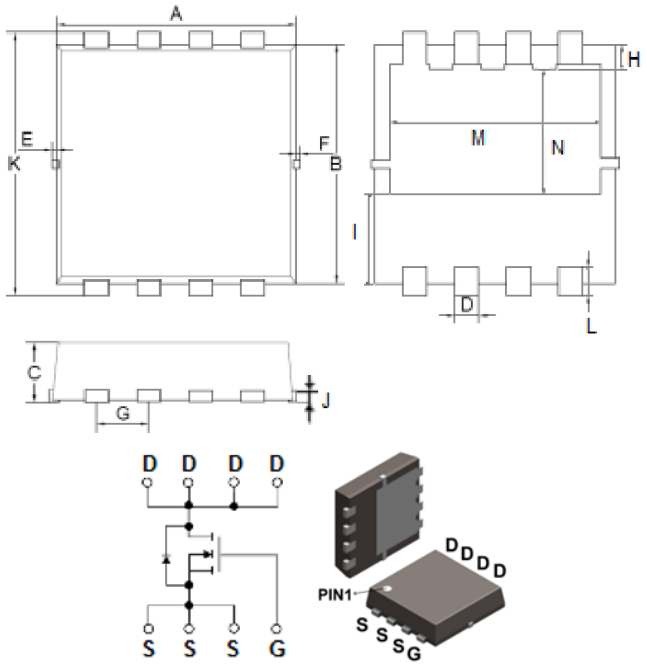
N-Channel Enhancement Mode MOSFET

Primary characteristics			
Symbol	**Parameter**	**Value**	**Unit**
I_D	Continuous drain current	21	A
V_{DSS}	Drain source voltage	60	V
R_{DSON}	Static drain-source on-resistance	35	mΩ MAX

Features

- **PDFN3x3-8L** case for easy automatic insertion
- Pb-free and **RoHS** compliant
- High-speed switching
- Molding compound: UL Flammability Classification Rating 94V-0
- Terminals: matte tin-plated leads; solderability-per MIL-STD-202, Method 208

Case dimensions



G – Gate; S – Source; D - Drain

PDFN3x3-8L

Unit		A	B	C	D	E	F	G	H	I	J	K	L	M	N
mm	MIN	2.9	2.9	0.65	0.2	0	0	0.55	0.2	0.7	0.1	3.15	0.2	2.35	1.5
	MAX	3.1	3.1	0.85	0.4	0.1	0.1	0.75	0.4	1.1	0.2	3.45	0.4	2.55	1.9

Maximum ratings (T_A = 25°C unless otherwise noted)

Characteristic	Symbol	Value	Unit
Drain-source voltage	V_{DSS}	60	V
Gate-source voltage	V_{GSS}	±20	V
Continuous drain current (T_C=25°C)	I_D	21	A
Continuous drain current (T_C=100°C)		13	
Continuous drain current (T_A=25°C) [1]		7.2	
Continuous drain current (T_A=100°C) [1]		4.5	
Pulsed drain current (t_p=10µs, T_C=25°C)	I_{DM}	84	A
Pulsed drain current (t_p=10µs, T_A=25°C)		60	
Single pulse avalanche energy [3]	E_{AS}	6.0	mJ
Power Dissipation (T_C=25°C)	P_D	18	W
Power Dissipation (T_A=25°C) [1]		2.0	
Operating junction temperature range	T_J, T_{STG}	-55 ~ 150	°C

Thermal characteristics

Characteristic	Test condition	Symbol	Value Min.	Value Typ.	Value Max.	Unit
Thermal resistance junction-case	-	$R_{\theta JC}$	-	-	7.0	°C/W
Thermal resistance junction-ambient [1]		$R_{\theta JA}$	-	54	60	°C/W

Electrical characteristics (T_A = 25°C)

Characteristic	Test condition	Symbol	Value Min.	Value Typ.	Value Max.	Unit
Drain-source breakdown voltage	V_{GS}=0V, I_D=250µA	V_{DSS}	60	-	-	V
Zero gate voltage drain current	V_{DS}=60V, V_{GS}=0V	I_{DSS}	-	-	1.0	µA
Gate body leakage current	V_{GS}=±20V, V_{DS}=0V	I_{GSS}	-	-	±100	nA
Gate threshold voltage	V_{DS}=V_{GS}, I_D=250µA	$V_{GS(TH)}$	1.0	1.5	3.0	V
Drain-source on-state resistance [2]	V_{GS}=10V, I_D=10A	$R_{DS(ON)}$	-	21	25	mΩ
	V_{GS}=4.5V, I_D=10A		-	27	35	
Gate resistance	V_{GS}=0V, f=1.0MHz	R_G	-	3.8	-	Ω

Dynamic electrical characteristics

Characteristic	Test condition	Symbol	Value Min.	Value Typ.	Value Max.	Unit
Input capacitance	V_{DS}=25V V_{GS}=0V f=1.0MHz	C_{ISS}	-	570	-	pF
Output capacitance		C_{OSS}	-	186	-	
Reverse transfer capacitance		C_{RSS}	-	23	-	

Switching characteristics

Characteristic	Test condition	Symbol	Value Min.	Value Typ.	Value Max.	Unit
Turn ON delay time	V_{DD}=30V V_{GS}=15V I_D=15A R_G=3.3Ω	$t_{d(ON)}$	-	3.0	-	ns
Turn ON rise time		t_r	-	37	-	
Turn OFF delay time		$t_{d(OFF)}$	-	14	-	
Turn OFF fall time		t_f	-	30	-	
Total gate-charge	V_{DD}=40V V_{GS}=10V I_D=10A	Q_G	-	14.5	-	nC
Gate to source charge		Q_{GS}	-	2.6	-	
Gate to drain (Miller) charge		Q_{GD}	-	2.9	-	

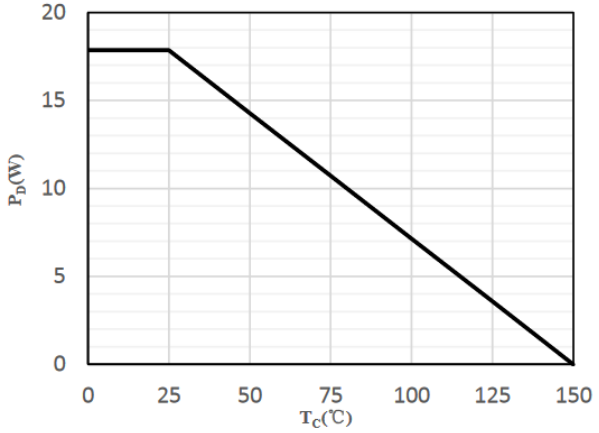
Source-drain diode characteristics

Characteristic	Test condition	Symbol	Value Min.	Value Typ.	Value Max.	Unit
Diode forward voltage [2]	I_{SD}=10A, V_{GS}=0V, T_J=25°C	V_{SD}	-	0.9	1.2	V
Reverse recovery time	I_F=10A, V_R=30V d_I/d_t=100A/µs	trr	-	24.8	-	ns
Reverse recovery charge		Qrr	-	15.7	-	nC

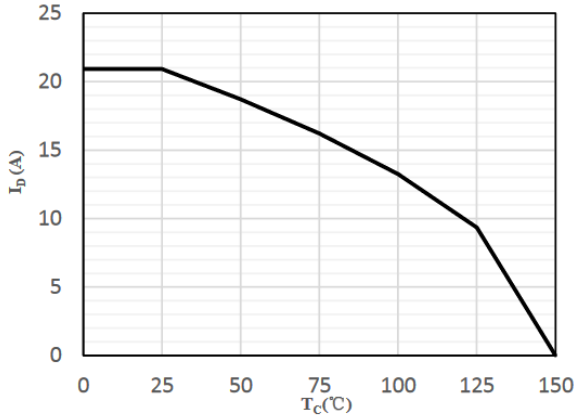
Notes:
1) The data tested by surface mounted on a 1.0 inch^2 FR-4 board with 2oz copper
2) The data tested by pulsed, pulse width ≤300µs, duty cycle ≤2%
3) The E_{AS} data shows max. rating. The test condition is V_{DD}=30V, L=0.5mH, V_{GS}=10V

Typical characteristics

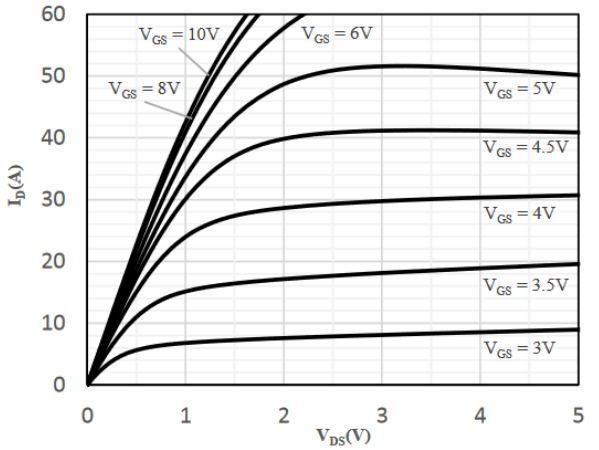
Power dissipation



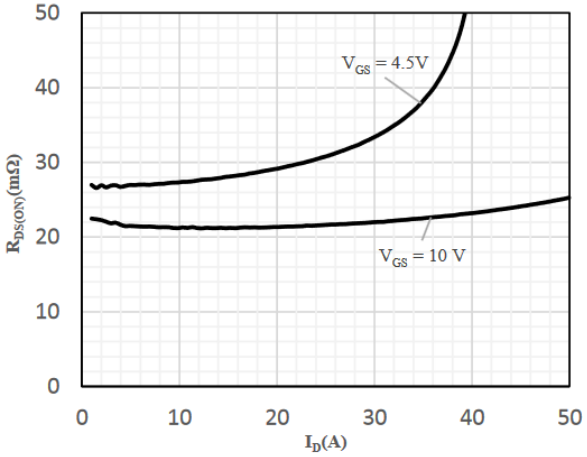
Drain current



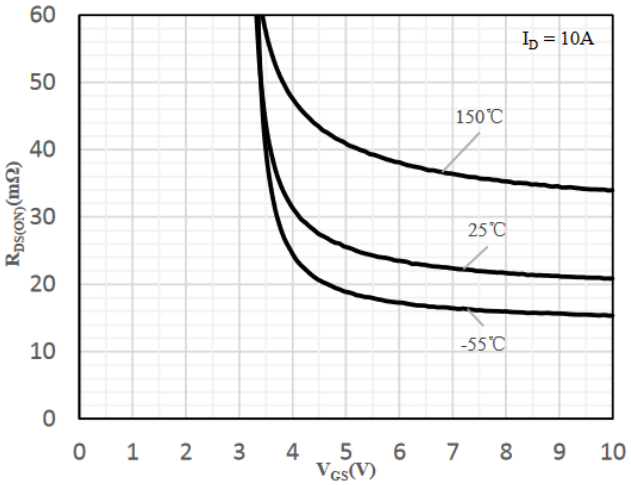
Typical output characteristics



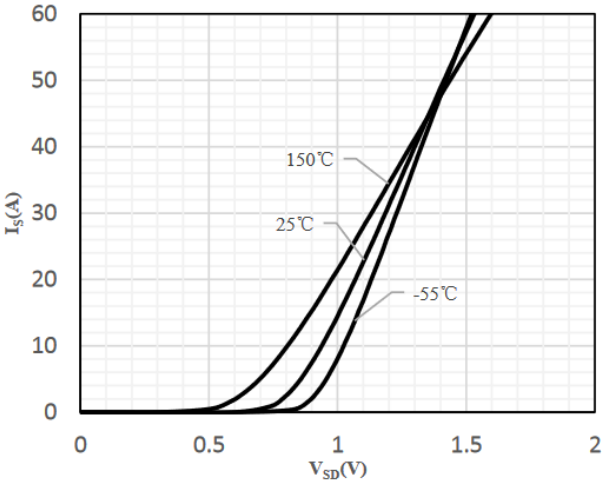
ON-resistance vs. drain current and gate voltage



ON-resistance vs. gate-source voltage

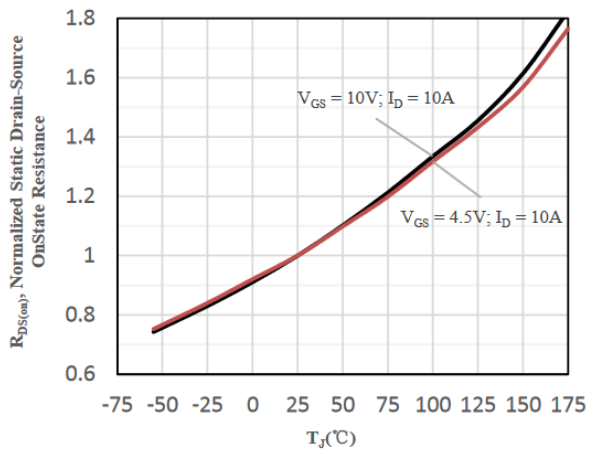


Body-diode characteristics

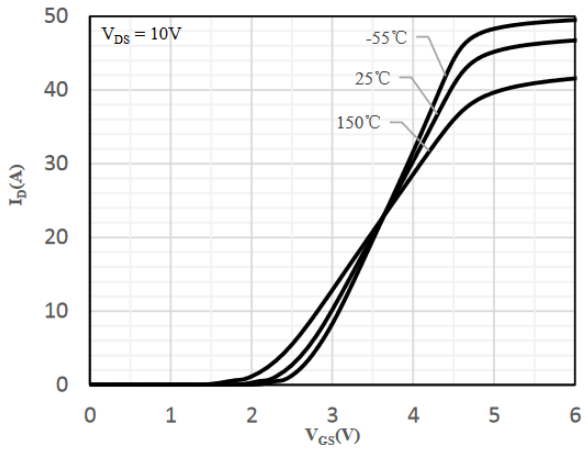


Typical characteristics

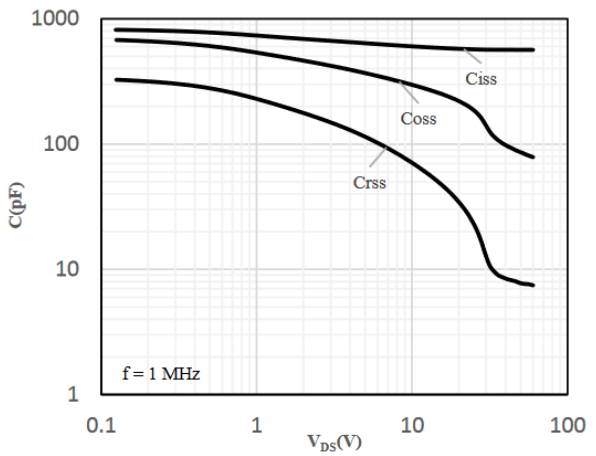
Normalized ON-resistance vs. junction temperature



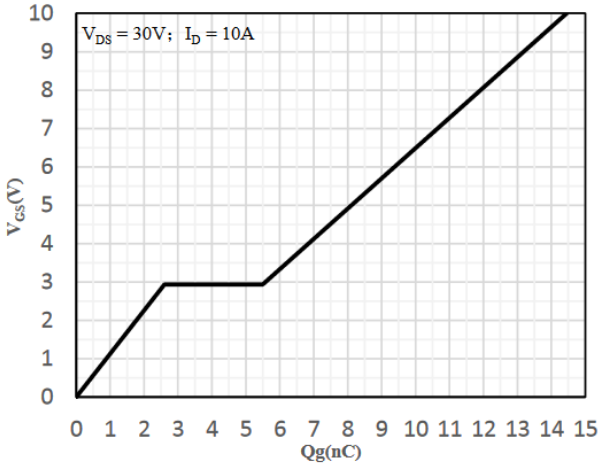
Transfer characteristics



Capacitance characteristics

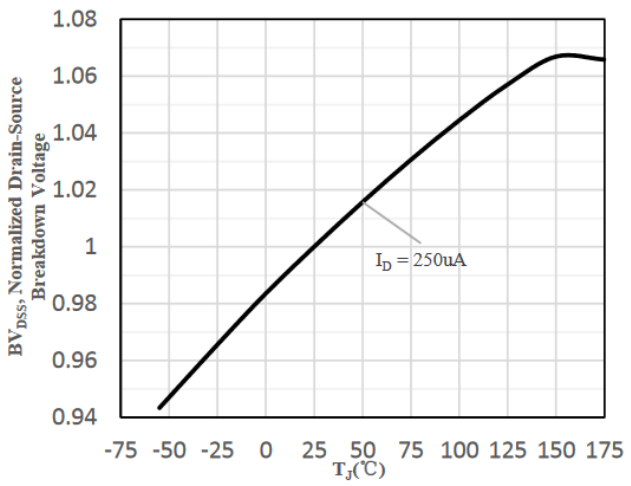


Gate-charge characteristics

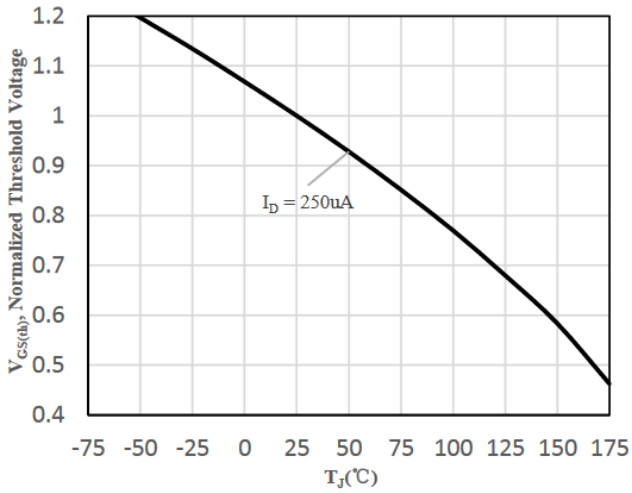


Typical characteristics

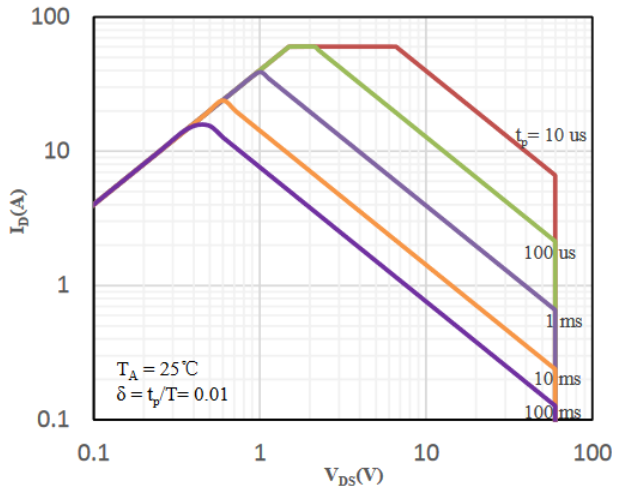
Normalized breakdown voltage vs junction temperature



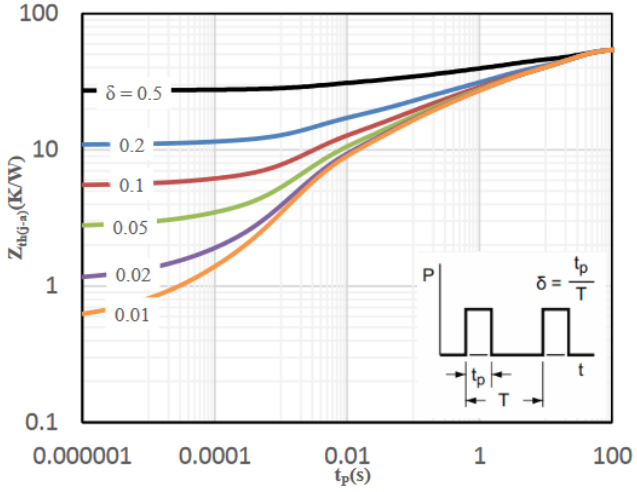
Normalized $V_{GS(th)}$ vs junction temperature

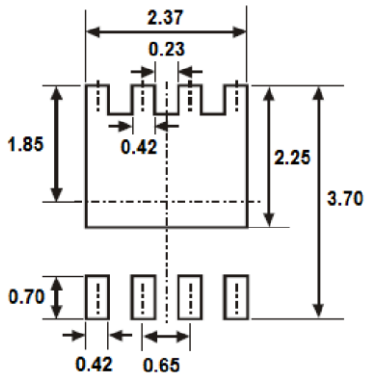


Safe operation area



Maximum transient thermal impedance



Suggested soldering pad layout

PDFN3×3-8L

Ordering information				
Part Number	**Marking**	**Package**	**Shipping Quantity**	**Dimensions**
AKS250N06T-3D8	250N06T	PDFN3×3-8L	**5000 pcs / reel**	---

Disclaimer

Akyga semi reserves the right to make changes without notice to any product specification herein, to make corrections, modifications, enhancements or other changes. Akyga semi or anyone on its behalf assumes no responsibility or liability for any errors or inaccuracies. Data sheet specifications and its information contained are intended to provide a product description only. "Typical" parameters which may be included on Akyga semi data sheets and/ or specifications can and do vary in different applications and actual performance may vary over time. Akyga semi does not assume any liability arising out of the application or use of any product or circuit. Akyga semi products are not designed, intended or authorized for use in medical, life-saving implant or other applications intended for life-sustaining or other related applications where a failure or malfunction of component or circuitry may directly or indirectly cause injury or threaten a life without expressed written approval of Akyga semi. Customers using or selling Akyga semi components for use in such applications do so at their own risk and shall agree to fully indemnify Akyga semi and its subsidiaries harmless against all claims, damages and expenditures.