

P-Channel 20V(D-S) MOSFET

Product summary		
V_{DS}	-20	V
$R_{DS(ON)}$ (at $V_{GS}=-4.5V$) Typ.	17	m Ω
$R_{DS(ON)}$ (at $V_{GS}=-2.5V$) Typ.	22	m Ω
$I_D(T_C=25^\circ C)$	-10	A

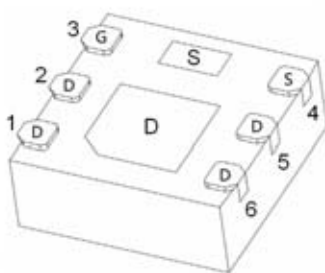
Features

- Advanced Trench Technology
- Low $R_{DS(ON)}$
- RoHS and Halogen-Free compliant

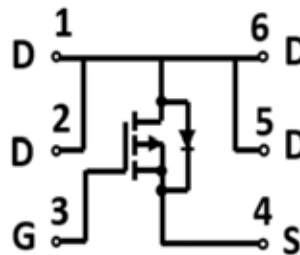
Applications

- Load switch
- PWM Application

Pin Configuration



DFN2X2-6L



Packing Information

Device	Package	Reel Size	Quantity(Min. Package)
EC4105	DFN2X2-6L	7"	3000pcs

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	± 12	V
I_D	Continuous Drain Current	$T_C=25^\circ C$	-10
		$T_C=100^\circ C$	-7
I_{DM}	Pulse Drain Current Tested ^A	-39	A
P_D	Power Dissipation $T_C=25^\circ C$	4.5	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	27.8	$^\circ C/W$

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	$V_{GS}=0V, I_D=-250\mu A$	-20	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=-20V, V_{GS}=0V$	--	--	-1	μA
I_{GSS}	Gate-Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 12V$	--	--	± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.4	-0.7	-1.0	V
$R_{DS(ON)}$	Drain-Source On-State Resistance ^B	$V_{GS}=-4.5V, I_D=-10A$	--	17	22	m Ω
		$V_{GS}=-2.5V, I_D=-5A$	--	22	30	m Ω
V_{SD}	Diode Forward Voltage	$I_S=-1A, V_{GS}=0V$	--	--	-1.2	V
I_S	Maximum Body-Diode Continuous Current		--	--	-10	A
Dynamic Parameters ^C						
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=-10V$ $f=1\text{MHZ}$	--	2000	--	pF
C_{oss}	Output Capacitance		--	242	--	pF
C_{rss}	Reverse Transfer Capacitance		--	231	--	pF
Q_g	Total Gate Charge	$V_{DS}=-10V, I_D=-6A$ $V_{GS}=-4.5V$	--	15.3	--	nC
Q_{gs}	Gate-Source Charge		--	2.2	--	nC
Q_{gd}	Gate-Drain Charge		--	4.4	--	nC
$t_{D(on)}$	Turn-on Delay Time	$V_{DD}=-10V$ $I_D=-10A,$ $R_{GEN}=2.5\Omega,$ $V_{GS}=-4.5V$	--	10	--	ns
t_r	Turn-on Rise Time		--	31	--	ns
$t_{D(off)}$	Turn-off Delay Time		--	28	--	ns
t_f	Turn-off Fall Time		--	8	--	ns

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

B. Pulse Test: Pulse Width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

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

Typical Characteristics

Figure 1: Output Characteristics

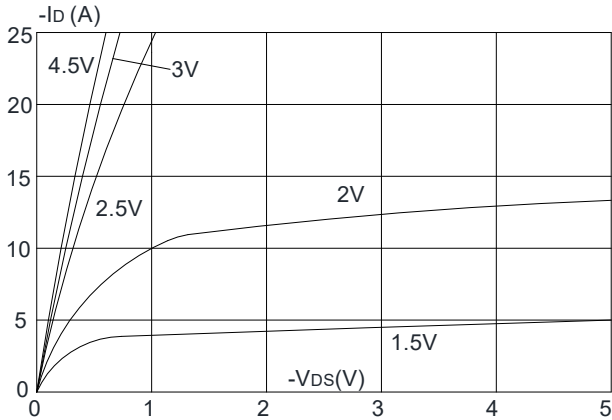


Figure 2: Typical Transfer Characteristics

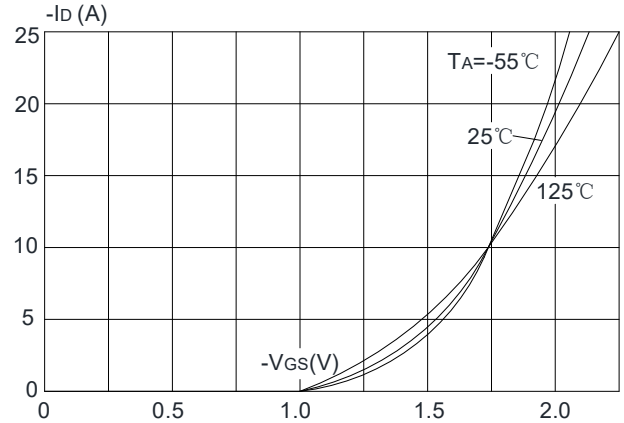


Figure 3: On-resistance vs. Drain Current

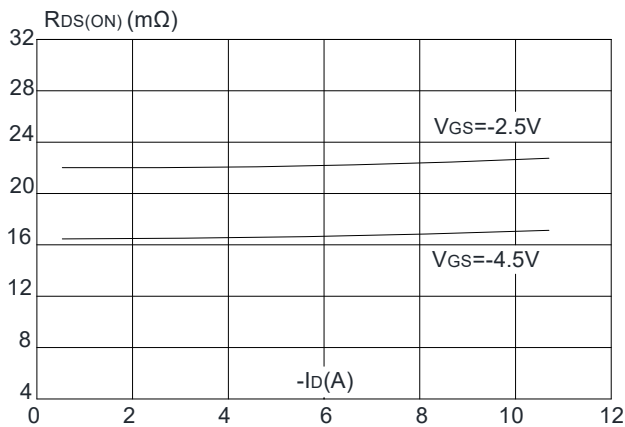


Figure 4: Body Diode Characteristics

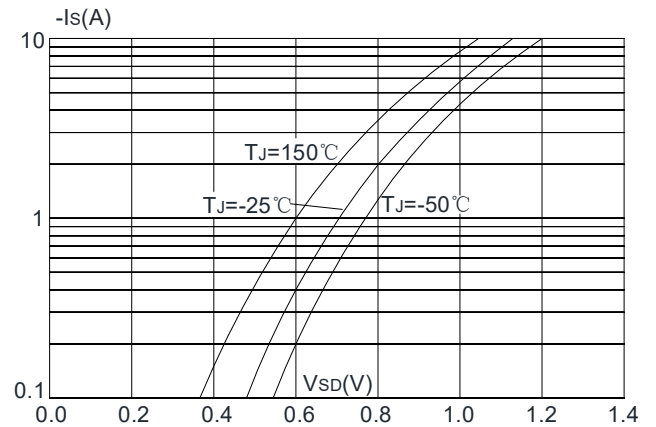


Figure 5: Gate Charge Characteristics

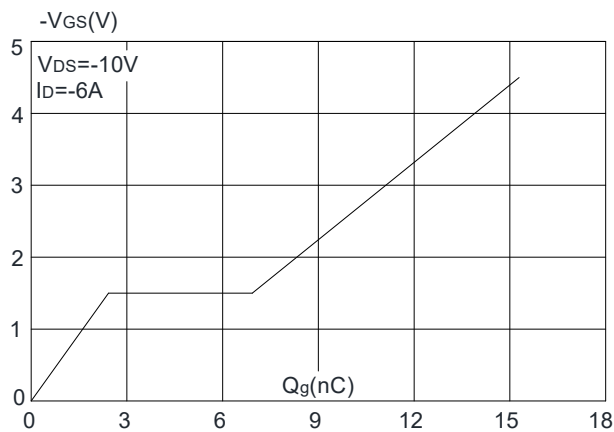
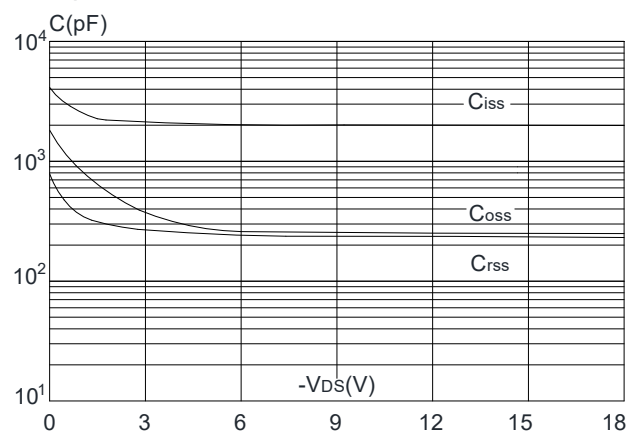


Figure 6: Capacitance Characteristics



Typical Characteristics

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

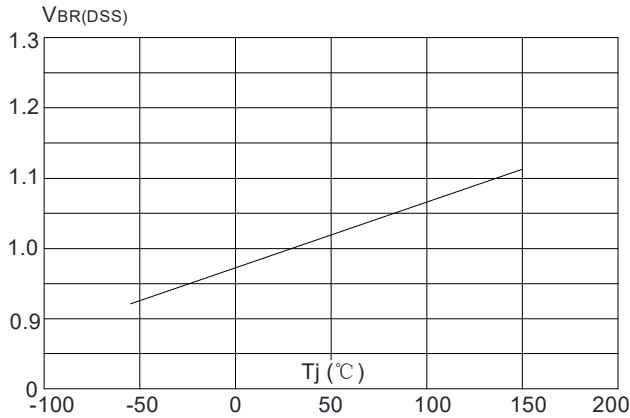


Figure 8: Normalized on Resistance vs. Junction Temperature

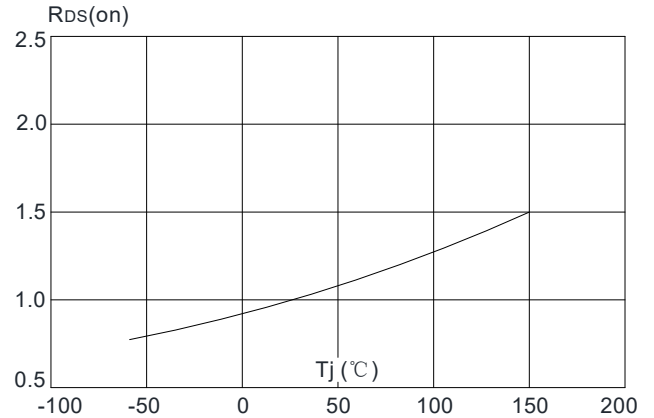


Figure 9: Maximum Safe Operating Area

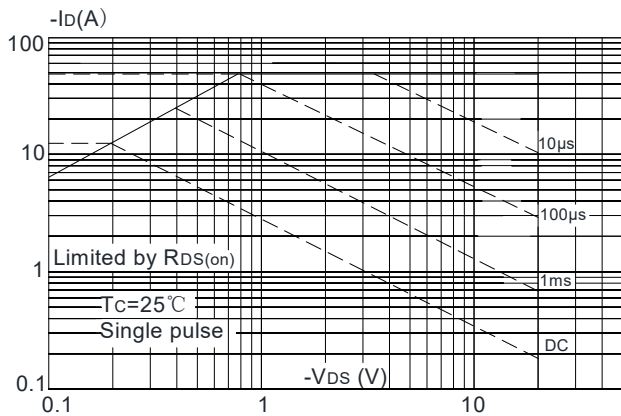


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

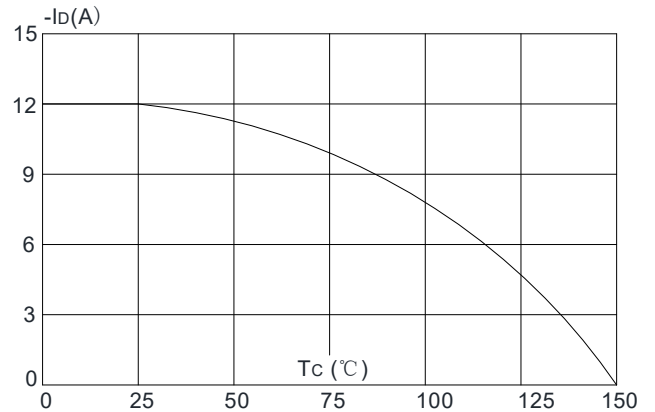
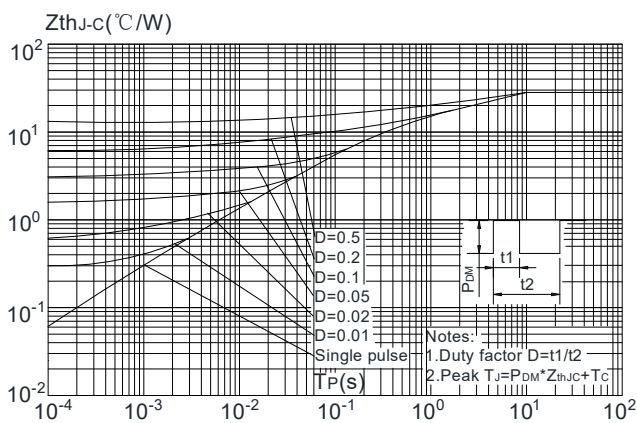
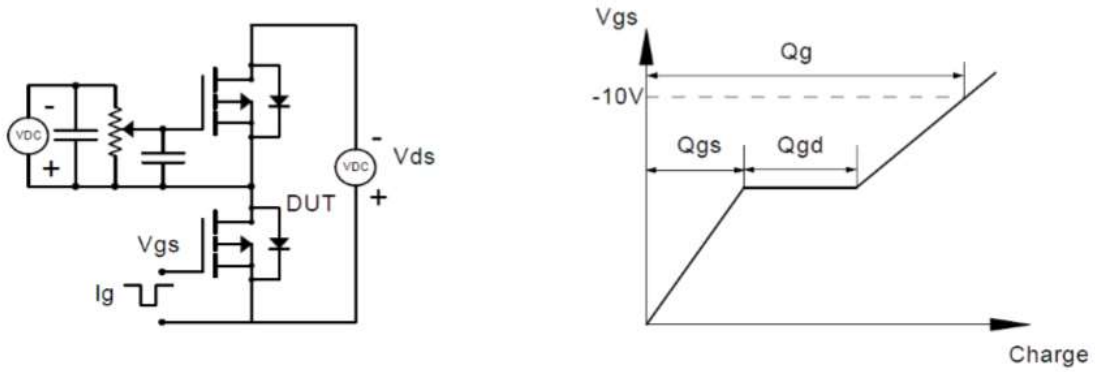


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

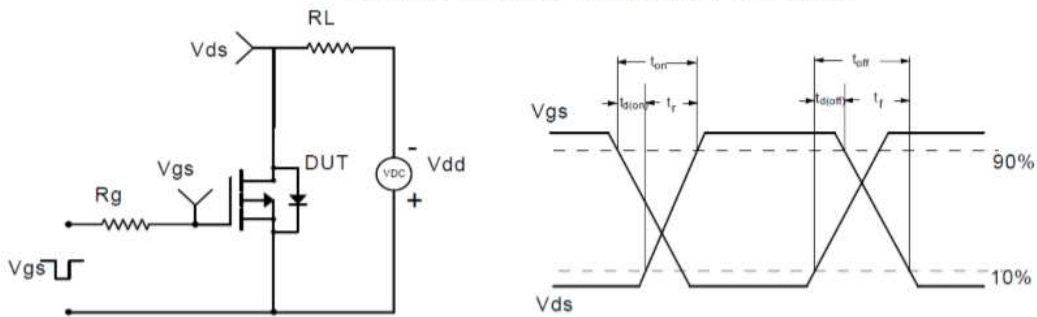


Test Circuit

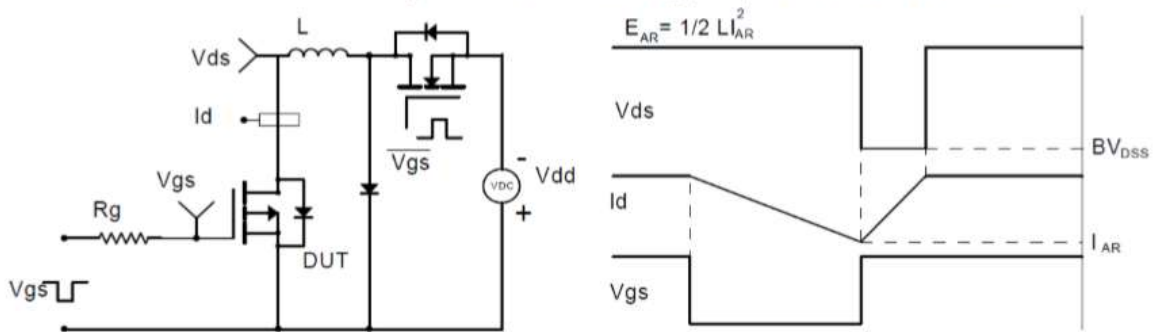
Gate Charge Test Circuit & Waveform



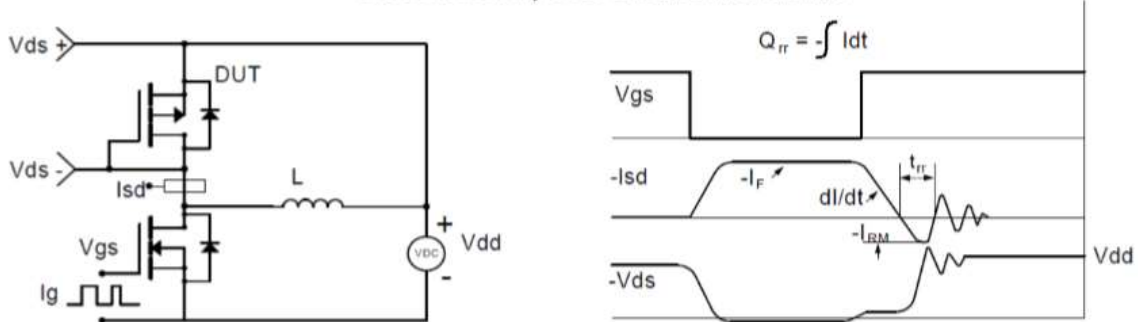
Resistive Switching Test Circuit & Waveforms



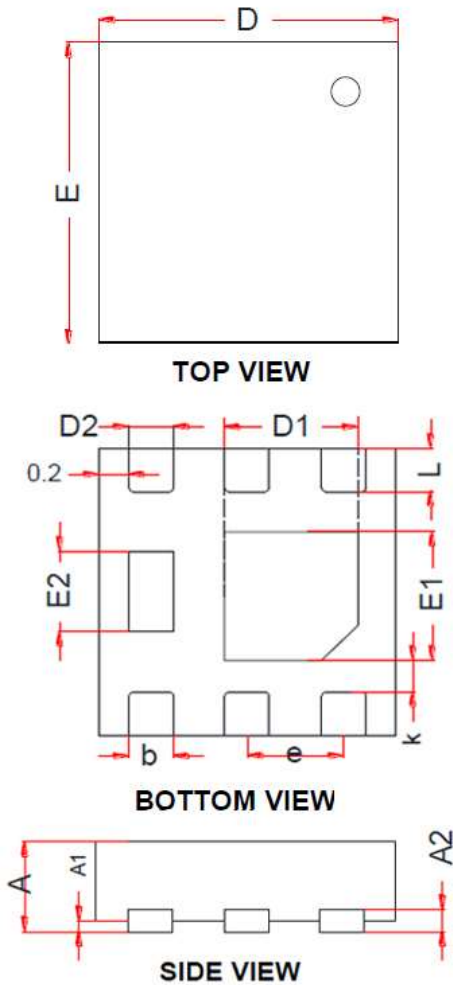
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



DFN2X2-6L Package Information



Symbol	Dimensions in millimeters		
	Min.	Typ.	Max.
A	0.70	0.75	0.85
A1	0.00	0.02	0.05
A2	0.20Ref.		
b	0.25	0.30	0.35
D	1.95	2.00	2.05
D1	0.85	0.90	0.95
D2	0.25	0.30	0.35
E	1.95	2.00	2.05
E1	0.75	0.80	0.85
E2	0.56Ref.		
e	0.65BSC.		
L	0.30	0.35	0.40
K	0.20	-	-