JMT3801N

Product Preview

25V 10A Dual N-Channel MOSFET

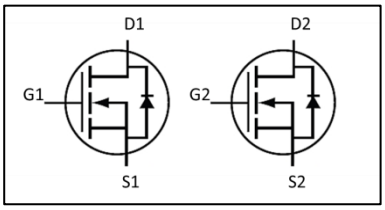
Features

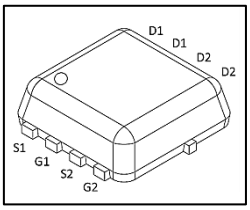
- Advanced shielded-gate technology
- Ultra-low on-resistance and gate-charge
- RoHS compliant
- 100% avalanche tested

Product Summary	
V_{DS}	25V
$R_{DS(ON)}$	9.8mΩ (Typ.)
	12mΩ (Max.)
I_D	10A

Applications

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





Ordering Information

Part Number	Marking	Package	Packaging
JMT3801N	MT3801N	DFN3.3x3.3 dual	Tape & Reel

Absolute Maximum Ratings

Parameter	Symbol	Limit	Unit
Drain-to-Source Voltage	V_{DS}	25	V
Gate-to-Source Voltage	V_{GS}	±10	
Continuous Drain Current, Package Limited (T_C = 25°C) (1)	I_D	10	A
Continuous Drain Current (T_C = 25°C) (1)	I_D	40	
Continuous Drain Current (T_C = 100°C) (1)	I_D	24	
Continuous Drain Current (T_A = 25°C) (2), (6)	I_D	11	
Continuous Drain Current (T_A = 100°C) (2), (6)	I_D	6	
Pulsed Drain Current (3)	I_{DM}	160	
Power Dissipation (T_C = 25°C)	P_D	26	W
Linear Derating Factor	-	0.21	W/°C
Single Pulse Avalanche Energy (4)	E_{AS}	17	mJ
Avalanche Current (5)	I_{AS}	13	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 (6)	$R_{\theta JA}$	62	°C/W
Junction-to-Case Thermal Resistance	$R_{\theta JC}$	4.8	

Static Electrical Characteristics (7)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-to-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V, I_D = 250μA	25	-	-	V
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS} = V_{GS} , I_D = 250μA	0.4	-	1.2	
Drain-to-Source Leakage Current	I_{DSS}	V_{DS} = 25V, V_{GS} = 0V	-	-	1	μA
		V_{DS} = 20V, V_{GS} = 0V, T_J = 125°C	-	-	10	
Gate-to-Source Leakage Current	I_{GSS}	V_{DS} = 0V, V_{GS} = ±10V	-	-	±100	nA
Drain-to-Source On-Resistance	$R_{DS(ON)}$	V_{GS} = 4.5V, I_D = 5A	-	9.8	12	mΩ

Dynamic Electrical Characteristics (7)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Forward Transconductance	g_{fs}	V_{DS} = 5V, I_D = 15A	-	50	-	S
Total Gate Charge	Q_g	V_{GS} = 4.5V, V_{DS} = 15V, I_D = 20A	-	8.9	-	nC
Gate-to-Source Charge	Q_{gs}		-	3.7	-	
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 = 3.0	-	6	-	ns
Rise Time	t_r		-	3	-	
Turn-Off Delay Time	$t_{d(off)}$		-	18	-	
Fall Time	t_f		-	5	-	
Input Capacitance	C_{iss}	V_{DS} = 10V, V_{GS} = 0V, f = 1MHz	-	910	-	pF
Output Capacitance	C_{oss}		-	510	-	
Reverse Transfer Capacitance	C_{rss}		-	55	-	

Diode Characteristics (7)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Forward Voltage	V_{SD}	V_{GS} = 0V, I_S = 10A	-	0.9	-	V
Reverse Recovery Time	t_{rr}	V_{GS} = 0V, I_S = 30A, dI_S/dt = 100A/µs	-	17	-	ns
Reverse Recovery Charge	Q_{rr}		-	8	-	µC

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

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

(3) Limited by maximum T_J.

(4) Starting T_J = 25°C, I_{AS} = 13A, L = 0.1mH, V_{DD} = 20V, V_{GS} = 10V

(5) Pulse width limited by maximum T_J.

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

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

Typical Electrical Characteristics

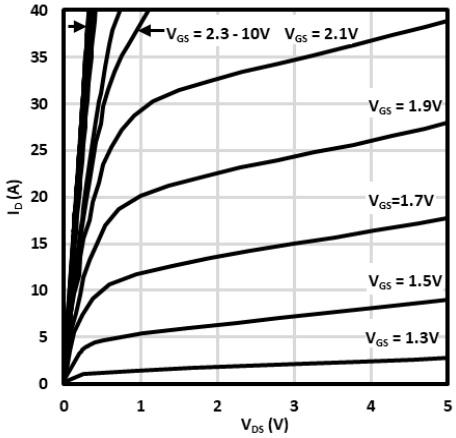


Fig.1 Output characteristics

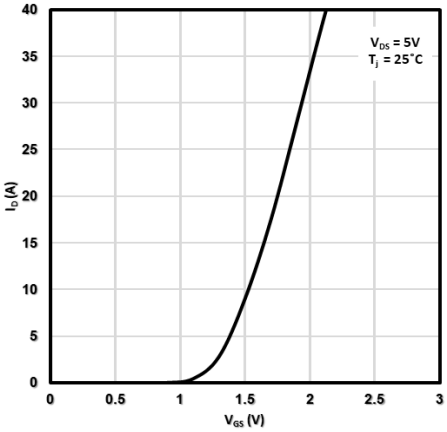


Fig.2 Transfer characteristics

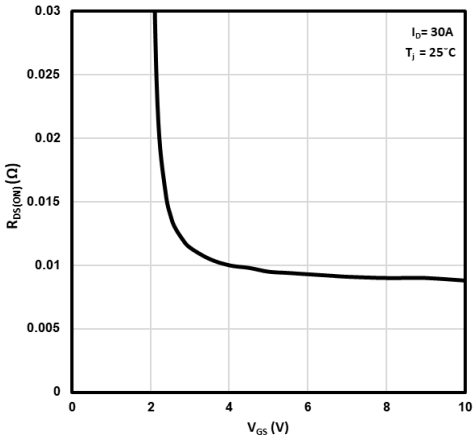


Fig.3 On-resistance vs. gate voltage

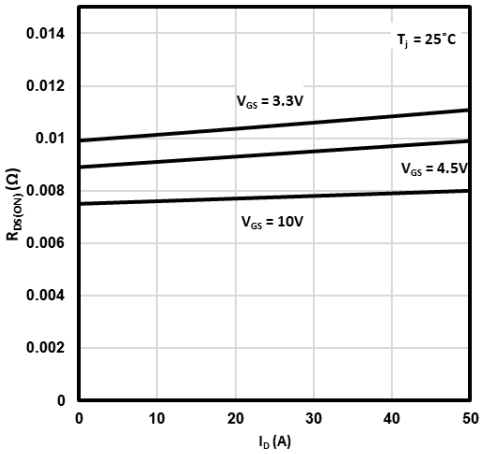


Fig.4 On-resistance vs. drain current

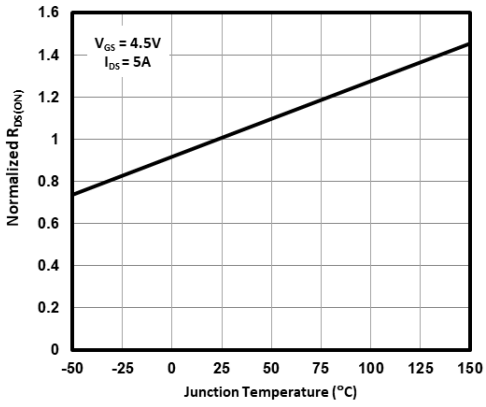


Fig.5 Normalized on-resistance vs. temperature

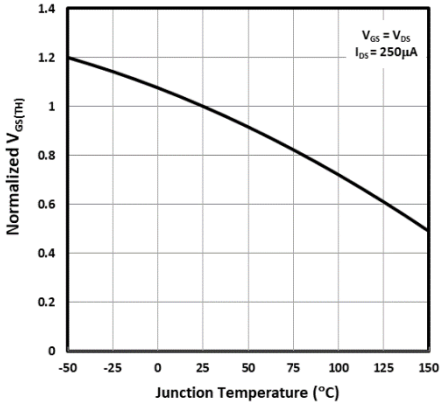


Fig.6 Normalized gate threshold voltage vs. temperature

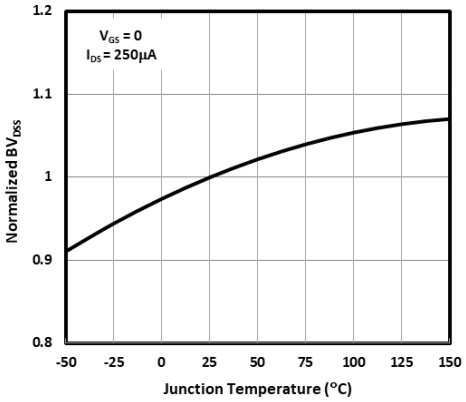


Fig.7 Normalized drain-to-source breakdown voltage vs. temperature

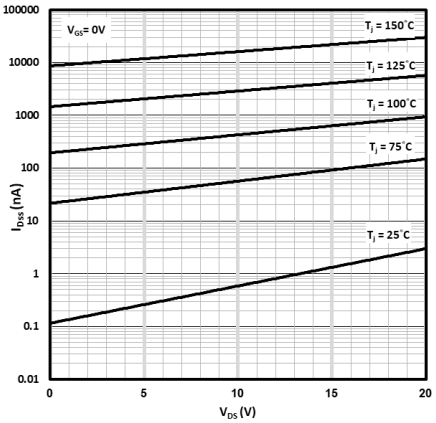


Fig.8 Drain-to-source leakage current vs. voltage

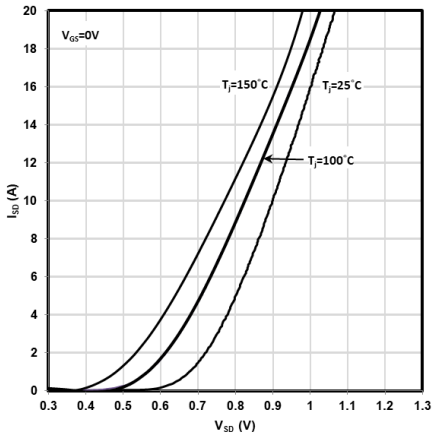


Fig.9 Source-to-drain diode forward characteristics

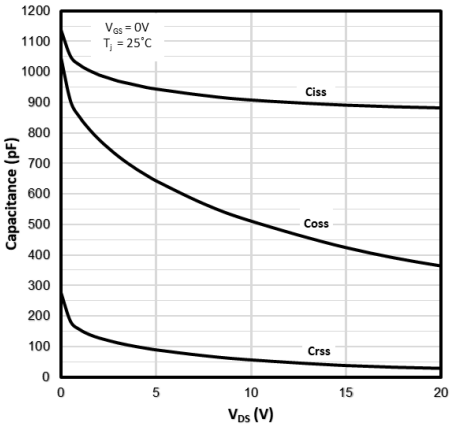


Fig.10 Capacitance vs. drain-to-source voltage

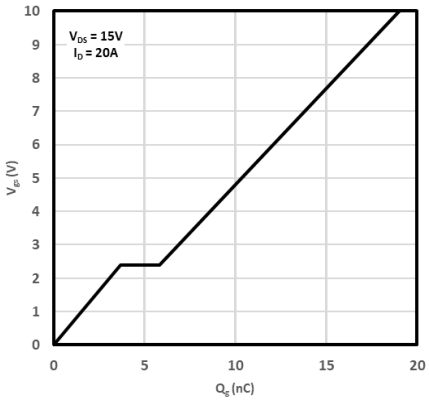


Fig.11 Gate-to-source voltage vs. gate charge

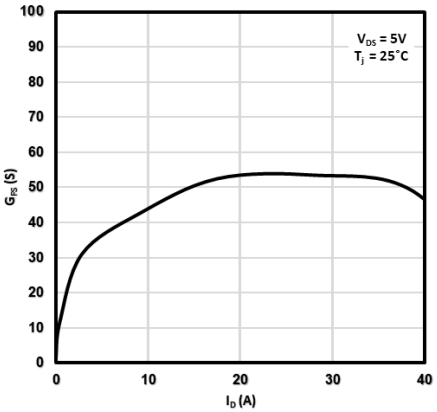


Fig.12 Transconductance

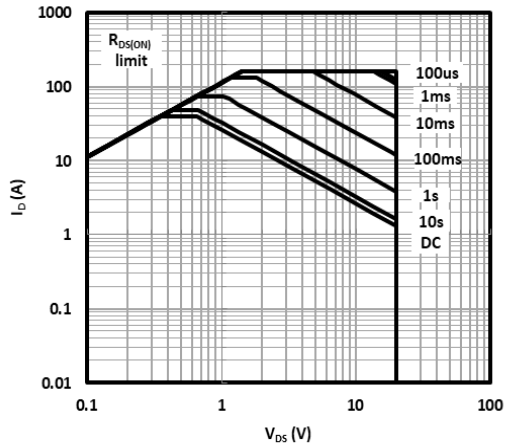


Fig. 13 Safe operating area

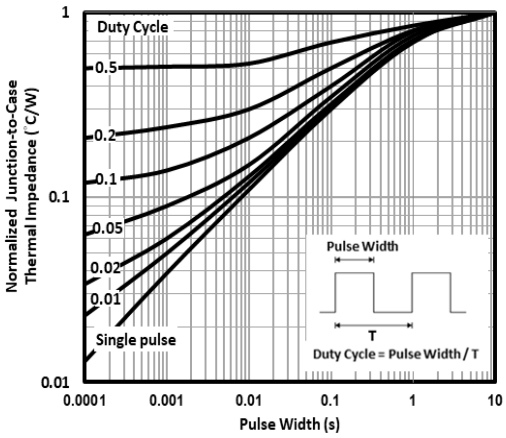


Fig. 14 Junction-to-ambient thermal impedance

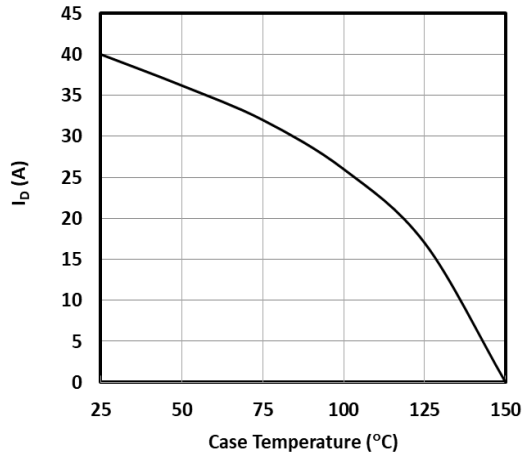


Fig.15 Maximum drain current vs. case temperature

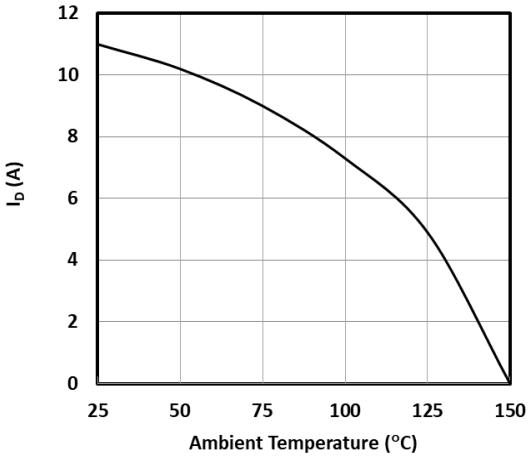
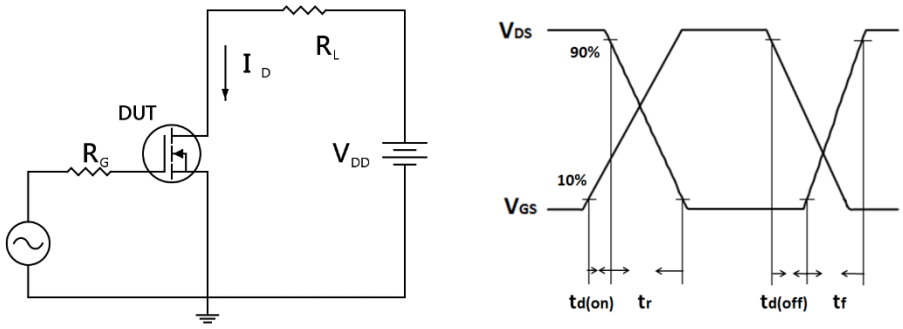
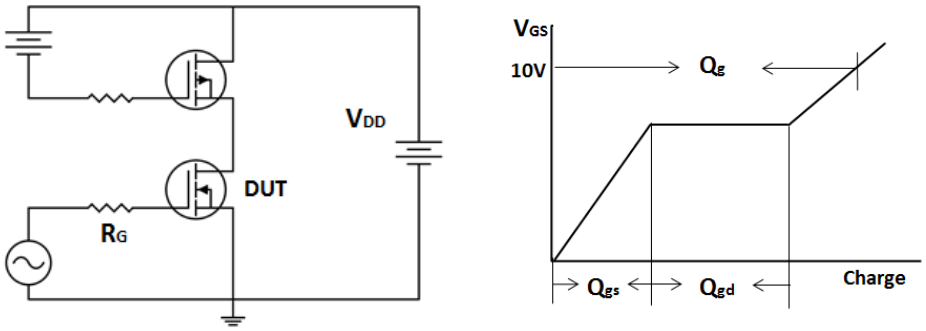


Fig.16 Maximum drain current vs. ambient temperature

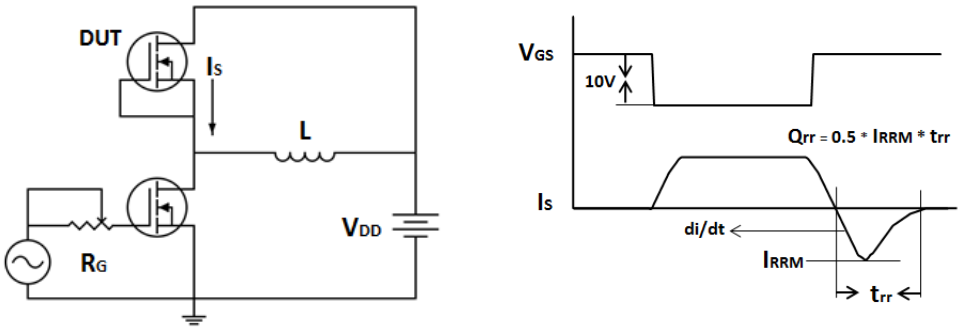
Test Circuits and Waveforms



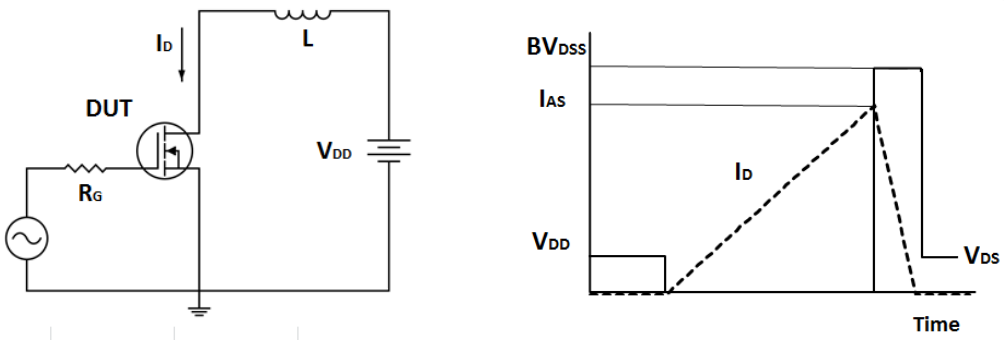
Resistive switching time test circuit & waveforms



Gate charge test circuit & waveform

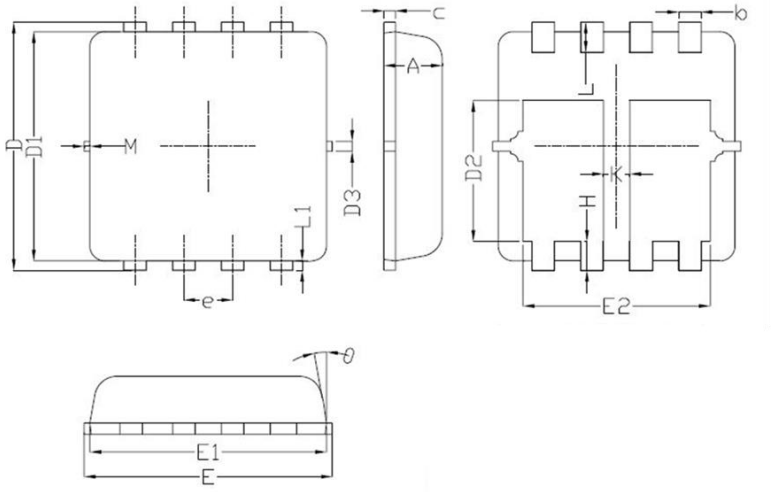


Peak diode recovery dv/dt test circuit & waveforms



Unclamped inductive switching test circuit & waveforms

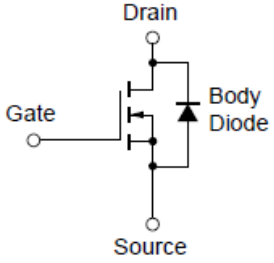
Package Drawing



SYMBOL	DIMENSONAL REQMTS		
	MIN.	NOM.	MAX.
A	0.65	0.75	0.85
b	0.20	0.30	0.40
c	0.10	0.150	0.25
D	3.15	3.35	3.45
D1	3.00	3.10	3.20
D2	1.54	1.88	1.94
D3	---	0.13	---
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65 BSC		
H	0.30	0.39	0.50
L	0.30	0.400	0.50
LI	---	0.130	---
K	0.30	---	---
α	---	10°	12°
M	*	*	0.15
* Not specified			

DFN 3.3x3.3

Equivalent Circuit



Revision history of JMT3801N Specification

Version	Change Items	Effective Date
1.00	Initial Release	09-Mar-20

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