freescale

飞思卡尔(深圳)功率半导体有限公司
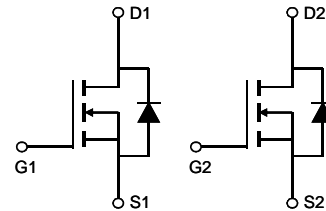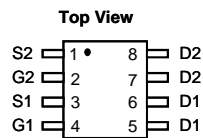
AO4832
30V Dual N-channel MOSFET

General Description

The AO4832 uses advanced trench technology to provide excellent $R_{DS(ON)}$ with low gate charge.

This device is suitable for high side switch in SMPS and general purpose applications.

Features

V_{DS}	30V
I_D (at V_{GS}=10V)	10A
$R_{DS(ON)}$ (at V_{GS}=10V)	< 13mΩ
$R_{DS(ON)}$ (at V_{GS}=4.5V)	< 17.5mΩ

Green Product

Top View

```
S2  1 •    8  D2
G2  2      7  D2
S1  3      6  D1
G1  4      5  D1
```

Absolute Maximum Ratings T_A=25℃ unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_A=25℃	I_D	10	A
	T_A=70℃		8	
Pulsed Drain Current [C]		I_{DM}	55	
Avalanche Current [C]		I_{AS}, I_{AR}	22	A
Avalanche energy L=0.1mH [C]		E_{AS}, E_{AR}	24	mJ
Power Dissipation [B]	T_A=25℃	P_D	2	W
	T_A=70℃		1.3	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	℃

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{θJA}$	48	62.5	℃/W
Maximum Junction-to-Ambient [A D]	Steady-State		74	90	℃/W
Maximum Junction-to-Lead	Steady-State	$R_{θJL}$	32	40	℃/W

Electrical Characteristics (T$_J$=25℃ unless otherwise noted)

Symbol	Parameter	Conditions		Min	Typ	Max	Units
STATIC PARAMETERS							
BV$_{DSS}$	Drain-Source Breakdown Voltage	I$_D$=250µA, V$_{GS}$=0V		30			V
I$_{DSS}$	Zero Gate Voltage Drain Current	V$_{DS}$=30V, V$_{GS}$=0V				1	µA
			T$_J$=55℃			5	
I$_{GSS}$	Gate-Body leakage current	V$_{DS}$=0V, V$_{GS}$=±20V				100	nA
V$_{GS(th)}$	Gate Threshold Voltage	V$_{DS}$=V$_{GS}$ I$_D$=250µA		1.5	1.9	2.5	V
I$_{D(ON)}$	On state drain current	V$_{GS}$=10V, V$_{DS}$=5V		55			A
R$_{DS(ON)}$	Static Drain-Source On-Resistance	V$_{GS}$=10V, I$_D$=10A			10.8	13	mΩ
			T$_J$=125℃		15.5	19	
		V$_{GS}$=4.5V, I$_D$=8A			14	17.5	mΩ
g$_{FS}$	Forward Transconductance	V$_{DS}$=5V, I$_D$=10A			43		S
V$_{SD}$	Diode Forward Voltage	I$_S$=1A,V$_{GS}$=0V			0.75	1	V
I$_S$	Maximum Body-Diode Continuous Current					2.5	A
DYNAMIC PARAMETERS							
C$_{iss}$	Input Capacitance	V$_{GS}$=0V, V$_{DS}$=15V, f=1MHz		610	760	910	pF
C$_{oss}$	Output Capacitance			88	125	160	pF
C$_{rss}$	Reverse Transfer Capacitance			40	70	100	pF
R$_g$	Gate resistance	V$_{GS}$=0V, V$_{DS}$=0V, f=1MHz		0.8	1.6	2.4	Ω
SWITCHING PARAMETERS							
Q$_g$(10V)	Total Gate Charge	V$_{GS}$=10V, V$_{DS}$=15V, I$_D$=10A		11	14	17	nC
Q$_g$(4.5V)	Total Gate Charge			5	6.6	8	nC
Q$_{gs}$	Gate Source Charge				2.4		nC
Q$_{gd}$	Gate Drain Charge				3		nC
t$_{D(on)}$	Turn-On DelayTime	V$_{GS}$=10V, V$_{DS}$=15V, R$_L$=1.5Ω, R$_{GEN}$=3Ω			4.4		ns
t$_r$	Turn-On Rise Time				9		ns
t$_{D(off)}$	Turn-Off DelayTime				17		ns
t$_f$	Turn-Off Fall Time				6		ns
t$_{rr}$	Body Diode Reverse Recovery Time	I$_F$=10A, dI/dt=500A/µs		5.6	7	8	ns
Q$_{rr}$	Body Diode Reverse Recovery Charge	I$_F$=10A, dI/dt=500A/µs		6.4	8	9.6	nC

A. The value of R$_{θJA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T$_A$ =25° C. The value in any given application depends on the user's specific board design.

B. The power dissipation P$_D$ is based on T$_{J(MAX)}$=150° C, using ⩽ 10s junction-to-ambient thermal resistance.

C. Repetitive rating, pulse width limited by junction temperature T$_{J(MAX)}$=150° C. Ratings are based on low frequency and duty cycles to keep initialT$_J$=25° C.

D. The R$_{θJA}$ is the sum of the thermal impedence from junction to lead R$_{θJL}$ and lead to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using <300µs pulses, duty cycle 0.5% max.

F. These curves are based on the junction-to-ambient thermal impedance which is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, assuming a maximum junction temperature of T$_{J(MAX)}$=150° C. The SOA curve provides a single pulse rating.
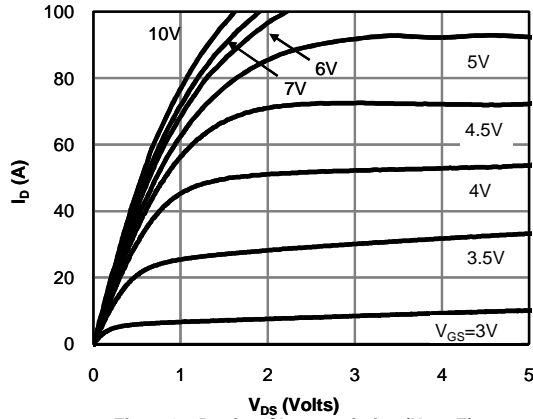
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

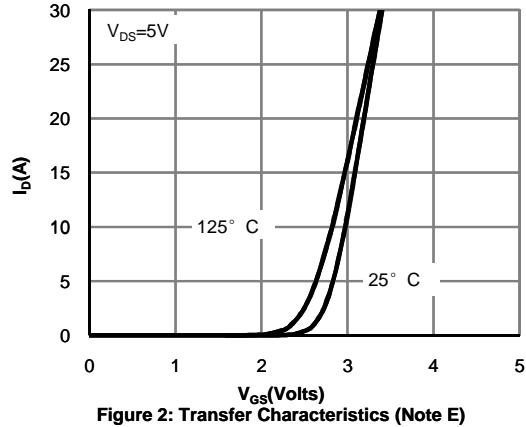Fig 1: On-Region Characteristics (Note E)
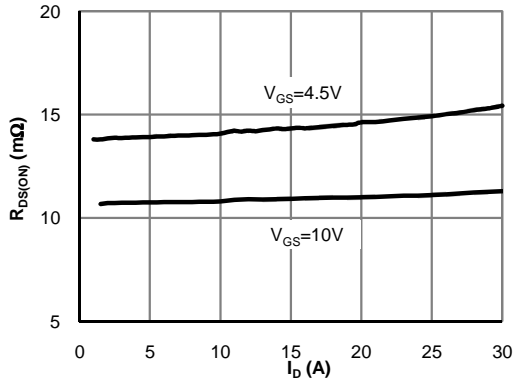
Figure 2: Transfer Characteristics (Note E)

Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)
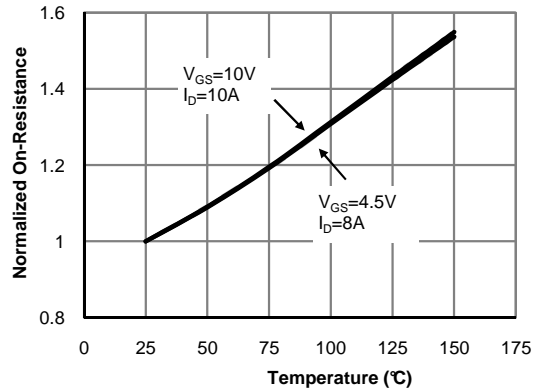
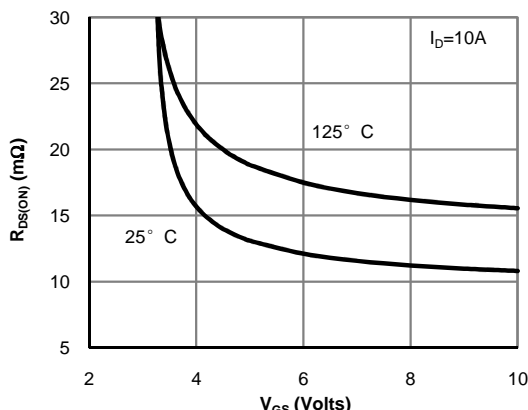Figure 4: On-Resistance vs. Junction Temperature (Note E)

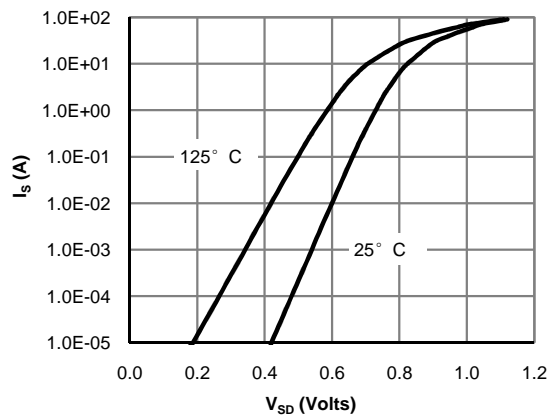Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

Figure 6: Body-Diode Characteristics (Note E)

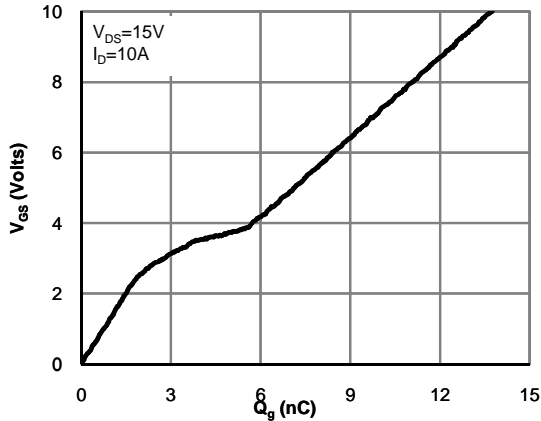## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS
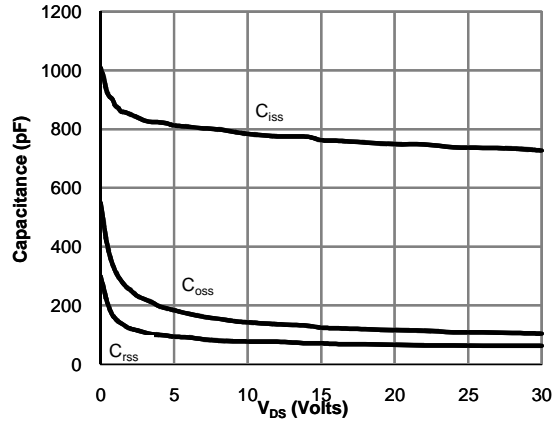
Figure 7: Gate-Charge Characteristics

Figure 8: Capacitance Characteristics

Figure 9: Single Pulse Avalanche capability (Note C)

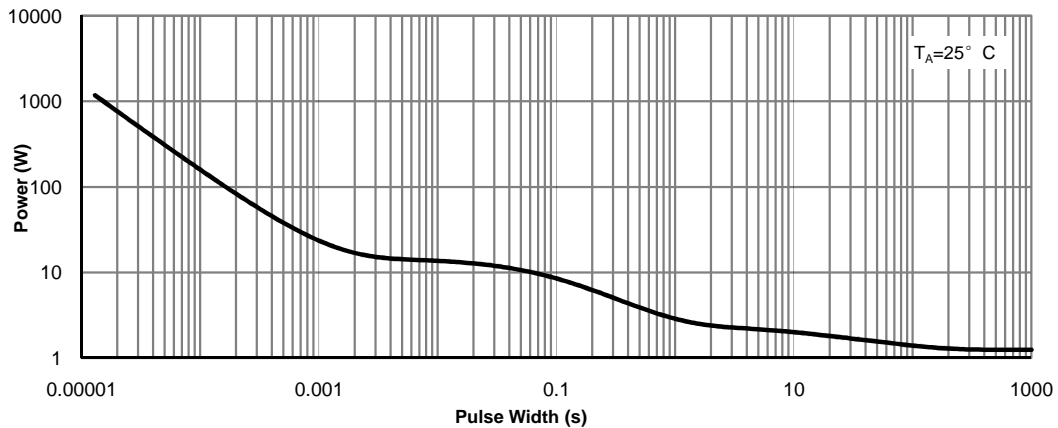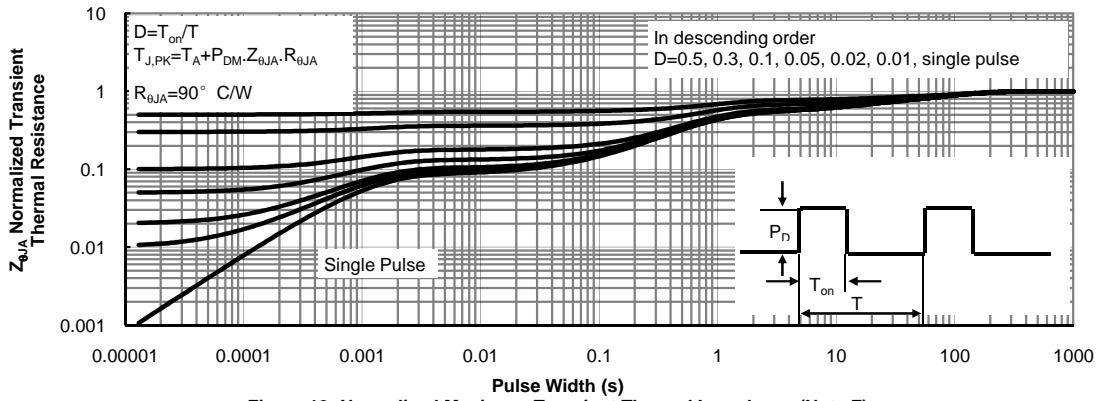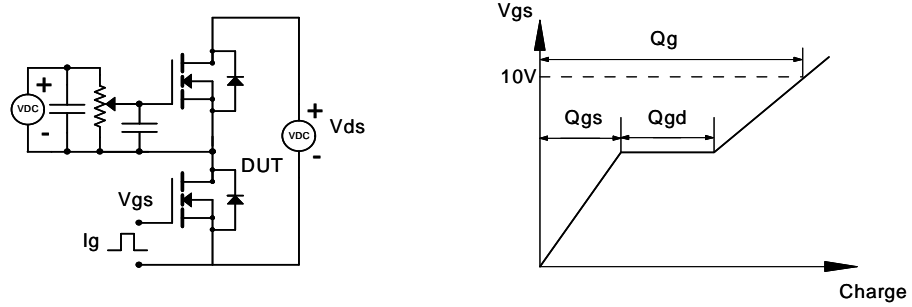Figure 10: Maximum Forward Biased Safe Operating Area (Note F)

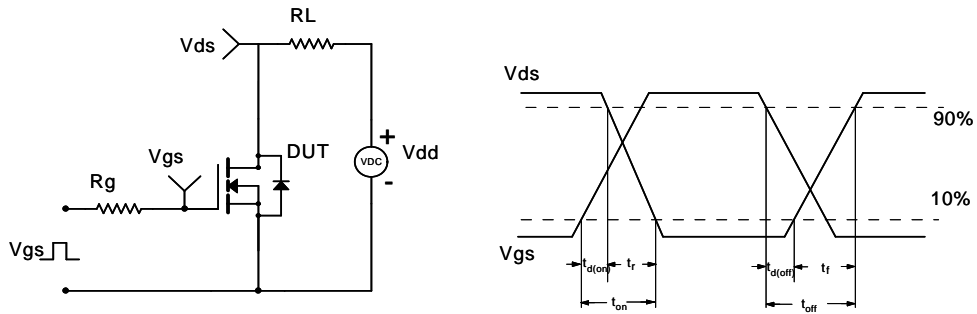Figure 11: Single Pulse Power Rating Junction-to-Ambient (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

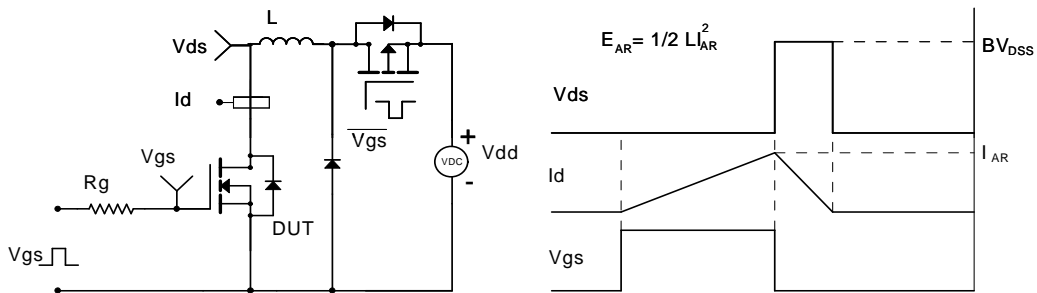**Figure 12: Normalized Maximum Transient Thermal Impedance (Note F)**

Gate Charge Test Circuit & Waveform

Resistive Switching Test Circuit & Waveforms

Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

$$E_{AR} = 1/2 \, LI_{AR}^2$$

Diode Recovery Test Circuit & Waveforms

$$Q_{rr} = -\int I dt$$