

P-Channel 30V(D-S) MOSFET

Product summary		
V_{DS}	-30	V
$R_{DS(ON)}$ (at $V_{GS}=-10V$) Typ.	7.6	m Ω
$R_{DS(ON)}$ (at $V_{GS}=-4.5V$) Typ.	12	m Ω
I_D ($T_C=25^\circ C$)	-55	A

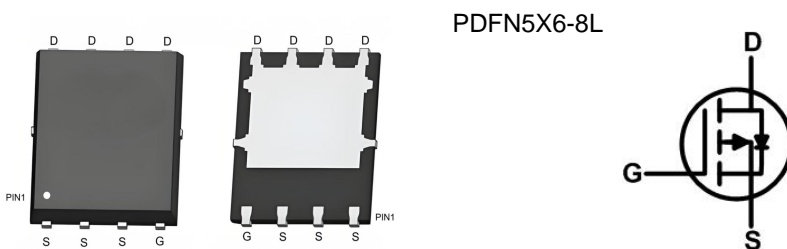
Features

- Advanced Trench Technology
- Low Gate Charge

Applications

- Load switching
- PWM Applications
- Power Management

Pin Configuration



Packing Information

Device	Package	Reel Size	Quantity(Min. Package)
ECAP55P03A	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	$T_C=25^\circ C$	-55
		$T_C=100^\circ C$	-34
I_{DM}	Pulse Drain Current Tested ^A	-185	A
E_{AS}	Single Pulse Avalanche Energy ^B	113	mJ
P_D	Power Dissipation $T_C=25^\circ C$	84	W
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to +150	$^\circ C$

Thermal Characteristics

Symbol	Parameter	Max.	Units
$R_{\theta JC}$	Thermal Resistance-Junction to case max	1.5	$^\circ C/W$

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	-1.6	-2.5	V
$R_{DS(on)}$	Drain-Source On-State Resistance ^C	$V_{GS}=-10V, I_D=-30A$	--	7.6	10	m Ω
		$V_{GS}=-4.5V, I_D=-20A$	--	12	16.8	m Ω
V_{SD}	Diode Forward Voltage	$I_S=-1A, V_{GS}=0V$	--	--	-1.2	V
I_S	Maximum Body-Diode Continuous Current		--	--	-55	A
Dynamic Parameters ^D						
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=-15V$ $f=1\text{MHz}$	--	3564	--	pF
C_{oss}	Output Capacitance		--	416	--	pF
C_{riss}	Reverse Transfer Capacitance		--	373	--	pF
Q_g	Total Gate Charge	$V_{DS}=-15V, I_D=-20A$ $V_{GS}=-10V$	--	37	--	nC
Q_{gs}	Gate-Source Charge		--	6.5	--	nC
Q_{gd}	Gate-Drain Charge		--	9.4	--	nC
$t_{D(on)}$	Turn-on Delay Time	$V_{DD}=-15V$ $V_{GS}=-10V,$ $R_G=2.5\Omega,$ $I_D=-30A$	--	16	--	ns
t_r	Turn-on Rise Time		--	21	--	ns
$t_{D(off)}$	Turn-off Delay Time		--	68	--	ns
t_f	Turn-off Fall Time		--	52	--	ns

Note:

- A. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
- B. EAS condition: $T_J=25^\circ\text{C}$, $R_G=25\Omega$, $V_{DD}=-20V$, $V_G=-10V$, $L=0.5\text{mH}$, $I_{AS}=-21.3A$.
- C. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 0.5\%$.
- D. Guaranteed by design, not subject to production testing.

Typical Characteristics

Figure 1: Output Characteristics

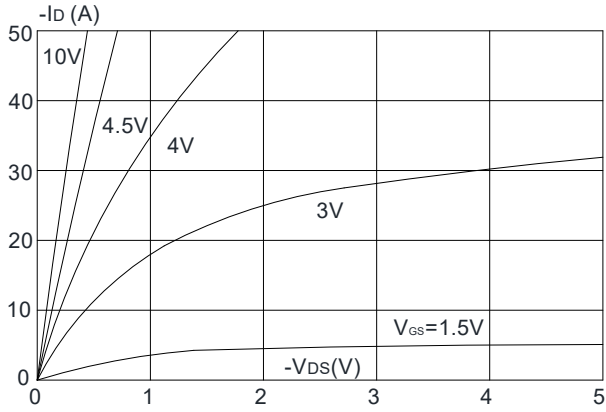


Figure 2: Typical Transfer Characteristics

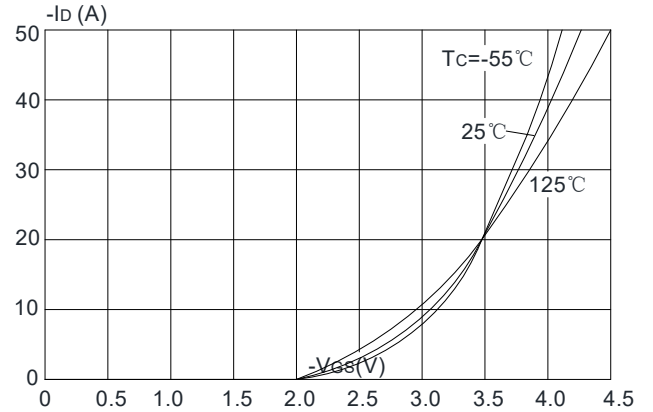


Figure 3: On-resistance vs. Drain Current

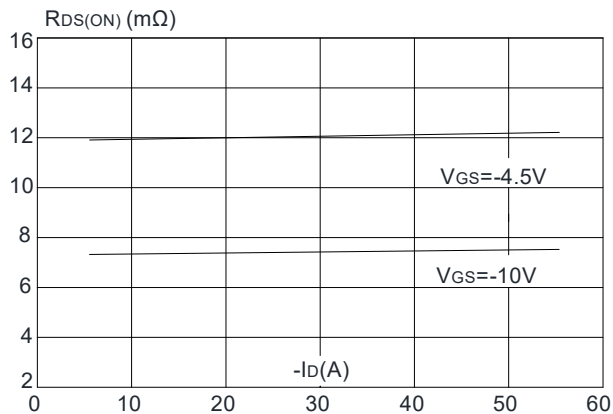


Figure 4: Body Diode Characteristics

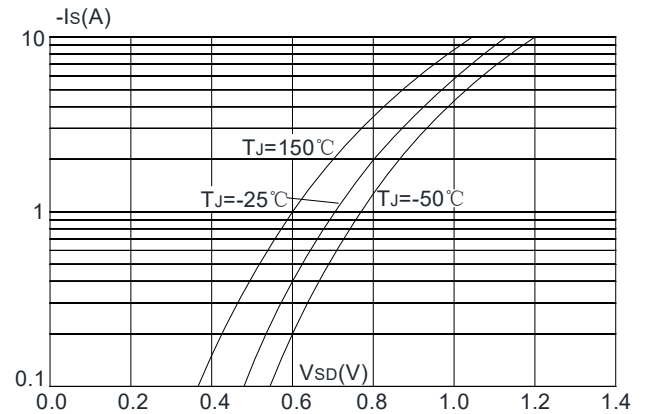


Figure 5: Gate Charge Characteristics

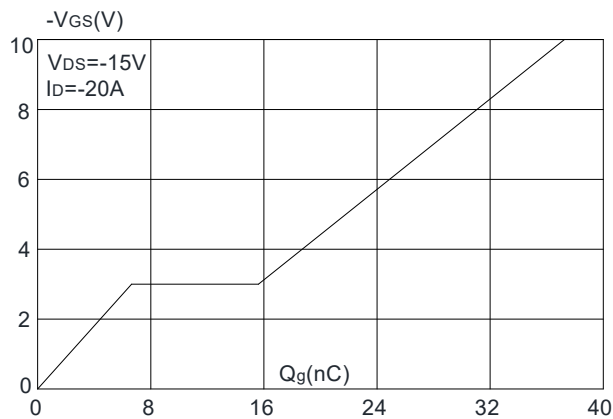
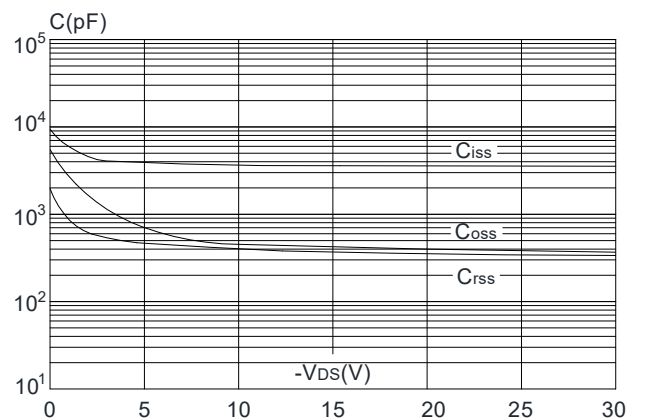


Figure 6: Capacitance Characteristics



Typical Characteristics

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

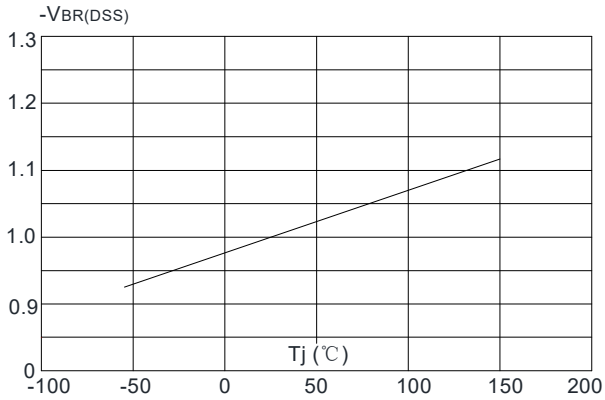


Figure 8: Normalized on Resistance vs. Junction Temperature

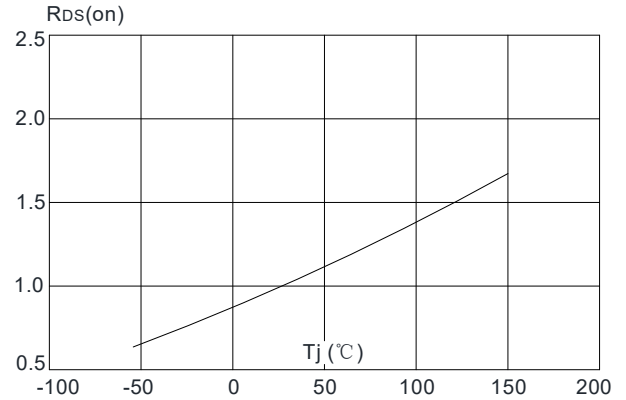


Figure 9: Maximum Safe Operating Area

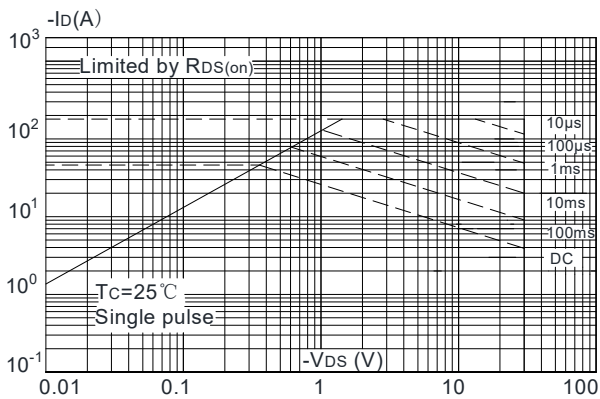


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

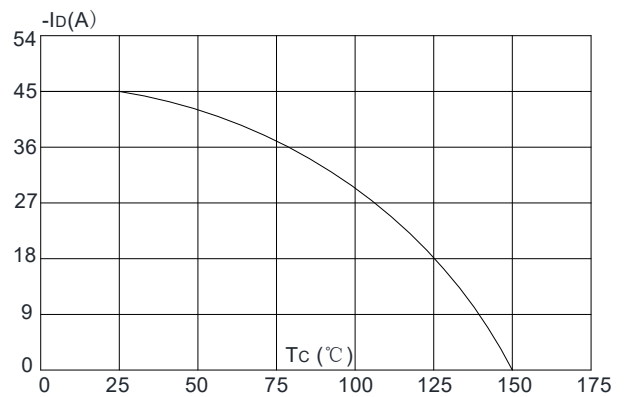
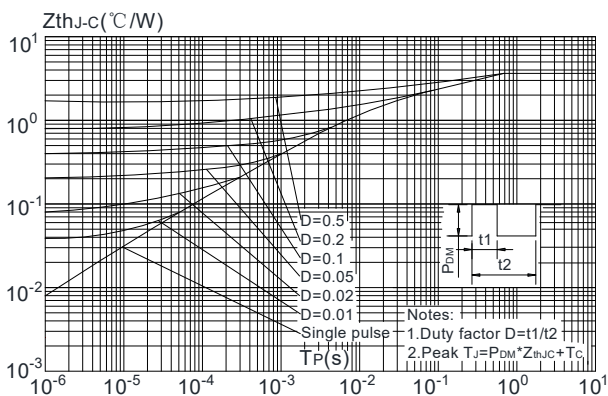
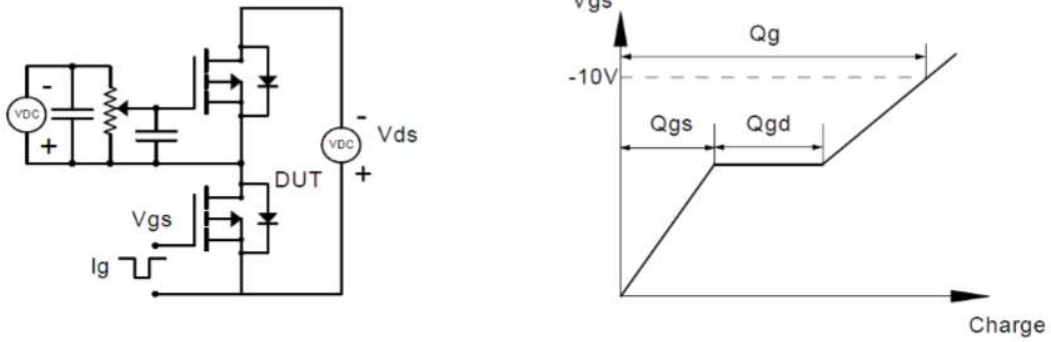


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

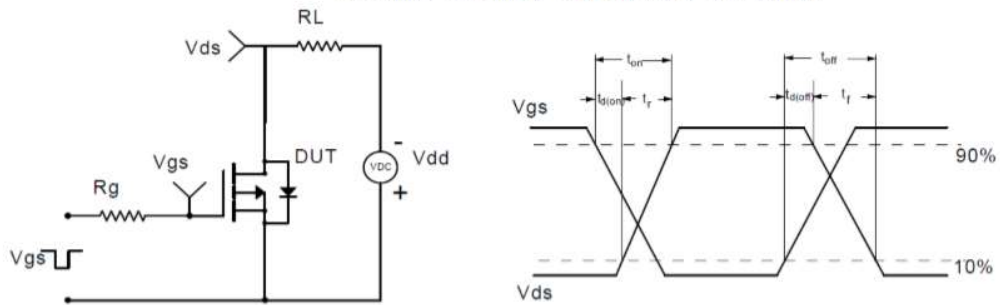


Test Circuit

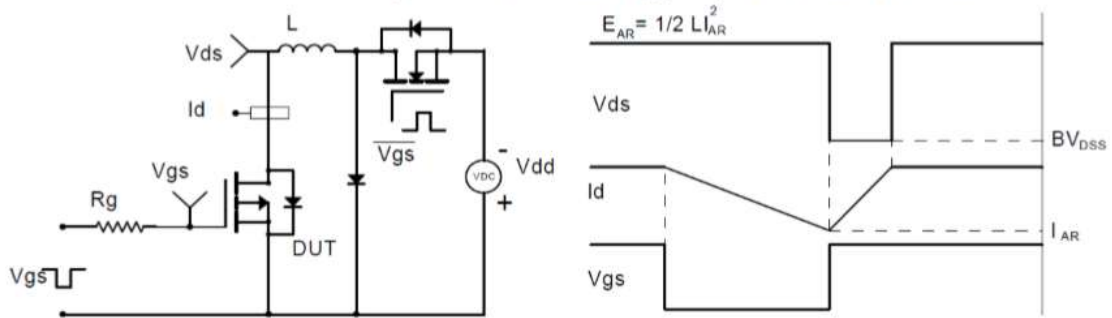
Gate Charge Test Circuit & Waveform



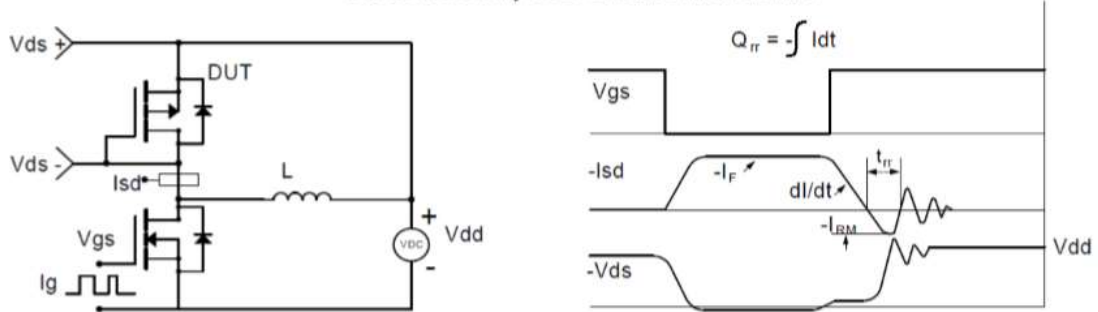
Resistive Switching Test Circuit & Waveforms



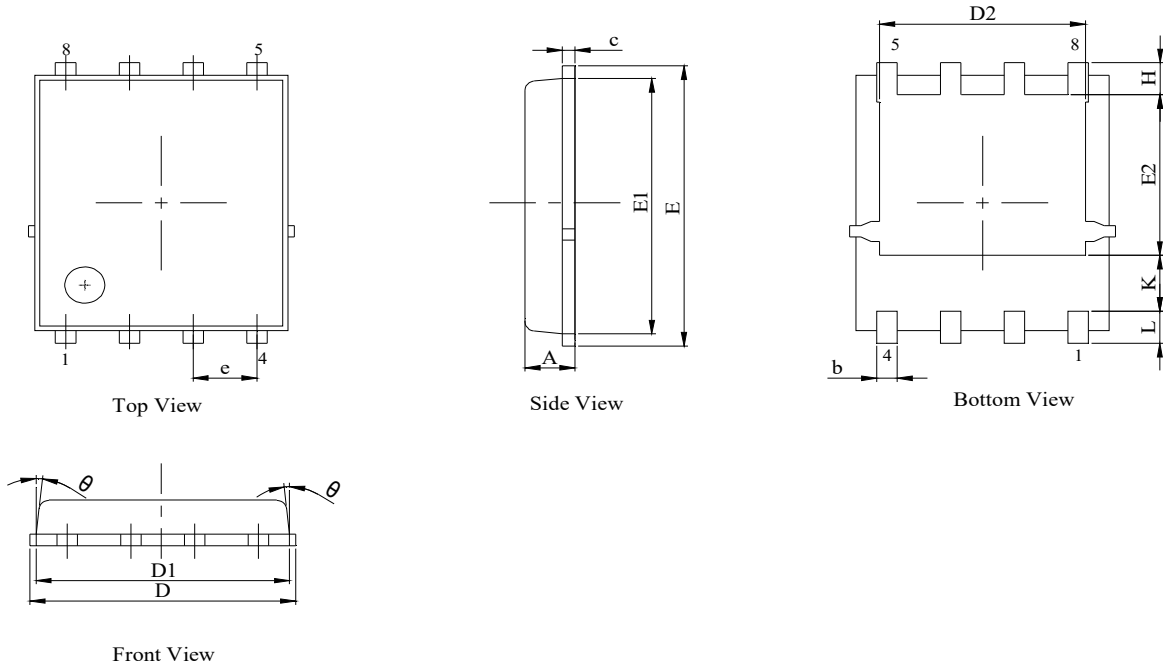
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



PDFN5X6-8L Package Information (unit:mm)



DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
b	0.31	0.41	0.51
c	0.20	0.25	0.30
D	5.00	5.20	5.40
D1	4.95	5.05	5.15
D2	4.00	4.10	4.20
E	6.05	6.15	6.25
E1	5.50	5.60	5.70
E2	3.42	3.53	3.63
e	1.27BSC		
H	0.60	0.70	0.80
L	0.50	0.70	0.80
θ	-	-	10°