

N-Channel 30V(D-S) MOSFET

Product summary		
V_{DS}	30	V
$R_{DS(ON)}$ (at $V_{GS}=10V$) Typ.	5	m Ω
I_D ($T_C=25^\circ C$)	52	A

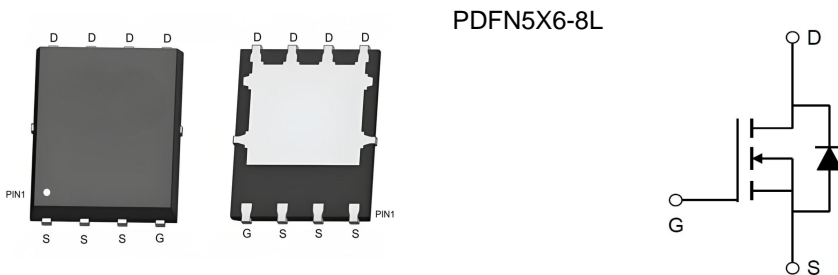
Features

- High density cell design for low $R_{DS(ON)}$
- Simple Drive Requirement
- Fast Switching Characteristic

Applications

- Power management functions

Pin Configuration



Packing Information

Device	Package	Reel Size	Quantity(Min. Package)
ECAP52N03S	PDFN5X6-8L	13"	3000pcs

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 at $V_{GS}=10V^A$	$T_C=25^\circ C$	52 A
		$T_C=100^\circ C$	33 A
I_{DM}	Pulse Drain Current Tested ^B	125	A
E_{AS}	Single Pulse Avalanche Energy ^C	28.8	mJ
P_D	Power Dissipation @ $T_C=25^\circ C$	27	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 ^A	50	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance-Junction to case ^A	4.6	$^\circ C/W$

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	$V_{DS}=24V, V_{GS}=0V$	--	--	1	μA
I_{GSS}	Gate-Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$	--	--	± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2	--	2.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance ^B	$V_{GS}=10V, I_D=20A$	--	5	6.3	m Ω
		$V_{GS}=4.5V, I_D=15A$	--	7	8.5	m Ω
V_{SD}	Forward Voltage	$I_S=1A, V_{GS}=0V$	--	--	1	V
I_S	Continuous Diode Forward Current		--	--	30	A
Dynamic Parameters ^D						
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=15V$ $f=1\text{MHz}$	--	814	977	pF
C_{oss}	Output Capacitance		--	498	598	pF
C_{rss}	Reverse Transfer Capacitance		--	41	49	pF
Q_g	Total Gate Charge	$V_{DS}=15V, I_D=15A$ $V_{GS}=4.5V$	--	8	9.6	nC
Q_{gs}	Gate-Source Charge		--	2.4	2.9	nC
Q_{gd}	Gate-Drain Charge		--	3.2	3.8	nC
$t_{D(on)}$	Turn-on Delay Time	$V_{DD}=15V$ $I_D=15A, R_G=3.3\Omega,$ $V_{GS}=10V$	--	7.1	8.5	nS
t_r	Turn-on Rise Time		--	40	48	nS
$t_{D(off)}$	Turn-off Delay Time		--	15	18	nS
t_f	Turn-off Fall Time		--	6	7.2	nS

A. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ 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 $V_{DD}=25V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=24A$.

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

Typical Characteristics

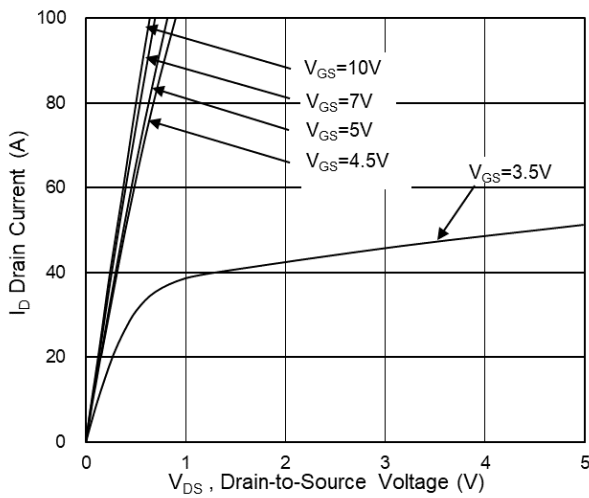


Fig.1 Typical Output Characteristics

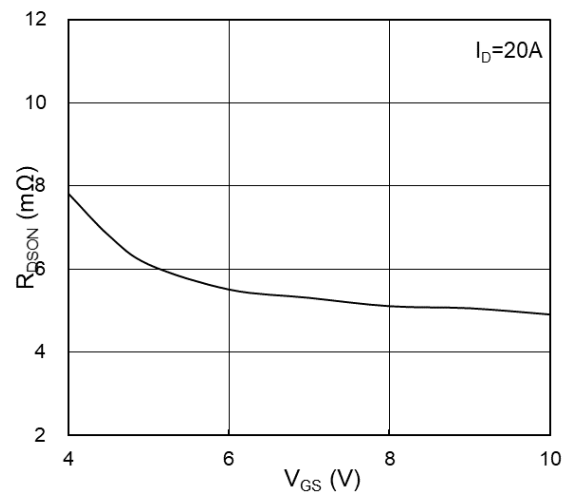


Fig.2 On-Resistance vs G-S Voltage

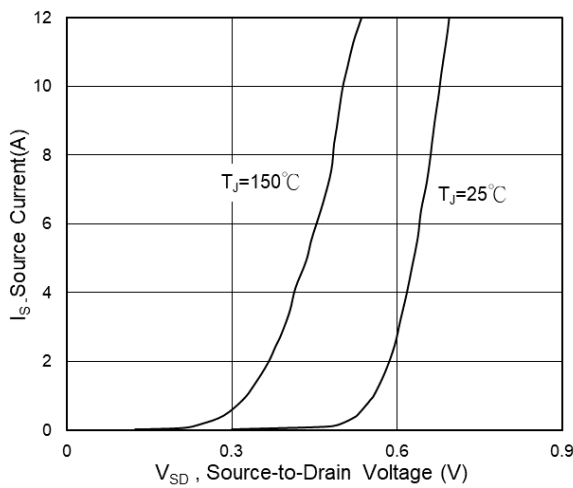


Fig.3 Source Drain Forward Characteristics

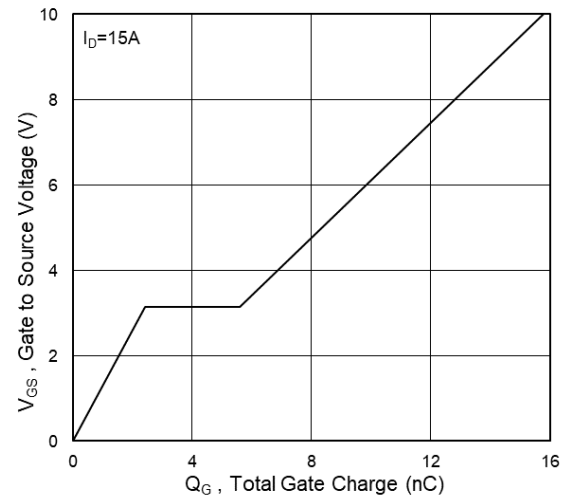


Fig.4 Gate-Charge Characteristics

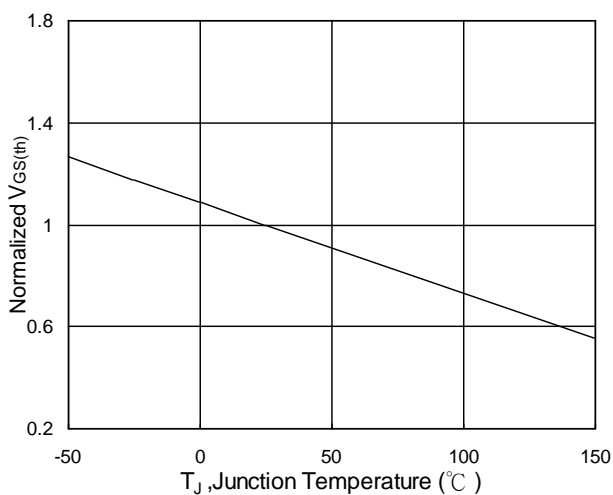


Fig.5 Normalized $V_{GS(th)}$ vs T_J

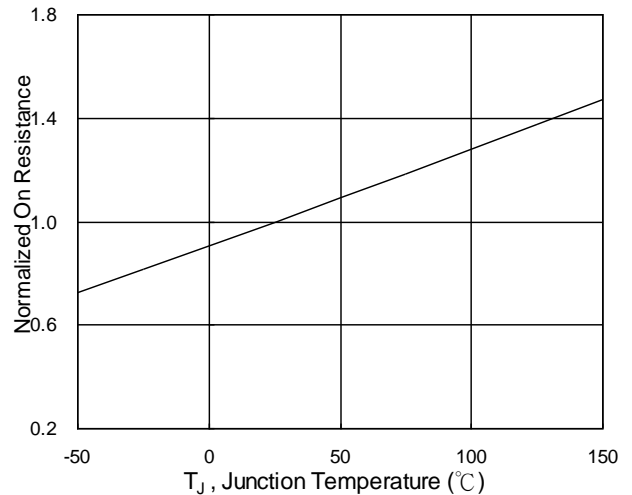


Fig.6 Normalized $R_{DS(on)}$ vs T_J

Typical Characteristics

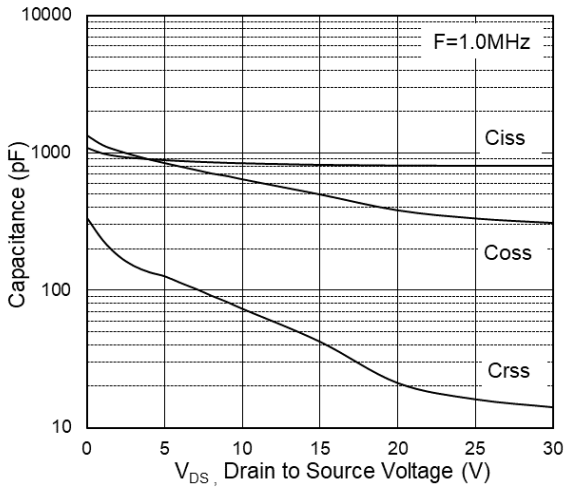


Fig.7 Capacitance

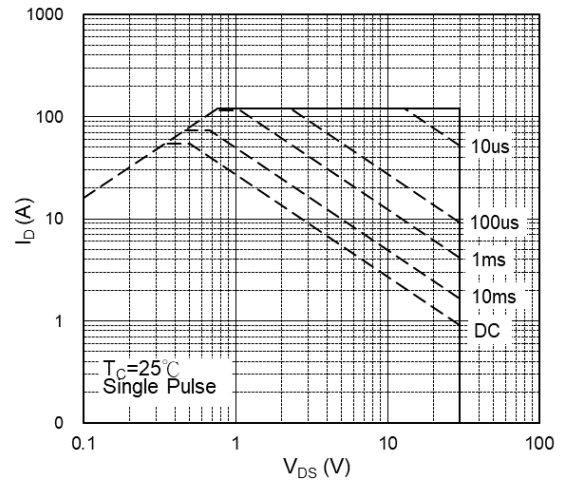


Fig.8 Safe Operating Area

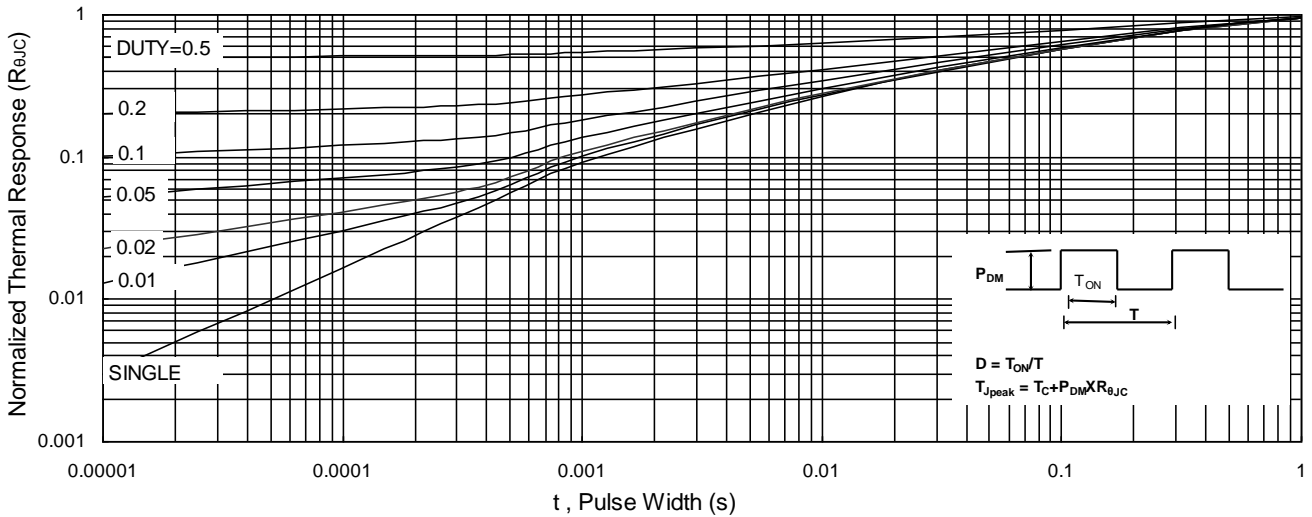


Fig.9 Normalized Maximum Transient Thermal Impedance

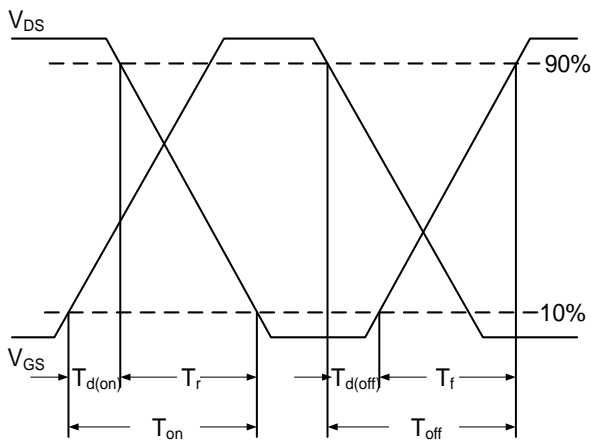


Fig.10 Switching Time Waveform

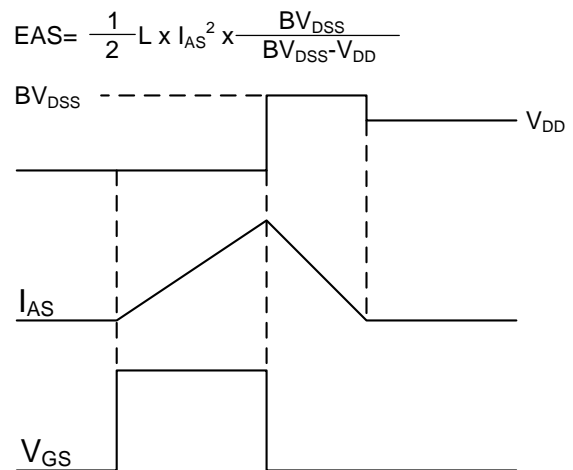
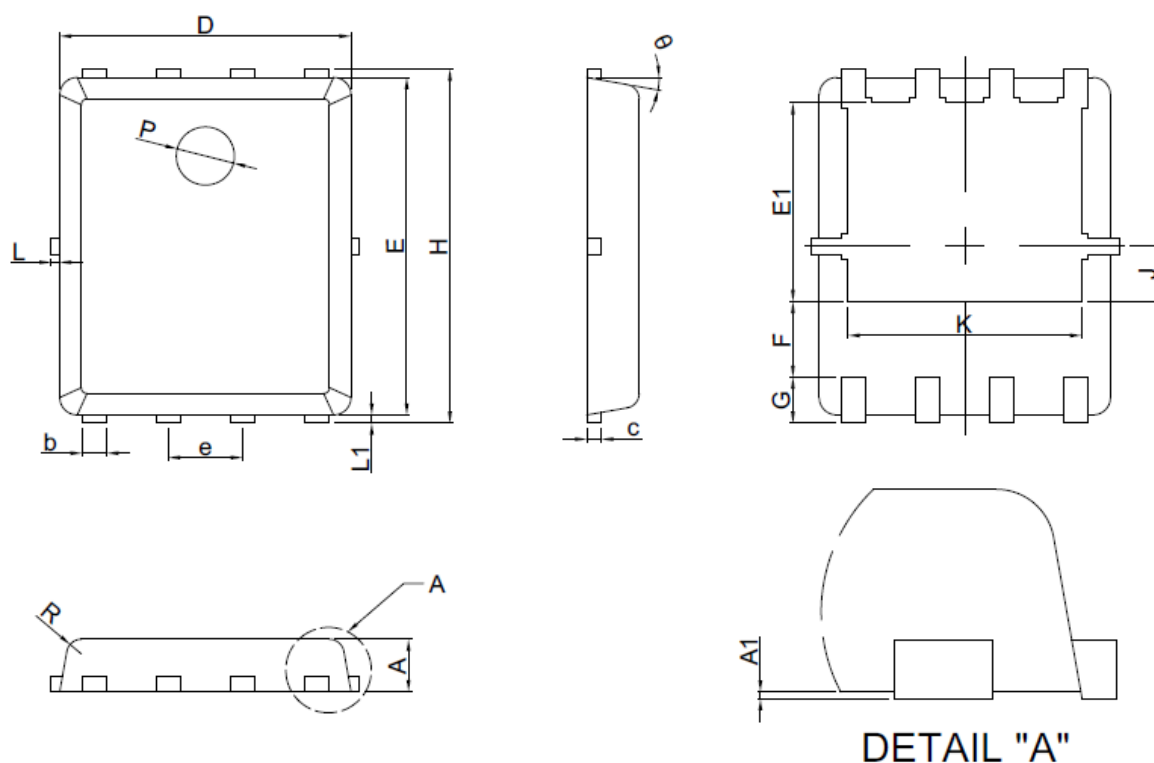


Fig.11 Unclamped Inductive Switching Waveform

PDFN5X6-8L Package Information



SYMBOL	MIN	NOM	MAX
A	0.80	0.90	1.00
A ₁	0.00	0.03	0.05
b	0.35	0.42	0.49
c	0.254REF		
D	4.90	5.00	5.10
F	1.40REF		
E	5.70	5.80	5.90
e	1.27BSC		
H	5.95	6.08	6.20
L1	0.10	0.14	0.18
G	0.60REF		
K	4.00REF		
L	—	—	0.15
J	0.95BSC		
P	1.00REF		
E1	3.40REF		
θ	6°	10°	14°
R	0.25REF		