JMM4716N

Product Preview

30V N-Channel MOSFET

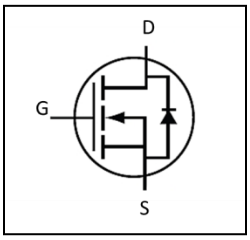
Features

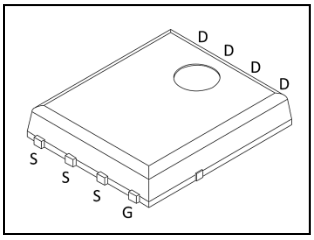
- Advanced shielded-gate technology
- Ultra-low on-resistance and gate-charge
- RoHS compliant
- 100% avalanche tested

Product Summary	
V_{DS}	30V
$R_{DS(ON)}$	6.6 mΩ (Typ.)
	8.6 mΩ (Max.)

Applications

- Motor controllers
- DC-to-DC convertors
- Battery-driven electronic products, electrical equipment and machines





Ordering Information

Part Number	Marking	Package	Packaging
JMM4716N	MM4716N	DFN5x6	Tape & Reel

Absolute Maximum Ratings

Parameter	Symbol	Limit	Unit
Drain-to-Source Voltage	V_{DS}	30	V
Gate-to-Source Voltage	V_{GS}	±20	
Continuous Drain Current, Silicon limited (T_C = 25°C) (1)	I_D	34	A
Continuous Drain Current, Silicon limited (T_C = 100°C) (1)	I_D	21	
Continuous Drain Current, Silicon limited (T_A = 25°C) (2), (5)	I_D	13	
Continuous Drain Current, Silicon limited (T_A = 100°C) (2), (5)	I_D	8	
Pulsed Drain Current (3)	I_{DM}	168	
Power Dissipation (T_C = 25°C)	P_D	25	W
Linear Derating Factor	-	0.2	W/°C
Single Pulse Avalanche Energy (4)	E_{AS}	24	mJ
Avalanche Current (4)	I_{AS}	14	A
Junction Temperature	T_J	-55 to 150	°C
Storage Temperature	T_{STG}	-55 to 150	

Thermal Characteristics

Parameter	Symbol	Max	Unit
Junction-to-Ambient Thermal Resistance (5)	$R_{\theta JA}$	55	°C/W
Junction-to-Case Thermal Resistance	$R_{\theta JC}$	5.0	

Static Electrical Characteristics (6)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-to-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V, I_D = 250μA	30	-	-	V
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS} = V_{GS} , I_D = 250μA	1.1	-	2.2	
Drain-to-Source Leakage Current	I_{DSS}	V_{DS} = 30V, V_{GS} = 0V	-	-	1	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
Drain-to-Source On-Resistance	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 15A	-	6.6	8.6	mΩ
		V_{GS} = 4.5 V, I_D = 10A	-	10.6	13.8	mΩ

Dynamic Electrical Characteristics (6)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Forward Transconductance	g_{fs}	V_{DS} = 5V, I_D = 20A	-	43	-	S
Total Gate Charge	Q_g	V_{GS} = 10V, V_{DS} = 15V, I_D = 15A	-	10.9	-	nC
Gate-to-Source Charge	Q_{gs}		-	1.3	-	
Gate-to-Drain Charge	Q_{gd}		-	2.2	-	
Turn-On Delay Time	$t_{d(on)}$	V_{GS} = 10V, V_{DS} = 15V, I_D = 15A, R_G = 3.0Ω	-	3.1	-	ns
Rise Time	t_r		-	3.1	-	
Turn-Off Delay Time	$t_{d(off)}$		-	27	-	
Fall Time	t_f		-	5.8	-	
Input Capacitance	C_{iss}	V_{DS} = 15V, V_{GS} = 0V, f = 1MHz	-	680	-	pF
Output Capacitance	C_{oss}		-	300	-	
Reverse Transfer Capacitance	C_{rss}		-	20	-	

Diode Characteristics (6)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Forward Voltage	V_{SD}	V_{GS} = 0V, I_S = 10A	-	0.8	-	V
Reverse Recovery Time	t_{rr}	V_{GS} = 0V, I_S = 10A, dI_S/dt = 100A/µs	-	18	-	ns
Reverse Recovery Charge	Q_{rr}		-	24	-	nC

(1) Rated according to $R_{\theta JC}$.

(2) Rated according to $R_{\theta JA}$.

(3) Limited by maximum T_J.

(4) T_A = 25°C, L = 0.1mH, I_{AS} = 14A.

(5) Surface−mounted on 1 inch² FR4 board, 2 oz Cu.

(6) T_J = 25°C unless otherwise specified.

Typical Electrical Characteristics

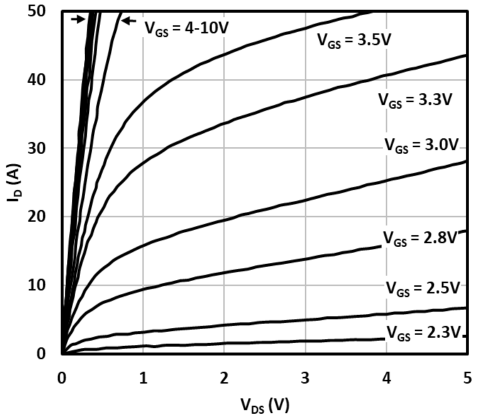


Fig. 1 Output characteristics

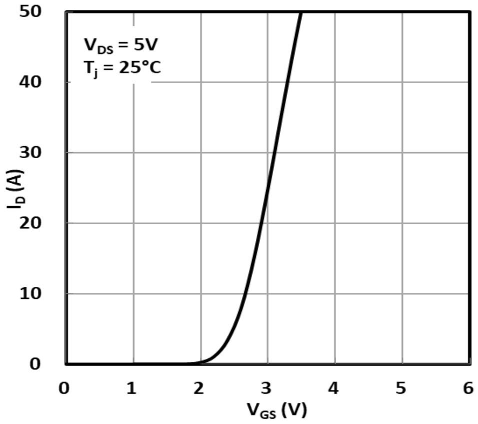


Fig. 2 Transfer characteristics

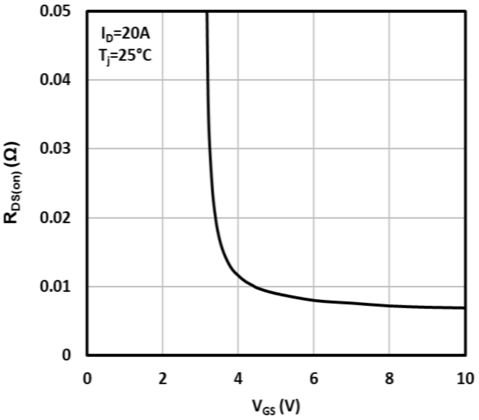


Fig.3 On-resistance vs. gate voltage

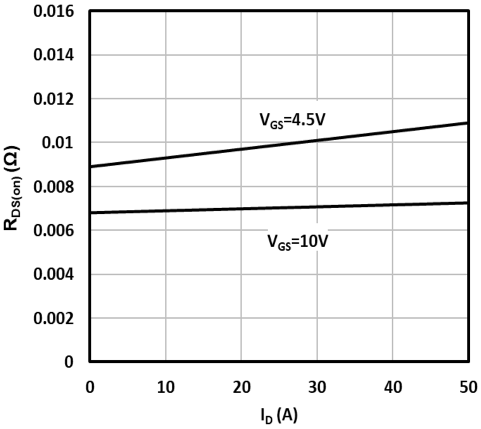


Fig.4 On-resistance vs. drain current

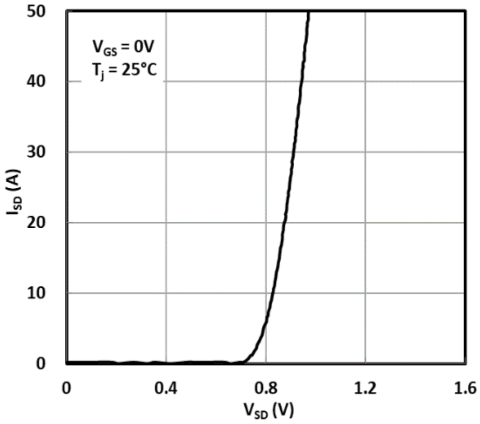


Fig.5 Source-to-drain diode forward characteristics

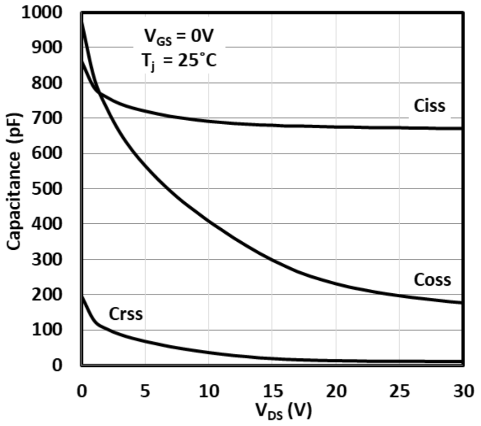


Fig.6 Capacitance vs. drain-to-source voltage

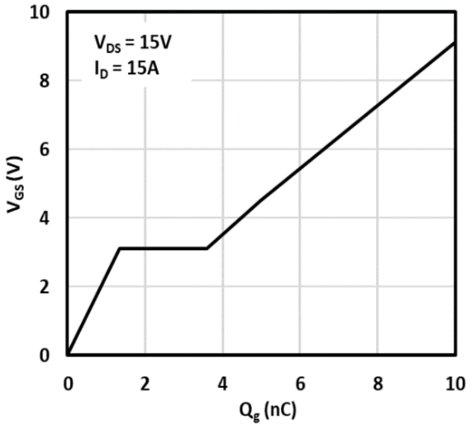


Fig.7 Gate-to-source voltage vs. gate charge

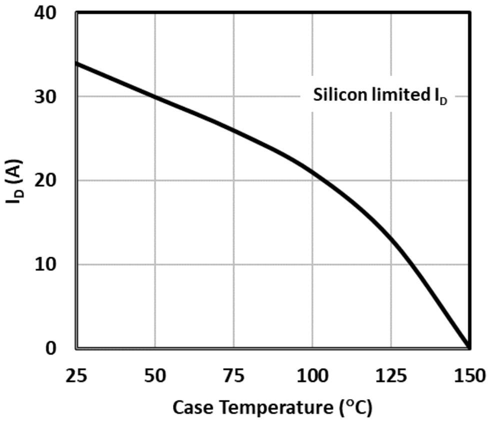


Fig.8 Maximum drain current vs. case temperature

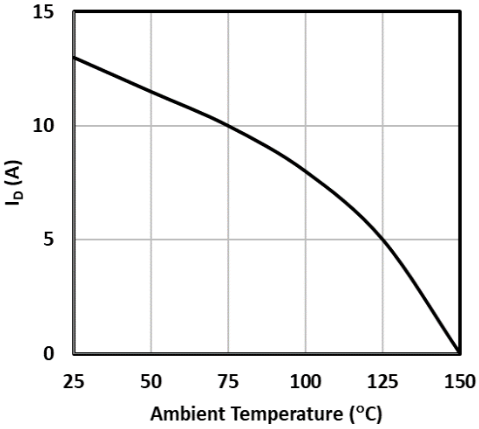
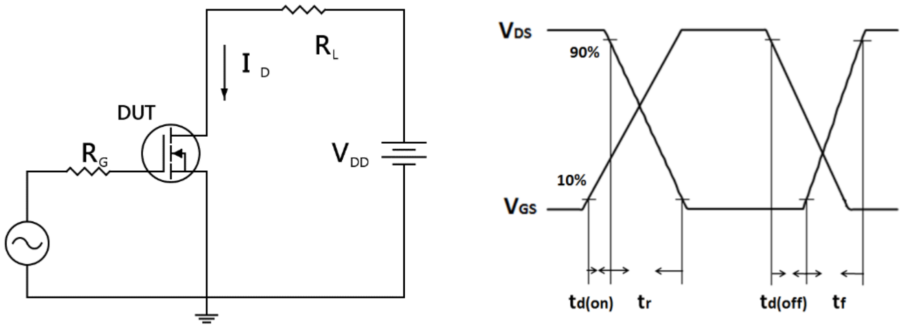
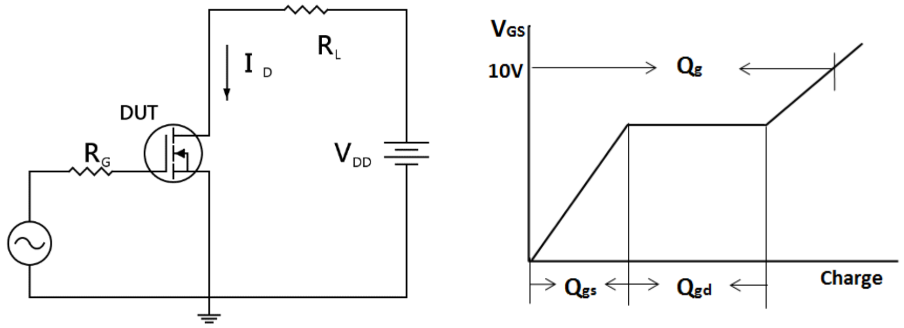


Fig.9 Maximum drain current vs. ambient temperature

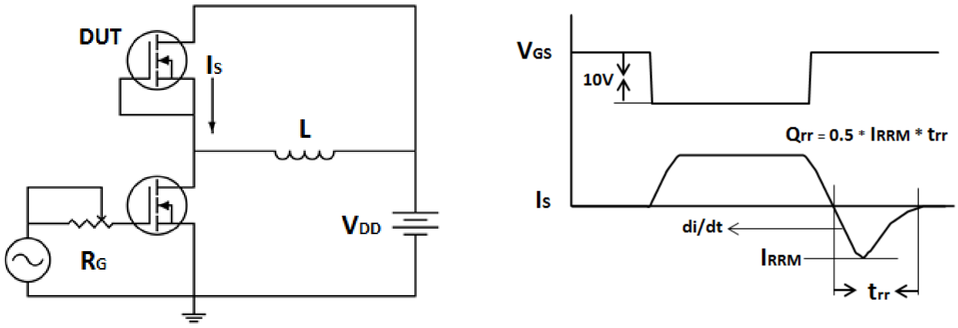
Test Circuits and Waveforms



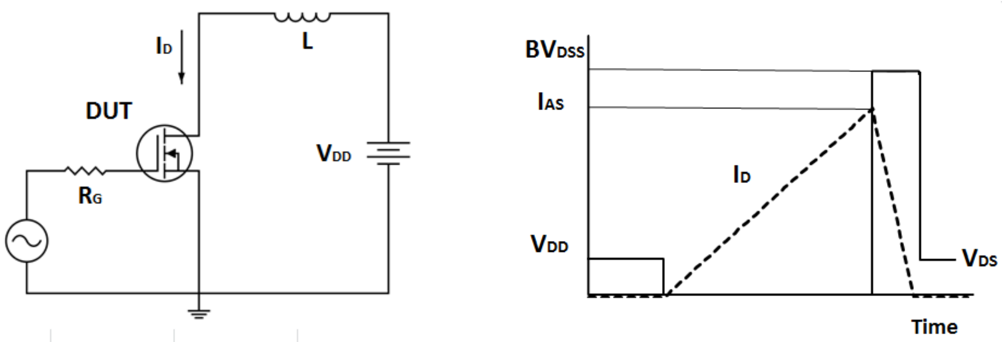
Resistive switching time test circuit & waveforms



Gate charge test circuit & waveform

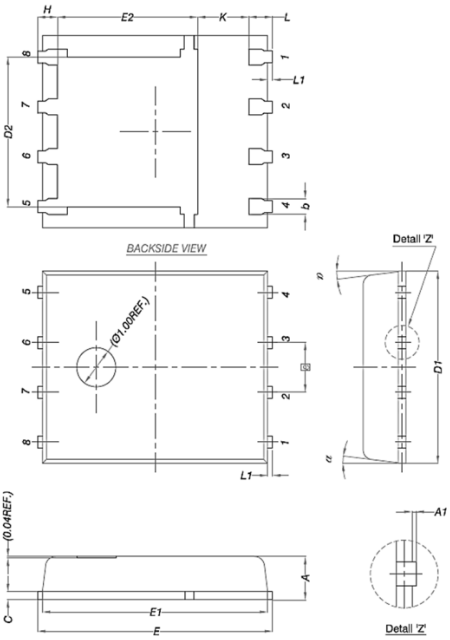


Peak diode recovery dv/dt test circuit & waveforms



Unclamped inductive switching test circuit & waveforms

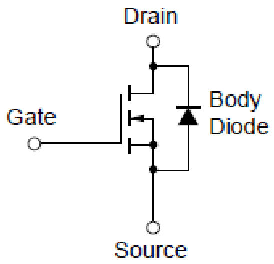
Package Drawing



DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
A1	0	-	0.05
b	0.33	0.41	0.51
C	0.20	0.25	0.30
D1	4.80	4.90	5.00
D2	3.61	3.81	3.96
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	3.38	3.58	3.78
e	1.27 BSC		
H	0.41	0.51	0.61
K	1.10	-	-
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
α	0°	-	12°

DFN 5x6

Equivalent Circuit



Revision history of JMM4716N specification

Version	Change Items	Effective Date
1.00	Initial Release	04-Dec-20
1.01	Update 4.5V and 10V Ron and Continuous Drain Current, Silicon limited	05-Jan-21

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