

N-Channel 40V(D-S) MOSFET

Product summary		
V_{DS}	40	V
$R_{DS(ON)}$ (at $V_{GS}=10V$) Typ.	2.2	m Ω
$R_{DS(ON)}$ (at $V_{GS}=4.5V$) Typ.	3.0	m Ω
$I_D(T_c=25^{\circ}C)$	100	A

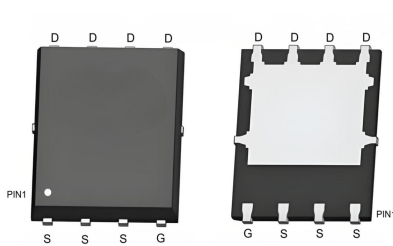
Features

- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge

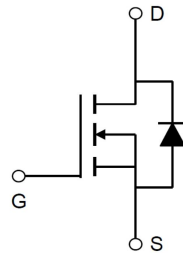
Applications

- Load switching
- PWM Application
- Power Management

Pin Configuration



PDFN5X6-8L



Packing Information

Device	Package	Reel Size	Quantity(Min. Package)
ECAP100N04A	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	$T_C=25^{\circ}C$	100
		$T_C=100^{\circ}C$	63
I_{DM}	Pulse Drain Current Tested ^A	400	A
E_{AS}	Single Pulse Avalanche Energy ^B	225	mJ
P_D	Power Dissipation @ $T_C=25^{\circ}C$	61	W
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to +150	$^{\circ}C$

Thermal Characteristics

Symbol	Parameter	Typical	Units
$R_{\theta JC}$	Thermal Resistance-Junction to case max	2.0	$^{\circ}C/W$

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	$V_{DS}=40V, V_{GS}=0V$	--	--	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 ^C	$V_{GS}=10V, I_D=20A$	--	2.2	2.8	m Ω
		$V_{GS}=4.5V, I_D=10A$	--	3.0	3.9	m Ω
V_{SD}	Diode Forward Voltage	$I_S=30A, V_{GS}=0V$	--	--	1.2	V
Dynamic Parameters ^D						
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=20V$ $f=1\text{MHz}$	--	5500	--	pF
C_{oss}	Output Capacitance		--	415	--	pF
C_{rss}	Reverse Transfer Capacitance		--	340	--	pF
Q_g	Total Gate Charge	$V_{DS}=20V, I_D=30A$ $V_{GS}=0 \text{ to } 10V$	--	59	--	nC
Q_{gs}	Gate-Source Charge		--	13	--	nC
Q_{gd}	Gate-Drain Charge		--	15	--	nC
$t_{D(on)}$	Turn-on Delay Time	$V_{DD}=20V$ $R_G=3\Omega,$ $I_D=30A,$ $V_{GS}=10V$	--	13	--	ns
t_r	Turn-on Rise Time		--	16	--	ns
$t_{D(off)}$	Turn-off Delay Time		--	39	--	ns
t_f	Turn-off Fall Time		--	15	--	ns

A. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.

B. EAS condition: starting $T_J=25^\circ\text{C}$, $R_G=25\Omega$, $V_{DD}=30V$, $V_G=10V$, $L=0.5\text{mH}$, $I_{AS}=30A$.

C. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$.

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

Typical Characteristics

Figure 1: Output Characteristics

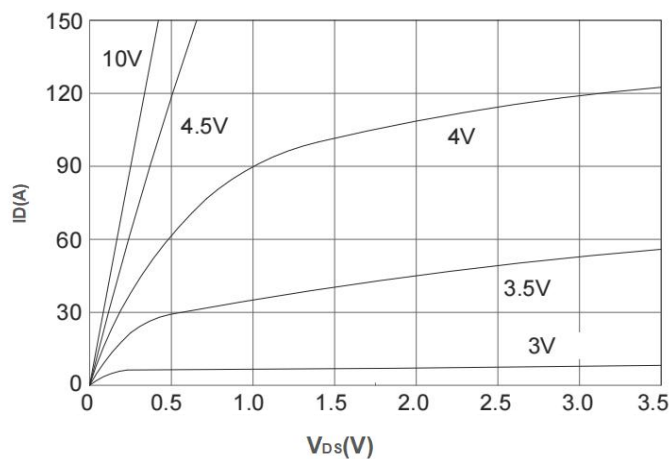


Figure 2: Typical Transfer Characteristic

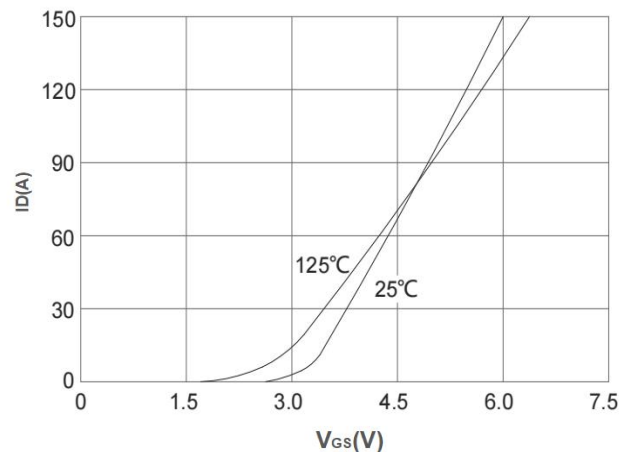


Figure 3: On-resistance vs. Drain Current

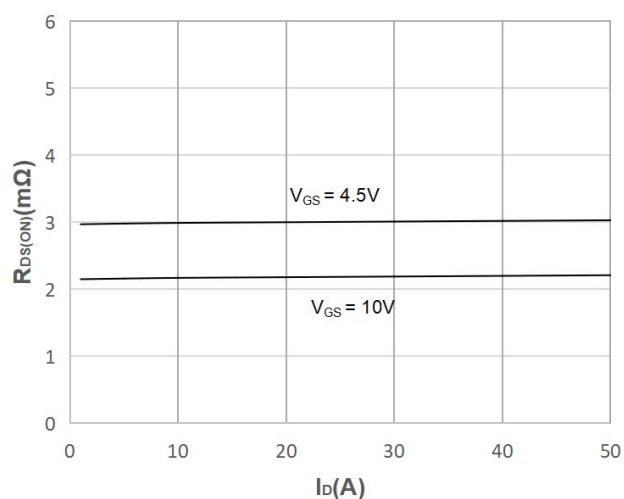
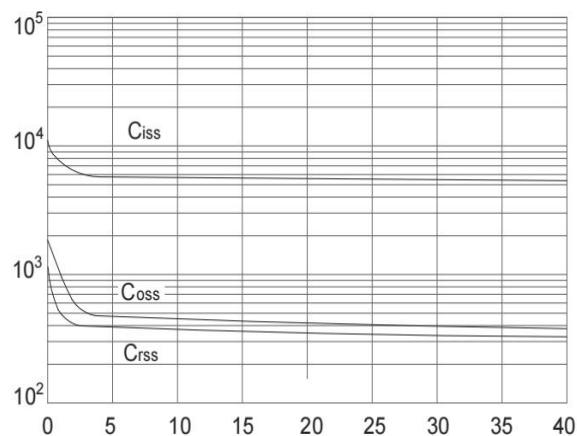
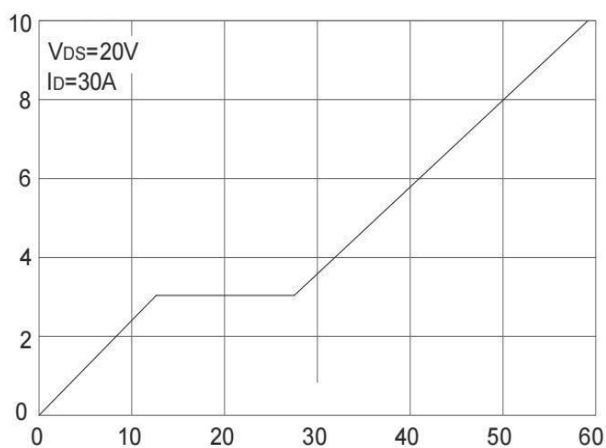
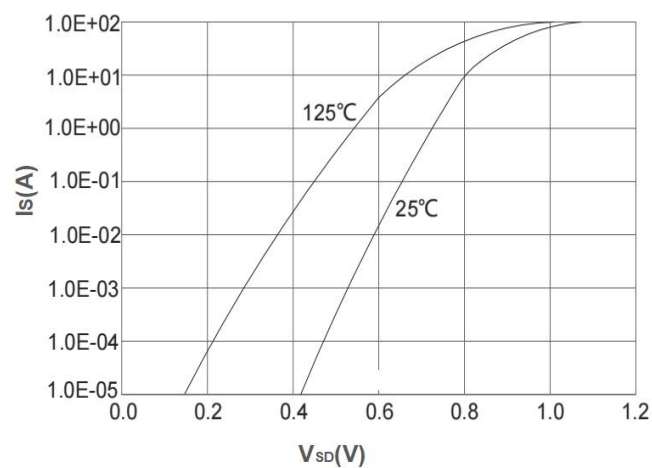


Figure 4: Body Diode Characteristics



Typical Characteristics

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

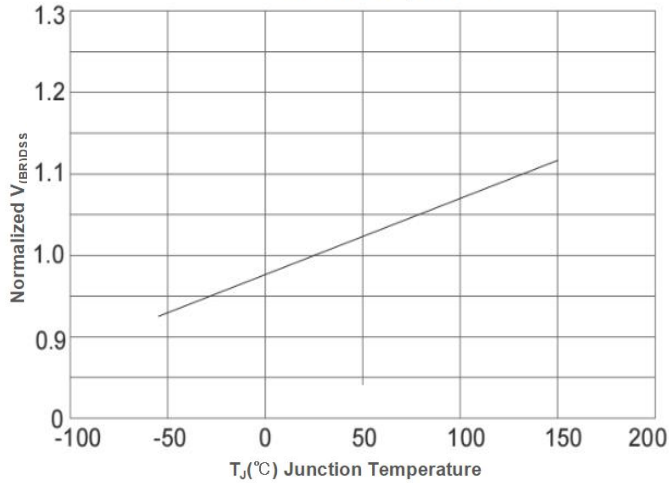


Figure 8: Normalized on Resistance vs. Junction Temperature

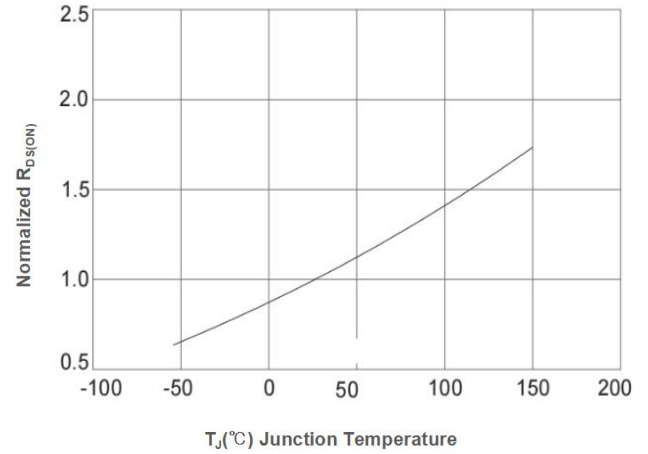


Figure 9: Maximum Safe Operating Area

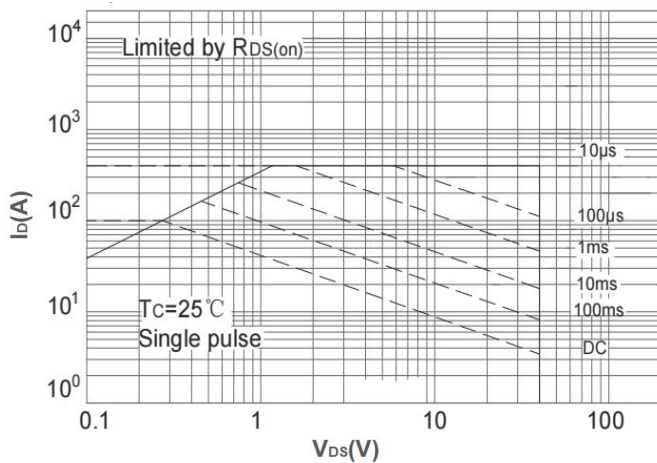


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

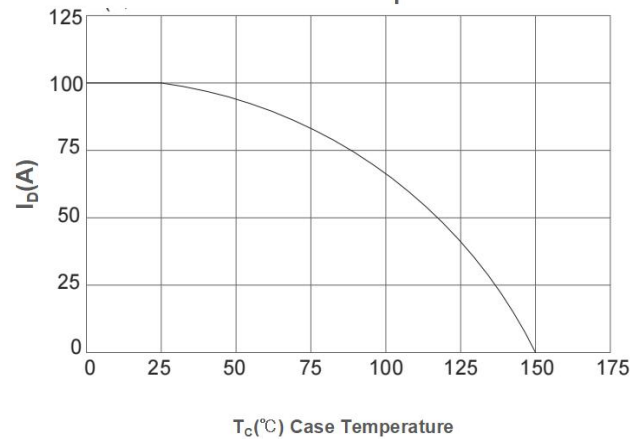


Figure 11: Normalized Maximum Transient Thermal Impedance

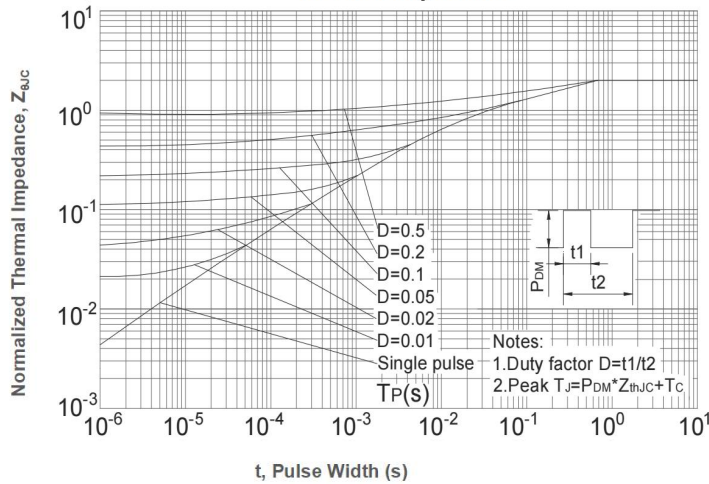
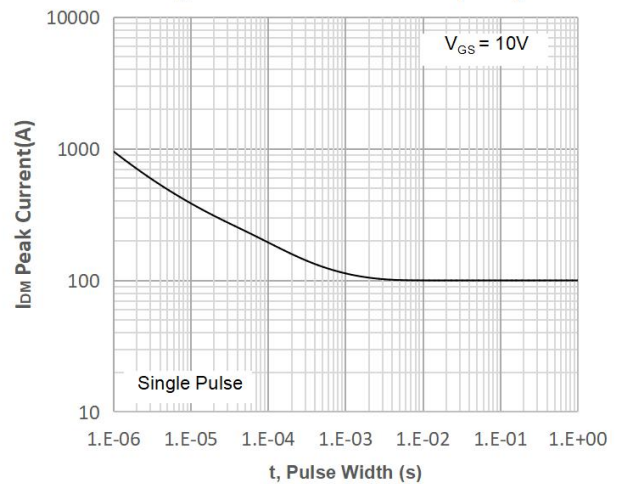


Figure 12: Peak Current Capacity



Test Circuit

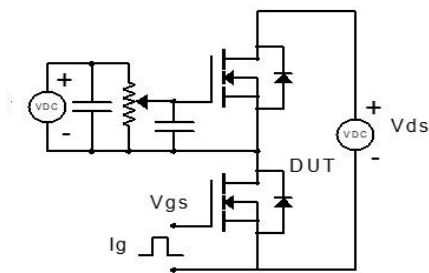


Figure 1: Gate Charge Test Circuit & Waveform

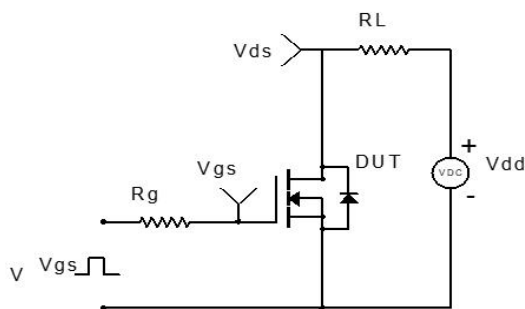


Figure 2: Resistive Switching Test Circuit & Waveform

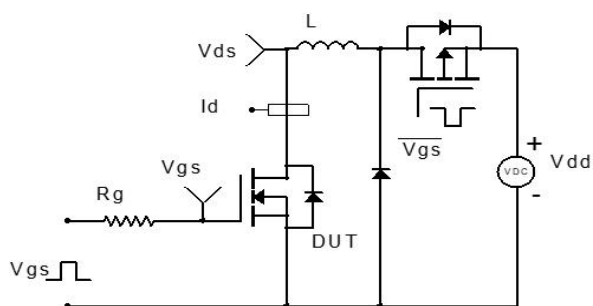


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

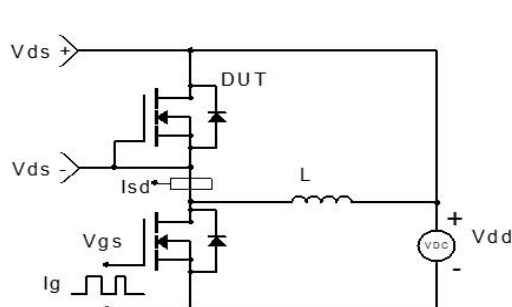
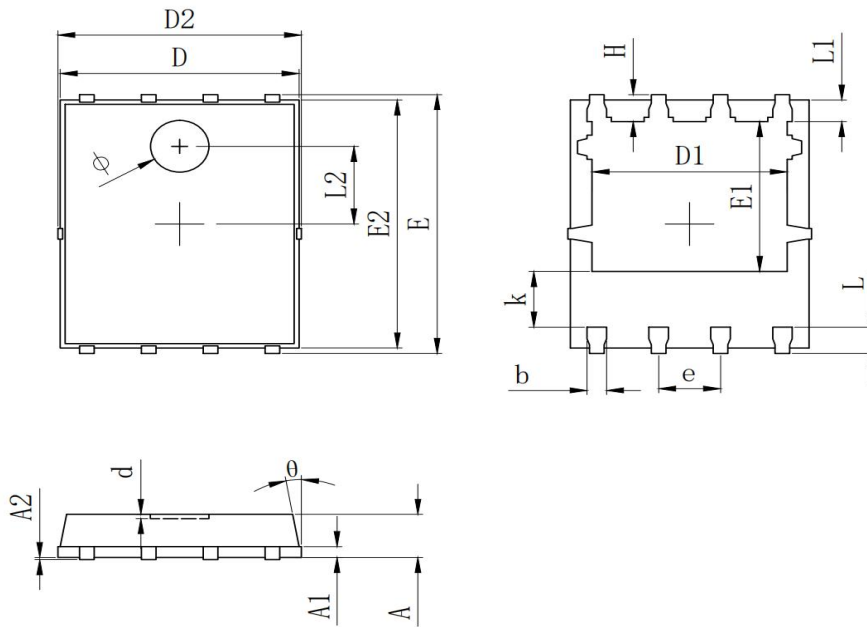


Figure 4: Diode Recovery Test Circuit & Waveform

PDFN5X6-8L Package Information (unit:mm)



SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	0.900	1.000	1.100
A1	0.254 REF.		
A2	0°0.05		
D	4.824	4.900	4.976
D1	3.910	4.010	4.110
D2	4.924	5.000	5.076
E	5.924	6.000	6.076
E1	3.375	3.475	3.575
E2	5.674	5.750	5.826
b	0.350	0.400	0.450
e	1.270 TYP.		
L	0.534	0.610	0.686
L1	0.424	0.500	0.576
L2	1.800 REF.		
k	1.190	1.290	1.390
H	0.549	0.625	0.701
θ	8°	10°	12°
Φ	1.100	1.200	1.300
d			0.100