

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

Product summary			
Symbol	Q1	Q2	Units
V_{DS}	30	30	V
$R_{DS(ON)}$ (at $V_{GS}=10V$) Typ.	6.8	3.5	m Ω
$I_D(T_C=25^\circ C)$	43	80	A

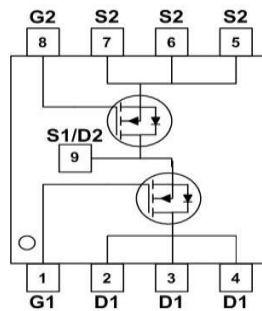
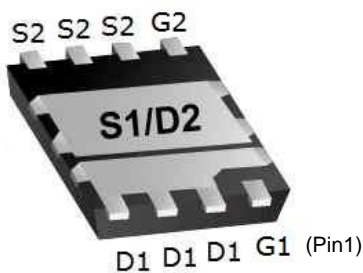
Features

- Advanced Trench Technology
- Low $R_{DS(ON)}$

Applications

- Load switching
- PWM Applications
- Power Management

Pin Configuration



Packing Information

Device	Package	Reel Size	Quantity(Min. Package)
ECAP43C03L	PDFN5X6-8L	13"	3000pcs

Absolute Maximum Ratings (at $T_A=25^\circ C$ Unless Otherwise Noted)

Symbol	Parameter	Q1	Q2	Units	
V_{DS}	Drain-Source Voltage	30	30	V	
V_{GS}	Gate-Source Voltage	± 20	± 20	V	
I_D	Continuous Drain Current	$T_C=25^\circ C$	43	80	A
		$T_C=100^\circ C$	26	52	A
I_{DM}	Pulse Drain Current Tested ^A	160	320	A	
E_{AS}	Single Pulse Avalanche Energy ^B	25	72	mJ	
P_D	Power Dissipation	25	43	W	
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to +150		$^\circ C$	

Thermal Characteristics

Symbol	Parameter	Typical	Units
$R_{\theta JC}$ (Q1)	Thermal Resistance-Junction to case max	5.0	$^\circ C/W$
$R_{\theta JC}$ (Q2)	Thermal Resistance-Junction to case max	2.9	$^\circ C/W$

Q1 Electrical Characteristics (at T_J =25°C 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 =20A	--	6.8	9	mΩ
		V _{GS} =4.5V, I _D =15A	--	10.3	14.5	mΩ
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V	--	--	1.2	V
Dynamic Parameters ^D						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V f=1MHZ	--	1116	--	pF
C _{oss}	Output Capacitance		--	187	--	pF
C _{rss}	Reverse Transfer Capacitance		--	152	--	pF
Q _g	Total Gate Charge	V _{DS} =15V, I _D =15A V _{GS} =10V	--	13.3	--	nC
Q _{gs}	Gate-Source Charge		--	3.1	--	nC
Q _{gd}	Gate-Drain Charge		--	5	--	nC
t _{D(on)}	Turn-on Delay Time	V _{DS} =15V , R _{GEN} =3Ω, I _D =30A, V _{GS} =10V	--	15	--	ns
t _r	Turn-on Rise Time		--	19	--	ns
t _{D(off)}	Turn-off Delay Time		--	35	--	ns
t _f	Turn-off Fall Time		--	21	--	ns
t _{rr}	Reverse recovery time		I _F =20A,	--	14	--
Q _{rr}	Reverse recovery charge	di/dt=100 A/uS	--	4.1	--	nC

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

B. EAS condition: T_J=25°C, R_G=25Ω, V_{DD}=25V, V_G=10V, L=0.5mH, I_{AS}=10A.

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

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

Q2 Electrical Characteristics (at T_J =25°C 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 =30A	--	3.5	4.2	mΩ
		V _{GS} =4.5V, I _D =20A	--	4.6	6.0	mΩ
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} =15V f=1MHZ	--	2680	--	pF
C _{oss}	Output Capacitance		--	393	--	pF
C _{rss}	Reverse Transfer Capacitance		--	330	--	pF
Q _g	Total Gate Charge	V _{DS} =15V, I _D =30A V _{GS} =10V	--	30	--	nC
Q _{gs}	Gate-Source Charge		--	7.2	--	nC
Q _{gd}	Gate-Drain Charge		--	10.4	--	nC
t _{D(on)}	Turn-on Delay Time	V _{DS} =15V , R _{GEN} =3Ω, I _D =30A, V _{GS} =10V	--	23	--	ns
t _r	Turn-on Rise Time		--	28	--	ns
t _{D(off)}	Turn-off Delay Time		--	74	--	ns
t _f	Turn-off Fall Time		--	36	--	ns
t _{rr}	Reverse recovery time		I _F =20A,	--	28	--
Q _{rr}	Reverse recovery charge	di/dt=100 A/uS	--	21	--	nC

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

B. EAS condition: T_J=25°C, V_{DD}=25V, V_G=10V, L=0.5mH, R_G=25Ω, I_{AS}=17A.

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

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

Q1 Typical Characteristics

Figure 1: Output Characteristics

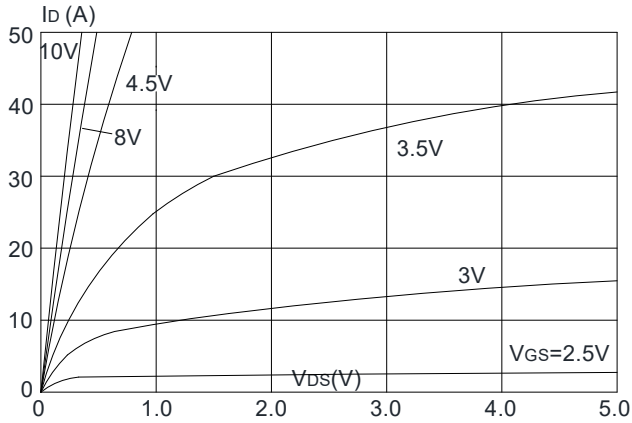


Figure 2: Typical Transfer Characteristics

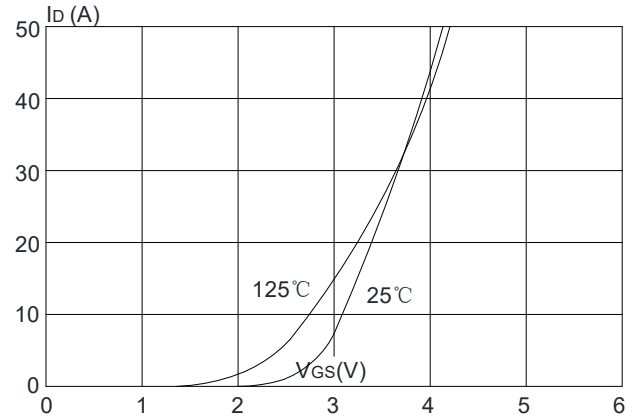


Figure 3: On-resistance vs. Drain Current

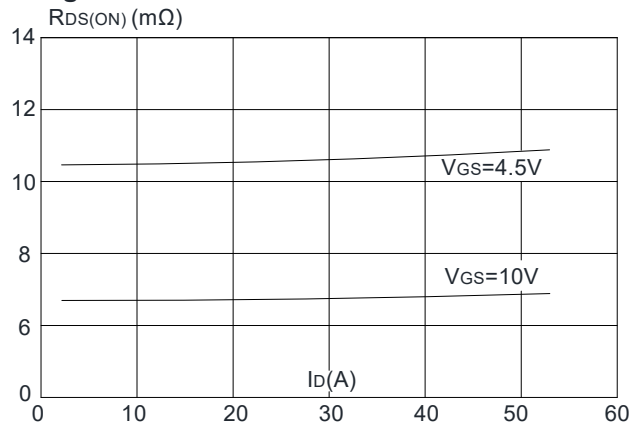


Figure 4: Body Diode Characteristics

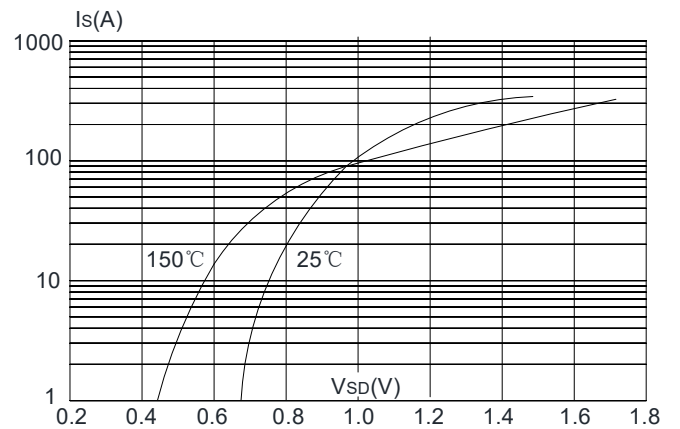


Figure 5: Gate Charge Characteristics

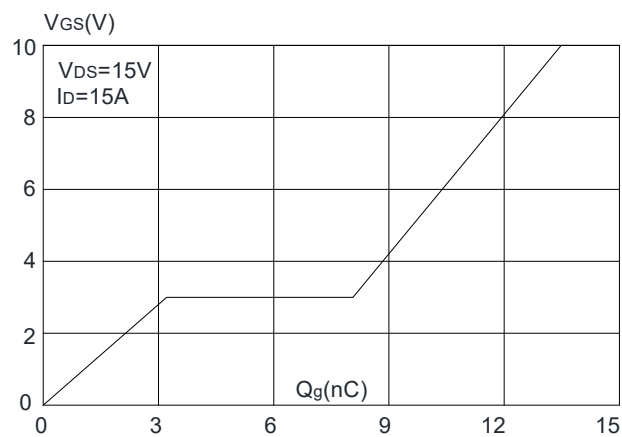
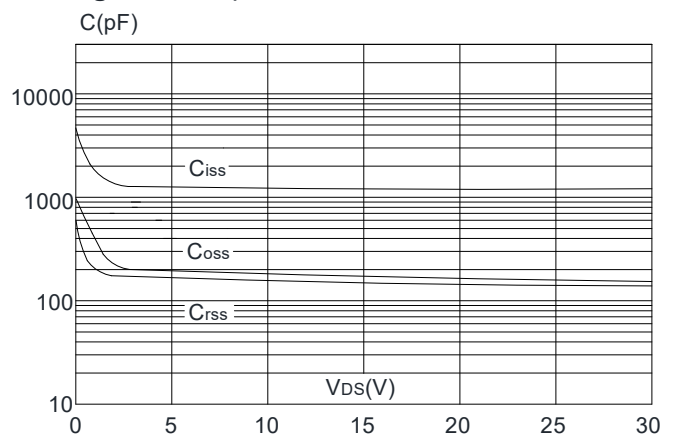


Figure 6: Capacitance Characteristics



Q1 Typical Characteristics

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

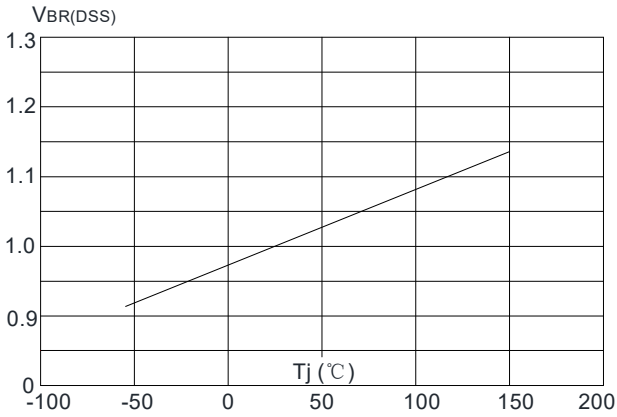


Figure 8: Normalized on Resistance vs. Junction Temperature

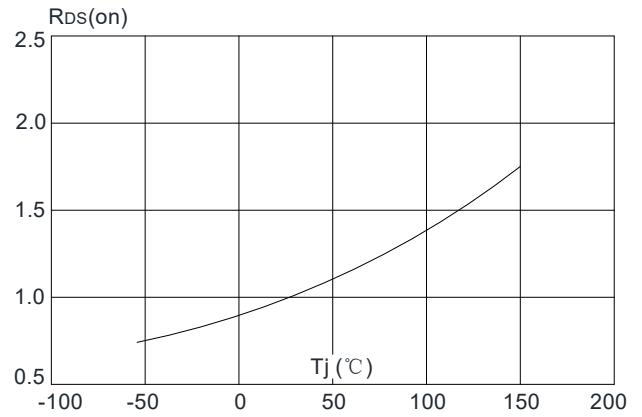


Figure 9: Maximum Safe Operating Area

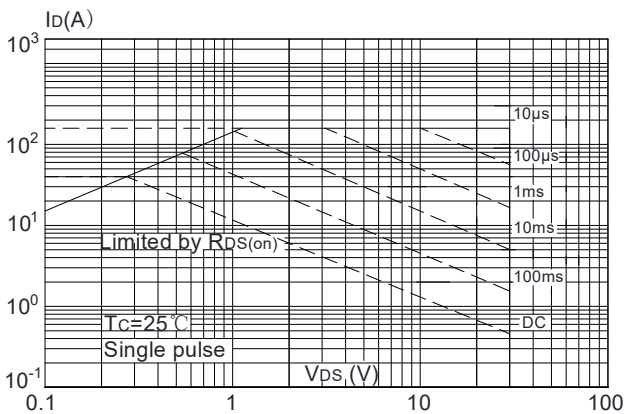


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

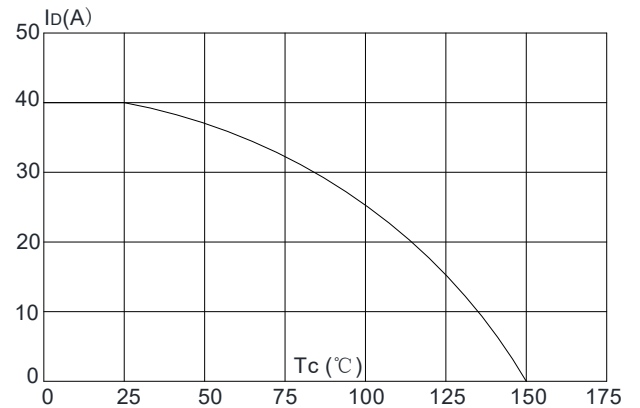
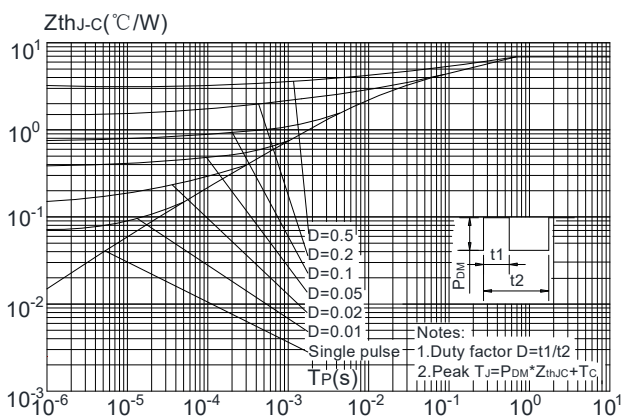


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



Q2 Typical Characteristics

Figure 1: Output Characteristics

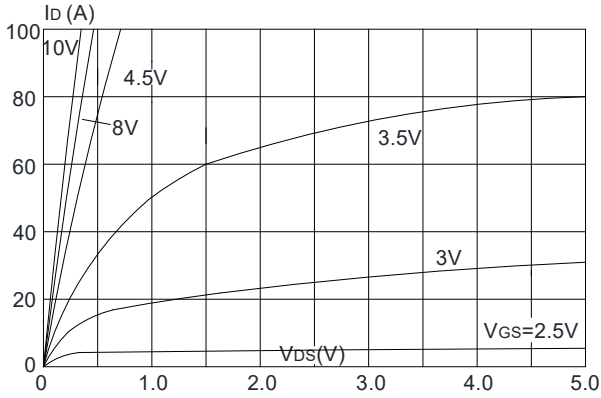


Figure 2: Typical Transfer Characteristics

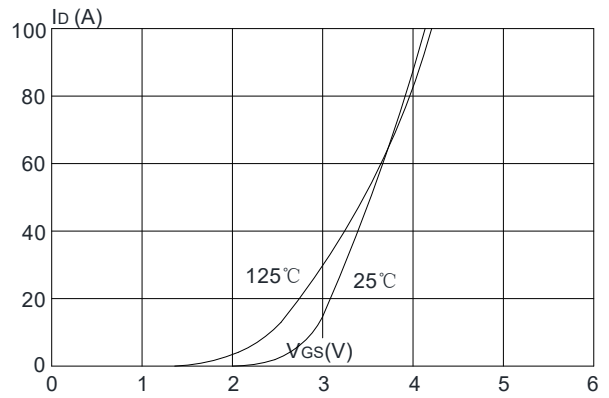


Figure 3: On-resistance vs. Drain Current

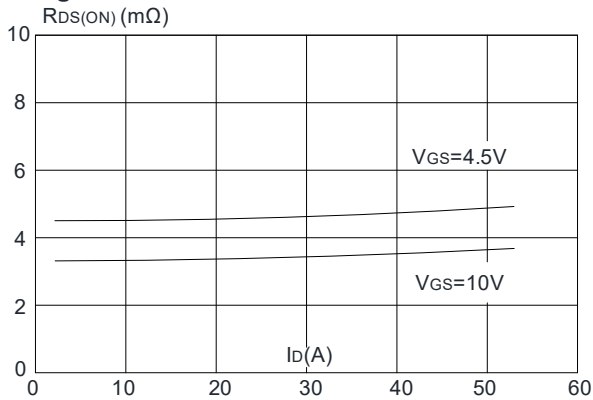


Figure 4: Body Diode Characteristics

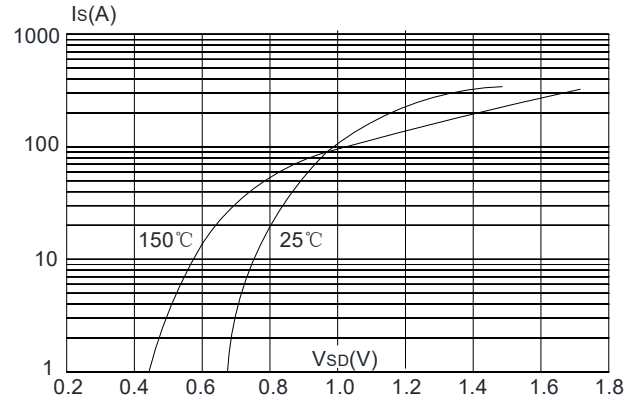


Figure 5: Gate Charge Characteristics

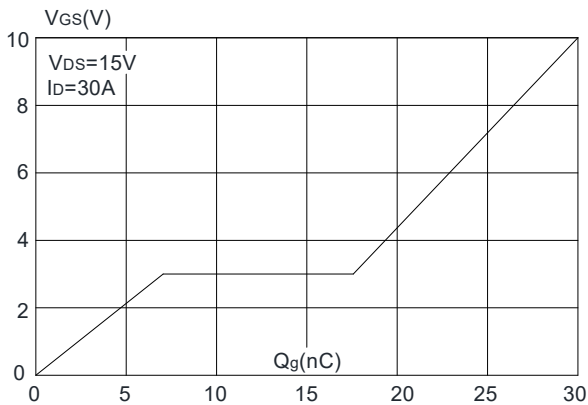
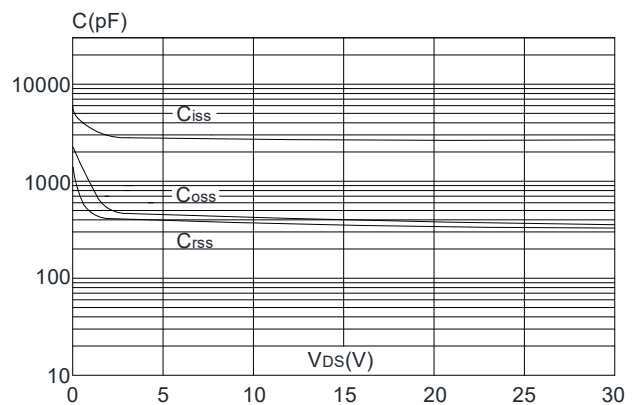


Figure 6: Capacitance Characteristics



Q2 Typical Characteristics

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

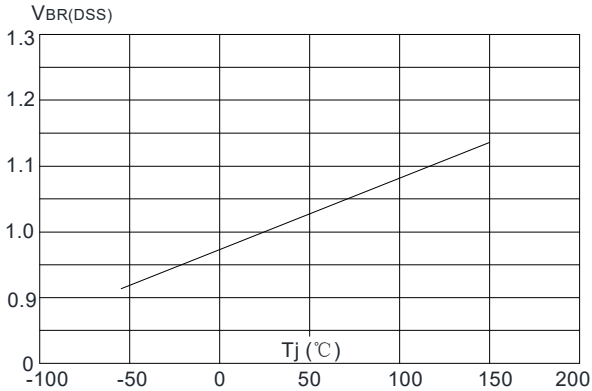


Figure 8: Normalized on Resistance vs. Junction Temperature

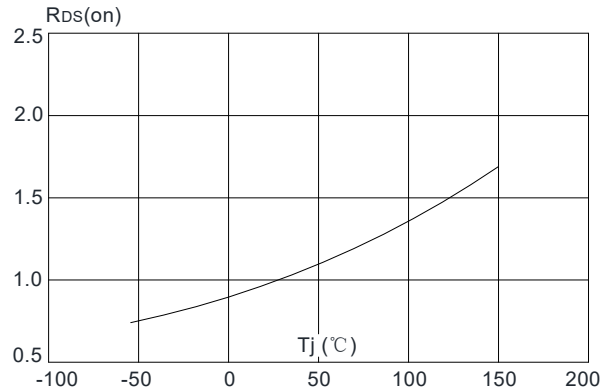


Figure 9: Maximum Safe Operating Area

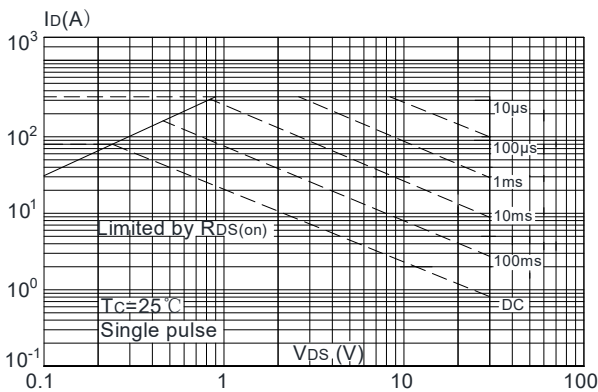


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

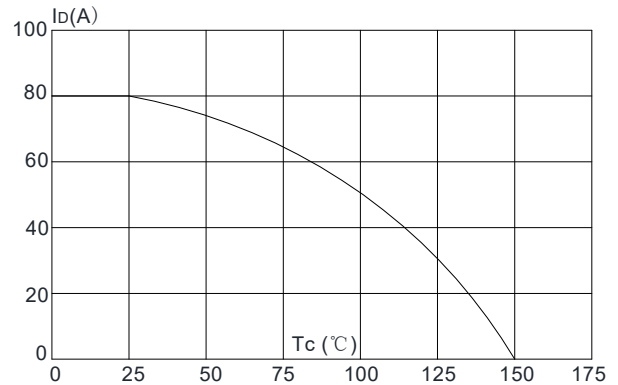
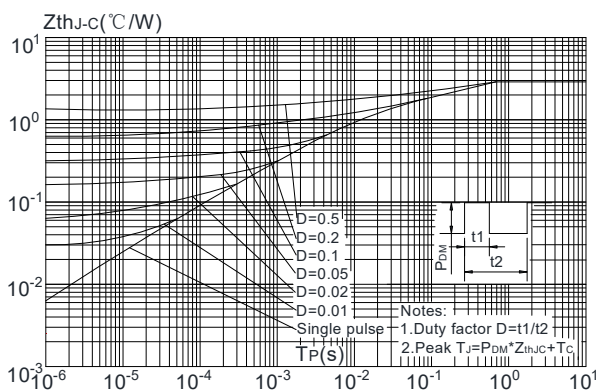


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



Test Circuit

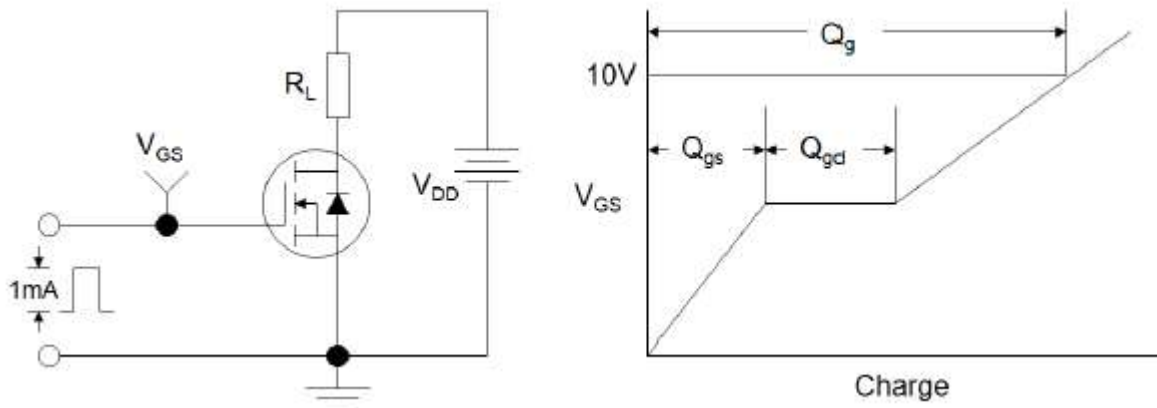


Figure1:Gate Charge Test Circuit & Waveform

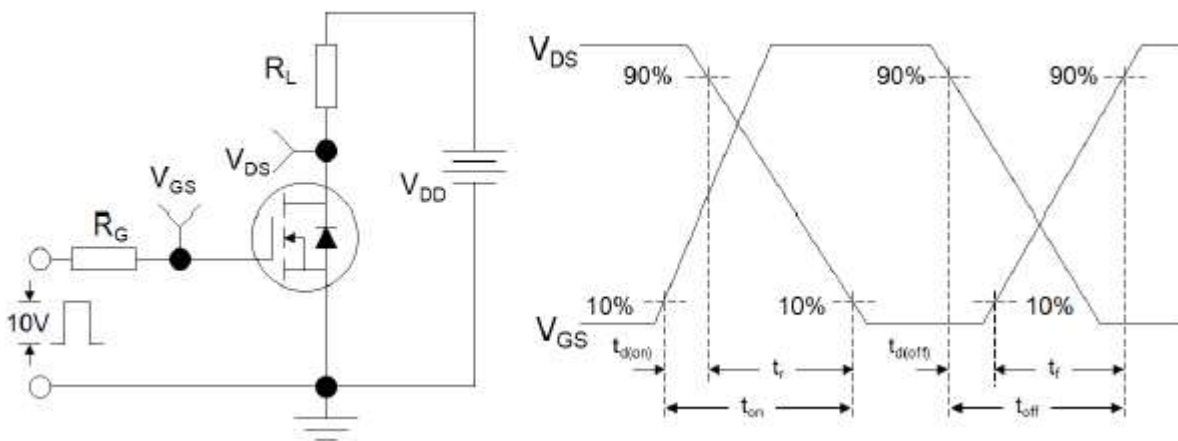


Figure 2: Resistive Switching Test Circuit & Waveforms

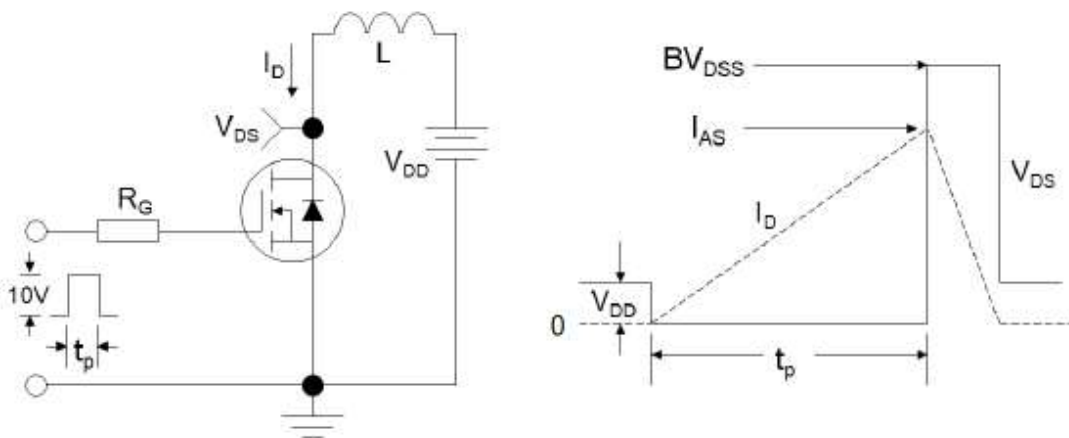
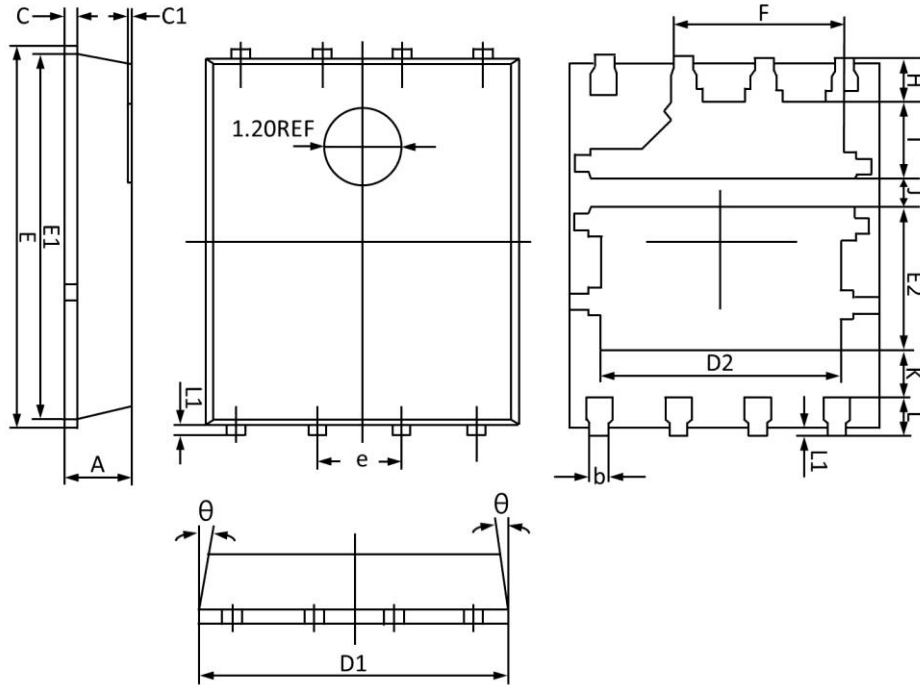


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

PDFN5X6-8L Package Information (unit:mm)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.036	0.043
b	0.330	0.510	0.013	0.020
C	0.200	0.300	0.008	0.011
C1	0.040 REF		0.040 REF	
D1	4.800	5.000	0.189	0.196
D2	3.610	3.960	0.143	0.155
E	5.900	6.100	0.233	0.240
E1	5.700	5.800	0.225	0.228
E2	2.020	2.420	0.080	0.095
e	1.270BSC		1.270BSC	
F	2.550	2.900	0.101	0.114
H	0.610	0.810	0.025	0.031
I	1.100	1.300	0.044	0.051
J	0.400	0.600	0.016	0.023
K	0.500	-	0.020	-
L	0.510	0.710	0.020	0.027
L1	0.060	0.200	0.003	0.007
θ	0°	12°	0°	12°