

N-channel Enhancement Mode Power MOSFET

Features

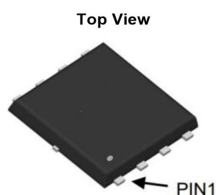
- 100V, 60A
 $R_{DS(ON)} < 13m\Omega @ V_{GS} = 10V$
 $R_{DS(ON)} < 17m\Omega @ V_{GS} = 4.5V$
- Advanced Split Gate Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- AEC-Q101 qualified (Automotive grade with suffix "Q".)
- Expsemi electronics

Applications

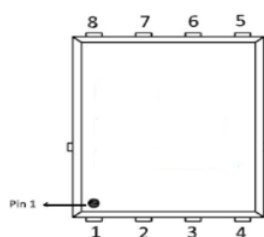
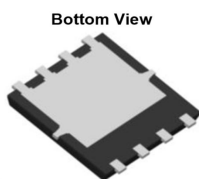
- Load Switch
- PWM Application
- Power Management

100% UIS TESTED!

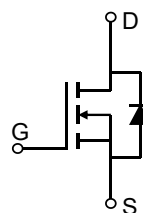
100% ΔV_{ds} TESTED!



PDFN5x6-8L



Marking and Pin Assignment



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	Outline	Package	Reel Size	Reel(pcs)	Per Carton (pcs)
EPS10N13LCQ	10N13L	TAPING	PDFN5x6-8L	13"	5000	50000

Absolute Maximum Ratings (@ $T_C = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter		Value	Units
V_{DS}	Drain-to-Source Voltage		100	V
V_{GS}	Gate-to-Source Voltage		± 20	V
I_D	Continuous Drain Current	$T_C = 25^\circ\text{C}$	60	A
		$T_C = 100^\circ\text{C}$	36	
I_{DM}	Pulsed Drain Current ⁽¹⁾		240	A
E_{AS}	Single Pulsed Avalanche Energy ⁽²⁾		64	mJ
P_D	Power Dissipation	$T_C = 25^\circ\text{C}$	52	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		2.4	$^\circ\text{C/W}$
T_J, T_{STG}	Junction & Storage Temperature Range		-55 to 150	$^\circ\text{C}$

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	I _D = 250μA, V _{GS} = 0V	100	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 100V, V _{GS} = 0V	-	-	1.0	μA
I _{GSS}	Gate-Body Leakage Current	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	1.0	1.7	2.5	V
R _{DS(ON)}	Static Drain-Source ON-Resistance ⁽⁴⁾	V _{GS} = 10V, I _D = 30A	-	10	13	mΩ
		V _{GS} = 4.5V, I _D = 25A	-	13	17	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{GS} = 0V, V _{DS} = 25V, f = 1MHz	-	1500	-	pF
C _{oss}	Output Capacitance		-	840	-	pF
C _{rss}	Reverse Transfer Capacitance		-	30	-	pF
Q _g	Total Gate Charge	V _{GS} = 0 to 10V V _{DS} = 50V, I _D = 15A	-	35	-	nC
Q _{gs}	Gate Source Charge		-	4.5	-	nC
Q _{gd}	Gate Drain("Miller") Charge		-	8	-	nC
Switching Characteristics						
t _{d(on)}	Turn-On DelayTime	V _{GS} = 10V, V _{DD} = 30V I _D = 15A, R _{GEN} = 3Ω	-	16	-	ns
t _r	Turn-On Rise Time		-	13	-	ns
t _{d(off)}	Turn-Off DelayTime		-	37	-	ns
t _f	Turn-Off Fall Time		-	17	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	60	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	240	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} = 0V, I _S = 30A	-	-	1.2	V

- Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
 2. E_{AS} condition: Starting $T_J = 25^{\circ}\text{C}$, $V_{DD} = 30\text{V}$, $V_G = 10\text{V}$, $R_G = 25\text{ohm}$, $L = 0.5\text{mH}$, $I_{AS} = 35\text{A}$
 3. $R_{\theta JA}$ is measured with the device mounted on a 1inch^2 pad of 2oz copper FR4 PCB
 4. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 0.5\%$.

Test Circuit

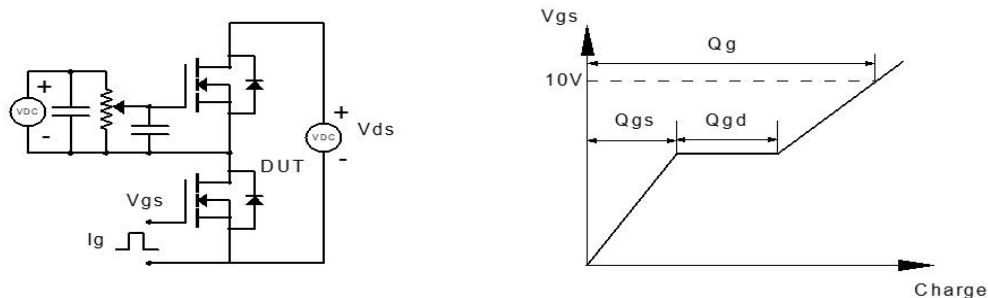


Figure 1: Gate Charge Test Circuit & Waveform

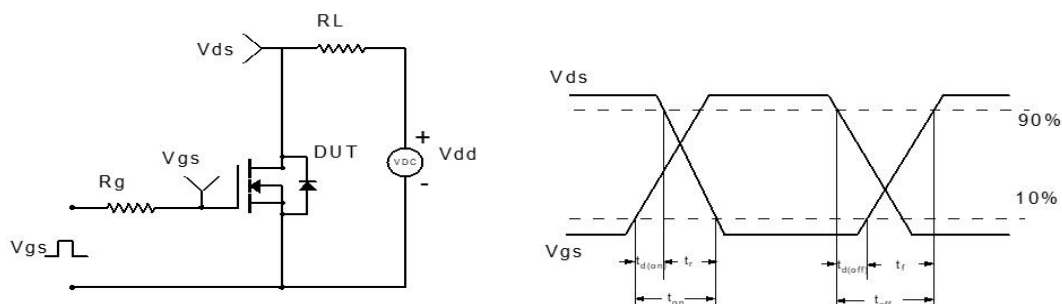


Figure 2: Resistive Switching Test Circuit & Waveform

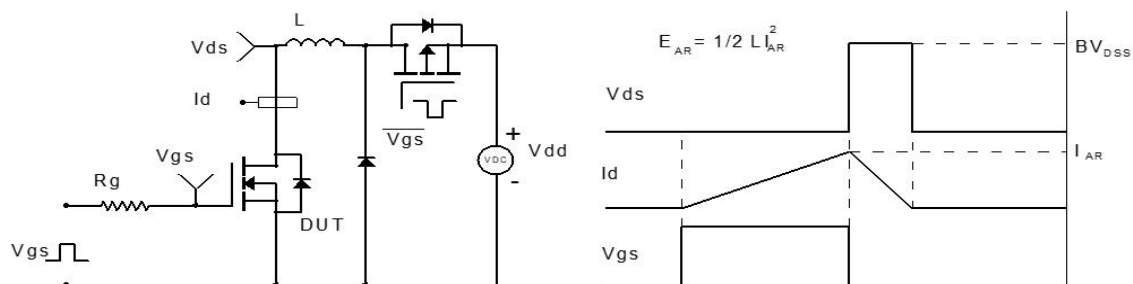


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

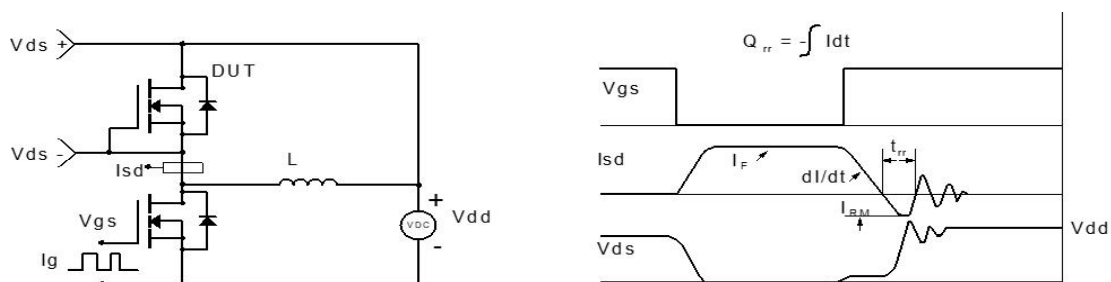
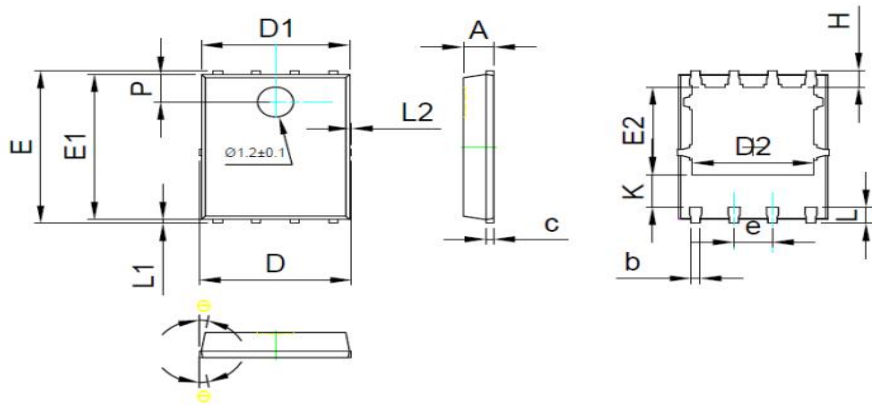


Figure 4: Diode Recovery Test Circuit & Waveform

Package Mechanical Data(PDFN5X6)



COMMON DIMENSIONS
(UNITS OF MEASURE = MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.90	1.00	1.10
b	0.20	0.30	0.40
c	0.21	0.25	0.34
D	-	-	5.10
D1	4.80	4.90	5.00
D2	3.91	4.01	4.11
e	1.27 BSC		
E	5.90	6.00	6.10
E1	5.65	5.75	5.85
E2	3.375	3.475	3.575
H	0.55	0.65	0.75
h	-	-	0.10
K	1.20	-	-
L	0.55	0.65	0.75
L1	0.05	0.15	0.25
L2	-	-	0.12
Ø	8°	10°	12°
P	1.00	1.10	1.20