

N-Channel 40V(D-S) MOSFET

Product summary		
V_{DS}	40	V
$R_{DS(ON)}$ (at $V_{GS}=10V$) Typ.	1.35	m Ω
I_D ($T_C=25^\circ C$)	130	A

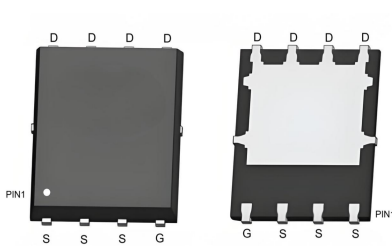
Features

- High density cell design for low $R_{DS(ON)}$
- Split gate trench MOSFET technology

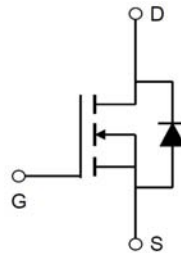
Applications

- Motor control
- Invertors

Pin Configuration



PDFN5X6-8L



Packing Information

Device	Package	Reel Size	Quantity(Min. Package)
ECAP130N04A	PDFN5X6-8L	13"	5000pcs

Absolute Maximum Ratings (at $T_A=25^\circ C$ Unless Otherwise Noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_C=25^\circ C$	130 A
		$T_C=100^\circ C$	82 A
I_{DM}	Pulse Drain Current Tested ^A	390	A
E_{AS}	Single Pulse Avalanche Energy ^B	720	mJ
P_D	Power Dissipation @ $T_C=25^\circ C$ ^C	115	W
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to +150	$^\circ C$

Thermal Characteristics

Symbol	Parameter	Typical	Units
$R_{\theta JA}$	Thermal Resistance-Junction to ambient ^D	50	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance-Junction to case max ^D	1.09	$^\circ C/W$

Electrical Characteristics (at $T_J = 25^\circ\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
Static Parameters						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	40	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=30V, V_{GS}=0V$	--	--	1	μA
I_{GSS}	Gate-Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$	--	--	± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.8	2.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	$V_{GS}=10V, I_D=20A$	--	1.35	1.5	m Ω
		$V_{GS}=4.5V, I_D=20A$	--	1.85	2.3	m Ω
V_{SD}	Diode Forward Voltage	$I_S=20A, V_{GS}=0V$	--	--	1.3	V
I_S	Maximum Body-Diode Continuous Current		--	--	130	A
R_G	Gate Resistance	f=1MHz	--	2.6	--	Ω
Dynamic Parameters ^E						
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=25V$ f=1MHz	--	7100	--	pF
C_{oss}	Output Capacitance		--	1900	--	pF
C_{riss}	Reverse Transfer Capacitance		--	130	--	pF
Q_g	Total Gate Charge	$V_{DS}=20V, I_D=20A$ $V_{GS}=10V$	--	134.7	--	nC
Q_{gs}	Gate-Source Charge		--	26.7	--	nC
Q_{gd}	Gate-Drain Charge		--	24.5	--	nC
$t_{D(on)}$	Turn-on Delay Time	$V_{DD}=20V$ $I_D=20A, R_G=2.2\Omega,$ $V_{GS}=10V$	--	22.5	--	ns
t_r	Turn-on Rise Time		--	86.1	--	ns
$t_{D(off)}$	Turn-off Delay Time		--	114.2	--	ns
t_f	Turn-off Fall Time		--	97.2	--	ns
t_{rr}	Reverse recovery time	$I_F=20A,$ di/dt=100 A/uS	--	59	--	ns
Q_{rr}	Reverse recovery charge		--	65.7	--	μC

A. Repetitive rating; pulse width limited by max. junction temperature.

B. The EAS data shows Max. rating . The test condition is $V_{DD}=25V, R_g=25\Omega, L=3mH, I_{AS}=32A$.

C. P_D is based on max. junction temperature, using junction-case thermal resistance.

D. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.

E. Guaranteed by design, not subject to production testing.

Typical Characteristics

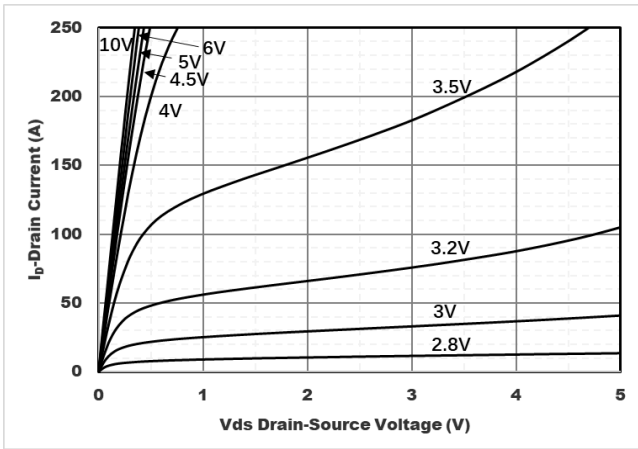


Figure1. Output Characteristics

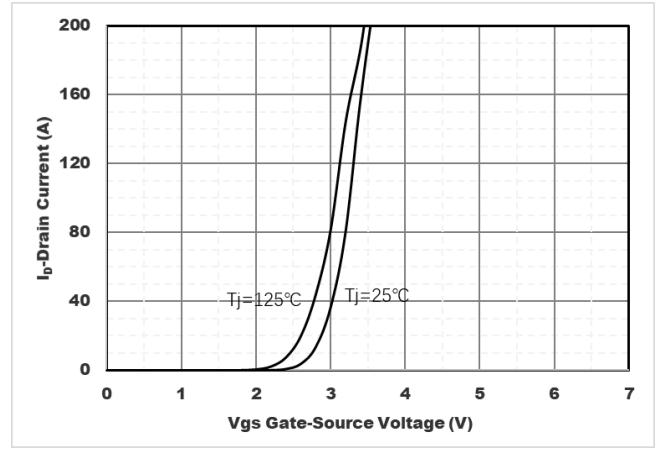


Figure2. Transfer Characteristics

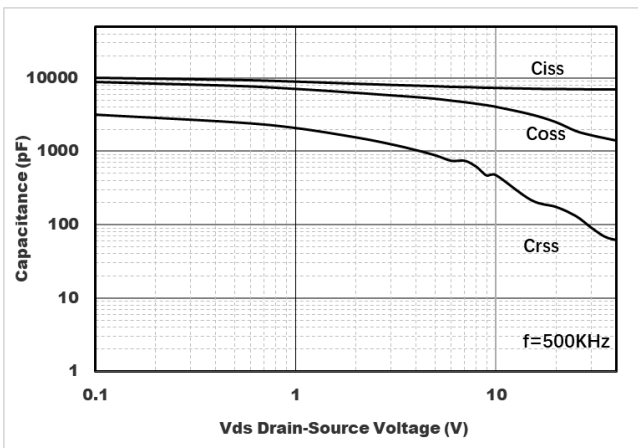


Figure3. Capacitance Characteristics

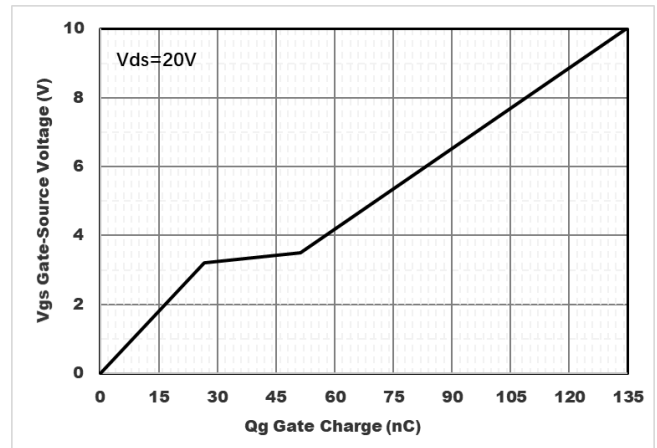


Figure4. Gate Charge

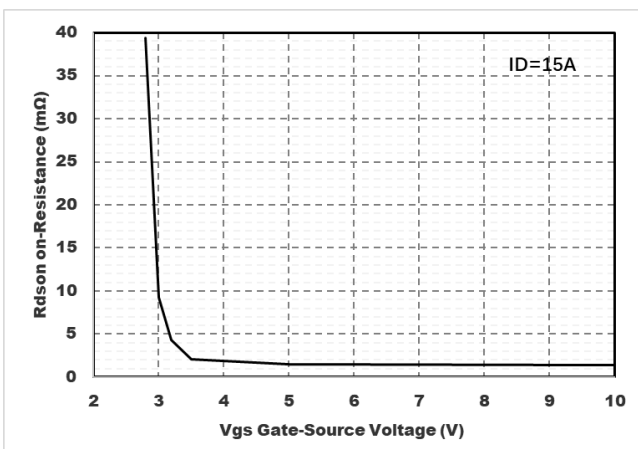


Figure5. : On-Resistance vs. Drain Current and Gate Voltage

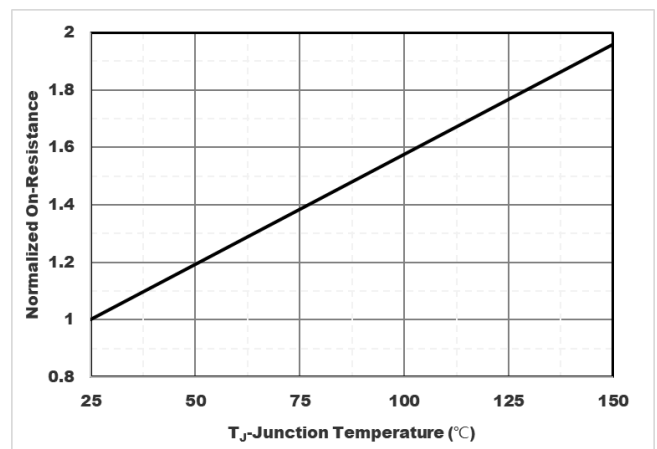


Figure6. Normalized On-Resistance

Typical Characteristics

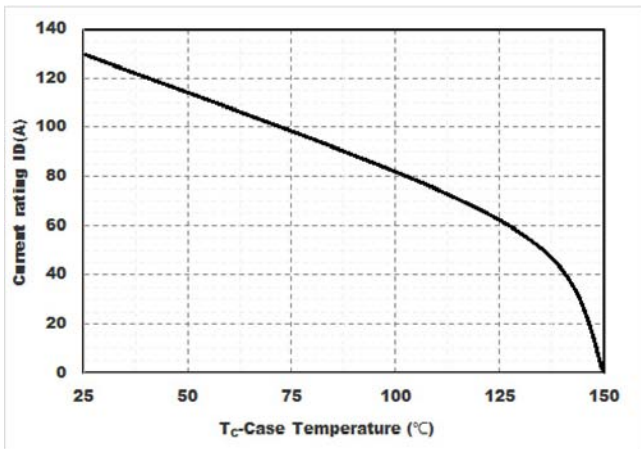


Figure7. Drain current

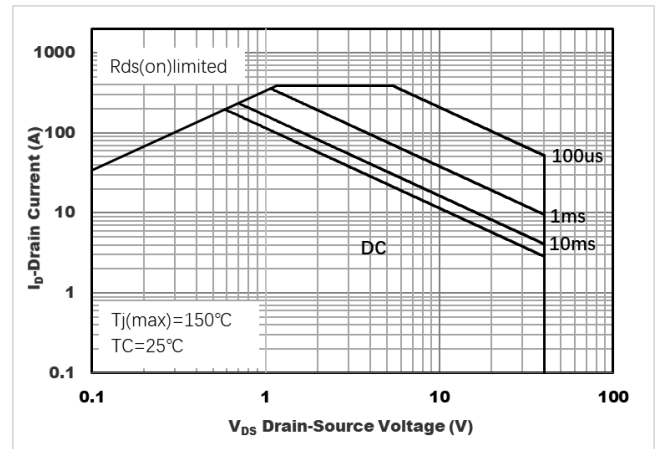


Figure8.Safe Operation Area

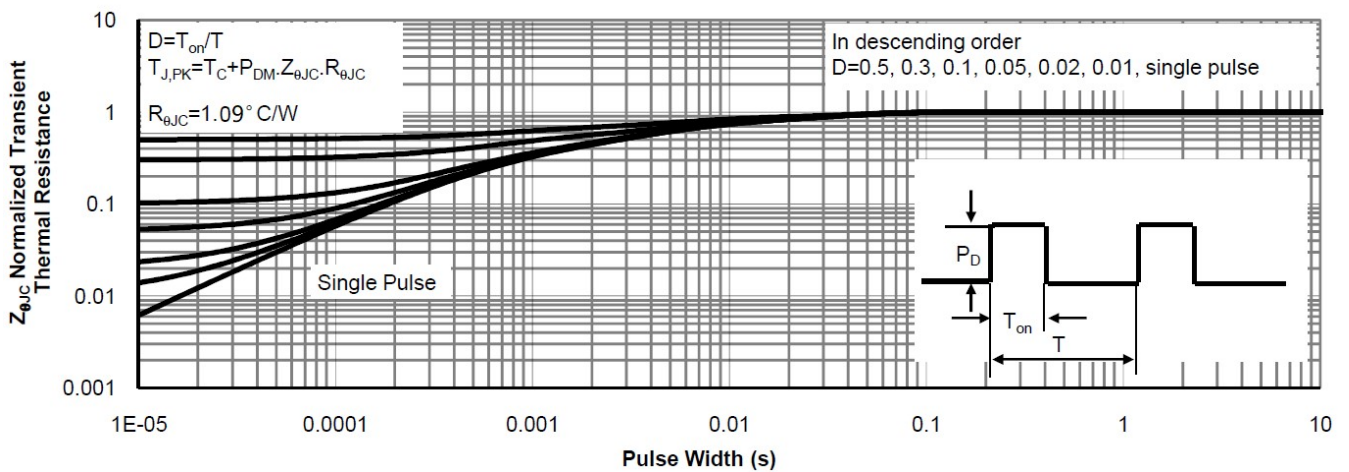
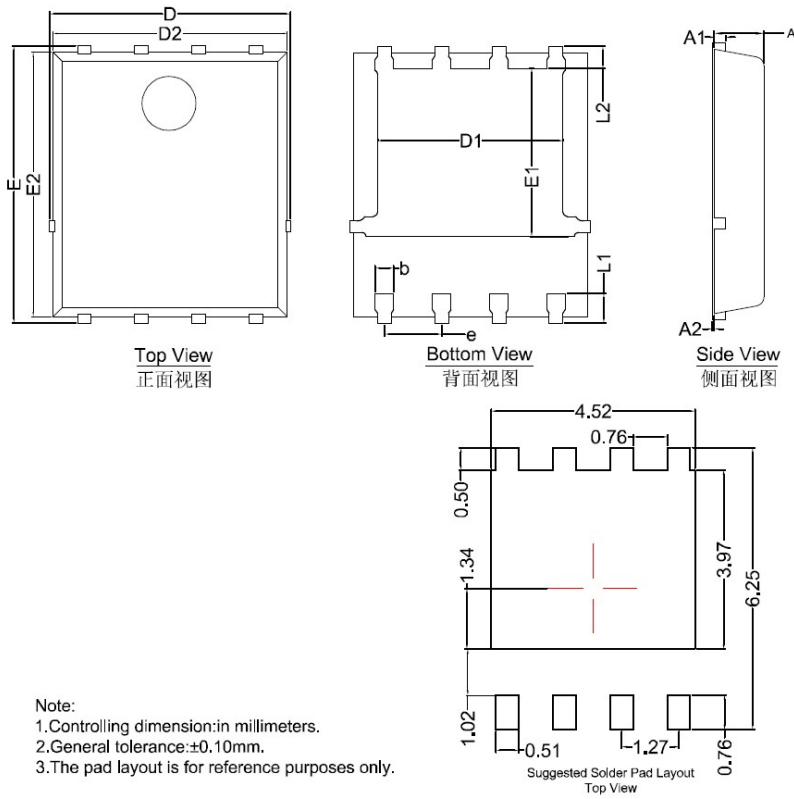


Figure9.Normalized Maximum Transient thermal impedance

PDFN5X6-8L Package Information



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
D	5.15	5.35	5.55
E	5.95	6.15	6.35
A	1.00	1.10	1.20
A1	0.254 BSC		
A2			0.10
D1	3.92	4.12	4.32
E1	3.52	3.72	3.92
D2	5.00	5.20	5.40
E2	5.66	5.86	6.06
L1	0.56	0.66	0.76
L2	0.50 BSC		
b	0.31	0.41	0.51
e	1.27 BSC		

Note:
 1. Controlling dimension: in millimeters.
 2. General tolerance: ± 0.10 mm.
 3. The pad layout is for reference purposes only.