

## P-Channel 30V(D-S) MOSFET

Product summary		
$V_{DS}$	-30	V
$R_{DS(ON)}$ (at $V_{GS}=-10V$ ) Typ.	5	m $\Omega$
$R_{DS(ON)}$ (at $V_{GS}=-4.5V$ ) Typ.	8	m $\Omega$
$I_D$ ( $T_A=25^\circ C$ )	-16	A

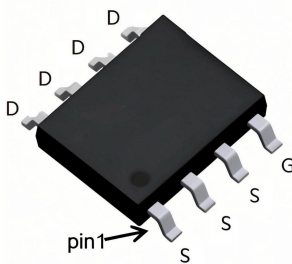
### Features

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

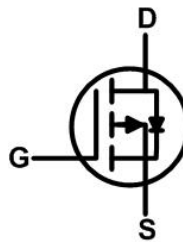
### Applications

- Power management functions
- Load switch

### Pin Configuration



SOP8



### Packing Information

Device	Reel Size	Quantity(Min. Package)
ECHA16P03S	13"	3000pcs

### 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	$\pm 20$	V
$I_D$	Continuous Drain Current at $V_{GS}=10V$	$T_A=25^\circ C$	-16
		$T_A=100^\circ C$	-10
$I_{DM}$	Pulse Drain Current Tested <sup>A</sup>	-120	A
$P_D$	Power Dissipation	3.1	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 <sup>B</sup>	40	$^\circ C/W$

**Electrical Characteristics (at  $T_J = 25^\circ\text{C}$  Unless Otherwise Noted)**

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
<b>Static Parameters</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-30	--	--	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=-24V, V_{GS}=0V$	--	--	-1	$\mu A$
$I_{GSS}$	Gate-Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$	--	--	$\pm 100$	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.2	--	-2.5	V
$R_{DS(on)}$	Drain-Source On-State Resistance	$V_{GS}=-10V, I_D=-15A$	--	5	7	m $\Omega$
		$V_{GS}=-4.5V, I_D=-10A$	--	8	11	m $\Omega$
$V_{SD}$	Forward Voltage	$I_S=-10A, V_{GS}=0V$	--	--	-1.2	V
$I_{SM}$	Maximum Body-Diode Continuous Current		--	--	-16	A
<b>Dynamic Parameters</b>						
$C_{iss}$	Input Capacitance	$V_{GS}=0V, V_{DS}=-25V$ $f=1\text{MHz}$	--	3450	--	pF
$C_{oss}$	Output Capacitance		--	255	--	pF
$C_{rss}$	Reverse Transfer Capacitance		--	140	--	pF
<b>Switching Parameters</b>						
$Q_g$	Total Gate Charge	$V_{DS}=-15V, I_D=-15A$ $V_{GS}=-10V$	--	60	--	nC
$Q_{gs}$	Gate-Source Charge		--	9	--	nC
$Q_{gd}$	Gate-Drain Charge		--	15	--	nC
$t_{D(on)}$	Turn-on Delay Time	$V_{DD}=-15V$ $I_D=-10A, R_G=3.3\Omega,$ $V_{GS}=-10V$	--	17	--	nS
$t_r$	Turn-on Rise Time		--	40	--	nS
$t_{D(off)}$	Turn-off Delay Time		--	55	--	nS
$t_f$	Turn-off Fall Time		--	13	--	nS

A. Pulse width limited by maximum junction temperature.

B.  $40^\circ\text{C} / \text{W}$  when mounted on a  $1 \text{ in}^2$  pad of 2 oz copper,  $t \leq 10\text{sec}$ .

Typical Characteristics

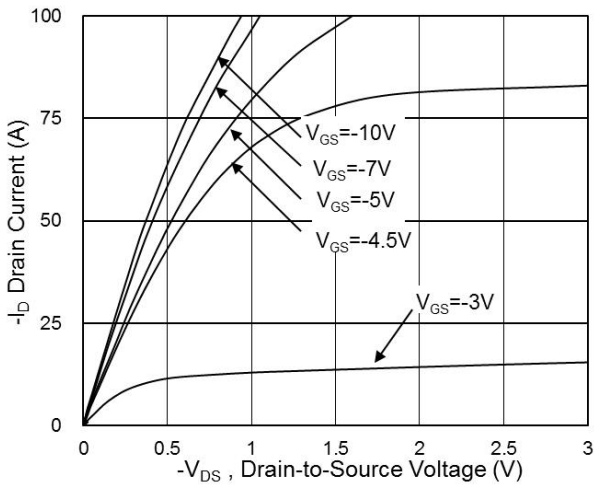


Fig.1 Typical Output Characteristics

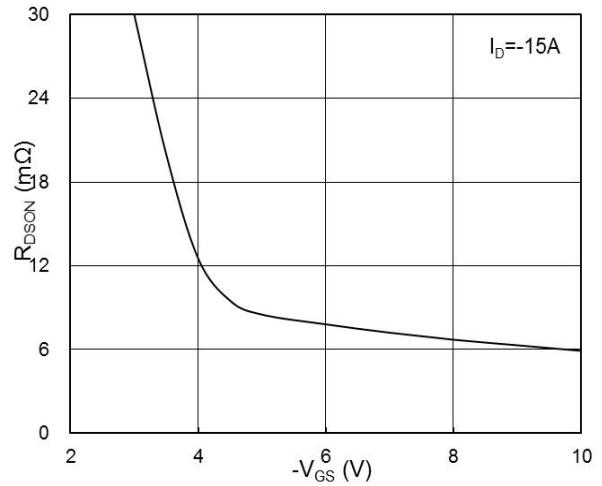


Fig.2 On-Resistance vs. Gate-Source Voltage

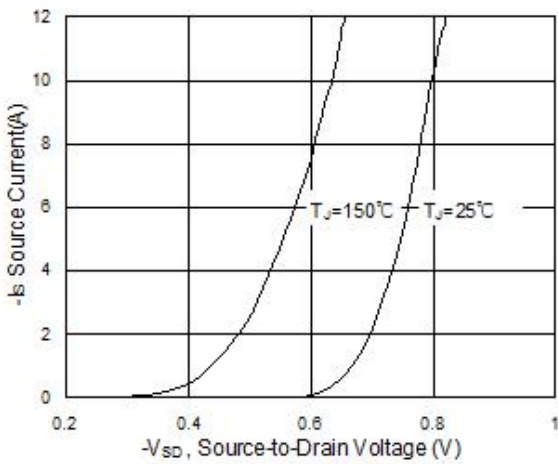


Fig.3 Forward Characteristics of Reverse

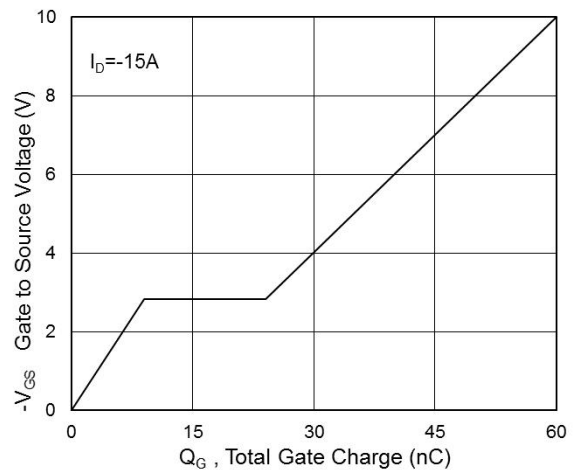


Fig.4 Gate-Charge Characteristics

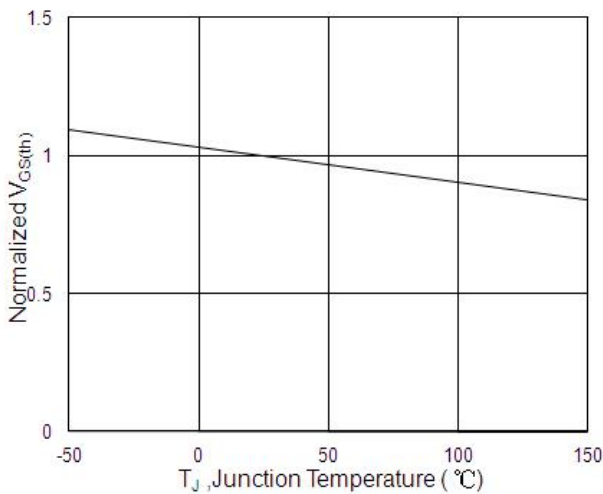


Fig.5 Normalized  $-V_{GS(th)}$  vs.  $T_J$

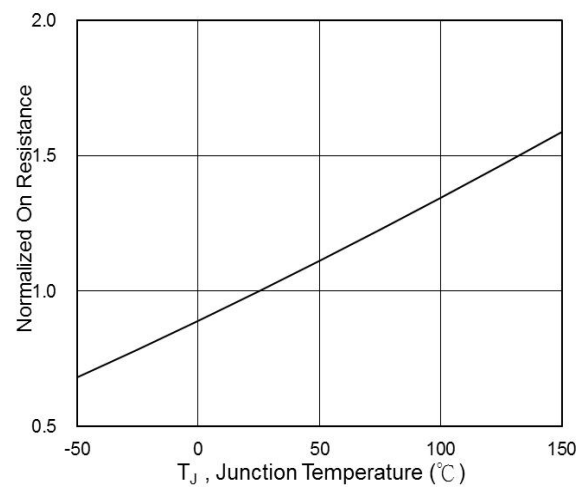


Fig.6 Normalized  $R_{DS(on)}$  vs.  $T_J$

Typical Characteristics

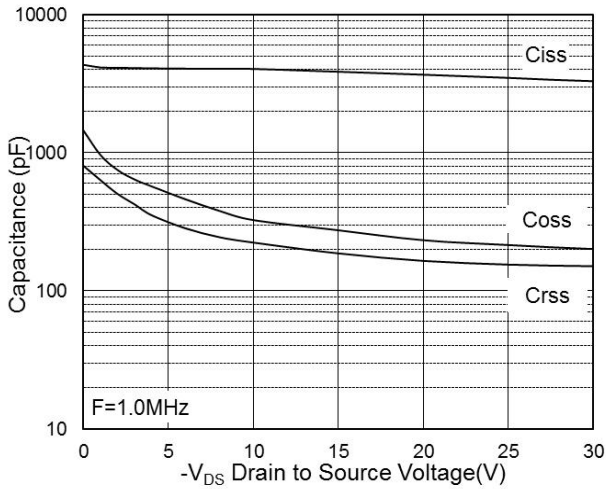


Fig.7 Capacitance

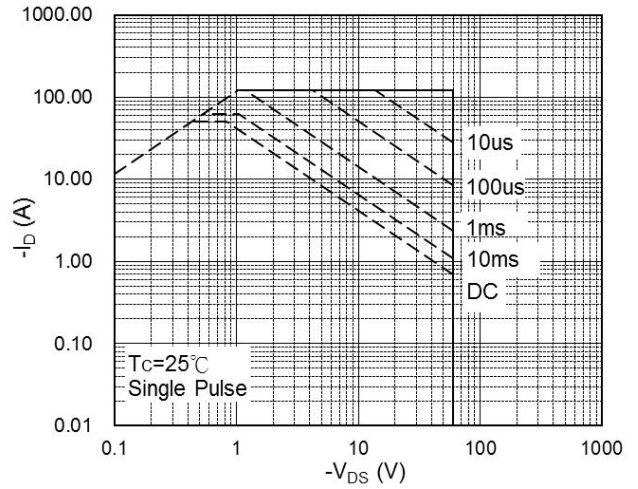


Fig.8 Safe Operating Area

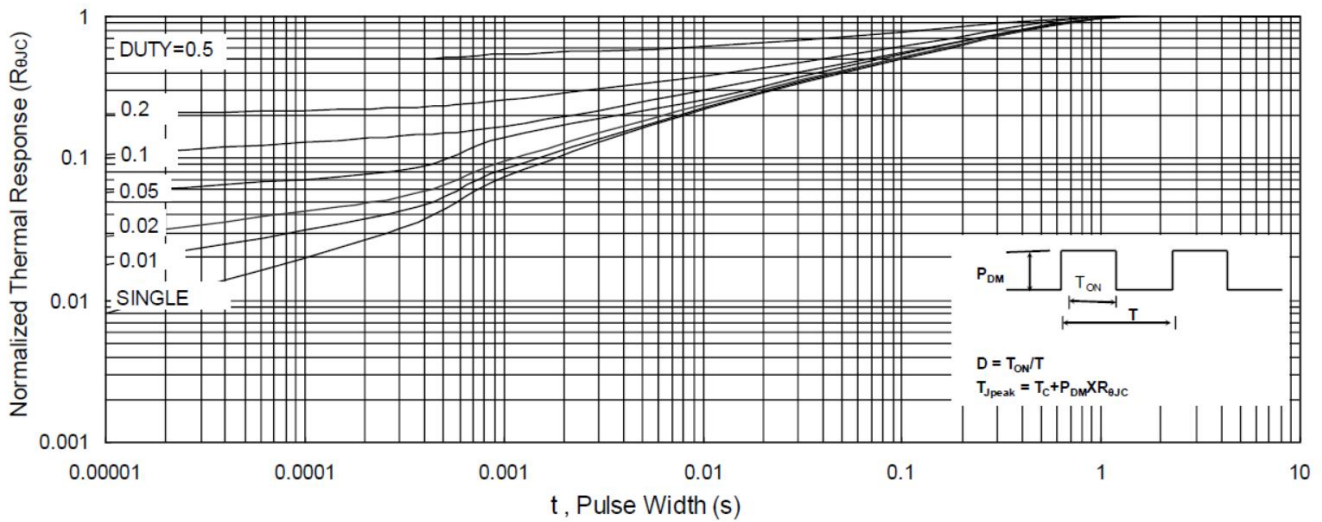


Fig.9 Normalized Maximum Transient Thermal Impedance

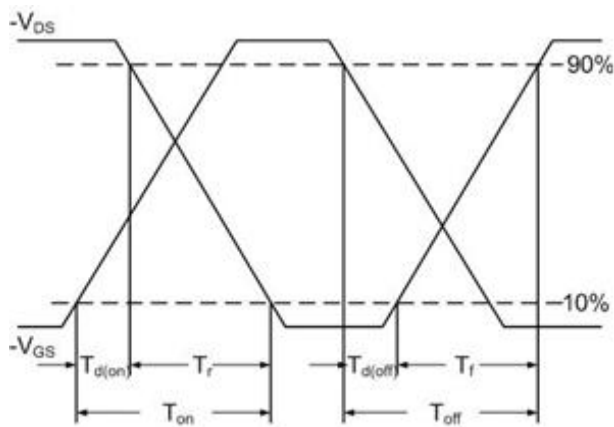


Fig.10 Switching Time Waveform

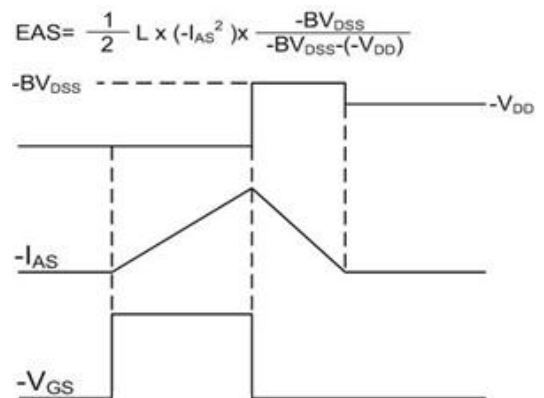
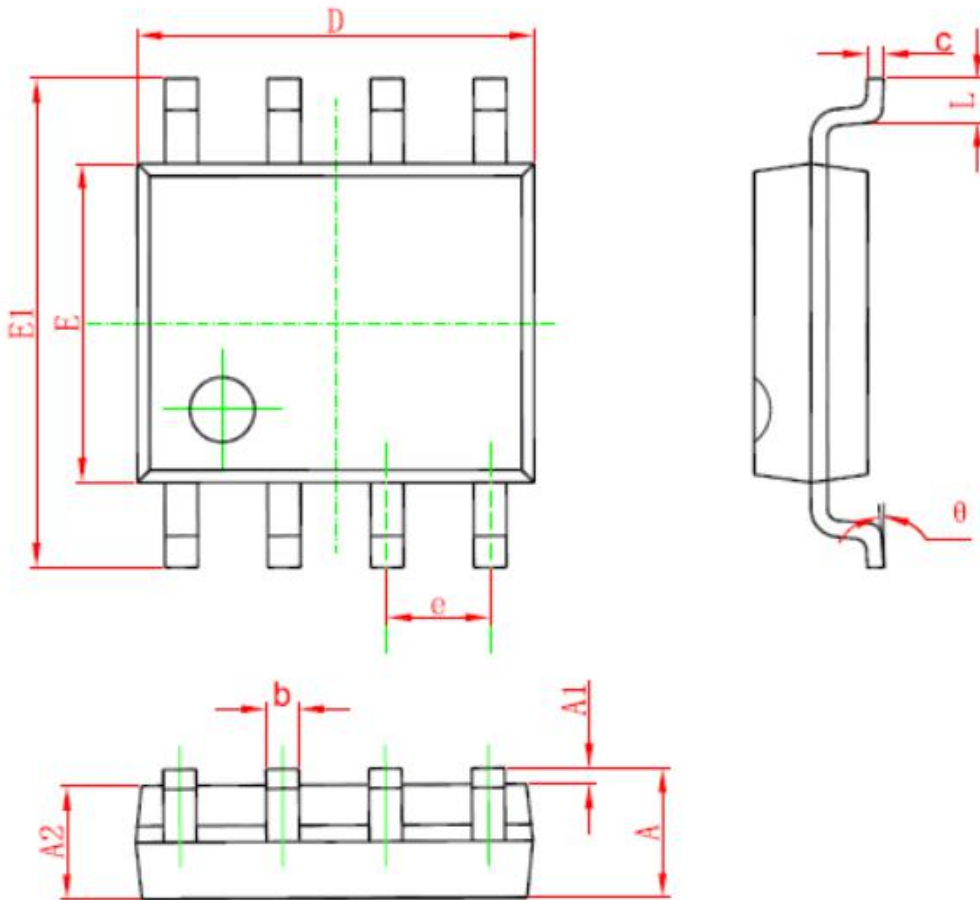


Fig.11 Unclamped Inductive Switching Waveform

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
$\theta$	0°	8°	0°	8°