

030N04TH-D5

40V N-Channel Super Trench Power MOSFET



Description

030N04TH-D5 is uses Super Trench technology and design to provide excellent RDS(ON) with low gate charge. It can be used in a wide variety of applications

General Features

- Shielded-gate trench technology
- Low on-resistance and low gate-charge
- RoHS compliant

MAIN CHARACTERISTICS

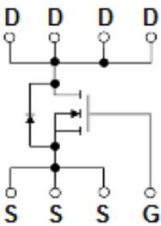
ID	80A
VDSS	40v
R _{DS(ON)Typ} (at VGS=10V)	2.3mΩ

Application

- DC/DC Converter
- Motor controllers
- Battery-driven electronic products, electrical equipment and machines



PDFN5×6-8L



Package Marking and Ordering Information

Device Marking	Device	Device Package	Quantity
030N04TH	030N04TH-D5	PDFN5×6-8L	5000 pcs/Tape & Reel

Absolute maximum ratings

Symbol	Parameter		Limit	Unit
V _{DSS}	Drain-source voltage		40	V
V _{GSS}	Gate-Source Voltage		±20	V
I _D	Drain Current -continuous(TC=25℃) (1)		111	A
	Drain Current -continuous(TC=100℃) (1)		78	
I _{DM}	Drain Current-Pulsed (2)		444	A
P _D	Power Dissipation	Tc=25℃	63	W
E _{AS}	Single pulsed avalanche energy (3)		249	mJ
T _J , T _{STG}	Operating and Storage Temperature Range		-50~175	℃

Thermal Characteristics

Symbol	Parameter	Value	Units
R _{θJC}	Thermal Resistance, Juction-to-Case	2.4	℃/W
R _{θJA}	Thermal Resistance, Juction-to-Ambient (5)	45	℃/W

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Electrical Characteristics $T_c=25^{\circ}\text{C}$ unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max	Unit
Static Characteristics						
BV_{DSS}	Drain Source breakdown voltage	$V_{GS}=0V, I_D=250\mu A, T_J=25^{\circ}\text{C}$	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=40V, V_{GS}=0V$	-	-	1	μA
I_{GSS}	Gate-to-Source Forward Leakage	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2.2	-	3.4	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=50A$	-	2.3	3.0	$m\Omega$
R_G	Gate Resistance	$f = 1\text{ MHz}$	-	1.4	-	Ω

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 20V$ $f = 1.0MHz$	-	3420	-	pF
C_{oss}	Output Capacitance		-	1150	-	pF
C_{rss}	Reverse Transfer Capacitance		-	60	-	pF

SWITCHING Characteristics

$T_{D(on)}$	Turn-on Delay Time	$V_{DD} = 20V$ $V_{GS} = 10V$ $R_G = 3\Omega$ $I_D = 20A$	-	20	-	ns
T_r	Turn-on Rise Time		-	25	-	ns
$T_{D(off)}$	Turn-off Delay Time		-	50	-	ns
T_f	Turn-off Fall Time		-	30	-	ns
Q_g	Total Gate Charge	$V_{DD} = 20V$ $V_{GS} = 10V$ $I_D = 20A$	-	43	-	nC
Q_{gs}	Gate Source Charge		-	13	-	nC
Q_{gd}	Gate Drain Charge		-	5	-	nC

Drain-Source Diode Characteristics and Maximum Ratings

V_{SD}	Drain-Source Diode Forward Voltage	$I_S = 50A, V_{GS} = 0V$	-	-	1.2	V
T_{rr}	Reverse Recovery Time	$I_S = 20A, V_{GS} = 0V$ $di/dt = 100A/\mu s$	-	50	-	ns
Q_{rr}	Reverse Recovery Charge		-	50	-	nC

Notes:

1. Rated according to $R_{\theta JC}$
2. Limited by maximum T_J
3. Starting $T_J = 25^{\circ}\text{C}$, $L = 0.1mH$, $V_{DD} = 30V$, $V_{GS} = 10V$
4. Pulse width limited by maximum T_J
5. Surface-mounted on 1 inch² FR4 board, 2 oz Cu

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)

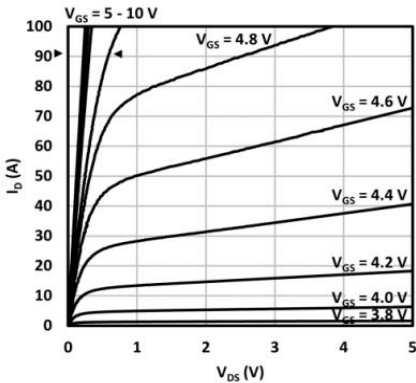


Fig. 1 Output characteristics

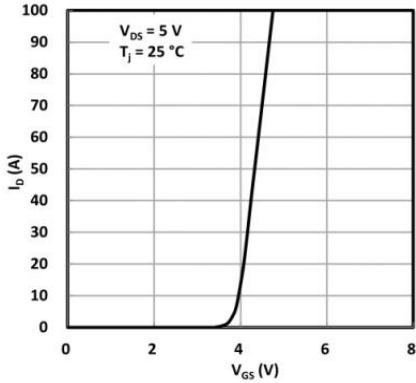


Fig. 2 Transfer characteristics

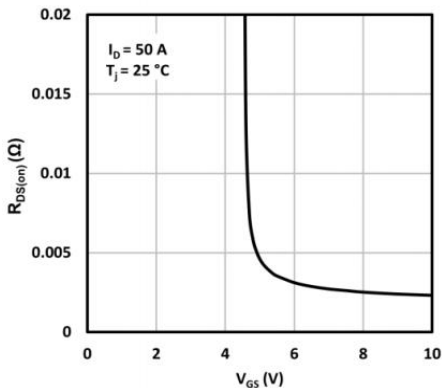


Fig.3 On-resistance vs. gate voltage

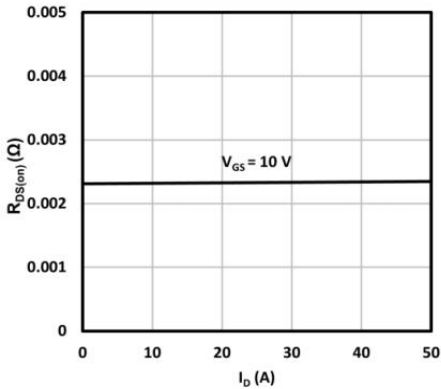


Fig.4 On-resistance vs. drain current

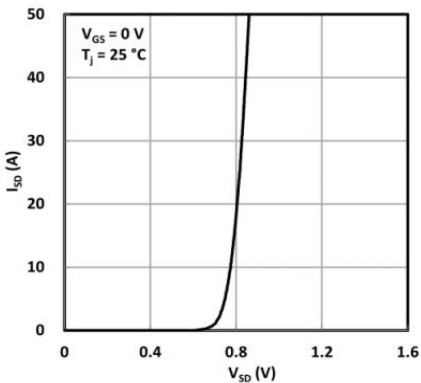


Fig.5 Source-to-drain diode forward characteristics

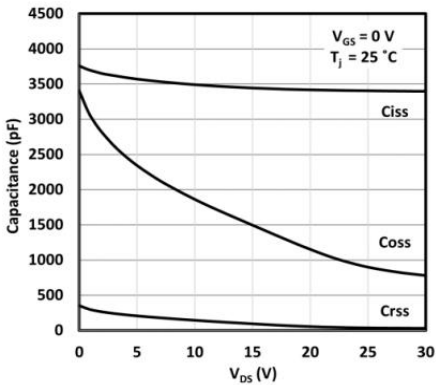


Fig.6 Capacitance vs. drain-to-source voltage

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)

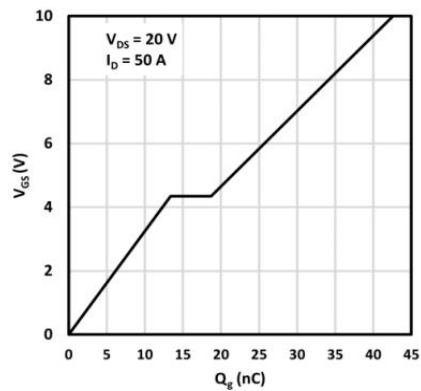


Fig.7 Gate-to-source voltage vs. gate charge

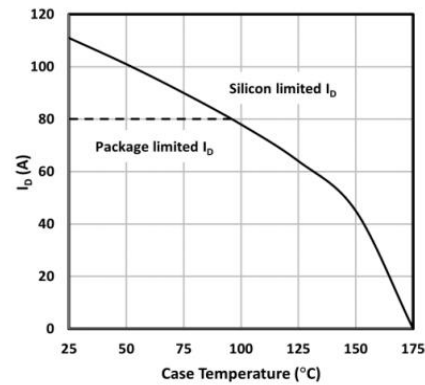


Fig.8 Maximum drain current vs. case temperature

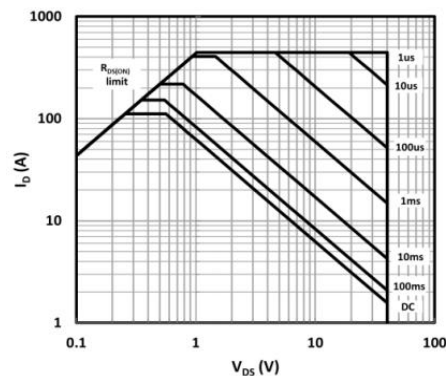


Fig.9 Safe operating area

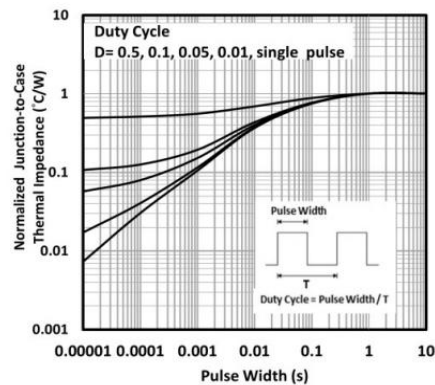


Fig.10 Junction-to-case thermal impedance

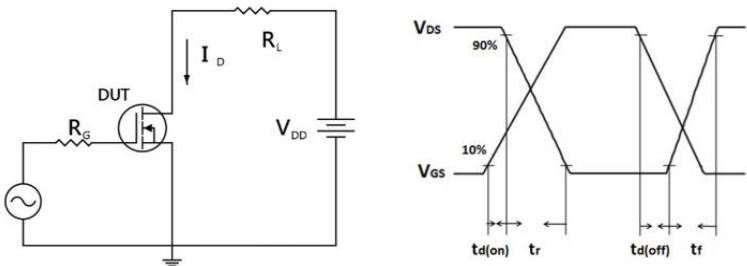
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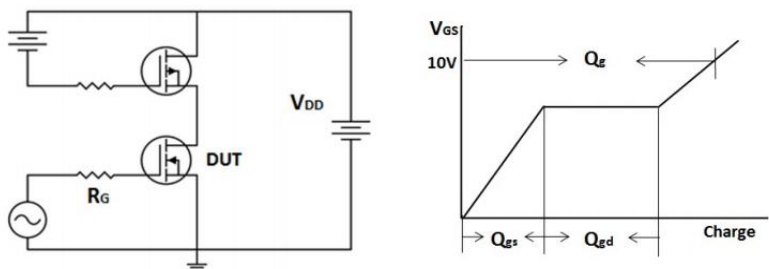


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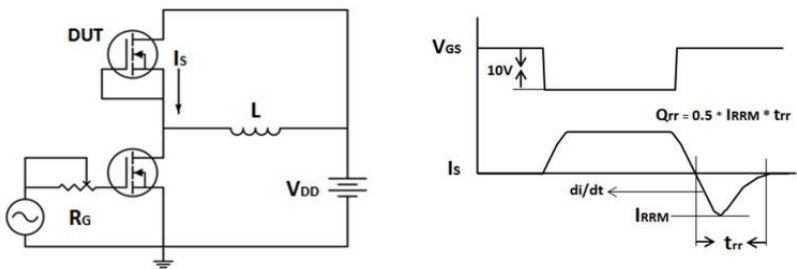
Test Circuits and Waveforms



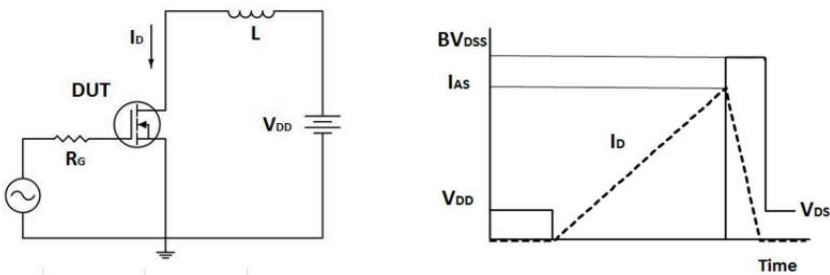
Resistive switching time test circuit & waveforms



Gate charge test circuit & waveform



Peak diode recovery dv/dt test circuit & waveforms

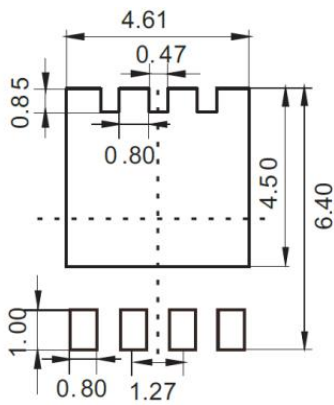
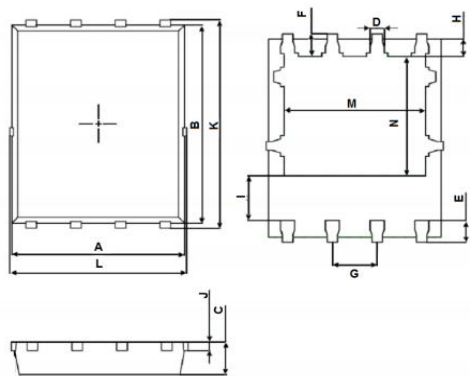


Unclamped inductive switching test circuit & waveforms

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PDFN5*6-8L Package Information



PDFN5×6-8L		
Dimension	Min.	Max.
A	4.824	4.976
B	5.674	5.826
C	0.900	1.000
D	0.350	0.450
E	0.559	0.711
F	0.574	0.726
G	1.250	1.290
H	0.424	0.576
I	1.190	1.390
J	0.154	0.354
K	5.974	6.126
L	4.944	5.096
M	3.910	4.110
N	3.375	3.575