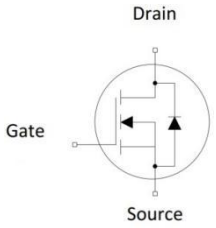
Description

Super-junction power MOSFET is a revolutionary technology for high voltage power MOSFET , designed according to the SJ principle. The resulting device has extremely low on resistance,making it especially suitable for applications which require superior power density and outstanding efficiency.

Product Summary

V_{DS} @ $T_{j,25℃}$	700V
$R_{DS(on),max}$	0.19Ω
I_D	20A
$Q_{g,typ}$	27 nC

TO-252



N-Channel MOSFET

Features

Very low FOM RDS(on)×Qg
100% UIS tested
RoHS compliant

Applications

Power factor correction (PFC).
Switched mode power supplies (SMPS).
Uninterrupted power supply (UPS).

Marking information

Product	Package	Marking	Packing methed
CD19RN70M	TO-252	CD19RN70M	Reel

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	700	V
Continuous drain current (T_C = 25°C) (T_C = 100°C)	I_D	20 13	A A
Pulsed drain current [1]	I_{DM}	60	A
Gate-Source voltage	V_{GSS}	±30	V
Avalanche energy, single pulse [2]	E_{AS}	235	mJ
Power Dissipation TO-252 (T_C = 25°C) - Derate above 25°C	P_D	140 1.1	W W/°C
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C
Continuous diode forward current	I_S	20	A
Diode pulse current	$I_{S,pulse}$	60	A
MOSFET dv/dt ruggedness，V_{DS}=0...480V	dv/dt	50	V/ns
Reverse diode dv/dt，V_{DS}=0...480V	dv/dt	15	V/ns

Thermal Characteristics

Parameter	Symbol	Value	Unit
		TO-252	
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.89	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	56	°C/W
Soldering temperature, wave soldering only allowed at leads. (1.6mm from case for 10s)	T_{sold}	260	°C

Electrical Characteristics

T_c = 25°C unless otherwise noted

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static characteristics						
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0 V, I_D=250uA	700	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA	2.5		4.0	V
Drain cut-off current	I_{DSS}	V_{DS}=700 V, V_{GS}=0 V, T_j = 25°C T_j = 125°C	 - -	 - 10	 1	μA
Gate leakage current, Forward	I_{GSSF}	V_{GS}=30 V, V_{DS}=0 V	-	-	100	nA
Gate leakage current, Reverse	I_{GSSR}	V_{GS}=-30 V, V_{DS}=0 V	-	-	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10 V, I_D=10 A T_j = 25°C	- - -	0.16	0.19	Ω
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS} = 100 V, V_{GS} = 0 V,	-	1303	-	pF
Output capacitance	C_{oss}	f = 1MHz	-	52.7	-	
Reverse transfer capacitance	C_{rss}		-	2.3	-	
Turn-on delay time	$t_{d(on)}$	V_{DD} = 400V, I_D = 10A	-	19	-	ns
Rise time	t_r	R_G = 10Ω, V_{GS}=10V	-	16	-	
Turn-off delay time	$t_{d(off)}$		-	92	-	
Fall time	t_f		-	26	-	
Gate charge characteristics						
Gate to source charge	Q_{gs}	V_{DD}=520 V, I_D=10A,	-	8.4	-	nC
Gate to drain charge	Q_{gd}	V_{GS}=0 to 10 V	-	8.2	-	
Gate charge total	Q_g		-	27	-	
Gate plateau voltage	$V_{plateau}$		-	5.8	-	V
Reverse diode characteristics						
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=10A	-	-	1.2	V
Reverse recovery time	t_{rr}	V_R=400 V, I_F=10A,	-	224.3	-	ns
Reverse recovery charge	Q_{rr}	dI_F/dt=100 A/μs	-	2.8	-	μC
Peak reverse recovery current	I_{rrm}		-	23.9	-	A

Notes:

1. Limited by maximum junction temperature, maximum duty cycle is 0.75.
2. I_{AS} = 2.8A, V_{DD} = 50V, Starting T_j= 25°C.

Electrical Characteristics Diagrams

Figure 1. Output Characteristics

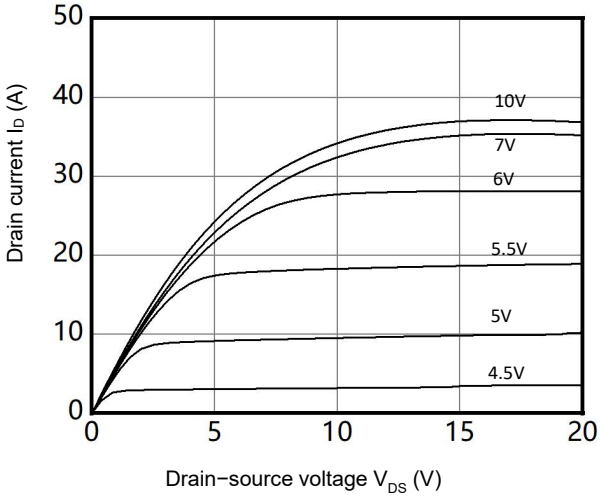


Figure 2. Transfer Characteristics

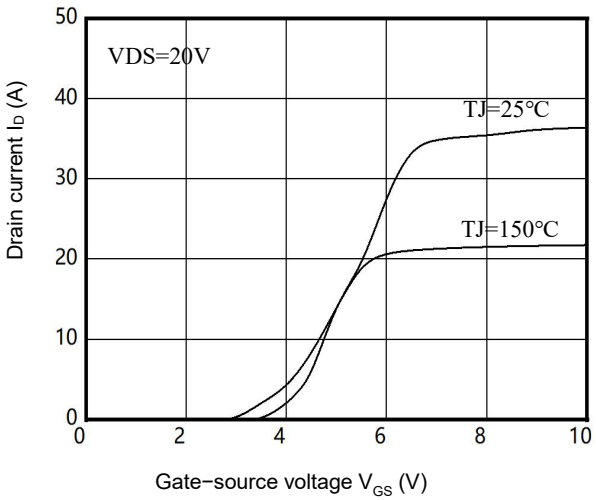


Figure 3. On-Resistance vs. Drain Current

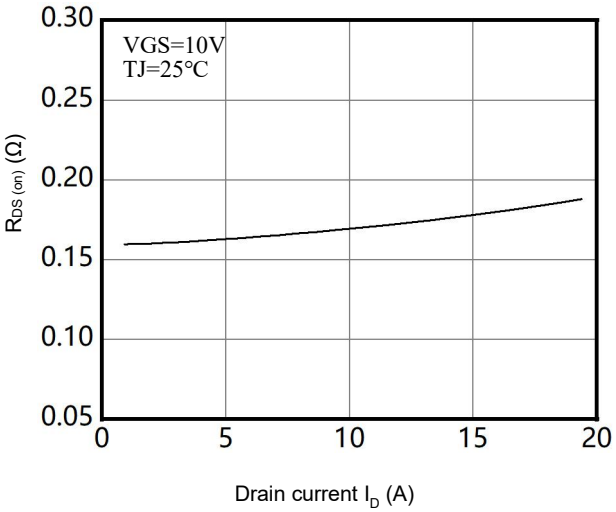


Figure 4. Capacitance Characteristics

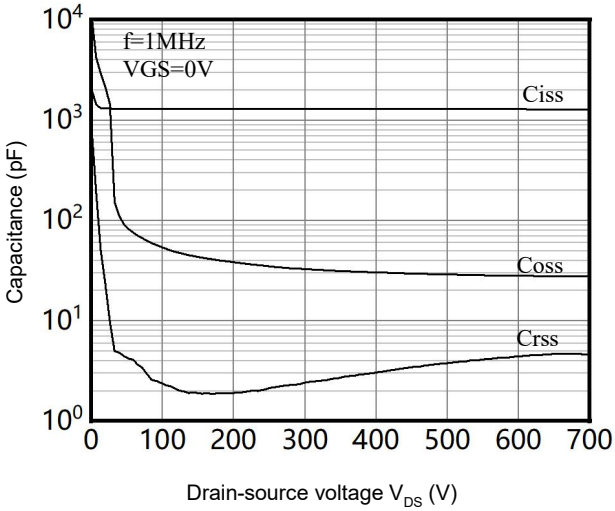


Figure 5. Gate Charge Characteristics

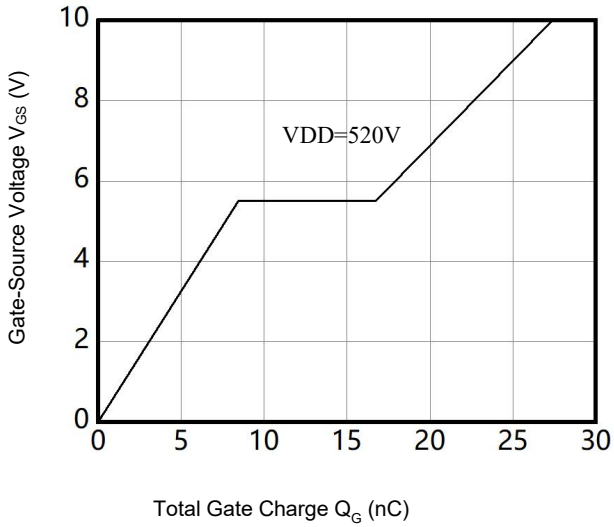


Figure 6. Body Diode Forward Voltage

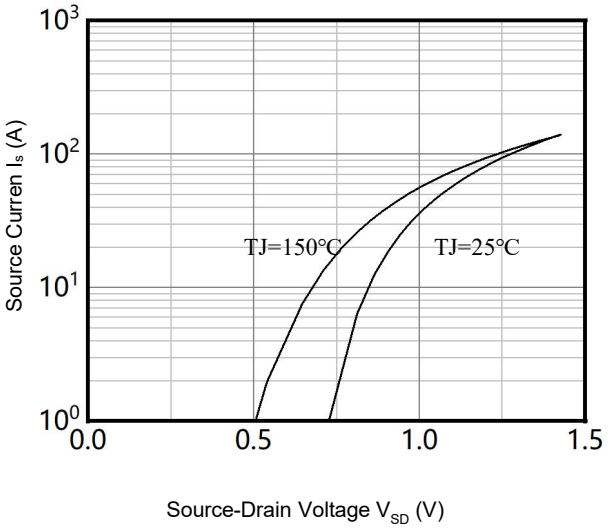


Figure 7. Breakdown Voltage vs. Temperature

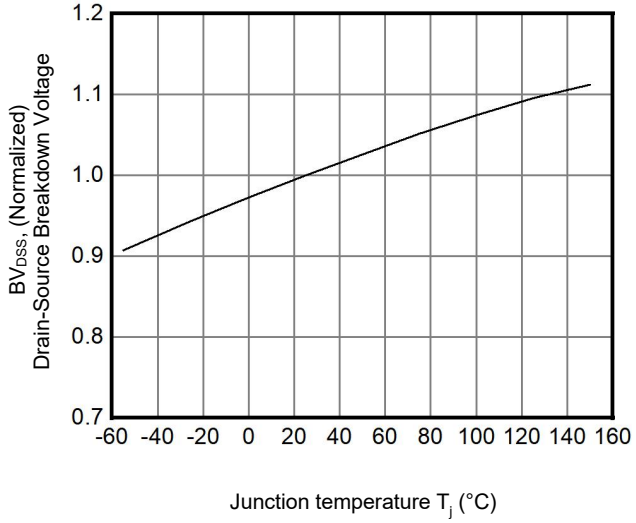


Figure 8. On-Resistance vs. Temperature

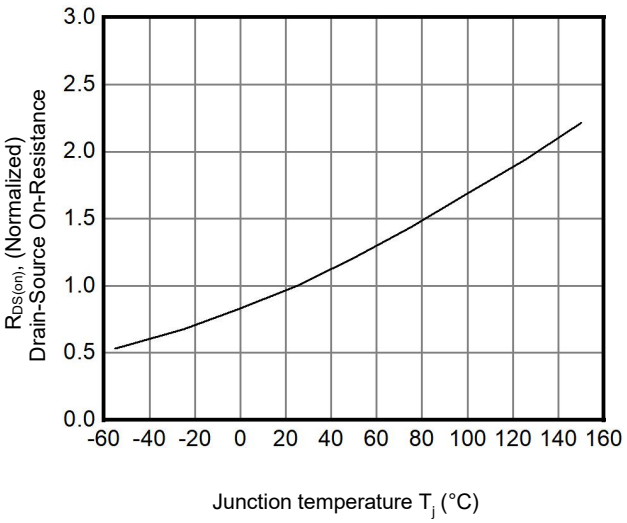


Figure 9. Transient Thermal Impedance

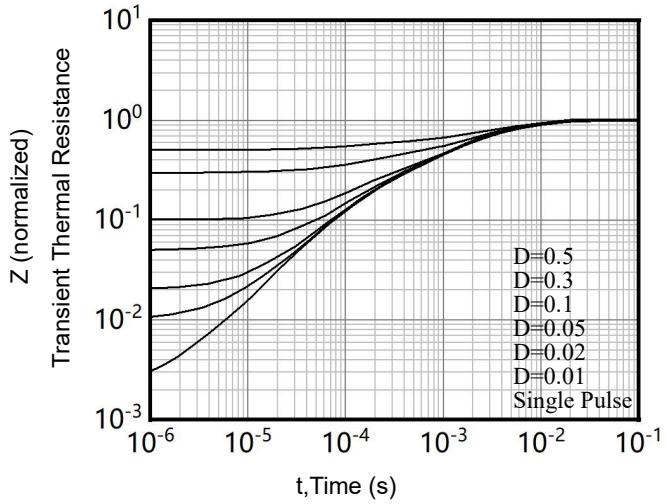


Figure 10. Maximum Safe Operating Area

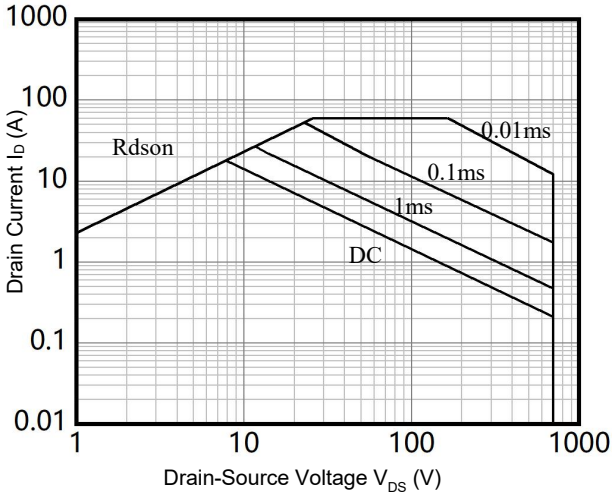
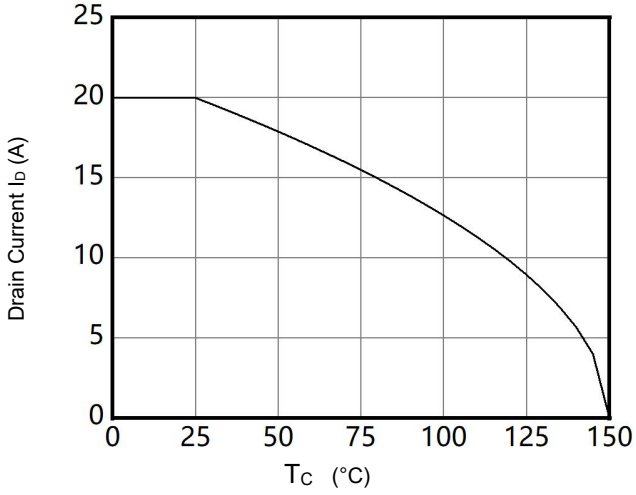
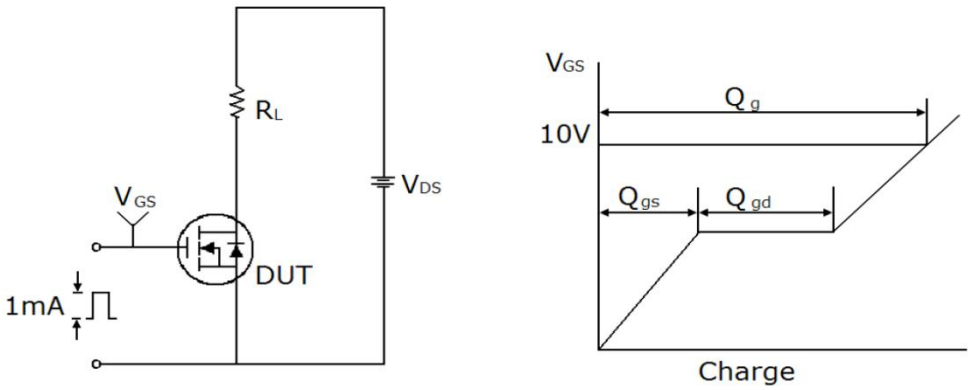


Figure11. Drain Current vs. Temperature

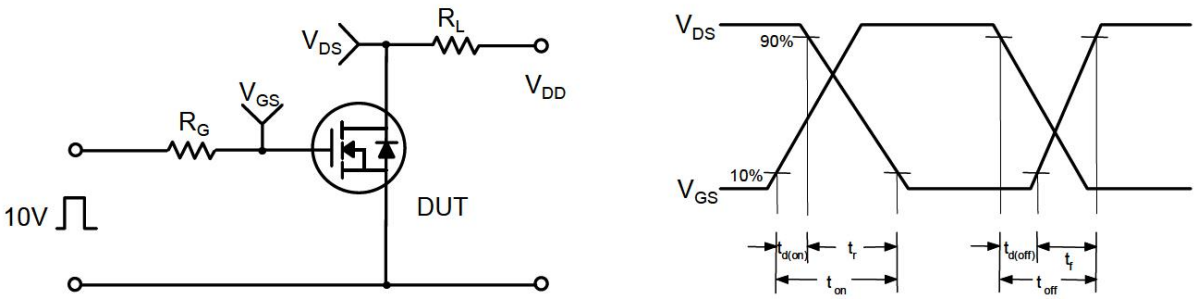


Test Circuits

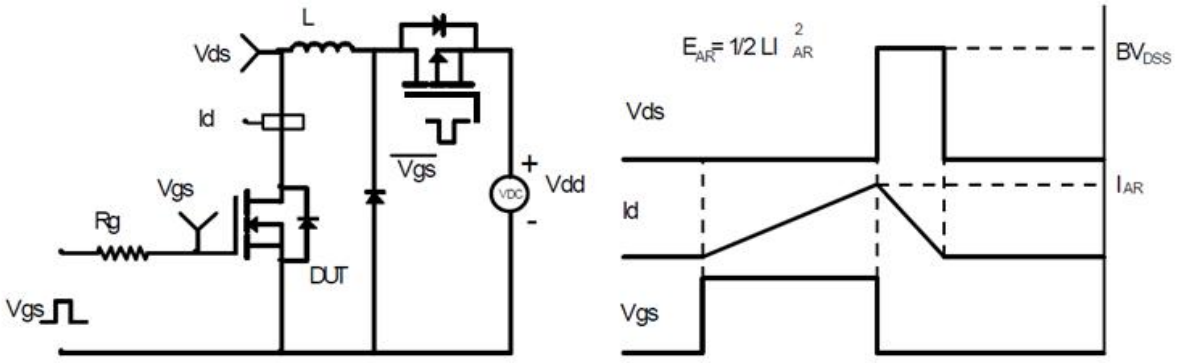
Gate Charge Test Circuit & Waveform



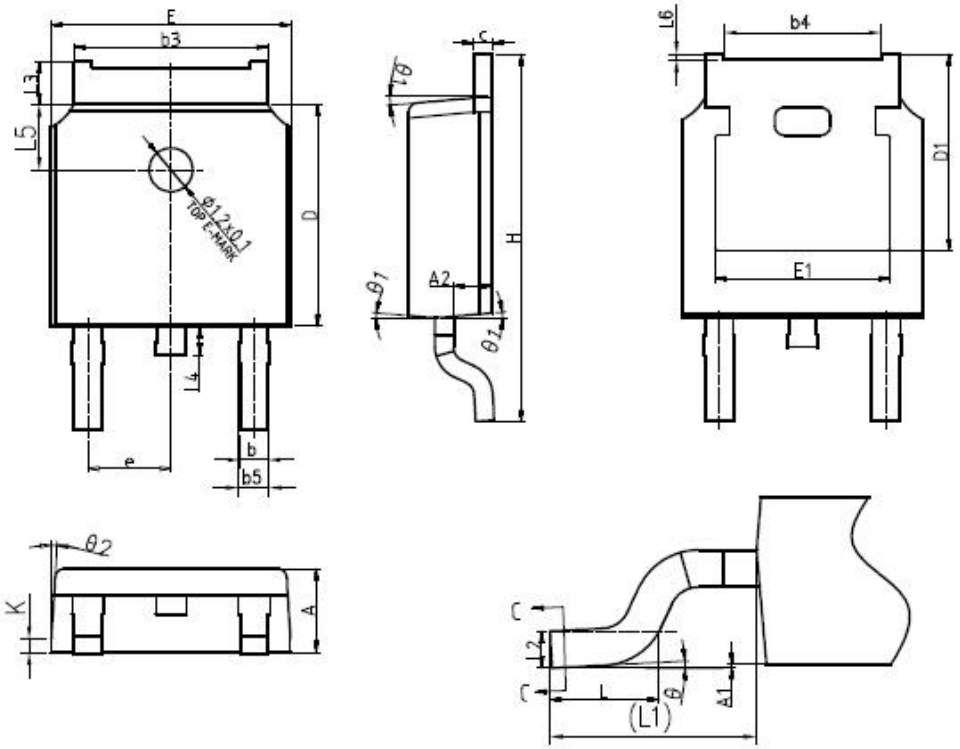
Switching Test Circuit & Waveform



Unclamped Inductive Switching Test Circuit & Waveform



Mechanical Dimensions for TO-252



单位：mm

SYMBOL	mm	
	MIN	MAX
A	2.20	2.40
A1	0.00	0.20
A2	0.97	1.17
b	0.50	0.90
b3	5.10	5.50
b4	4.27	4.37
b5	0.72	0.93
c	0.43	0.61
D	5.95	6.25
D1	5.30REF	
H	9.40	10.50
E	6.40	6.75

E1	4.63	—
e	2.286BSC	
L	1.25	1.75
L1	2.90REF	
L2	0.51BSC	
L3	0.88	1.28
L4	0.50	1.00
L5	1.65	1.95
L6	0	0.123
θ	0°	8°
θ 1	5°	9°
θ 2	5°	9°
K	0.40REF	

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