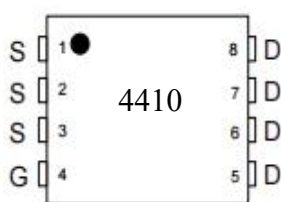


**Features**

- Super Low Gate Charge
- Green Device Available
- 100% EAS Guaranteed
- Excellent CdV/dt effect decline
- Advanced high cell density Trench technology

 $Bvdss$ **30V** **$Rdson$** **7m Ω** **ID** **18A****Application**

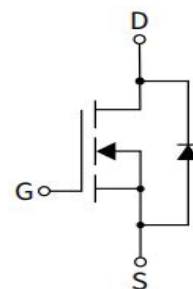
- DC-DC Converters
- Power management function
- Synchronous-rectification applications

RoHS**Package**

Marking and pin assignment



SOP-8 top view



Schematic diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Quantity
4410	4410	SOP-8	3000

Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$ unless otherwise specified)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current, $V_{GS}@10V^1$	$T_A=25^{\circ}\text{C}$	I_D	18	A
	$T_A=70^{\circ}\text{C}$		10	
Pulsed Drain Current ²		I_{DM}	60	A
Single Pulse Avalanche Energy ³		EAS	40	mJ
Power Dissipation		P_D	5	W
Avalanche Current		I_{AS}	35	A
Junction Temperature		T_J	-55 ~ 150	$^{\circ}\text{C}$
Storage Temperature		T_{STG}	-55 ~ 150	$^{\circ}\text{C}$

Thermal Resistance Ratings

Parameter	Symbol	Max	Unit
Thermal Resistance Junction-ambient ¹	$R_{\theta JA}$	41	$^{\circ}\text{C/W}$
Thermal Resistance Junction-Case ¹	$R_{\theta JC}$	10	$^{\circ}\text{C/W}$



Ordering Information

Ordering Number	Package	Pin Assignment			Packing
Halogen Free		G	D	S	
HL4410	SOP-8	4	5,6,7,8	1,2,3	Tape Reel

Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V$	-	-	1	μA
Gate-Source Leakage current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1	1.5	2.5	V
Static Drain-Source On-Resistance ³	$R_{DS(ON)}$	$V_{GS}=10V, I_D=15A$	-	7	9	m Ω
		$V_{GS}=4.5V, I_D=10A$	-	11	14	
Total Gate Charge	Q_g	$V_{DS}=15V, V_{GS}=10V, I_D=8A$	-	13.3	-	nC
Gate-Source Charge	Q_{gs}		-	3.1	-	
Gate-Drain Charge	Q_{gd}		-	5	-	
Turn-On Delay Time	$T_{d(on)}$	$V_{GS}=10V, V_{DS}=15V,$ $I_D=15A, R_G=3\Omega$	-	15	-	ns
Rise Time	T_R		-	19	-	
Turn-Off Delay Time	$T_{d(off)}$		-	35	-	
Fall Time	T_f		-	21	-	
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V, f=1MHz$	-	1116	-	pF
Output Capacitance	C_{oss}		-	187	-	
Reverse Transfer Capacitance	C_{rss}		-	152	-	
Continuous Source Current	I_S	$V_G=V_D=0V, \text{Force Current}$	-	-	15	A
Maximum Source Diode Forward Current	I_{SM}	-	-	-	60	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=15A$	-	-	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F=15A, di/dt=100A/\mu s$	-	14	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	4.1	-	nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition: $T_J=25^{\circ}\text{C}$, $V_{GS}=15V$, $R_G=25\Omega$, $L=0.5mH$, $I_{AS}=12.6A$
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$



Typical Performance Characteristics

Figure 1: Output Characteristics

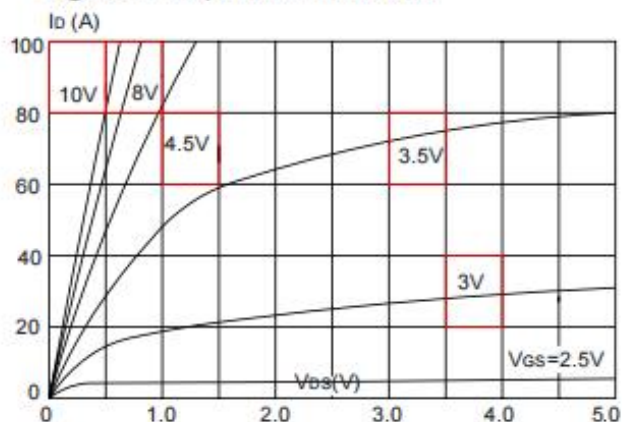


Figure 2: Typical Transfer Characteristics

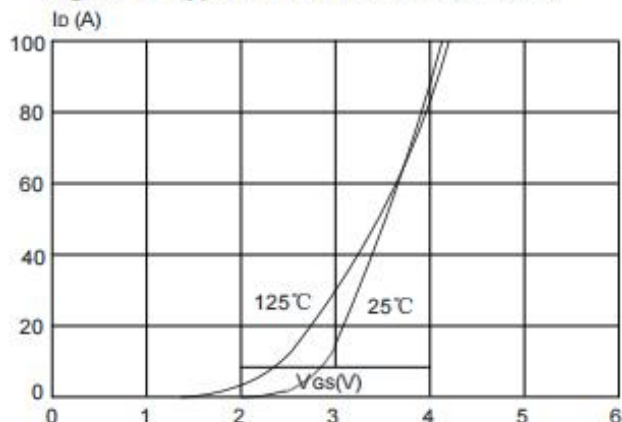


Figure 3: On-resistance vs. Drain Current

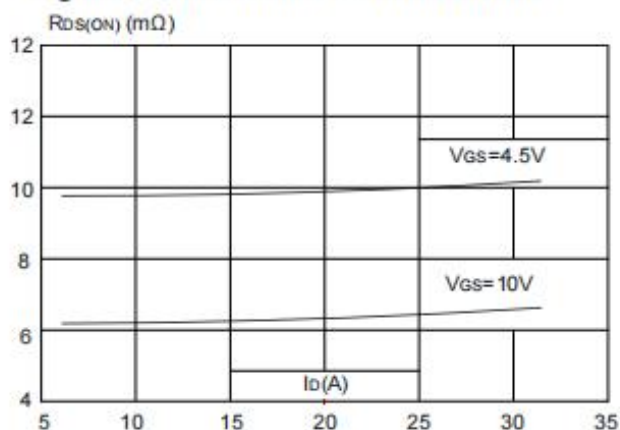


Figure 4: Body Diode Characteristics

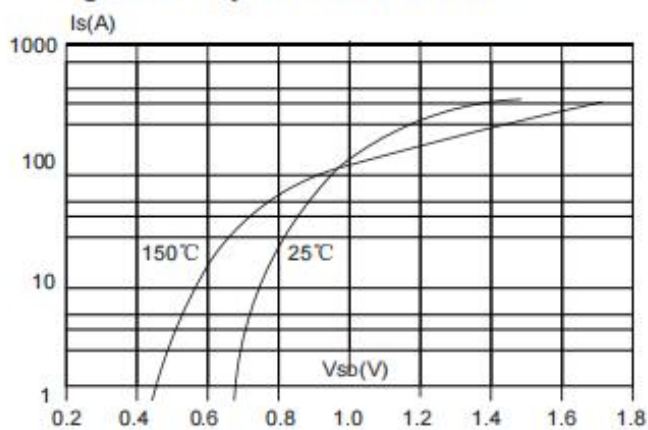


Figure 5: Gate Charge Characteristics

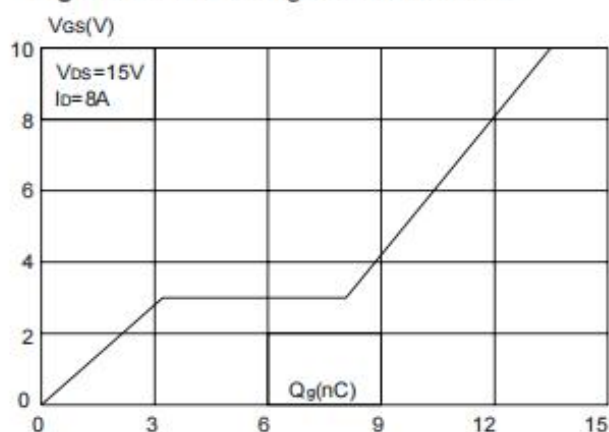
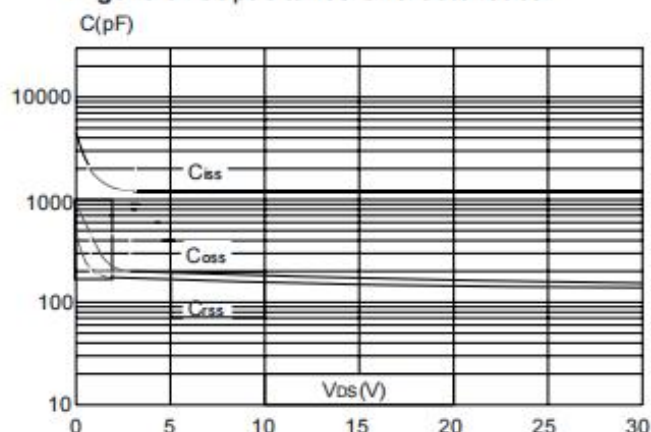
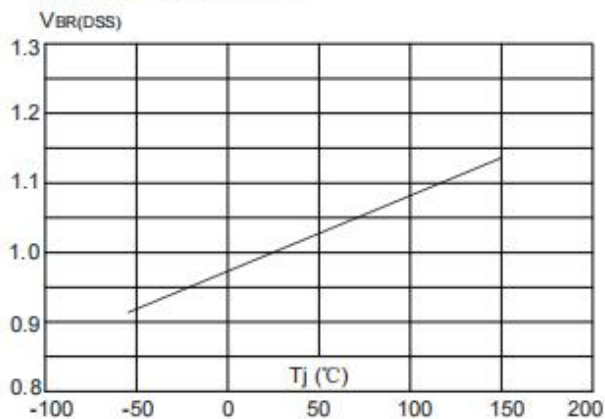
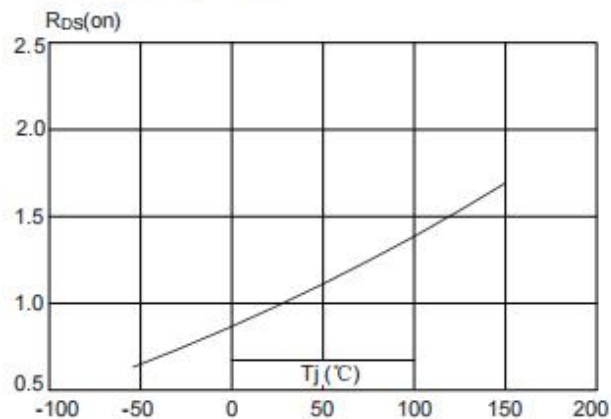
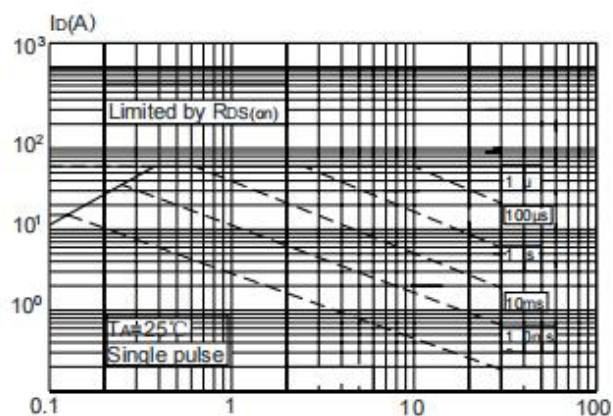
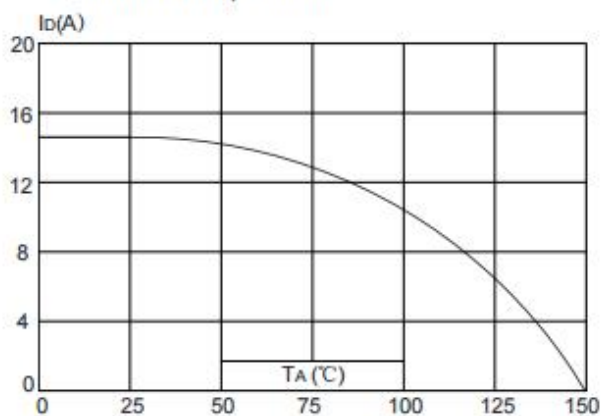
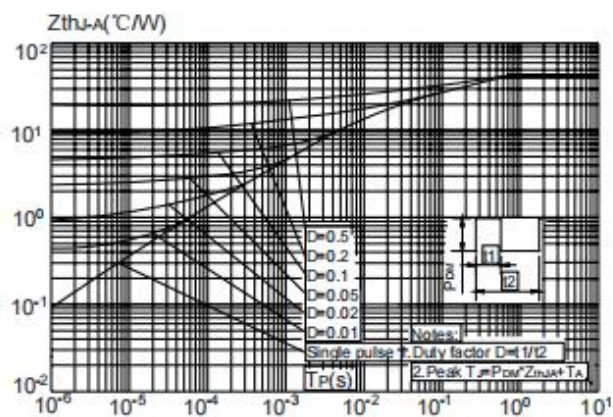


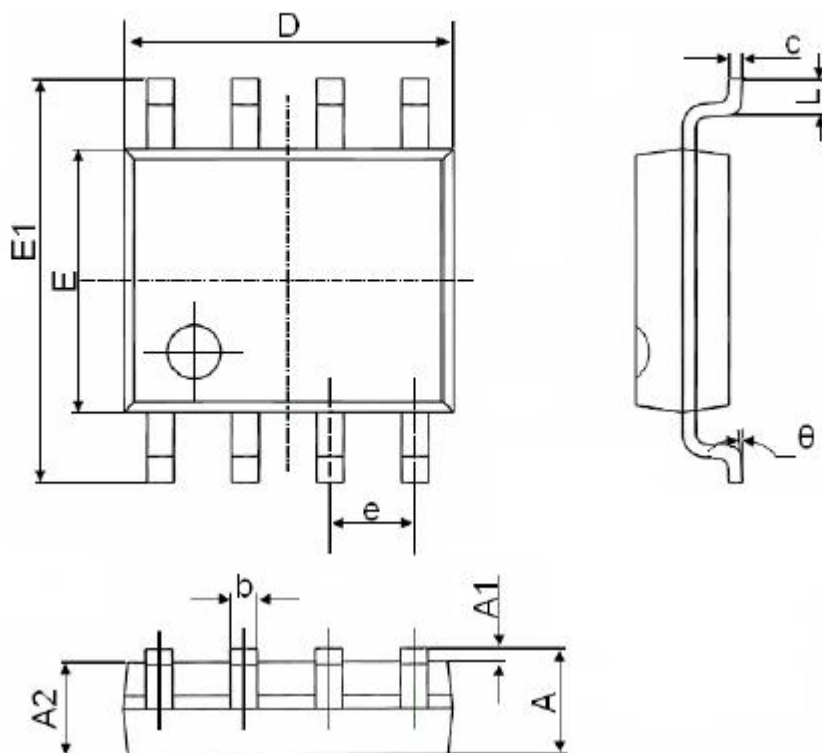
Figure 6: Capacitance Characteristics



**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. Ambient Temperature**Figure 11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



Package Dimensions SOP-8



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°



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