

P-Channel 30V(D-S) MOSFET

Product summary		
V_{DS}	-30	V
$R_{DS(ON)}$ (at $V_{GS}=-10V$) Typ.	9.5	m Ω
$R_{DS(ON)}$ (at $V_{GS}=-4.5V$) Typ.	14	m Ω
I_D ($T_A=25^{\circ}C$)	-12	A

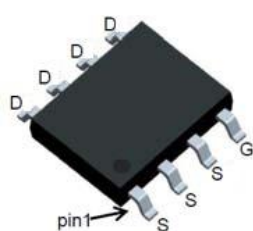
Features

- High density cell design for low $R_{DS(ON)}$
- Trench Power LV MOSFET technology
- High Speed switching

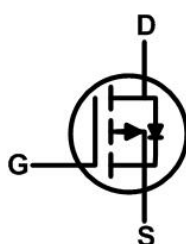
Applications

- Power management functions
- Load switch

Pin Configuration



SOP8



Packing Information

Device	Package	Reel Size	Quantity(Min. Package)
ECG4407	SOP8	13"	4000pcs

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		± 25	V
I_D	Continuous Drain Current ^A	$T_A=25^{\circ}C$	-12	A
		$T_A=70^{\circ}C$	-10	A
I_{DM}	Pulse Drain Current ^B		-55	A
E_{AS}	Single Pulse Avalanche Energy ^C		105	mJ
P_D	Power Dissipation ^A		3.2	W
T_J, T_{STG}	Junction and Storage Temperature Range		-55 to +150	$^{\circ}C$

Thermal Characteristics

Symbol	Parameter	Typical	Units
$R_{\theta JA}$	Thermal Resistance-Junction to ambient ^A	39	$^{\circ}C/W$

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	$V_{DS}=0V, V_{GS}=\pm 25V$	--	--	± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.2	-1.8	-2.8	V
$R_{DS(on)}$	Drain-Source On-State Resistance ^B	$V_{GS}=-20V, I_D=-12A$	--	9.0	10.5	m Ω
		$V_{GS}=-10V, I_D=-12A$	--	9.5	12.5	m Ω
		$V_{GS}=-4.5V, I_D=-10A$	--	14	21	m Ω
V_{SD}	Diode Forward Voltage	$I_S=-12A, V_{GS}=0V$	--	--	-1.2	V
Dynamic Parameters ^D						
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=-15V$ $f=1\text{MHz}$	--	2152	--	pF
C_{oss}	Output Capacitance		--	308	--	pF
C_{rss}	Reverse Transfer Capacitance		--	242	--	pF
Q_g	Total Gate Charge	$V_{DS}=-15V, I_D=-12A$ $V_{GS}=-10V$	--	40.1	--	nC
Q_{gs}	Gate-Source Charge		--	8.4	--	nC
Q_{gd}	Gate-Drain Charge		--	8.6	--	nC
$t_{D(on)}$	Turn-on Delay Time	$V_{DD}=-15V$ $I_D=-1A, R_G=2.5\Omega,$ $V_{GS}=-10V$	--	8	--	ns
t_r	Turn-on Rise Time		--	19	--	ns
$t_{D(off)}$	Turn-off Delay Time		--	75	--	ns
t_f	Turn-off Fall Time		--	46	--	ns
t_{rr}	Reverse recovery time	$I_F=-12A,$ $di/dt=100\text{ A/uS}$	--	18	--	ns
Q_{rr}	Reverse recovery charge		--	7.8	--	nC

A. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.

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

C. The EAS data shows Max. rating . The test condition is $L=0.3\text{mH}, T_A=25^{\circ}\text{C}$.

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

Typical Characteristics

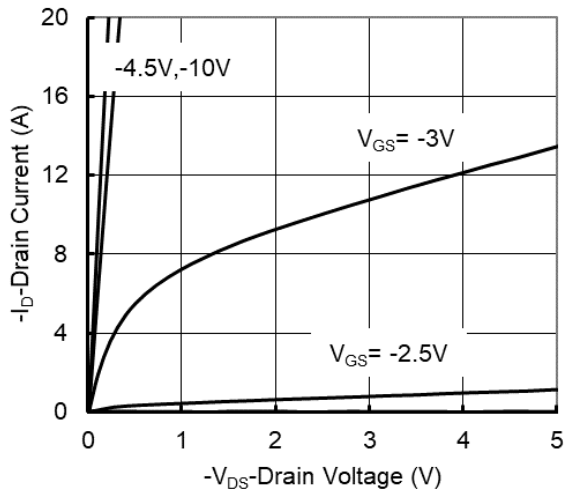


Figure 1. Output Characteristics

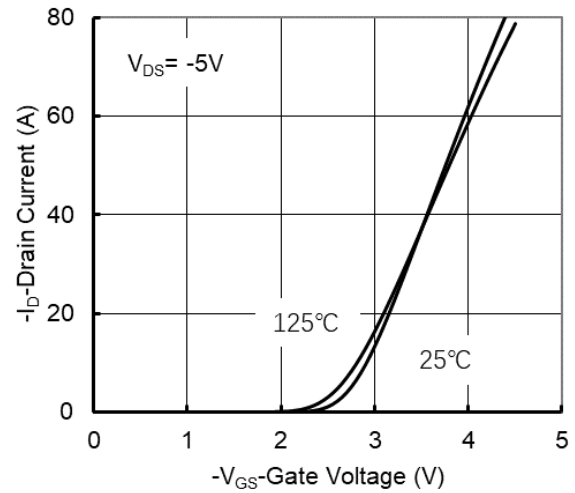


Figure 2. Transfer Characteristics

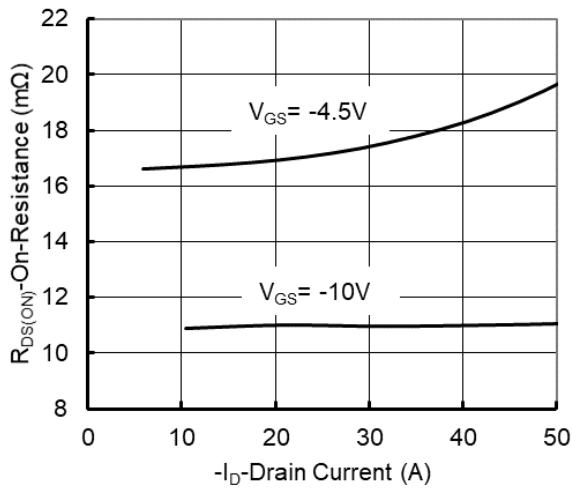


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

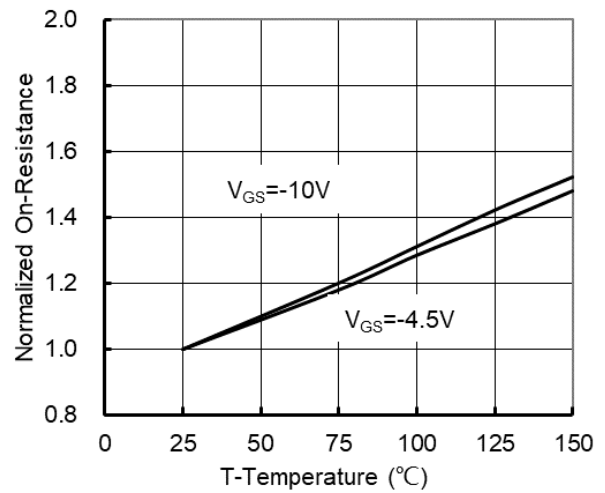


Figure 4. On-Resistance vs. Junction Temperature

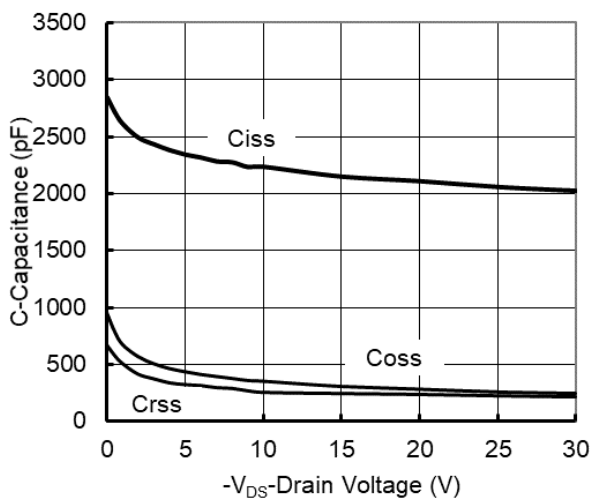


Figure 5. Capacitance Characteristics

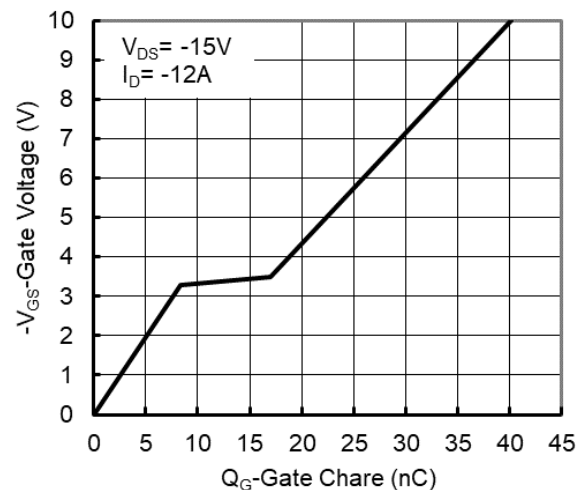


Figure 6. Gate Charge

Typical Characteristics

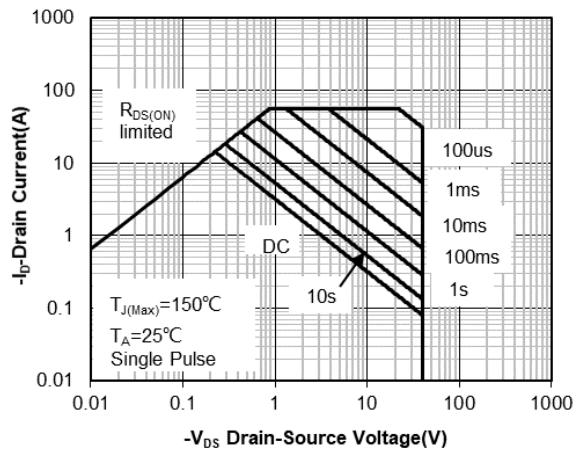


Figure 7. Safe Operation Area

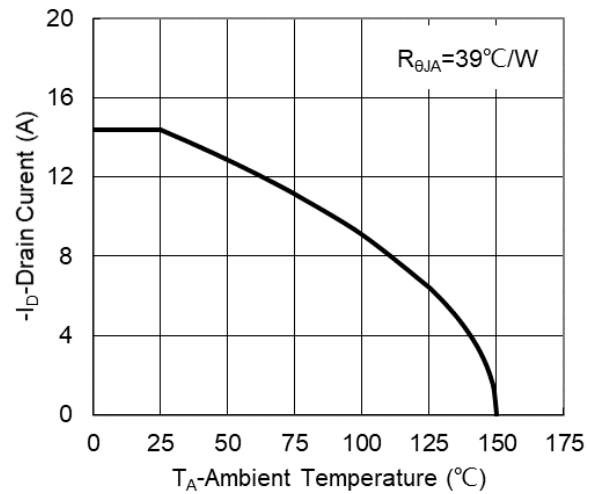


Figure 8. Maximum Continuous Drain Current vs Ambient Temperature

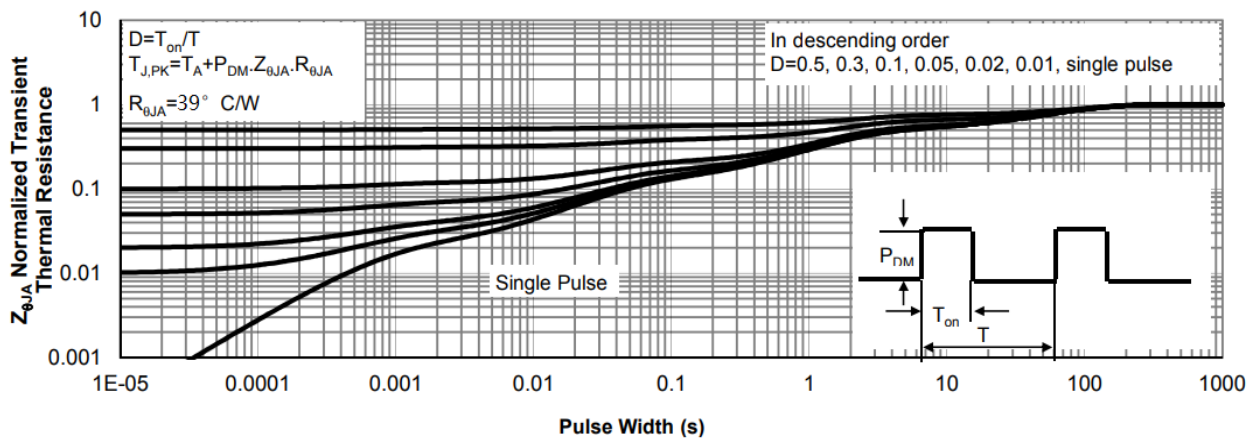
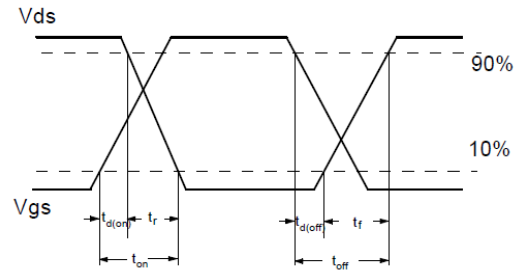
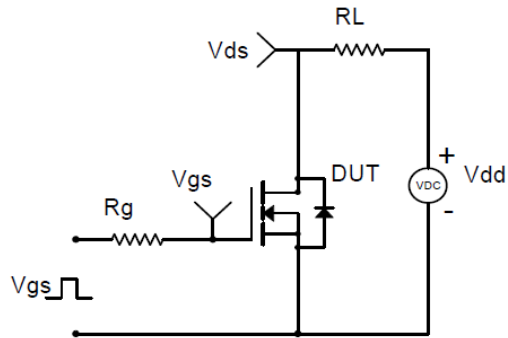
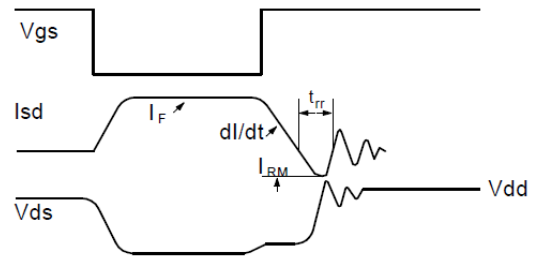
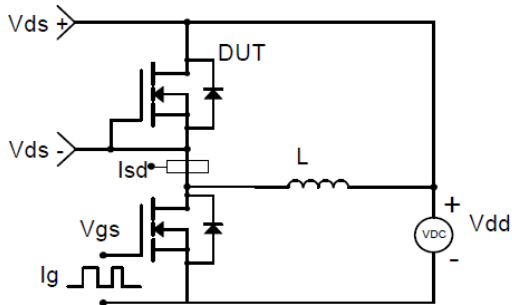


Figure 9. Normalized Maximum Transient Thermal Impedance

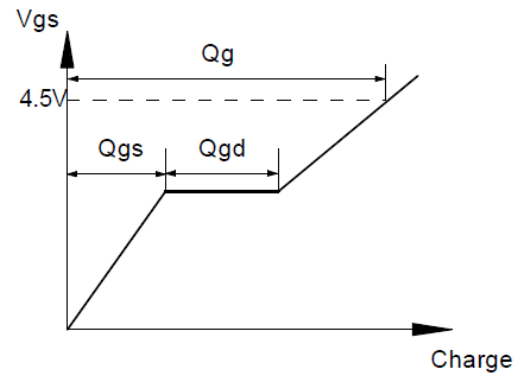
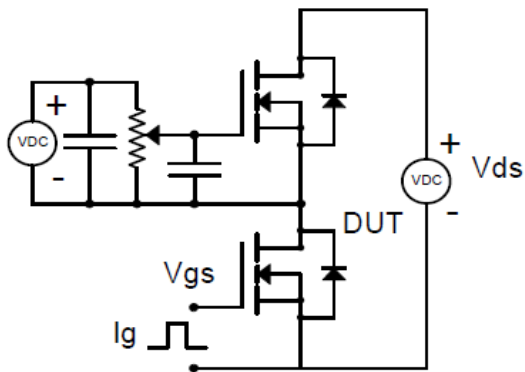
Typical Characteristics



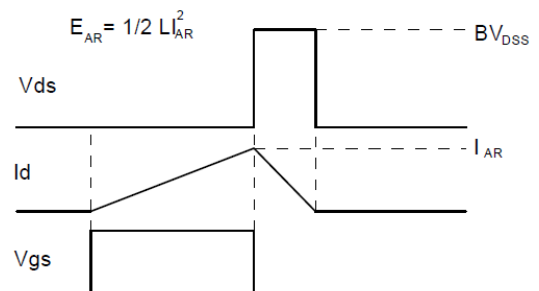
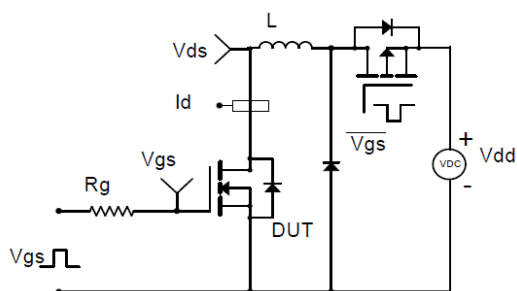
Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

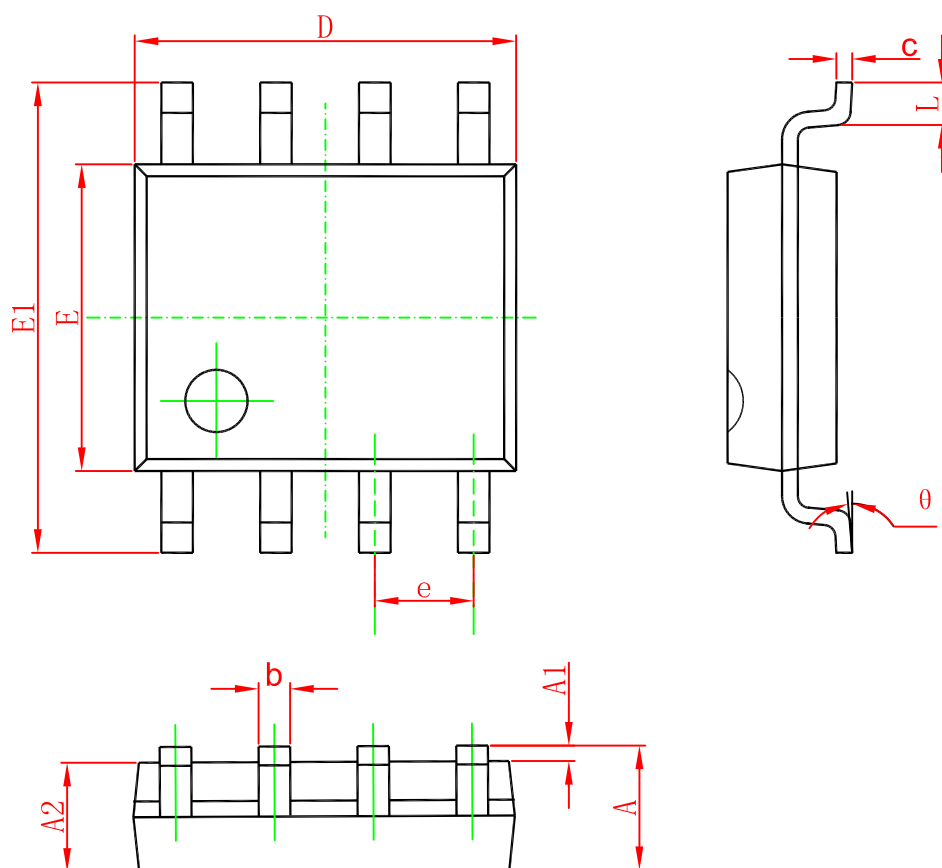


Gate Charge Test Circuit & Waveform



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

SOP8 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°