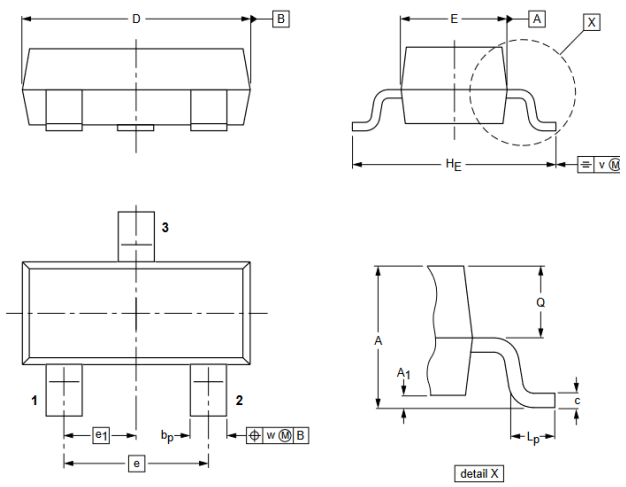
N-Channel Power MOSFET

Primary characteristics			
Symbol	**Parameter**	**Value**	**Unit**
I_D	Continuous drain current (@T_C=25°C)	4.0	A
V_{DS}	Drain-source voltage	30	V
R_{DSON}	Drain-source ON resistance (@V_{GS}=4.5V)	<60	mΩ

Application

- DC fan
- Charger
- Fast switch
- Portable products:
  - H-bridges
  - Inverters
  - Car charger
  - etc.

Case dimensions



1 – Gate; 2 – Source; 3 – Drain

SOT-23 (TO-236AB)

Unit	A	A_1max	b_p	c	D	E	e	e_1	H_E	L_p	Q	v	w
mm	1.0 ±0.1	0.1	0.43 ±0.05	0.12 ±0.03	2.9 ±0.1	1.3 ±0.1	1.9	0.95	2.3 ±0.2	0.3 ±0.15	0.5 ±0.05	0.2	0.1

Absolute maximum ratings (T_A = 25°C unless otherwise noted)

Characteristic		Symbol	Value	Unit
Drain-source breakdown voltage		$V_{(BR)DS}$	30	V
Gate-source voltage		V_{GS}	±20	V
Continuous drain current	V_{GS}=4.5V, T_A=25°C	I_D	4.0	A
	V_{GS}=4.5V, T_A=70°C		3.2	
Pulse drain current tested [1)]	T_A=25°C	I_{DM}	20.4	A
Maximum power dissipation	T_A=25°C	P_D	1.5	W
	T_A=70°C		0.9	
Thermal resistance junction-ambient		$R_{\theta JA}$	80 ~ 100	°C/W
Maximum junction temperature		T_J	150	°C
Operating junction temperature range		T_{STG}	-50 ~ 150	°C

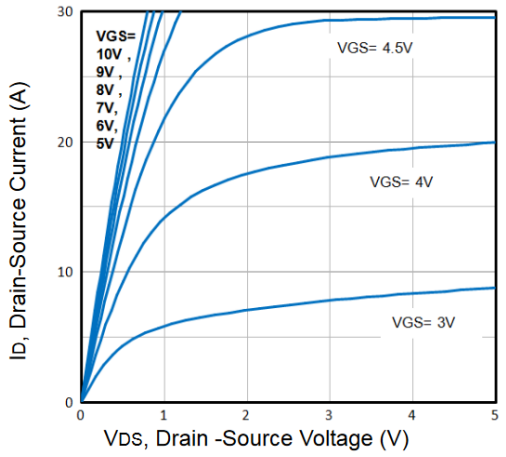
Electrical characteristics (T_J = 25°C)						
Characteristic	**Test condition**	**Symbol**	**Value**			**Unit**
			Min.	**Typ.**	**Max.**	
Drain-source breakdown voltage	V_{GS}=0V, I_D=250μA	$V_{(BR)DSS}$	30	-	-	V
Zero gate voltage drain current	V_{DS}=30V, V_{GS}=0V, T_A=25°C	I_{DSS}	-	-	1.0	μA
	V_{DS}=30V, V_{GS}=0V, T_A=125°C		-	-	100	
Gate to body leakage current	V_{GS}=±20V, V_{DS}=0V	I_{GSS}	-	-	±100	nA
Gate threshold voltage	V_{DS}=V_{GS}, I_D=250μA	$V_{GS(TH)}$	500	900	1500	mV
Drain-source ON-state resistance [2]	V_{GS}=10V, I_D=4.0A	$R_{DS(ON)}$	-	29	50	mΩ
	V_{GS}=4.5V, I_D=3.0A		-	44	60	
Dynamic electrical characteristics (T_J = 25°C)						
Characteristic	**Test condition**	**Symbol**	**Value**			**Unit**
			Min.	**Typ.**	**Max.**	
Input capacitance	V_{DS}=24V V_{GS}=0V f=1.0MHz	C_{iss}	-	300	-	pF
Output capacitance		C_{oss}	-	44	-	
Reverse transfer capacitance		C_{rss}	-	38	-	
Total gate charge	V_{DS}=24V V_{GS}=10V I_D=2.0A	Q_g	-	3.5	-	nC
Gate source charge		Q_{gs}	-	0.4	-	
Gate drain (“Miller”) charge		Q_{gd}	-	1.7	-	
Switching characteristics						
Characteristic	**Test condition**	**Symbol**	**Value**			**Unit**
			Min.	**Typ.**	**Max.**	
Turn on delay time	V_{DD}=24V I_D=5.0V R_G=3.3Ω V_{GS}=10V	$t_{d(on)}$	-	2.2	-	ns
Turn on rise time		t_r	-	6.9	-	
Turn off delay time		$t_{d(off)}$	-	15.5	-	
Turn off fall time		t_f	-	4.5	-	
Source drain diode characteristics						
Characteristic	**Test condition**	**Symbol**	**Value**			**Unit**
			Min.	**Typ.**	**Max.**	
Source drain current (body diode)	T_A=25°C	I_{SD}	-	-	1.8	A
Forward ON-voltage [2]	I_{SD}=5.0A, V_{GS}=0V, T_J=25°C	V_{SD}	-	-	1.2	V

Notes:

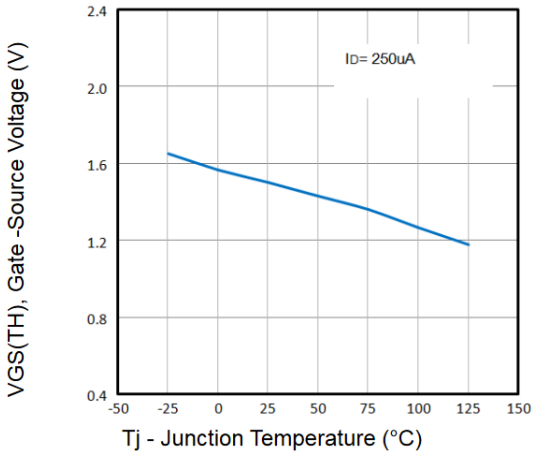
1) Pulse width limited by maximum allowable junction temperature
2) Pulse test; pulse width ≤300μs, duty cycle ≤2%

Typical characteristics

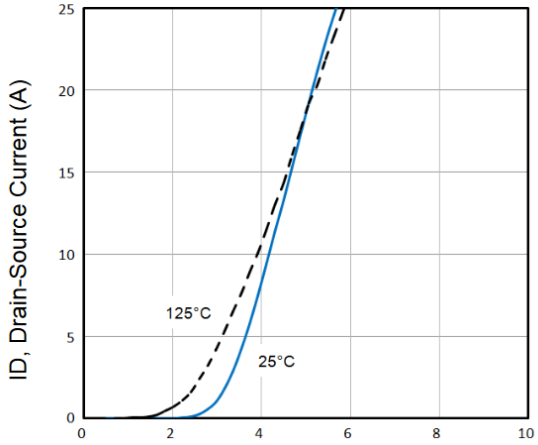
Output characteristics



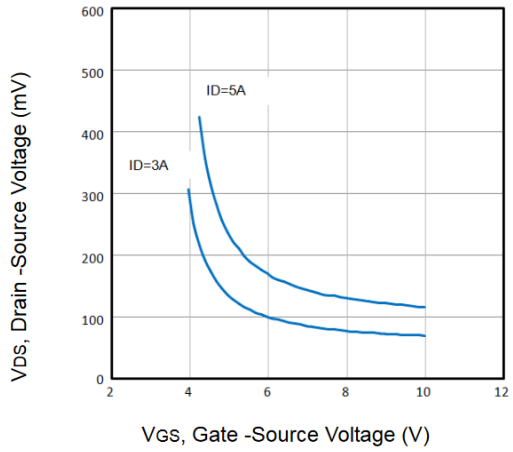
Normalized threshold voltage vs. temperature



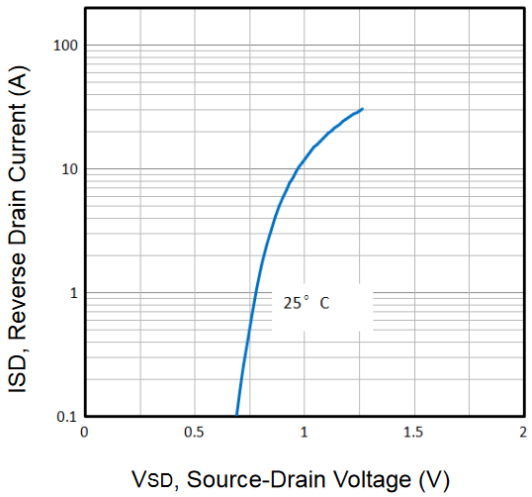
Transfer characteristics



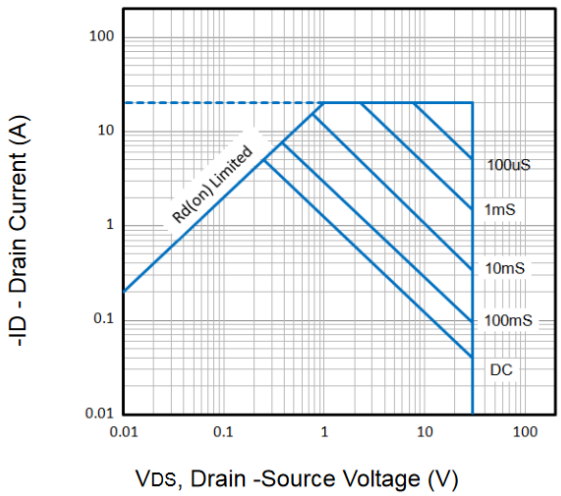
Drain-source voltage vs. gate-source voltage



Typical source-drain diode forward voltage

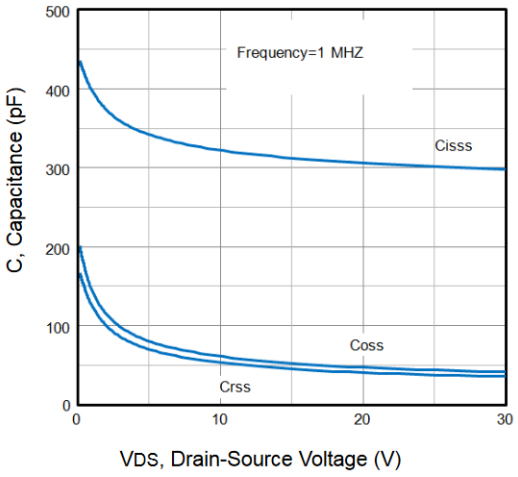


Maximum safe operating area

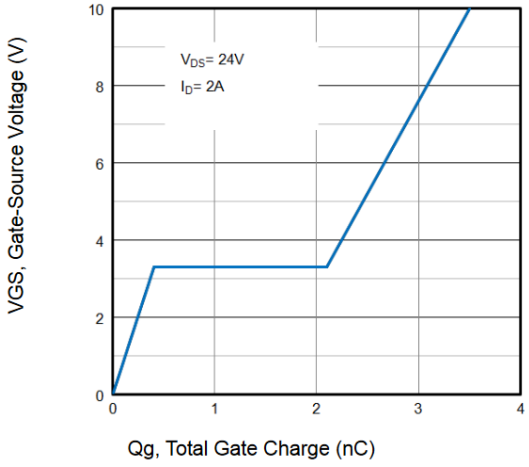


Typical characteristics

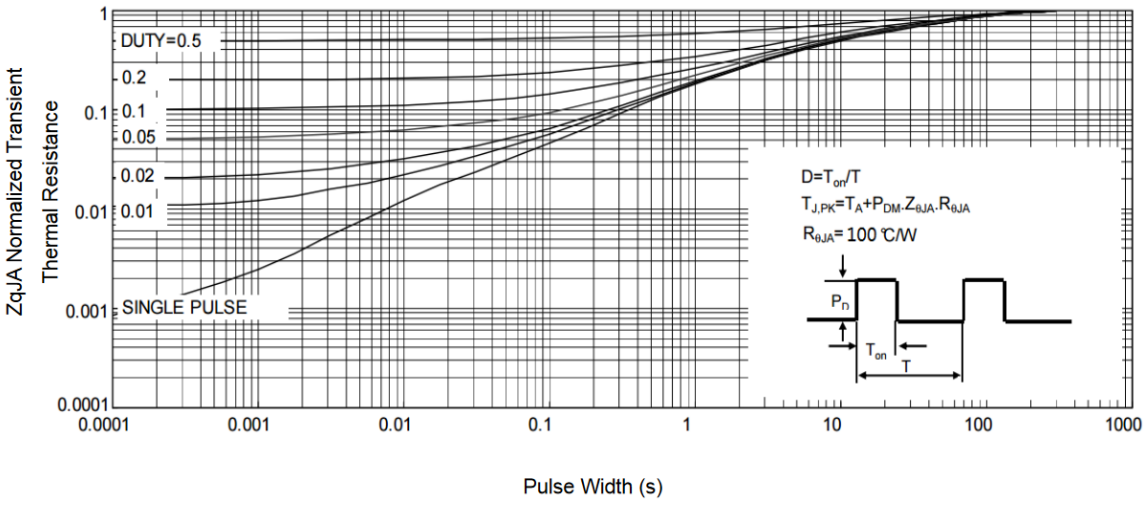
Typical capacitance vs. drain source voltage



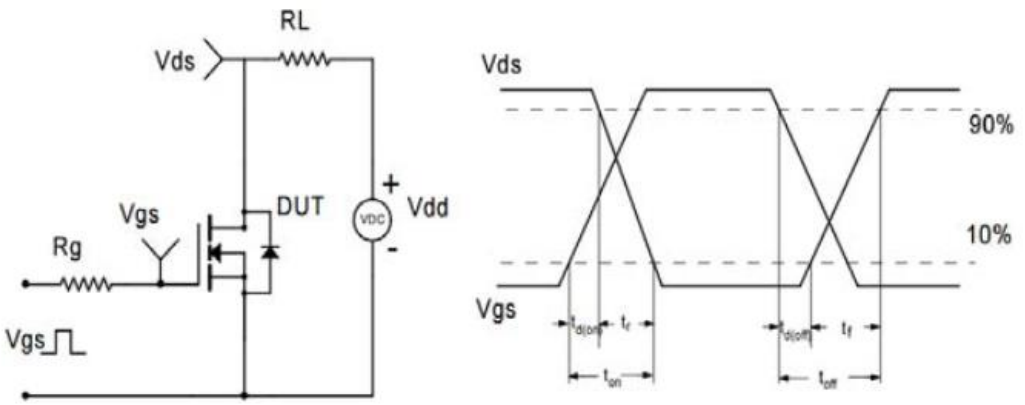
Typical gate charge vs. gate-source voltage



Normalized maximum transient thermal impedance

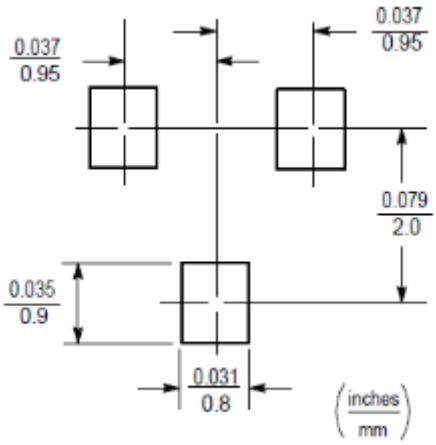


Switching time test circuit and waveforms



Ordering information		
Part Number	**Package**	**Shipping Quantity**
AKS3402	SOT-23	**3000 pcs / reel**

Suggested soldering pad layout



SOT-23

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