100V N-Channel Enhancement Mode Power MOSFET

Description

EMQ16N10TS uses advanced power trench 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.

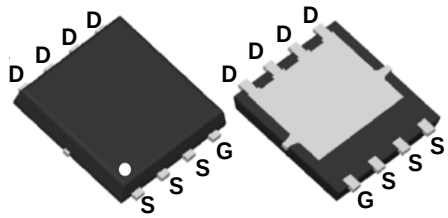
Features

- V_{DS}= 100V, I_D = 16A (T_C=25°C)
  $R_{DS(on)}$ < 57mΩ @ V_{GS} = 10V
  $R_{DS(on)}$ < 80mΩ @ V_{GS} = 4.5V
- 100% EAS Guaranteed

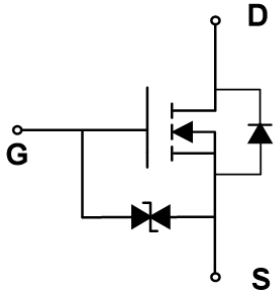
Applications

- Power Management Switches
- DC/DC Converter

Schematic & PIN Configuration



PDFN3030-8L



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

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C=25°C	I_D	16	A
	T_C=100°C		10	
Pulsed Drain Current (1)		I_{DM}	64	A
Single Pulse Avalanche Energy (2)		EAS	14.5	mJ
Total Power Dissipation	T_C=25°C	P_D	27.8	W
Operating Junction and Storage Temperature Range		T_J ,T_{STG}	-55 to +150	°C
ESD Human Body Model		ESD(HBM)	±2000	V
ESD Charged Device Model		ESD(CDM)	±1500	V

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction to Ambient (3)	$R_{\theta JA}$	60	°C/W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	4.5	°C/W

Electrical Characteristics (T_J = 25°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	100	-	-	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} = 100V, 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	2.3	V
Drain-Source on-state Resistance (4)		$R_{DS(on)}$	V_{GS} = 10V, I_D = 10A	-	44.5	57	mΩ
			V_{GS} = 4.5V, I_D = 8A	-	60	80	
Forward Transconductance (4)		g_{fs}	V_{DS} = 10V, I_D = 10A	-	7.5	-	S
Dynamic Characteristics (5)							
Input Capacitance		C_{iss}	V_{DS} = 50V, V_{GS} = 0V, f = 1MHz	-	398	-	pF
Output Capacitance		C_{oss}		-	102	-	
Reverse Transfer Capacitance		C_{rss}		-	4.5	-	
Gate Resistance		R_g	f =1MHz	-	7	-	Ω
Switching Characteristics (5)							
Total Gate Charge		Q_g	V_{GS} = 10V, V_{DS} = 50V, I_D= 10A	-	8.2	-	nC
Gate-Source Charge		Q_{gs}		-	1.4	-	
Gate-Drain Charge		Q_{gd}		-	2.1	-	
Turn-On Delay Time		$t_{d(on)}$	V_{GS} = 10V, V_{DD} = 50V, R_G = 3Ω, I_D= 10A	-	4.2	-	ns
Rise Time		t_r		-	4.9	-	
Turn-Off Delay Time		$t_{d(off)}$		-	13.9	-	
Fall Time		t_f		-	6.4	-	
Body Diode Reverse Recovery Time		t_{rr}	I_F=10A, dI/dt=100A/μs	-	31	-	ns
Body Diode Reverse Recovery Charge		Q_{rr}		-	34.4	-	nC
Drain-Source Body Diode Characteristics							
Body Forward Voltage (4)		V_{SD}	I_S = 10A, V_{GS} = 0V	-	-	1.2	V
Continuous Source Current	T_C=25°C	I_S		-	-	16	A

Note1：Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C

Note2：The test condition is V_{DD}= 25V, V_{GS}=10V, L= 0.4mH, I_{AS}= 8.5A.

Note3：The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.

Note4：The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.

Note5：This value is guaranteed by design hence it is not included in the production test.

Typical Characteristics

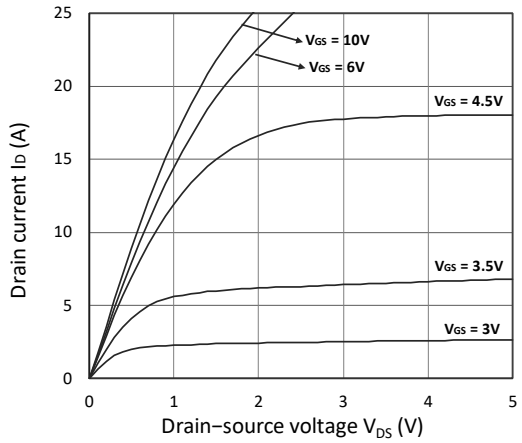


Figure 1. Output Characteristics

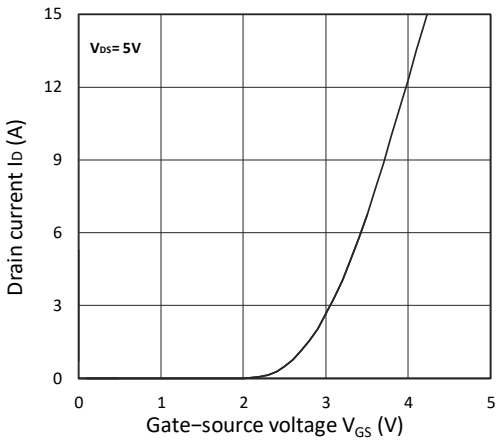


Figure 2. Transfer Characteristics

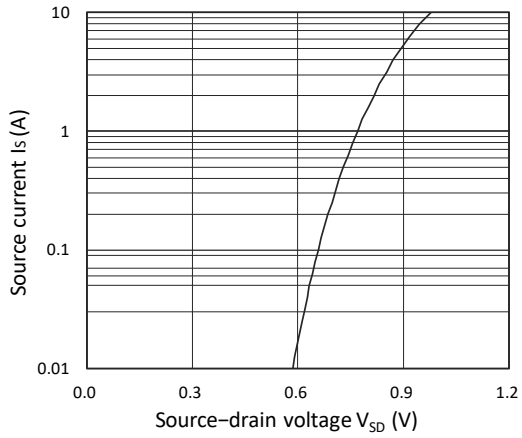


Figure 3. Forward Characteristics of Reverse

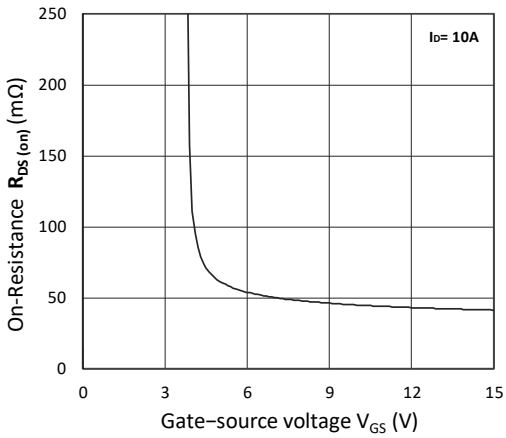


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

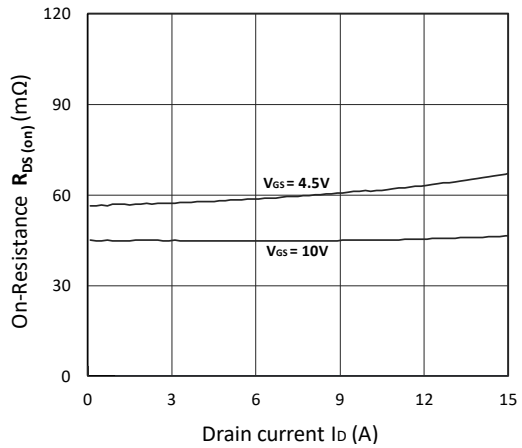


Figure 5. $R_{DS(ON)}$ vs. I_D

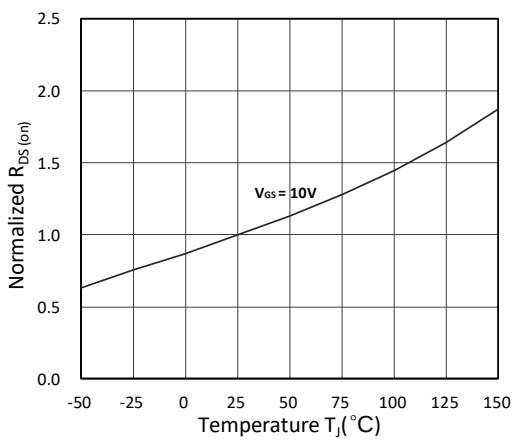


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

Typical Characteristics(Continued)

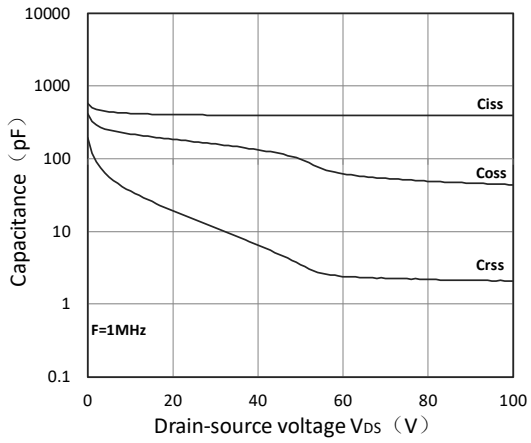


Figure 7. Capacitance Characteristics

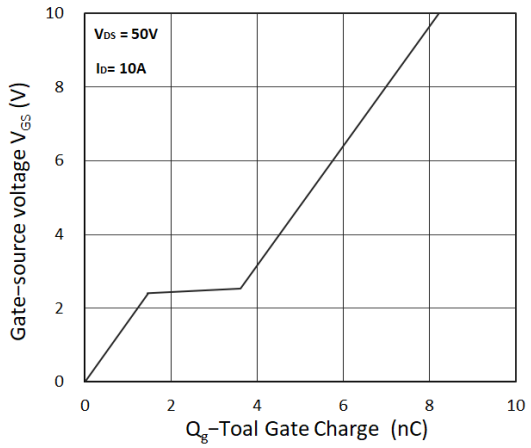


Figure 8. Gate Charge Characteristics

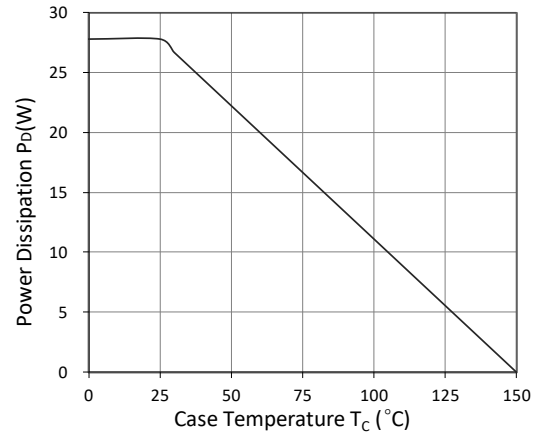


Figure 9. Power Dissipation

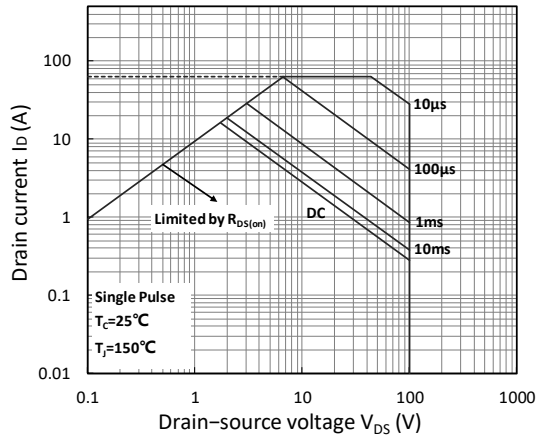


Figure10. Safe Operating Area

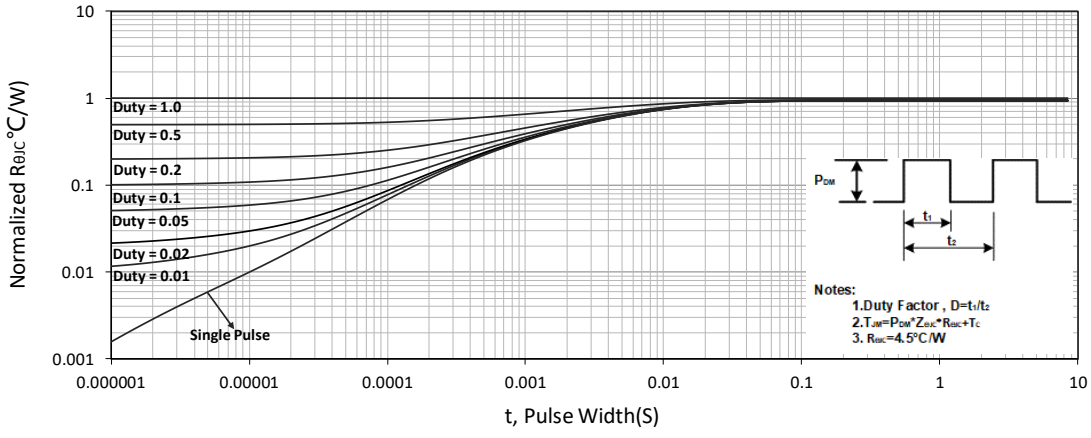


Figure 11. Normalized Maximum Transient Thermal Impedance

Test Circuit

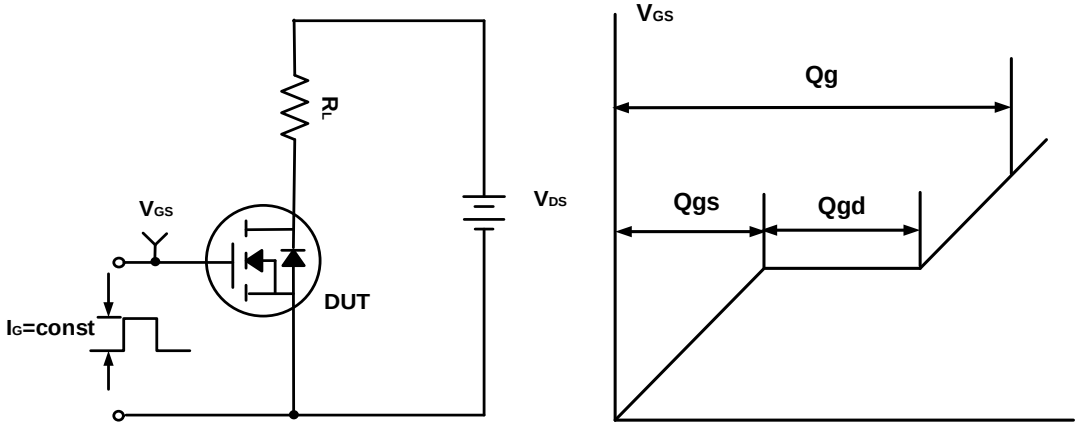


Figure A. Gate Charge Test Circuit & Waveforms

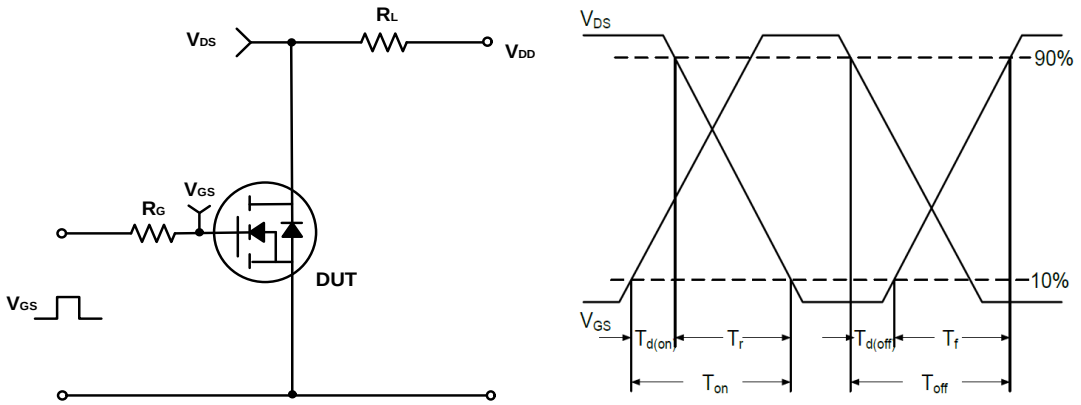


Figure B. Switching Test Circuit & Waveforms

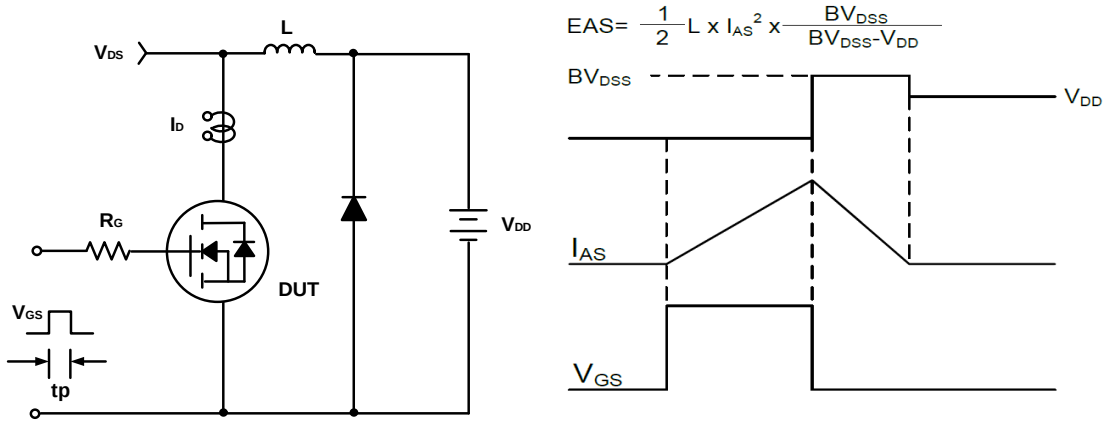
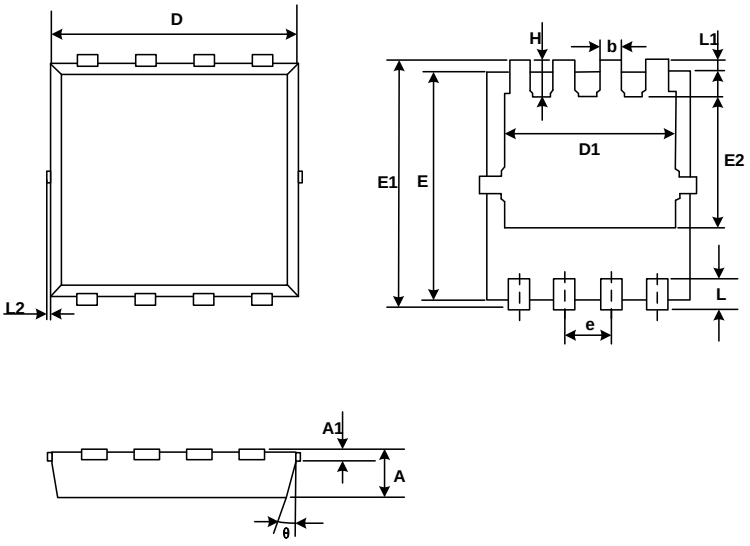


Figure C. Unclamped Inductive Switching Circuit & Waveforms

Package Dimension

PDFN3030-8L



SYMBOL	MILLIMETER	
	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°

Ordering Information

Part	Package	Marking	Packing Information
EMQ16N10TS	PDFN3030-8L	16N10TS	3k/Reel

Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
0.0	2024-03-14	Preliminary Version	Chen Zu Xiong	Qi Shu Kun	Liu Jia Ying
1.0	2024-05-16	Released Version	Chen Zu Xiong	Qi Shu Kun	Liu Jia Ying
1.1	2024-09-18	Official version	Chen Zu Xiong	Qi Shu Kun	Liu Jia Ying