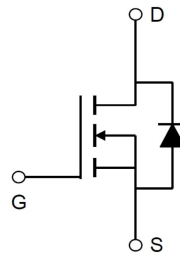
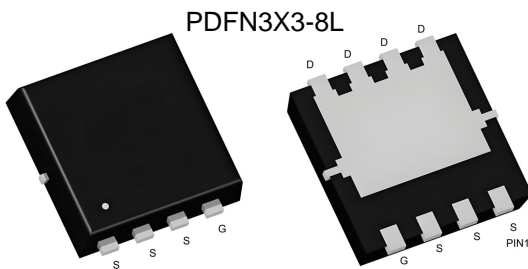


N-Channel 30V(D-S) MOSFET

Product summary		
V_{DS}	30	V
$R_{DS(ON)}$ (at $V_{GS}=10V$) Typ.	15	m Ω
$R_{DS(ON)}$ (at $V_{GS}=4.5V$) Typ.	21	m Ω
I_D ($T_C=25^\circ C$)	12	A

Features
<ul style="list-style-type: none"> ● Low Gate Charge ● Advanced high cell density Trench technology
Applications
<ul style="list-style-type: none"> ● Power management functions

Pin Configuration



Packing Information

Device	Package	Reel Size	Quantity(Min. Package)
ECAL12N03A	PDFN3X3-8L	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	$T_C=25^\circ C$	12
		$T_C=100^\circ C$	7.8
I_{DM}	Pulse Drain Current ^A	48	A
E_{AS}	Single Pulse Avalanche Energy ^B	11	mJ
P_D	Power Dissipation @ $T_C=25^\circ C$	4.8	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	26	$^\circ C/W$

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 ^C	$V_{GS}=10V, I_D=5A$	--	15	20	m Ω
		$V_{GS}=4.5V, I_D=3A$	--	21	29	m Ω
V_{SD}	Diode Forward Voltage	$I_S=12A, V_{GS}=0V$	--	--	1.2	V
I_S	Diode Forward Current	$V_G=V_D=0V$	--	--	48	A
Dynamic Parameters ^D						
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=15V$ $f=1\text{MHz}$	--	490	--	pF
C_{oss}	Output Capacitance		--	79	--	pF
C_{riss}	Reverse Transfer Capacitance		--	61	--	pF
Q_g	Total Gate Charge	$V_{DS}=15V, I_D=5.8A$ $V_{GS}=10V$	--	5.2	--	nC
Q_{gs}	Gate-Source Charge		--	0.9	--	nC
Q_{gd}	Gate-Drain Charge		--	1.3	--	nC
$t_{D(on)}$	Turn-on Delay Time	$V_{DS}=15V$ $I_D=3A, R_{GEN}=3\Omega,$ $V_{GS}=10V$	--	4.5	--	ns
t_r	Turn-on Rise Time		--	2.5	--	ns
$t_{D(off)}$	Turn-off Delay Time		--	14.5	--	ns
t_f	Turn-off Fall Time		--	3.5	--	ns

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

B. The EAS data shows Max. Rating, The test condition is $V_{DD}=15V, V_{GS}=10V, L=0.5\text{mH}, I_{AS}=6.6A, R_g=25\Omega, T_J=25^\circ\text{C}$.

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

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

Typical Characteristics

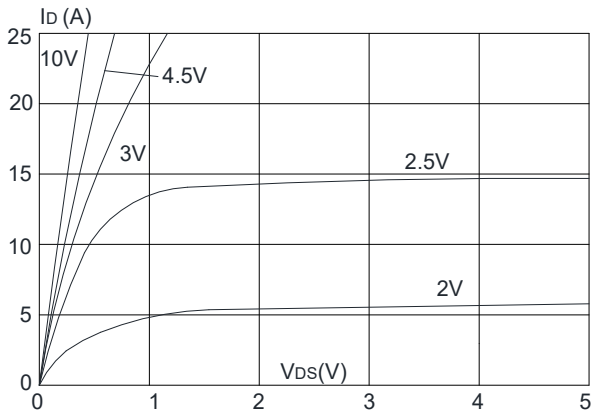


Figure 1: Output Characteristics

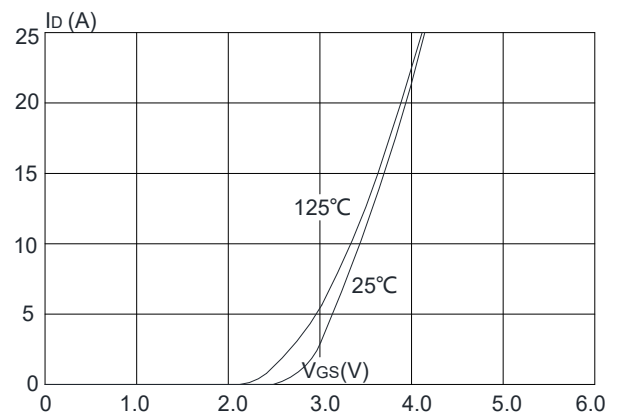


Figure 2: Typical Transfer Characteristics

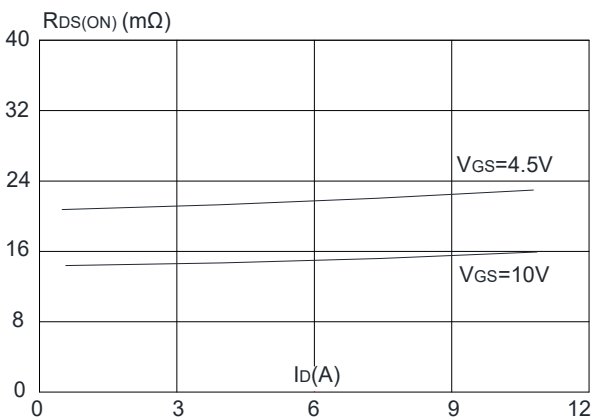


Figure 3: On-resistance vs. Drain Current

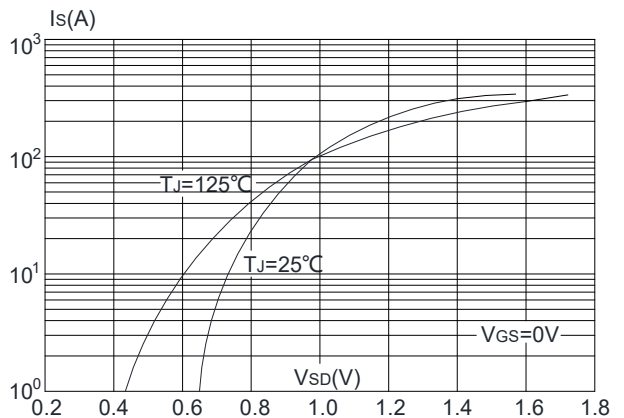


Figure 4: Body Diode Characteristics

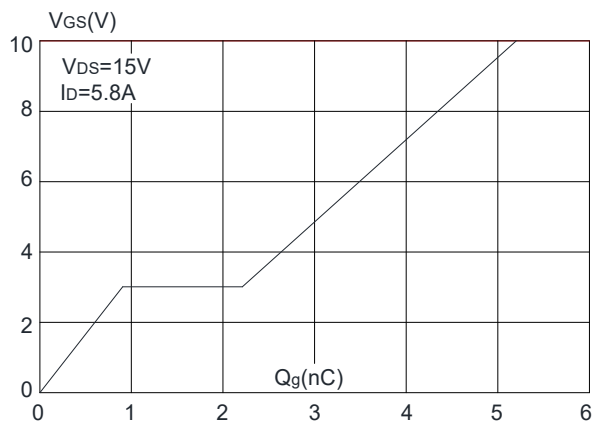


Figure 5: Gate Charge Characteristics

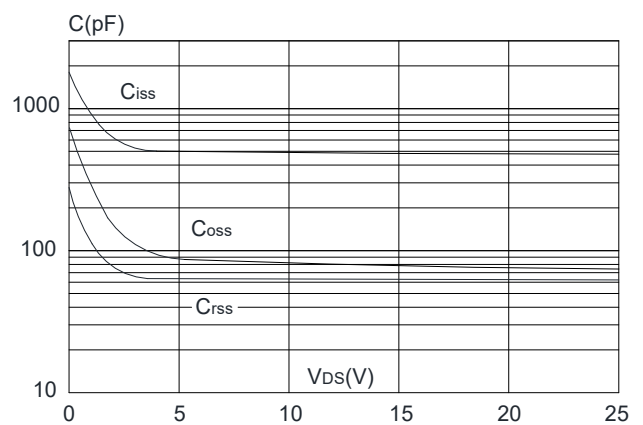


Figure 6: Capacitance Characteristics

Typical Characteristics

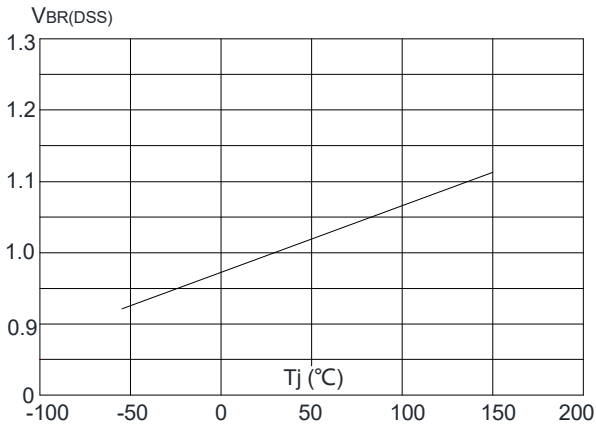


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

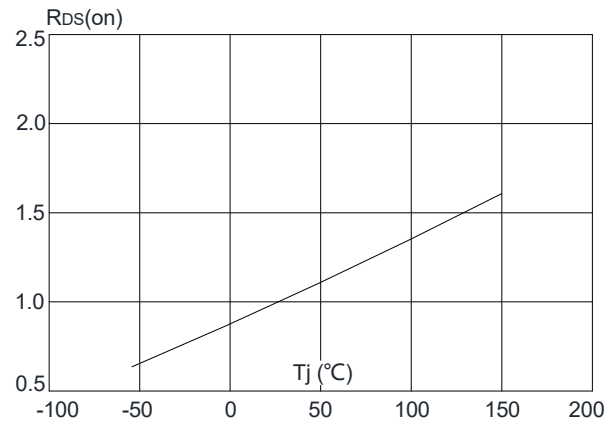


Figure 8: Normalized on Resistance vs. Junction Temperature

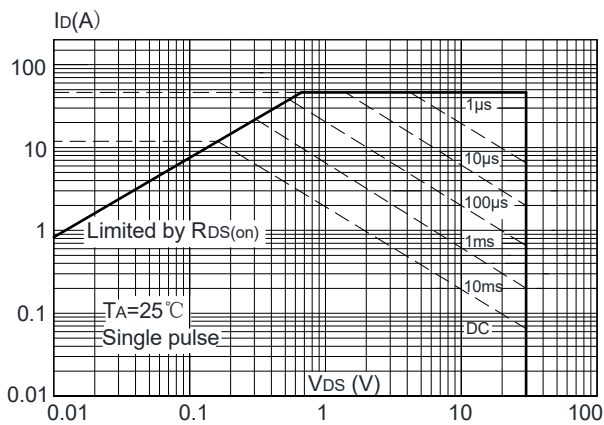


Figure 9: Maximum Safe Operating Area

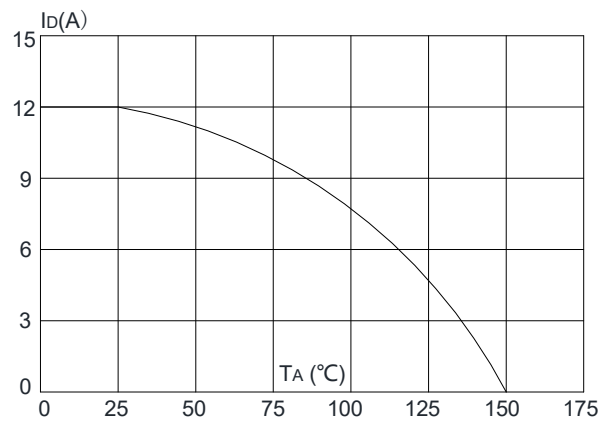


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

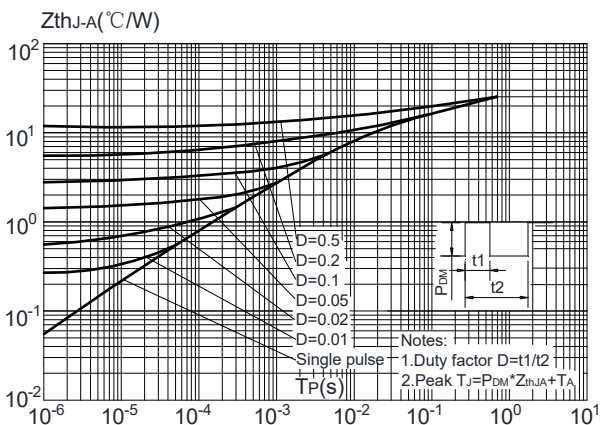


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

Typical Characteristics

Test Circuit

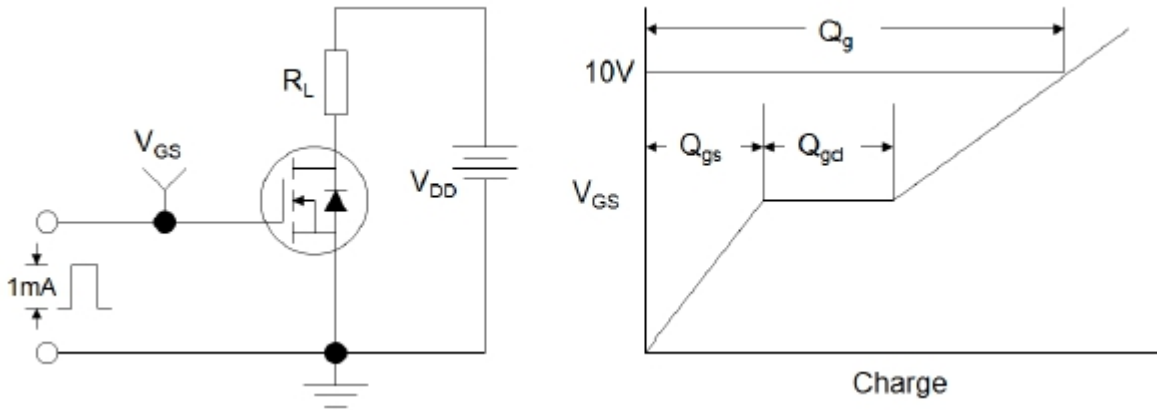


Figure1:Gate Charge Test Circuit & Waveform

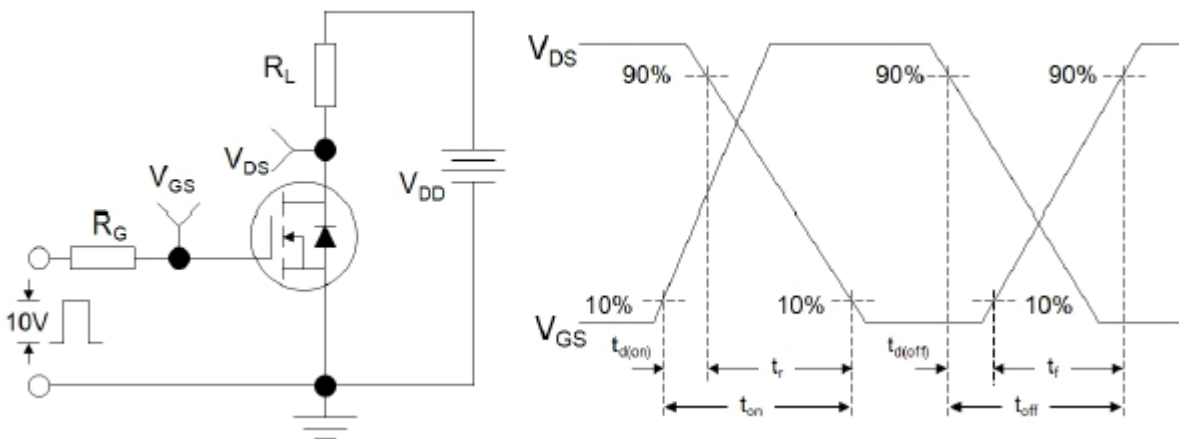


Figure 2: Resistive Switching Test Circuit & Waveforms

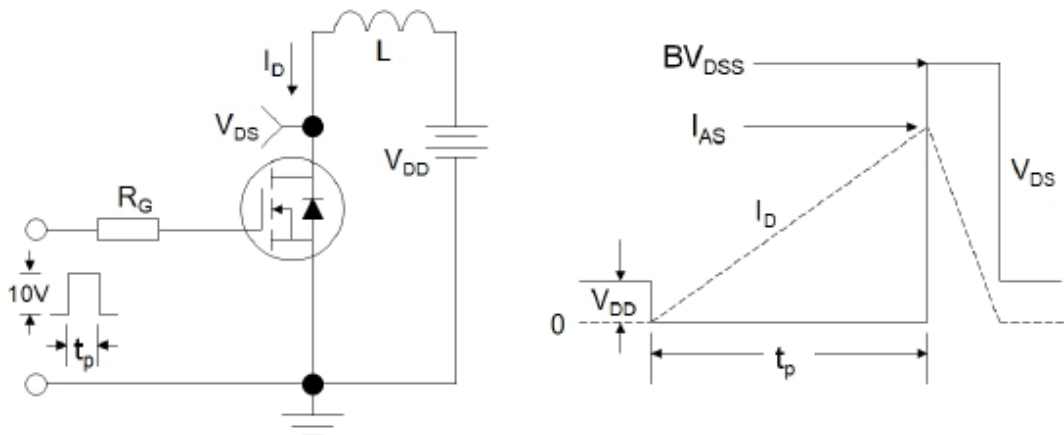
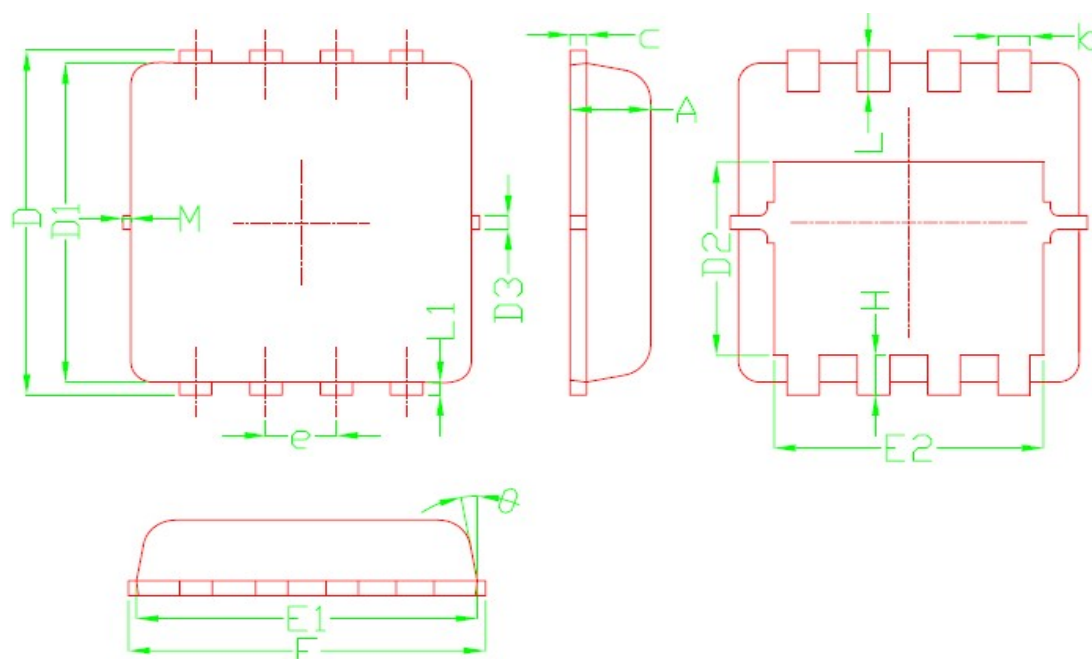


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

PDFN3X3-8L Package Information



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.70	0.85	0.027	0.034
b	0.20	0.40	0.007	0.016
c	0.10	0.25	0.004	0.010
D	3.15	3.45	0.124	0.136
D1	2.90	3.20	0.114	0.126
D2	1.54	1.98	0.060	0.080
D3	0.10	0.30	0.004	0.012
E	3.15	3.45	0.124	0.136
E1	3.00	3.25	0.118	0.128
E2	2.29	2.65	0.090	0.104
e	0.65 BSC		0.025 BSC	
H	0.28	0.65	0.011	0.026
Θ	0°	14°	0°	14°
L	0.30	0.50	0.012	0.020
L1	0.13		0.005	
M	---	0.15	---	0.006