

N-Channel Enhancement Mode Power MOSFET

Description

The A04410 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

General Features

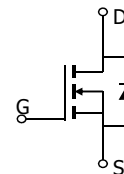
- High density cell design for ultra low R_{dson}
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation

Application

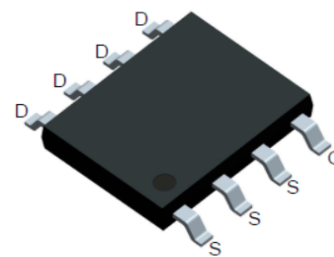
- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

100% UIS TESTED!

V_{DSS}	$R_{DS(ON)}$ Typ	I_D Max
30V	8m Ω @ 10V	15A
	10m Ω @ 4.5V	



Schematic diagram



SOP-8 top view

Package Marking and Ordering Information

Part ID	Package	Marking	Packing
A04410	SOP-8		3000PCS/Reel

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	15	A
Drain Current-Continuous($T_C=70^\circ\text{C}$)	$I_D (70^\circ\text{C})$	11	A
Pulsed Drain Current ^(Note 1)	I_{DM}	45	A
Maximum Power Dissipation	P_D	0.8	W
Single pulse avalanche energy ^(Note 5)	E_{AS}	35	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ\text{C}$

Thermal Characteristic

Thermal Resistance, Junction-to-Case ^(Note 2)	$R_{\theta JC}$	4.5	$^\circ\text{C/W}$
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Electrical Characteristics (TC=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.5	2.5	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=15A$	-	8	10	m Ω
		$V_{GS}=4.5V, I_D=15A$	-	10	15	
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=20A$	30	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V,$ $F=1.0MHz$	-	1007	-	PF
Output Capacitance	C_{oss}		-	128	-	PF
Reverse Transfer Capacitance	C_{rss}		-	117	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=5V, I_D=5A$ $V_{GS}=10V, R_{GEN}=3.3\Omega$	-	13	-	nS
Turn-on Rise Time	t_r		-	38	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	29	-	nS
Turn-Off Fall Time	t_f		-	8	-	nS
Total Gate Charge	Q_g	$V_{DS}=15V, I_D=20A,$ $V_{GS}=10V$	-	23.1	-	nC
Gate-Source Charge	Q_{gs}		-	4.28	-	nC
Gate-Drain Charge	Q_{gd}		-	4.32	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	$V_{GS}=0V, I_S=10A$	-	0.82	1.2	V
Diode Forward Current (Note 2)	I_S		-	-	45	A
Reverse Recovery Time	t_{rr}	$V_{GS}=0V, I_{SD}=9A$ $di/dt=100A/\mu s$ (Note3)	-	-	25	nS
Reverse Recovery Charge	Q_{rr}		-	-	15	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes: ① Pulse width $\leq 300\mu s$; duty cycles $\leq 2\%$.

Typical Characteristics

Typical Electrical and Thermal Characteristics

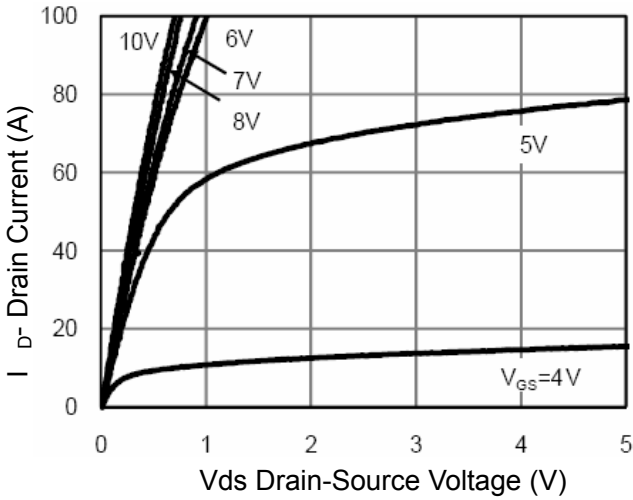


Figure 1 Output Characteristics

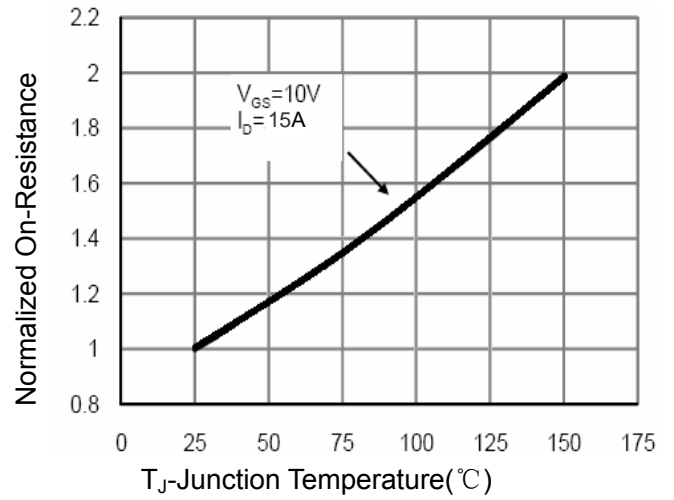


Figure 4 Rdson-Junction Temperature

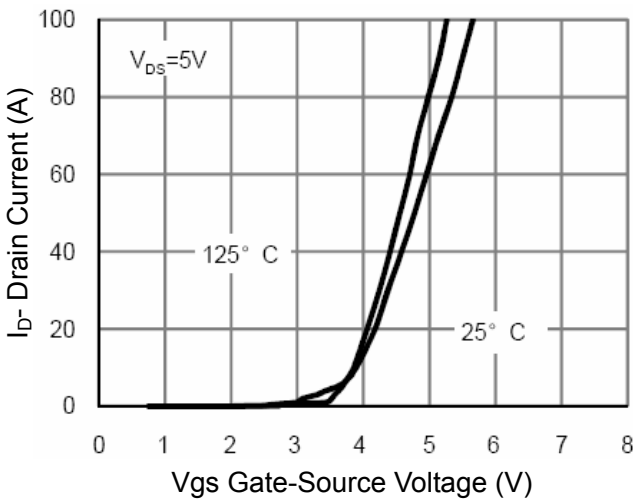


Figure 2 Transfer Characteristics

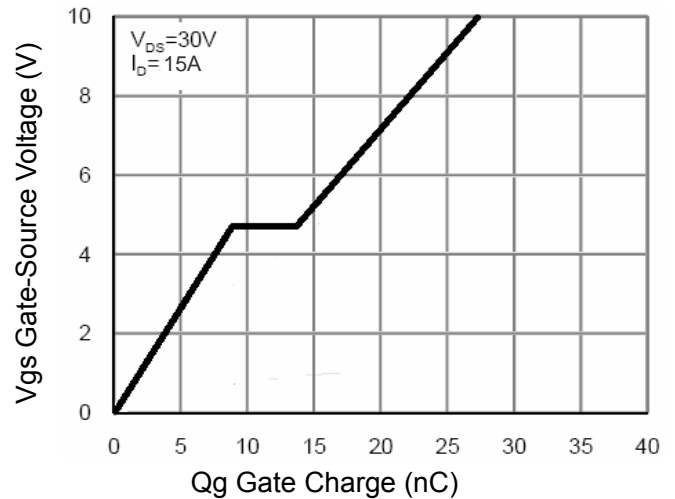


Figure 5 Gate Charge

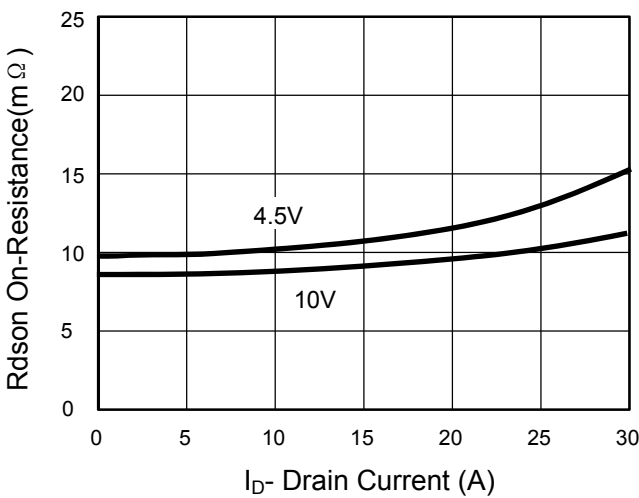


Figure 3 Rdson- Drain Current

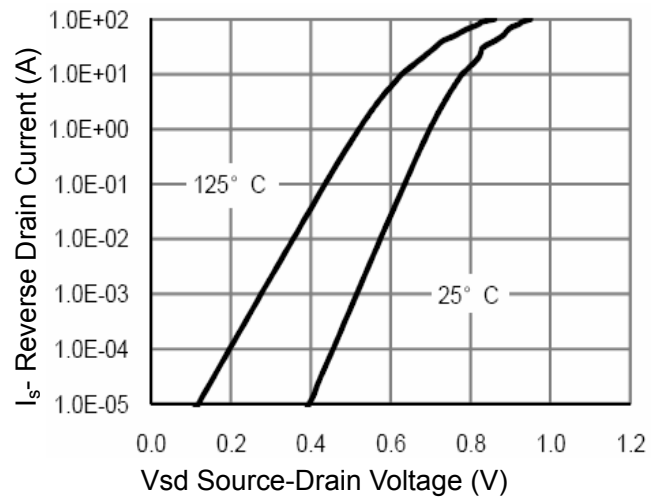


Figure 6 Source- Drain Diode Forward

Typical Characteristics

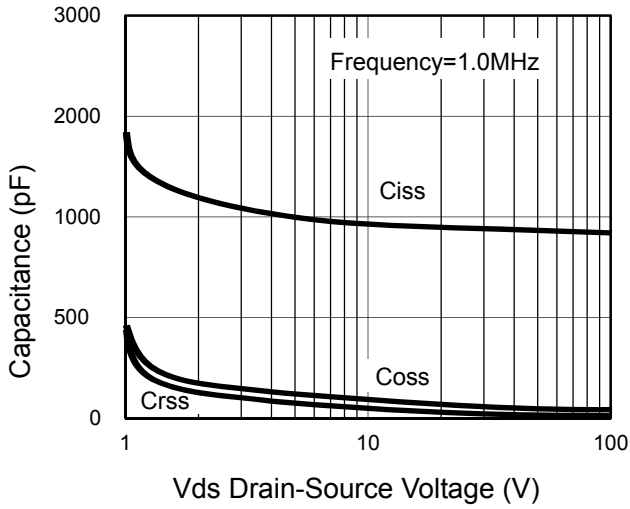


Figure 7 Capacitance vs Vds

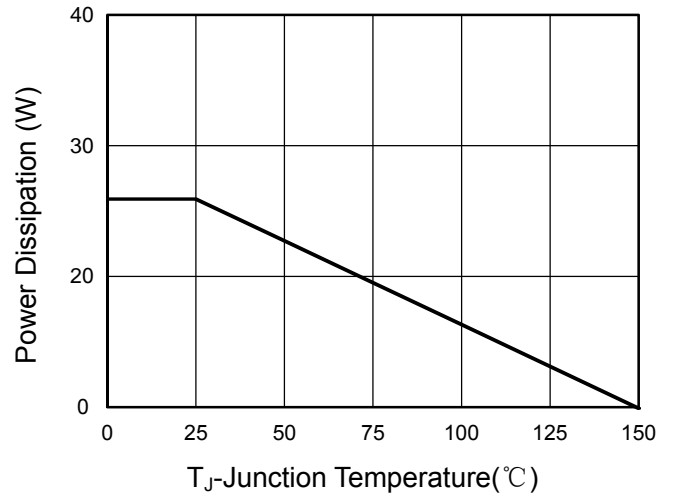


Figure 9 Power De-rating

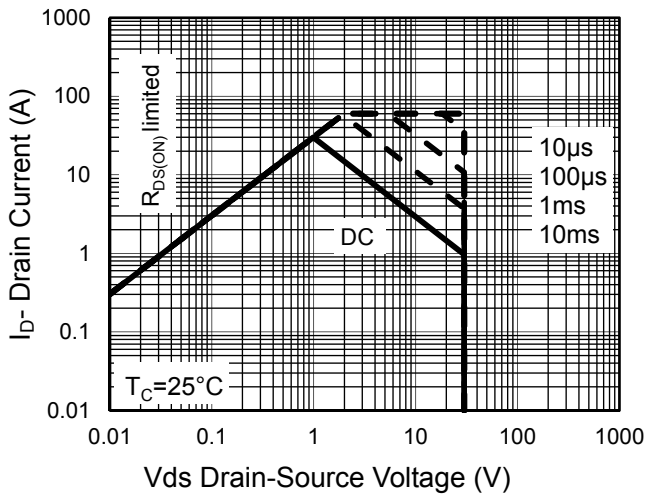


Figure 8 Safe Operation Area

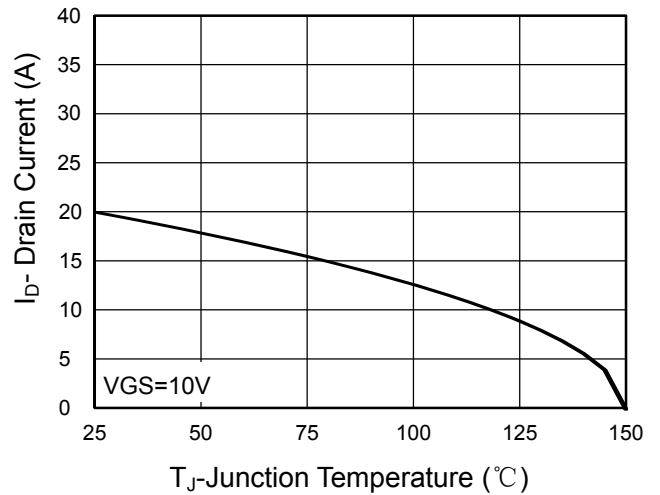


Figure 10 Current De-rating

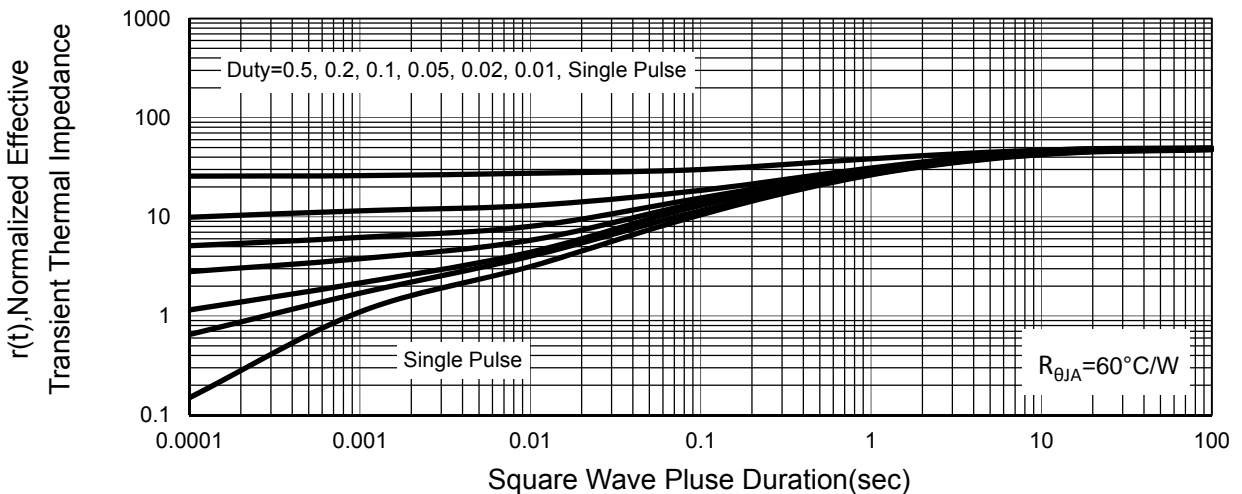
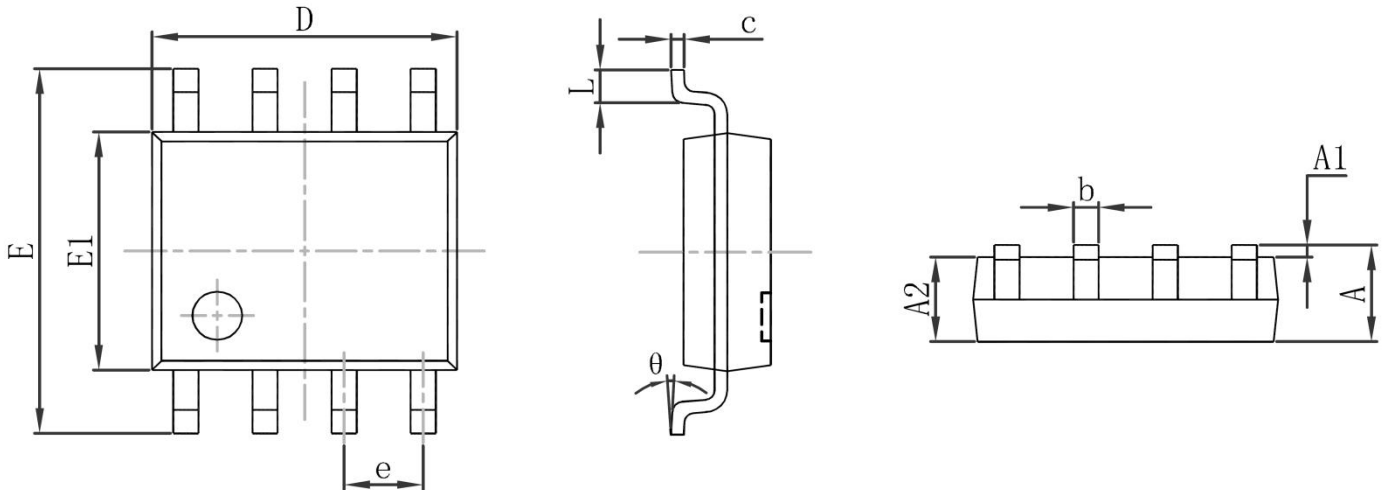


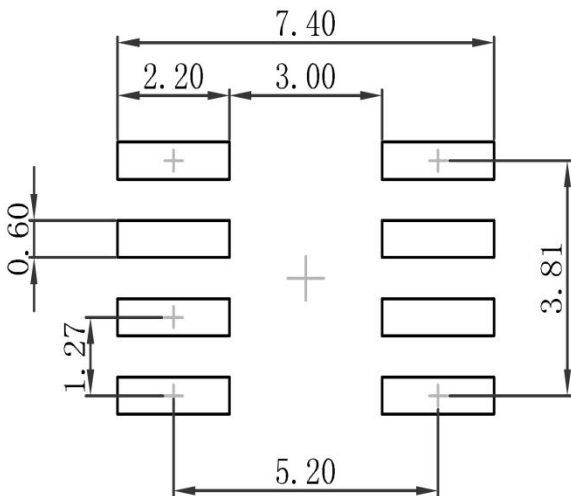
Figure 11 Normalized Maximum Transient Thermal Impedance

SOP-8 Package Outline Dimensions



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	0.007	0.010
D	4.800	5.000	0.189	0.197
e	1.270(BSC)		0.050 (BSC)	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

SOP-8 Suggested Pad Layout



Note:

1. Controlling dimension: in millimeters
2. General tolerance: $\pm 0.05\text{mm}$
3. The pad layout is for reference purposes only