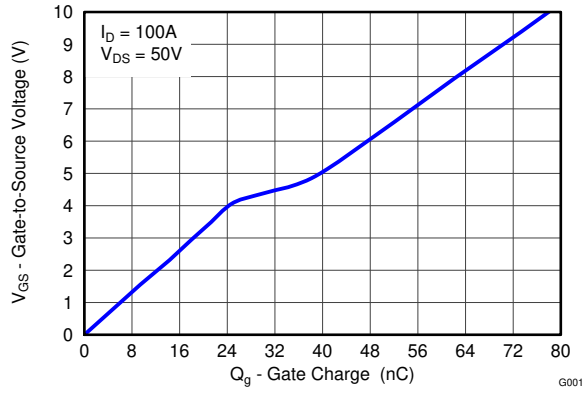


Figure 4-4. Gate Charge

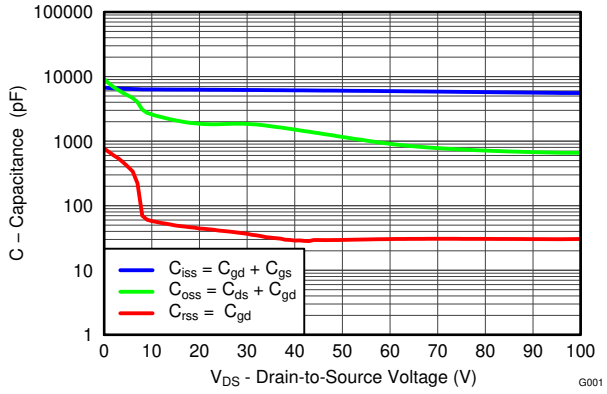


Figure 4-5. Capacitance

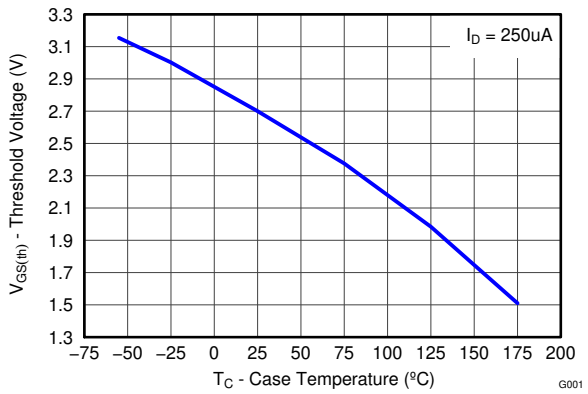


Figure 4-6. Threshold Voltage vs Temperature

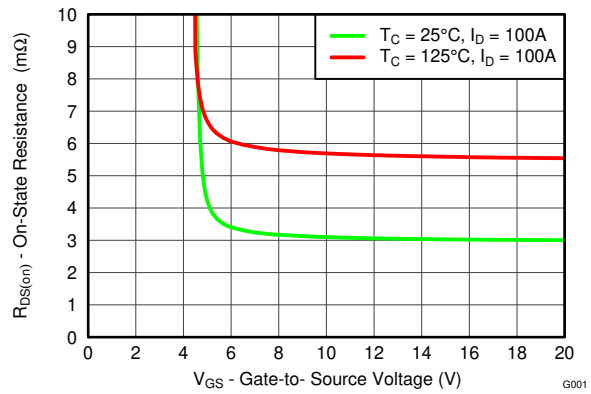


Figure 4-7. On-State Resistance vs Gate-to-Source Voltage

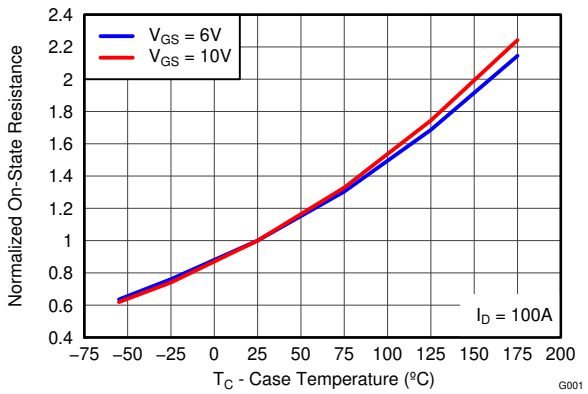


Figure 4-8. Normalized On-State Resistance vs Temperature

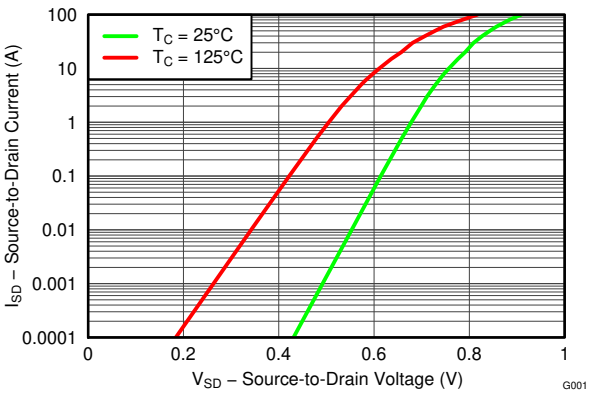


Figure 4-9. Typical Diode Forward Voltage

4.3 Typical MOSFET Characteristics (continued)

(T_A = 25°C unless otherwise stated)

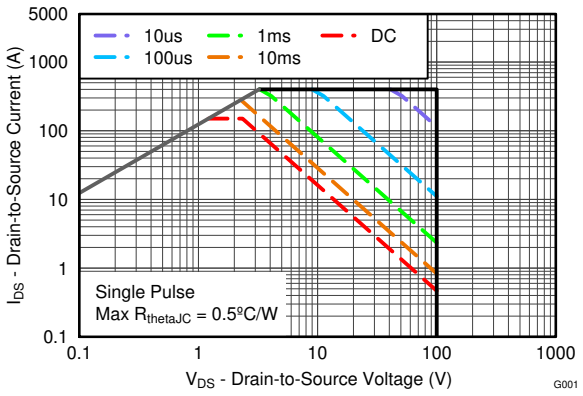


Figure 4-10. Maximum Safe Operating Area

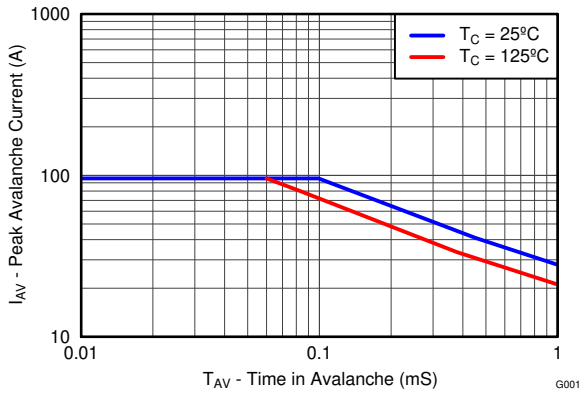


Figure 4-11. Single Pulse Unclamped Inductive Switching

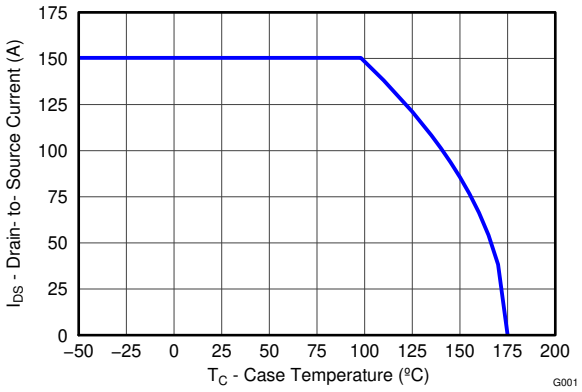


Figure 4-12. Maximum Drain Current vs Temperature

5 Device and Documentation Support

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5.6 Glossary

TI Glossary	This glossary lists and explains terms, acronyms, and definitions.

6 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Revision B (October 2014) to Revision C (May 2024)	Page
• Updated the numbering format for tables, figures, and cross-references throughout the document	1

Changes from Revision A (February 2014) to Revision B (October 2014)	Page
• Updated Pulsed Drain Current conditions	1
• Updated the SOA in Figure 4-10	4

Changes from Revision * (January 2014) to Revision A (February 2014)	Page
• Increased Pulsed Drain Current to 400A	1
• Updated SOA Curve	4

7 Mechanical, Packaging, and Orderable Information

The following pages include mechanical packaging and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

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