

N-Channel 30V(D-S) MOSFET

Product summary

V_{DS}	30	V
$R_{DS(ON)}$ (at $V_{GS}=10V$) Typ.	5.5	m Ω
I_D ($T_C=25^{\circ}C$)	40	A

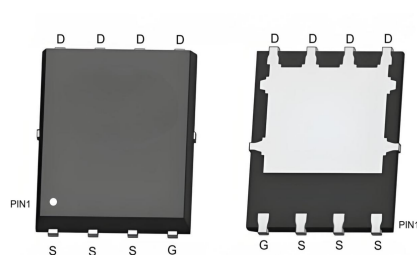
Features

- High density cell design for low $R_{DS(ON)}$
- Trench Power LV MOSFET technology

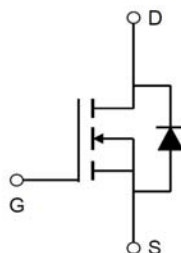
Applications

- Power management functions
- Load switching

Pin Configuration



PDFN5X6-8L



Packing Information

Device	Package	Reel Size	Quantity(Min. Package)
ECAP40N03A	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		30	V
V _{GS}	Gate-Source Voltage		±20	V
I _D	Continuous Drain Current ^A	T _C =25°C	40	A
		T _C =100°C	25	A
I _{DM}	Pulse Drain Current Tested ^B		140	A
E _{AS}	Single Pulse Avalanche Energy ^C		56	mJ
P _D	Power Dissipation @T _C =25°C		21	W
T _J ,T _{STG}	Junciton and Storage Temperature Range		-55 to +150	°C

Thermal Characteristics

Symbol	Parameter	Typical	Units
$R_{\theta JA}$	Thermal Resistance-Junction to ambient ^A	25	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance-Junction to case max	6	$^{\circ}C/W$

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	$V_{GS}=0V, I_D=250\mu A$	30	--	--	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	1.5	2.5	V
$R_{DS(on)}$	Drain-Source On-State Resistance ^B	$V_{GS}=10V, I_D=15A$	--	5.5	7.5	m Ω
		$V_{GS}=4.5V, I_D=12A$	--	9.5	11.5	m Ω
V_{SD}	Forward Voltage	$I_S=15A, V_{GS}=0V$	--	--	1.2	V
I_S	Maximum Body-Diode Continuous Current		--	--	40	A
Dynamic Parameters ^D						
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=15V$ $f=1\text{MHz}$	--	1015	--	pF
C_{oss}	Output Capacitance		--	201	--	pF
C_{rss}	Reverse Transfer Capacitance		--	164	--	pF
Q_g	Total Gate Charge	$V_{DS}=15V, I_D=15A$ $V_{GS}=10V$	--	23.6	--	nC
Q_{gs}	Gate-Source Charge		--	3.9	--	nC
Q_{gd}	Gate-Drain Charge		--	7	--	nC
$t_{D(on)}$	Turn-on Delay Time	$V_{DD}=20V$ $I_D=2A, R_G=3\Omega,$ $R_L=1\Omega, V_{GS}=10V$	--	7	--	ns
t_r	Turn-on Rise Time		--	19	--	ns
$t_{D(off)}$	Turn-off Delay Time		--	24	--	ns
t_f	Turn-off Fall Time		--	24	--	ns
t_{rr}	Reverse recovery time	$I_S=25A,$ $di/dt=100\text{ A/uS}$	--	0.2	--	ns
Q_{rr}	Reverse recovery charge		--	5	--	nC

A. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.

B. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

C. The EAS data shows Max. rating . The test condition is $V_{DD}=20V, V_{GS}=10V, L=0.5\text{mH}, R_G=25\Omega, T_J=25^\circ\text{C}$.

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

Typical Characteristics

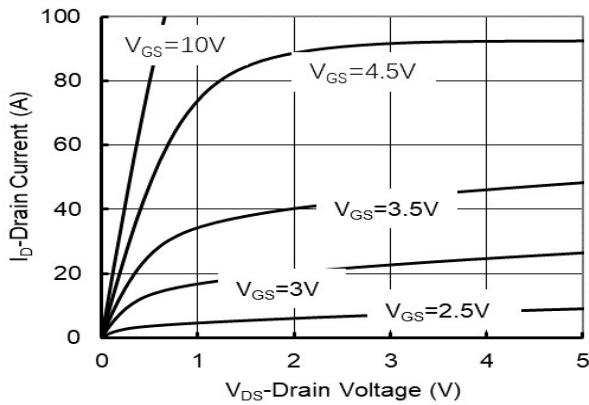


Figure1. Output Characteristics

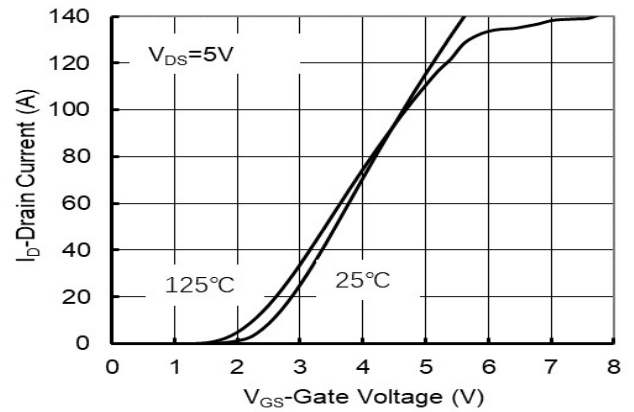


Figure2. Transfer Characteristics

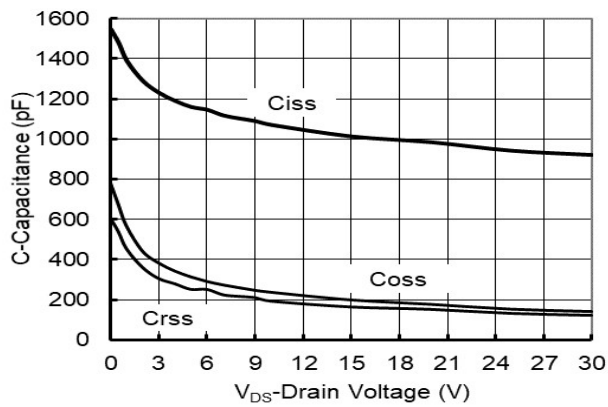


Figure3. Capacitance Characteristics

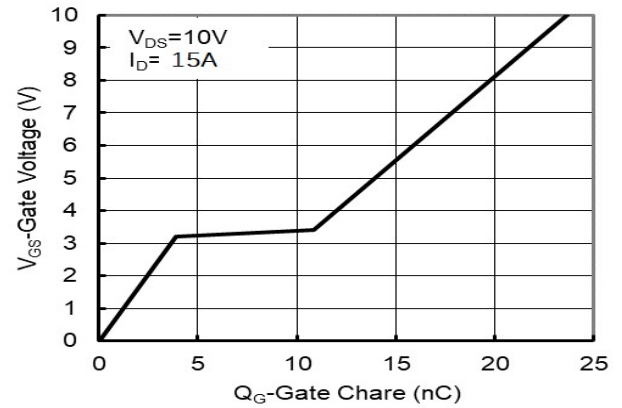


Figure4. Gate Charge

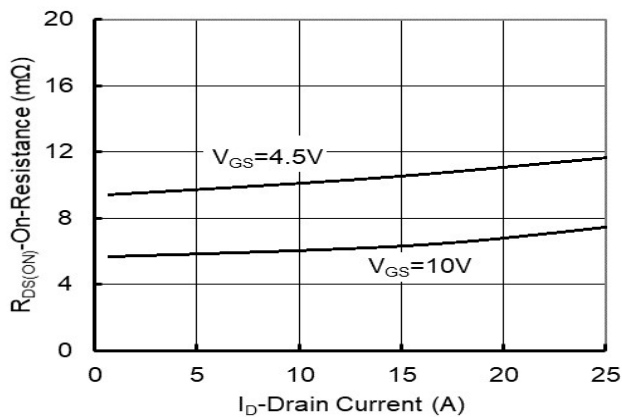


Figure5. Drain-Source on Resistance

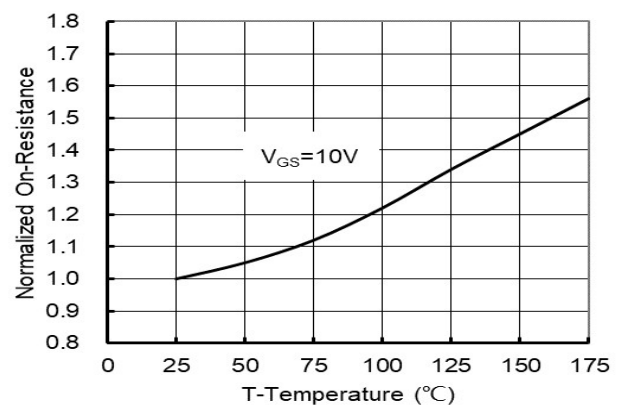


Figure6. Drain-Source on Resistance

Typical Characteristics

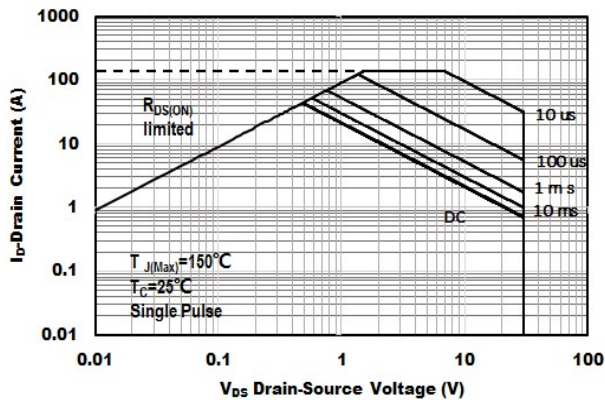


Figure7. Safe Operation Area

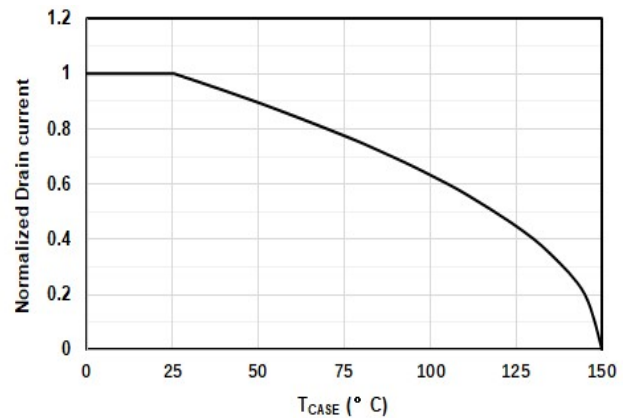


Figure8. Drain current vs. Case Temperature

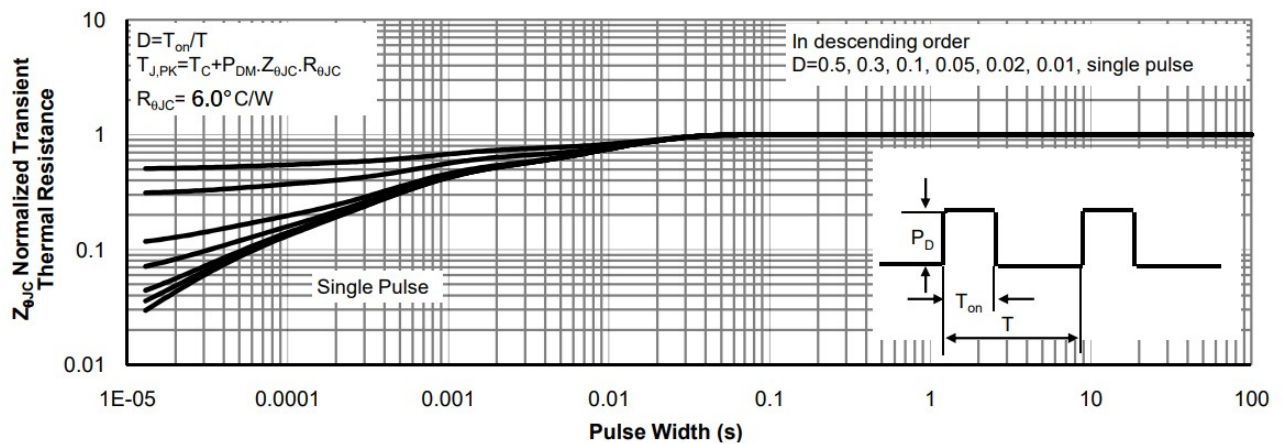
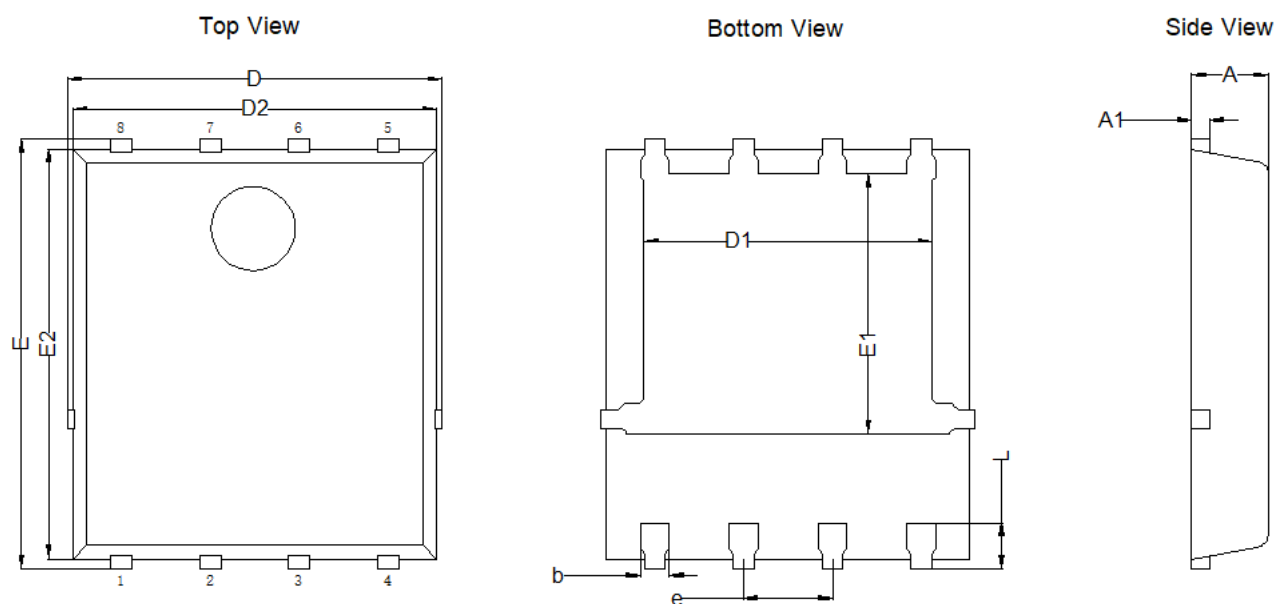


Figure 9. Normalized Maximum Transient Thermal Impedance

PDFN5X6-8L Package Information



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	1.00	1.10	1.20
A1	0.254 BSC		
D	5.15	5.35	5.55
E	5.95	6.15	6.35
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
e	1.27BSC		
b	0.31	0.41	0.51
L	0.56	0.66	0.76