

Description

This is CT120N04ZT uses generation power trench MOSFET technology that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance. This device is well suited for high efficiency fast switching applications.

Features

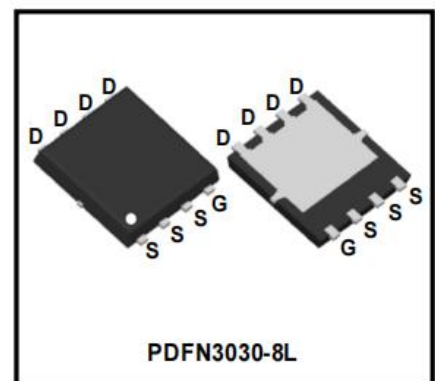
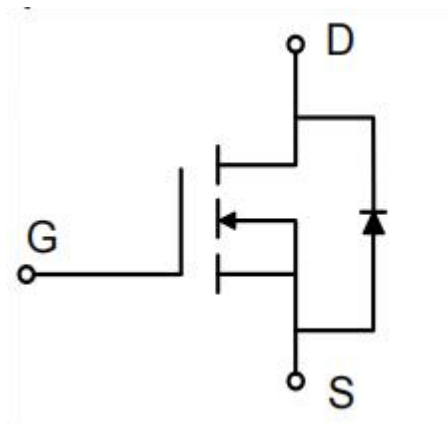
- $V_{DS}=40V$, $I_D=120A$
 $R_{DS(on)} < 2.8m\Omega$ @ $V_{GS} = 10V$
 $R_{DS(on)} < 3.8m\Omega$ @ $V_{GS} = 4.5V$
- Low $R_{DS(on)}$
- Low Gate Charge
- 100% EAS Guaranteed
- RoHS and Halogen-Free Compliant

Mechanical Characteristics

- Power Management in Switches
- DC/DC Converter

V_{DSS}	$R_{DS(on)}$ (typ)	I_D
40V	2.1m Ω	120A

Equivalent Circuit & Pinning



Absolute Maximum Ratings(TA = 25°C, unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T _C =25°C	I_D	120	A
	T _C =100°C		76	
Pulsed Drain Current ¹		I_{DM}	480	A
Single Pulse Avalanche Energy ²		EAS	180	mJ
Total Power Dissipation	T _C =25°C	P_D	65.7	W
Operating Junction and Storage Temperature Range		T_J , T_{STG}	-55 to 150	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Ambient ³	R_{θJA}	60	°C/W
Thermal Resistance from Junction-to-Case	R_{θJC}	1.9	°C/W

Electrical Characteristics ($T_J = 25^\circ\text{C}$, unless otherwise noted)

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	40	-	-	V
Gate-body Leakage Current		I _{GSS}	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T _J =25°C	I _{DSS}	V _{DS} = 40V, V _{GS} = 0V	-	-	1	μA
	T _J =100°C			-	-	100	
Gate-Threshold Voltage		V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1.2	1.7	2.2	V
Drain-Source On-Resistance ⁴		R _{DS(on)}	V _{GS} = 10V, I _D = 20A	-	2.1	2.8	mΩ
			V _{GS} = 4.5V, I _D = 15A	-	2.8	3.8	
Forward Transconductance ⁴		g _{fs}	V _{DS} = 10V, I _D = 20A	-	75	-	S
Dynamic Characteristics ⁵							
Input Capacitance		C _{iss}	V _{DS} = 20V, V _{GS} = 0V, f = 1MHz	-	2625	-	pF
Output Capacitance		C _{oss}		-	560	-	
Reverse Transfer Capacitance		C _{rss}		-	35	-	
Gate Resistance		R _G	f = 1MHz	-	1	-	Ω
Switching Characteristics ⁵							
Total Gate Charge		Q _g	V _{GS} = 10V, V _{DS} = 20V, I _D = 20A	-	42.6	-	nC
Gate-Source Charge		Q _{gs}		-	6.6	-	
Gate-Drain Charge		Q _{gd}		-	7.2	-	
Turn-on Delay Time		t _{d(on)}	V _{GS} = 10V, V _{DD} = 20V, R _G = 3Ω, I _D = 20A	-	9.8	-	ns
Rise Time		t _r		-	8.7	-	
Turn-off Delay Time		t _{d(off)}		-	30.8	-	
Fall Time		t _f		-	10.4	-	
Body Diode Reverse Recovery Time		t _{rr}	I _F =20A , dI/dt=100A/μs	-	46	-	ns
Body Diode Reverse Recovery Charge		Q _{rr}		-	18.4	-	nC
Drain-Source Body Diode Characteristics							
Diode Forward Voltage ⁴		V _{SD}	I _S = 20A, V _{GS} = 0V	-	-	1.2	V
Continuous Source Current	T _C =25°C	I _S	-	-	-	120	A

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)} = 150^\circ\text{C}$.
2. The test condition is $V_{DD} = 25V, V_{GS} = 10V, L = 0.4mH, I_{AS} = 30A$.
3. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
5. This value is guaranteed by design hence it is not included in the production test.

Typical Characteristics

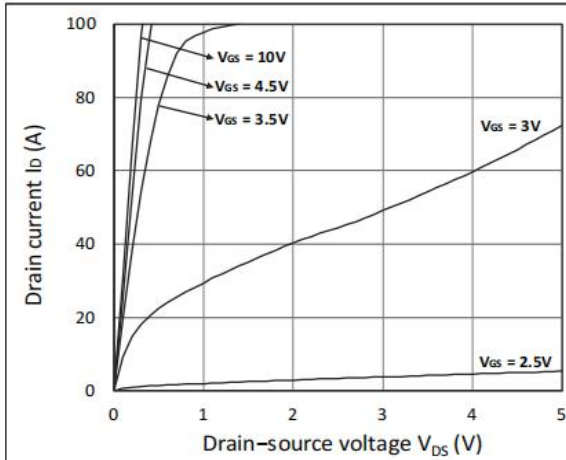


Figure 1. Output Characteristics

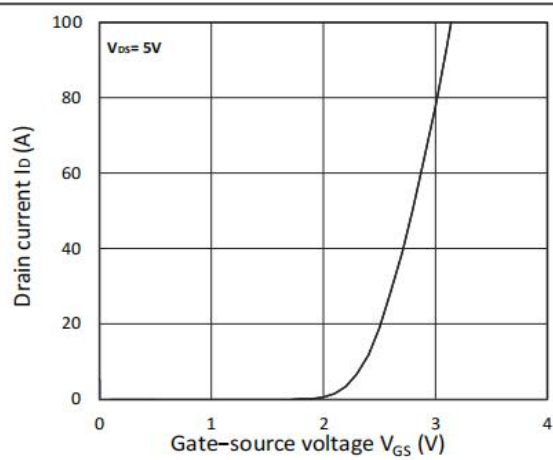


Figure 2. Transfer Characteristics

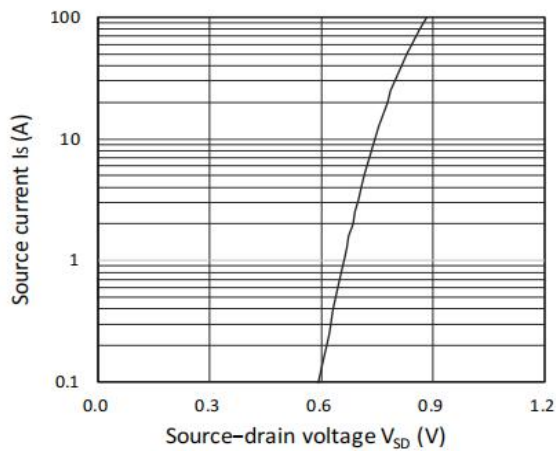


Figure 3. Forward Characteristics of Reverse

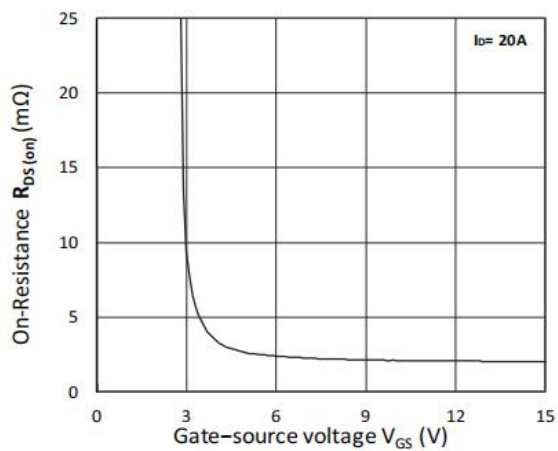


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

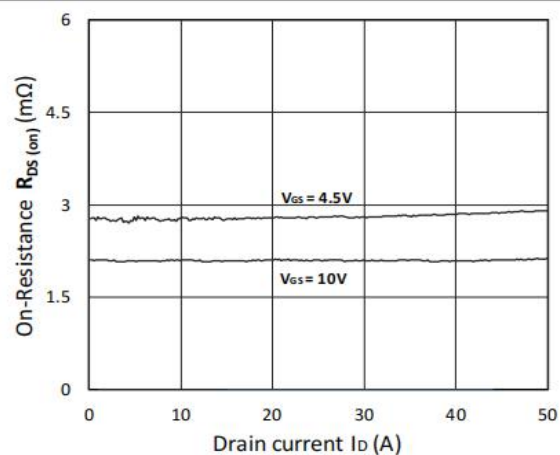


Figure 5. $R_{DS(ON)}$ vs. I_D

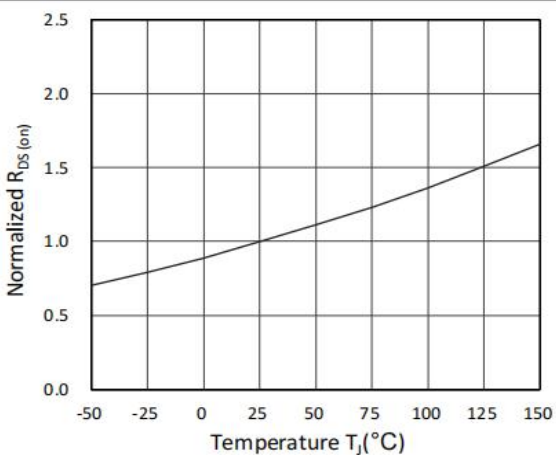


Figure 6. Normalized $R_{DS(ON)}$ vs. Temperature

Typical Characteristics

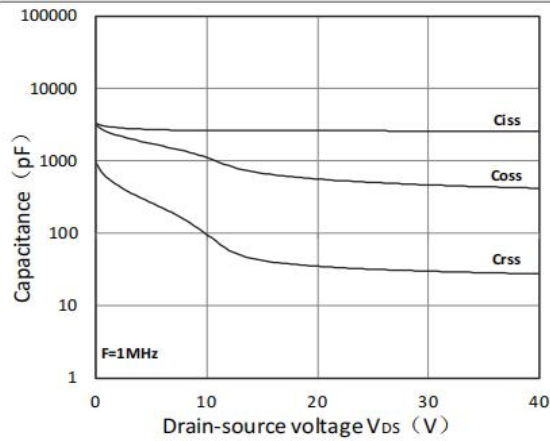


Figure 7. Capacitance Characteristics

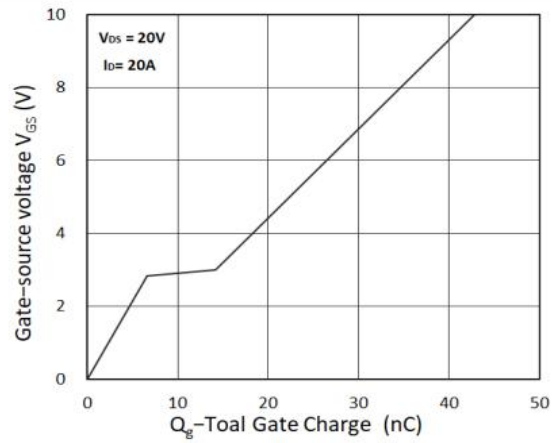


Figure 8. Gate Charge Characteristics

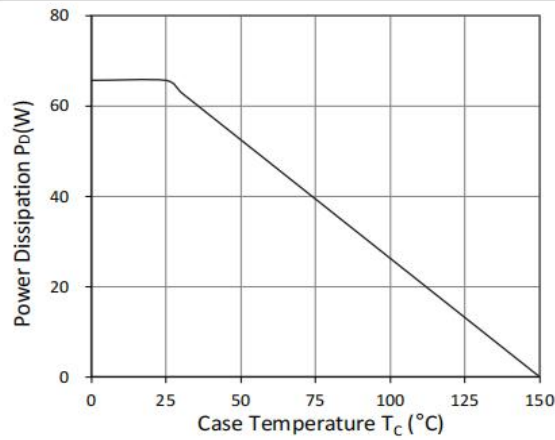


Figure 9. Power Dissipation

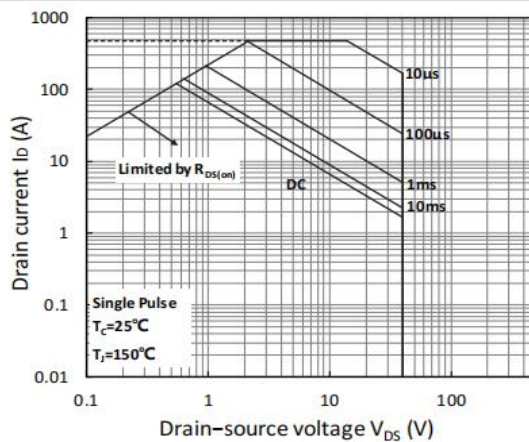


Figure 10. Safe Operating Area

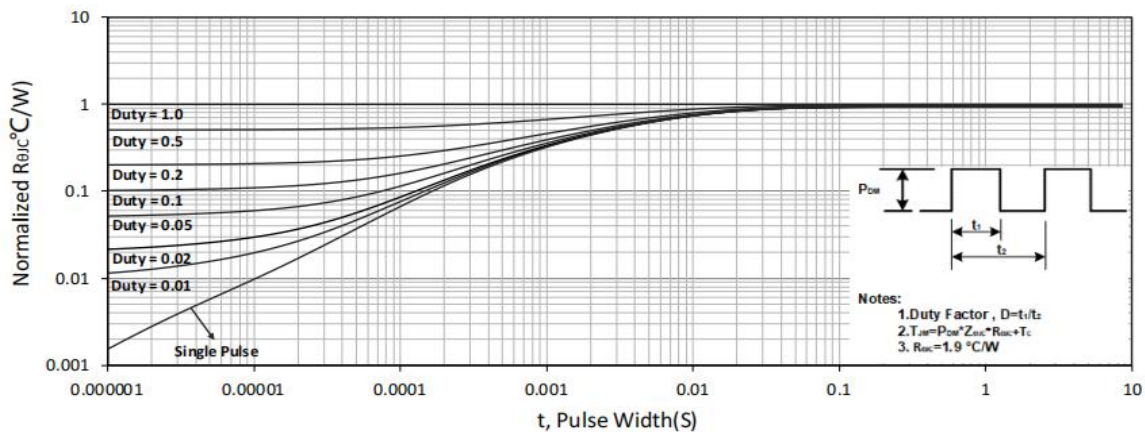


Figure 11. Normalized Maximum Transient Thermal Impedance

Test Circuit

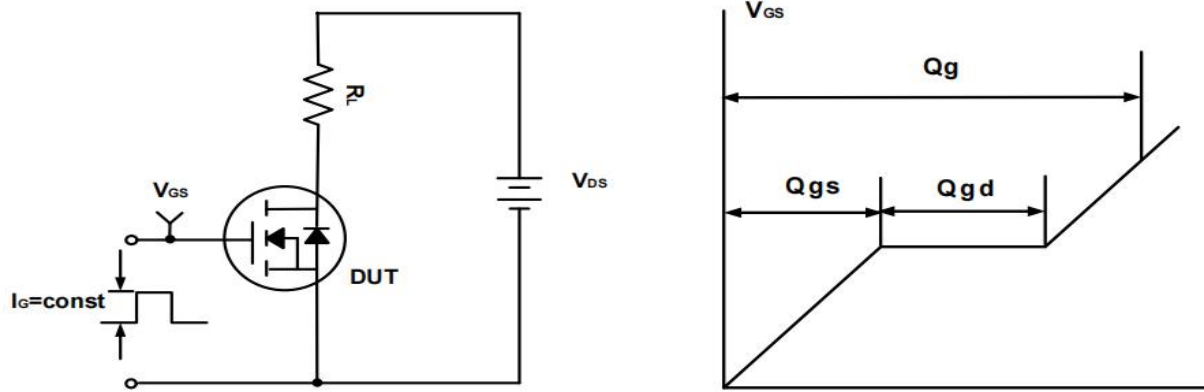


Figure A. Gate Charge Test Circuit & Waveforms

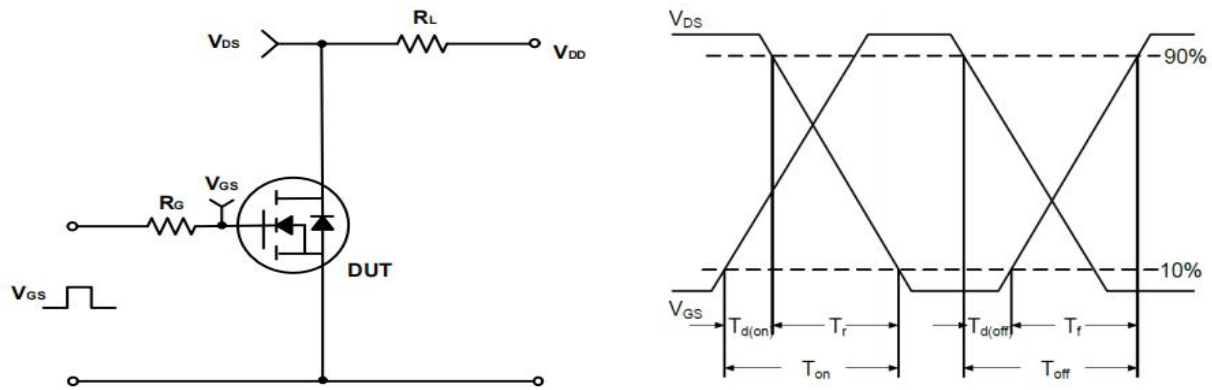


Figure B. Switching Test Circuit & Waveforms

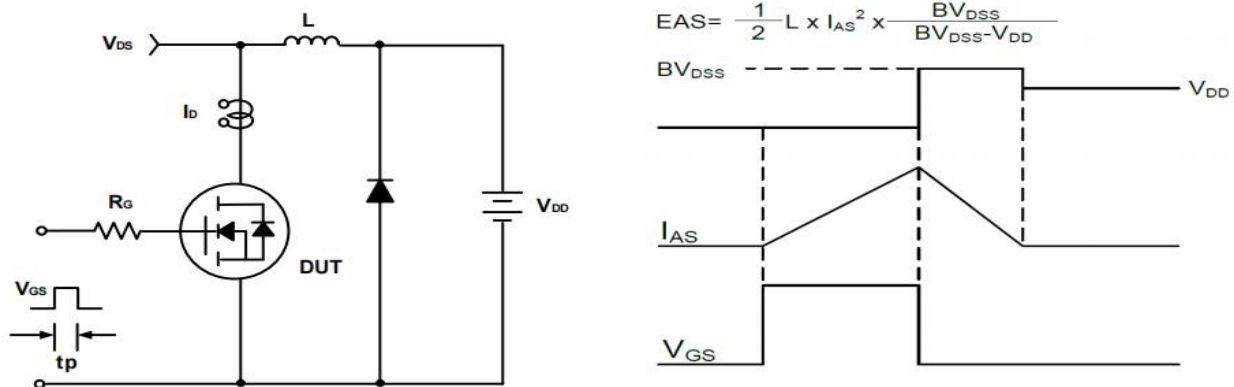
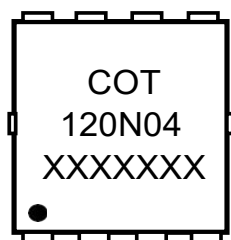


Figure C. Unclamped Inductive Switching Circuit & Waveforms

Marking Codes

Part	Package	Marking	Packing method
CT120N04ZT	PDFN3030-8L	120N04	Tape and Reel

Marking Information



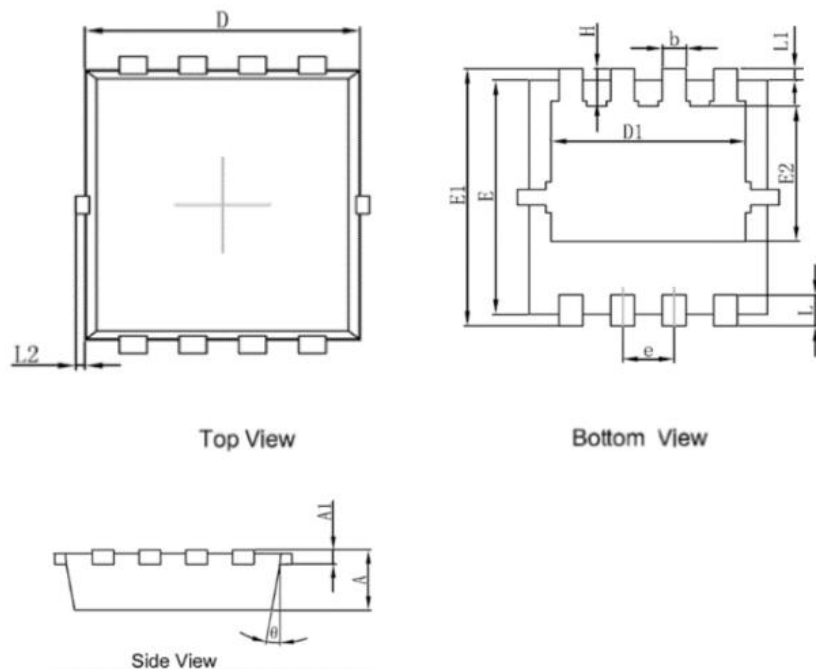
COT= Company Logo

120N04= Device code

XX XXXXX= Date code

Mechanical Dimensions for PDFN3030-8L

COMMON DIMENSIONS



SYMBOL	MM	
	MIN	MAX
A	0.65	0.90
A1	0.10	0.25
D	2.90	3.25
D1	2.25	2.69
E	2.90	3.20
E1	3.00	3.60
E2	1.35	2.20
b	0.20	0.40
e	0.65BSC	
L	0.15	0.50
L1	0.13BSC	
L2	0.00	0.20
H	0.15	0.65
θ	0°	14°