Dual N-Channel 30V(D-S) MOSFET

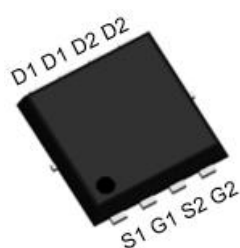| Product summary		
V_{DS}	30	V
$R_{DS(ON)}$(at V_{GS}=10V) Typ.	10	mΩ
$R_{DS(ON)}$(at V_{GS}=4.5V) Typ.	16	mΩ
I_D(Tc=25℃)	20	A

Features

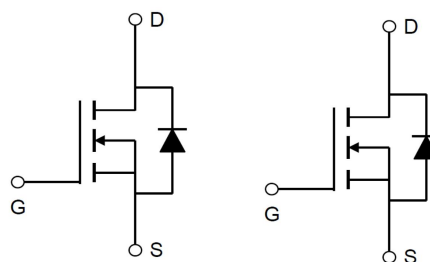● Advanced Trench Technology
● Low Gate Charge

Applications

● Load switching
● PWM Applications

Pin Configuration

PDFN3X3-8L

Packing Information

Device	Package	Reel Size	Quantity(Min. Package)
ECAL20N03D	PDFN3X3-8L	13″	5000pcs

Absolute Maximum Ratings (at T_A=25℃ 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℃	20	A
		T_C=100℃	14	A
I_{DM}	Pulse Drain Current [A]		74	A
E_{AS}	Single Pulse Avalanche Energy [B]		16	mJ
P_D	Power Dissipation @T_C=25℃		25	W
T_J,T_{STG}	Junciton and Storage Temperature Range		-55 to +150	℃

Thermal Characteristics

Symbol	Parameter	Typical	Units
$R_{θJC}$	Thermal Resistance-Junction to case	5.0	℃/W

Electrical Characteristics (at T_J =25℃ Unless Otherwise Noted)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
Static Parameters						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V,I_D=250uA	30	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V,V_{GS}=0V	--	--	1	uA
I_{GSS}	Gate-Body Leakage Current	V_{DS}=0V,V_{GS}=±20V	--	--	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250uA	1.0	1.5	2.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance [C]	V_{GS}=10V,I_D=10A	--	10	13	mΩ
		V_{GS}=4.5V,I_D=5A	--	16	22.5	mΩ
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V	--	--	1.2	V
I_S	Diode Forward Current	T_C=25℃	--	--	20	A
Dynamic Parameters [D]						
C_{iss}	Input Capacitance	V_{GS}=0V,V_{DS}=15V f=1MHZ	--	633	--	pF
C_{oss}	Output Capacitance		--	120	--	pF
C_{rss}	Reverse Transfer Capacitance		--	99	--	pF
Q_g	Total Gate Charge	V_{DS}=15V,I_D=15A V_{GS}=10V	--	15	--	nC
Q_{gs}	Gate-Source Charge		--	4.7	--	nC
Q_{gd}	Gate-Drain Charge		--	3.6	--	nC
$t_{D(on)}$	Turn-on Delay Time	V_{DS}=30V ,R_{GEN}=3Ω, I_D=18A, V_{GS}=10V	--	5	--	ns
t_r	Turn-on Rise Time		--	8	--	ns
$t_{D(off)}$	Turn-off Delay Time		--	21	--	ns
t_f	Turn-off Fall Time		--	7	--	ns
t_{rr}	Reverse recovery time	I_F=18A, di/dt=100 A/uS	--	7	--	ns
Q_{rr}	Reverse recovery charge		--	5.9	--	nC

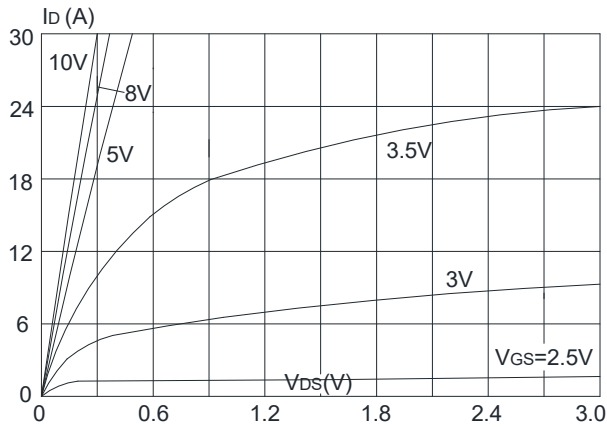A. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.

B. EAS condition: T_J=25℃, R_G=25Ω, V_{GS}=10V, L=0.5mH,I_{AS}=8A.

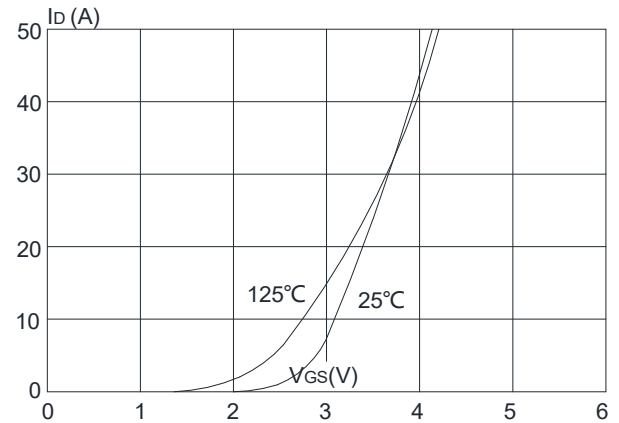C. Pulse Test: Pulse Width≤300µs, Duty Cycle≤0.5%.

D. Guaranteed by design, not subject to production testing.
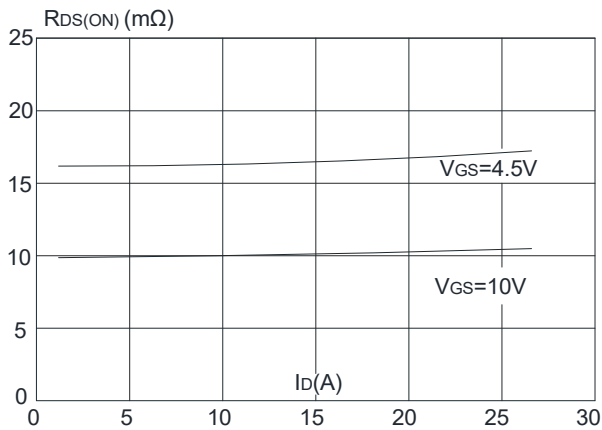
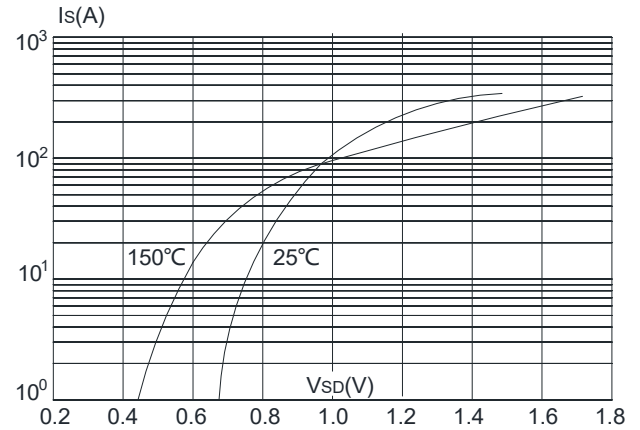## Typical Characteristics

Figure1: Output Characteristics

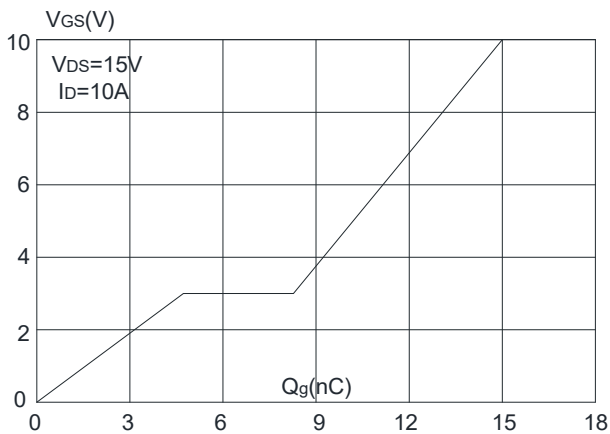**Figure 2:** Typical Transfer Characteristics

Figure 3: On-resistance vs. Drain Current
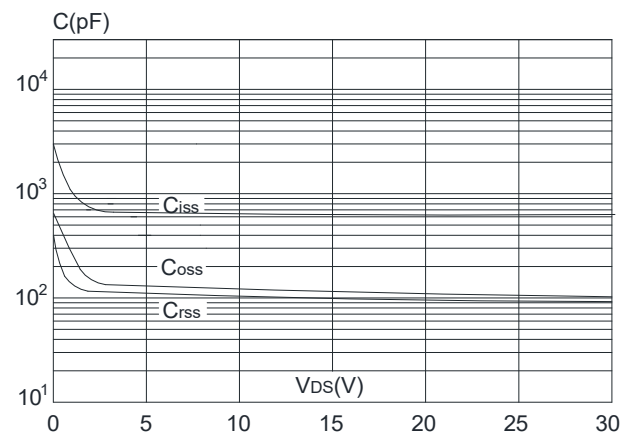

Figure 4: Body Diode Characteristics
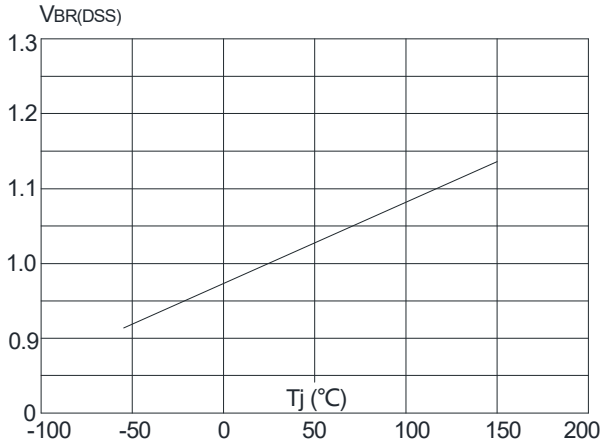

Figure 5: Gate Charge Characteristics
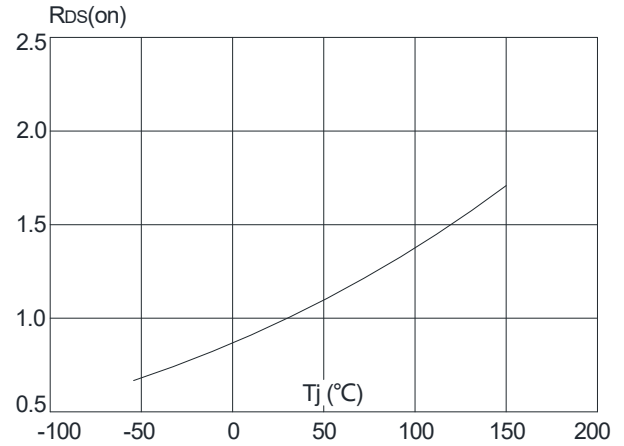

Figure 6: Capacitance Characteristics
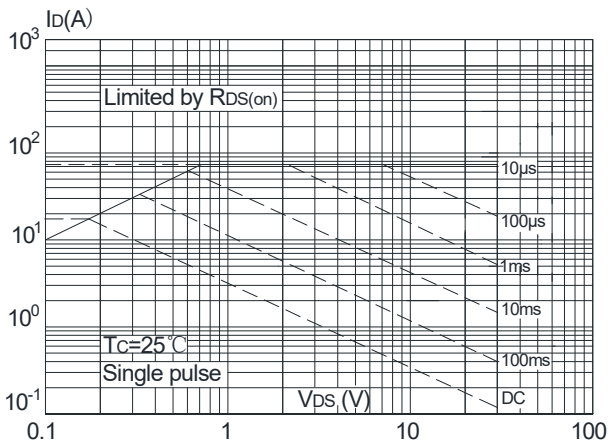
Typical Characteristics

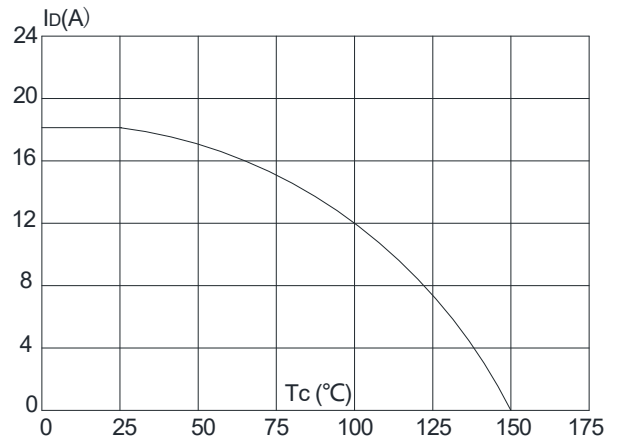**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature

Figure 8: Normalized on Resistance vs. Junction Temperature
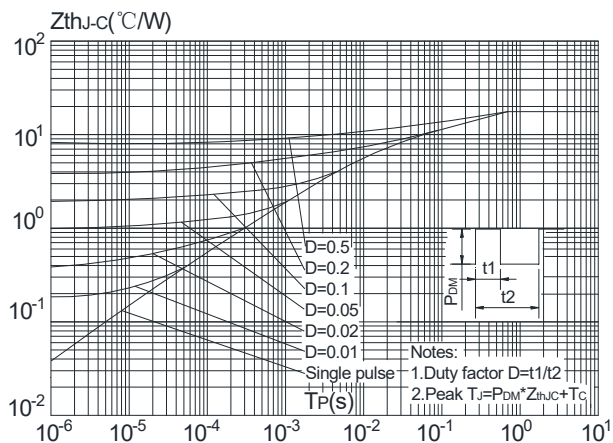

Figure 9: Maximum Safe Operating Area

Figure 10: Maximum Continuous Drain Current vs. Case Temperature

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

Notes:
1. Duty factor $D=t1/t2$
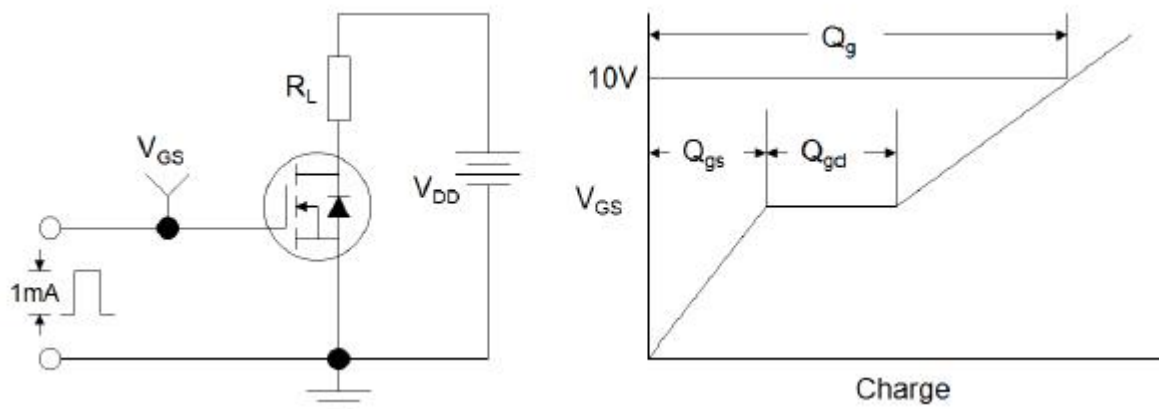2. Peak $T_J=P_{DM}*Z_{thJC}+T_C$

Test Circuit

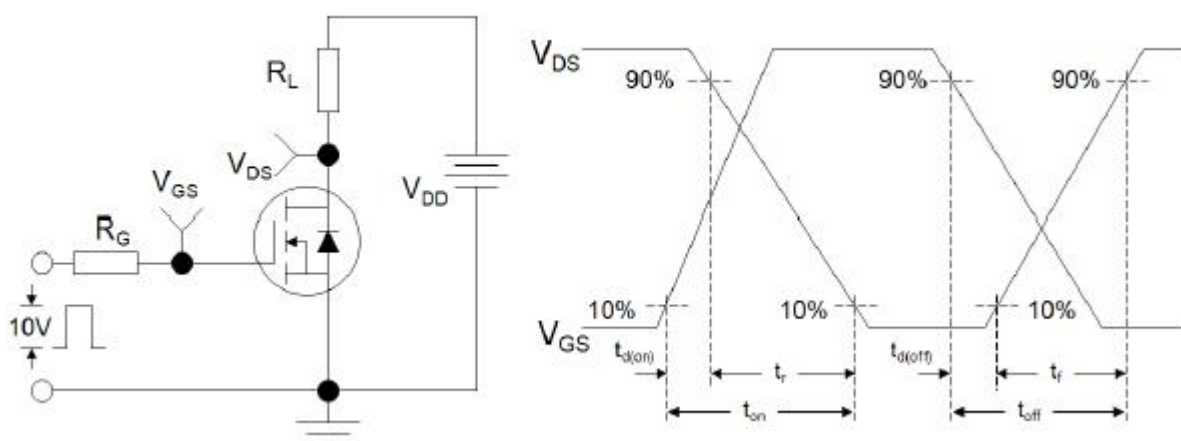**Figure1:Gate Charge Test Circuit & Waveform**
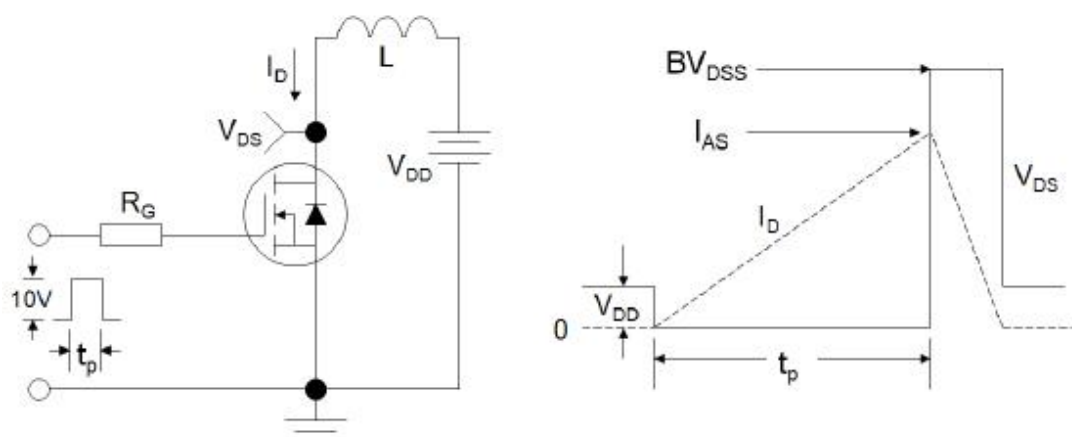

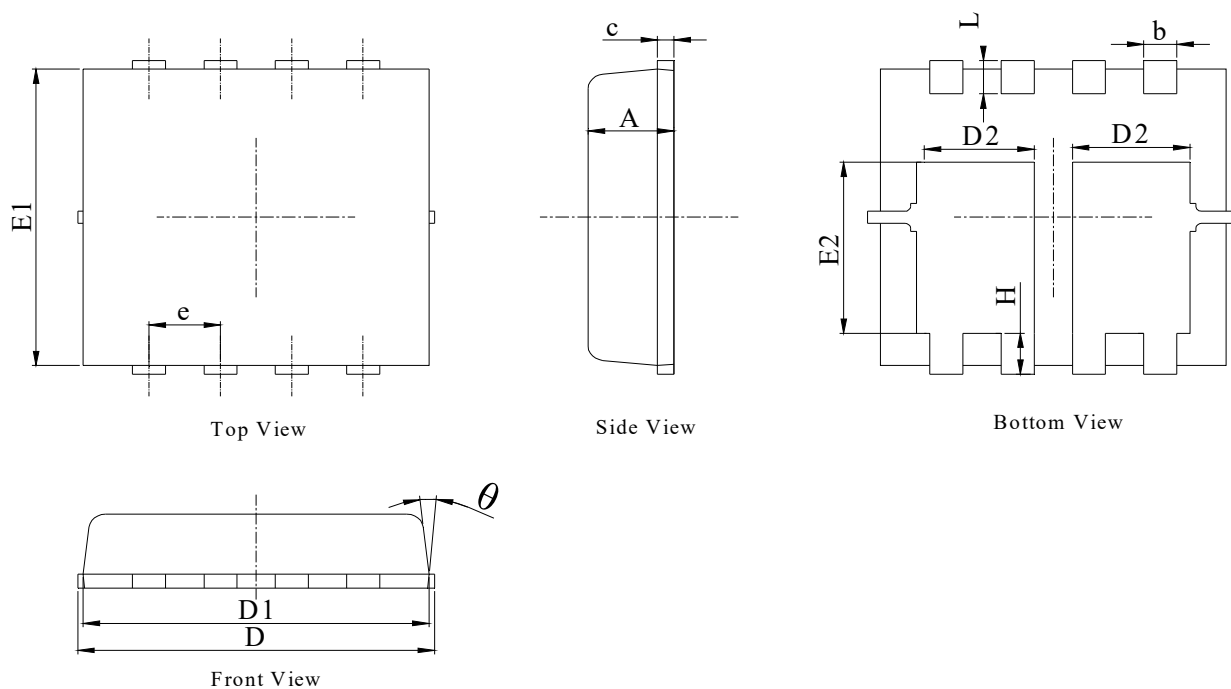**Figure 2: Resistive Switching Test Circuit & Waveforms**

Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

PDFN3X3-8L Package Information

Top View

Side View

Bottom View

Front View

DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	-	0.15	-
D	3.05	3.25	3.35
D1	2.95	3.05	3.15
D2	0.97	1.07	1.17
E	3.20	3.30	3.40
E1	2.95	3.05	3.15
E2	1.70	1.80	1.90
e	0.65BSC		
H	0.30	0.40	0.50
L	0.25	0.40	0.50
g	0.15	0.25	0.35
θ	---	--	12°