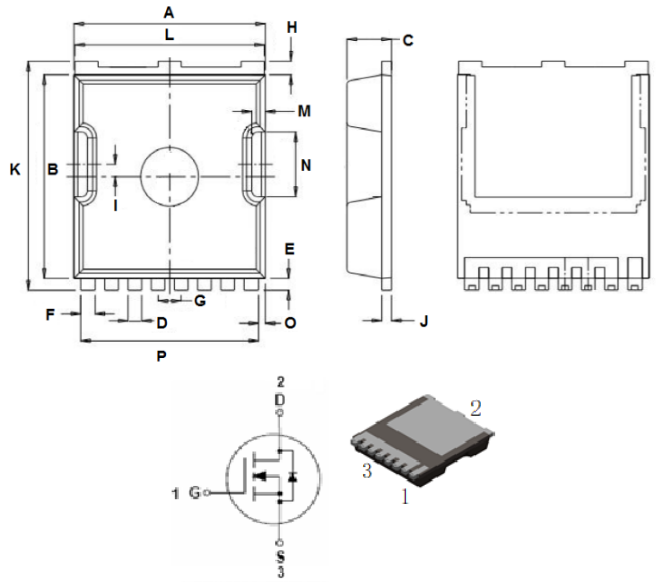
N-Channel Enhancement Mode MOSFET

Primary characteristics			
Symbol	**Parameter**	**Value**	**Unit**
I_D	Continuous drain current (T_A=25°C)	33	A
V_{DSS}	Drain source voltage	100	V
R_{DSON}	Static drain-source on-resistance	2.2	mΩ MAX

Features

- **TOLL** case for easy automatic insertion
- Pb-free and **RoHS** compliant
- Ultra low ON resistance and gate charge
- Advanced shielded gate technology
- JESD22-A114-B ESD rating of class 3.0A per human body model
- Molding compound: UL Flammability Classification Rating 94V-0
- Terminals: matte tin-plated leads; solderability-per MIL-STD-202, method 208

Case dimensions



TOLL

	A	B	C	D	E	F	G	H
TYP	9.9	10.4	2.3	0.7	0.6	0.75	1.2	0.7
MIN	9.7	10.2	2.1	0.6	0.5	0.65	1.1	0.6
MAX	10.1	10.6	2.5	0.8	0.7	0.85	1.3	0.8
	I	**J**	**K**	**L**	**M**	**N**	**O**	**P**
TYP	0.65	0.50	11.7	9.8	0.6	3.3	0.35	9.2
MIN	0.55	0.45	11.5	9.6	0.5	3.1	0.25	9.0
MAX	0.75	0.55	11.9	10.0	0.7	3.5	0.45	9.4

All measurements in mm

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

Characteristic		Symbol	Value	Unit
Drain-source voltage		V_{DSS}	100	V
Gate-source voltage		V_{GSS}	±20	V
Continuous drain current	T_C=25°C	I_D	300	A
	T_C=100°C		210	A
	T_A=25°C [1)]		33	A
	T_A=100°C [1)]		23	A
Pulsed drain current (t_p=10µs, T_C=25°C)		I_{DM}	1200	A
Thermal resistance junction-to-case		$R_{\theta JC}$	0.5 (0.4 typ.)	°C/W
Thermal resistance junction-to-air [1)]		$R_{\theta JA}$	40 (24 typ.)	°C/W
Single pulse avalanche energy [3)]		E_{AS}	3500	mJ
Power Dissipation (T_C=25°C)		P_D	300	W
Operating junction temperature range		T_J, T_{STG}	-55 ~ 175	°C

Electrical characteristics (T_A = 25°C)						
Characteristic	**Test condition**	**Symbol**	**Value**			**Unit**
			Min.	**Typ.**	**Max.**	
Drain-source breakdown voltage	V_{GS}=0V, I_D=1.0mA	V_{DSS}	100	-	-	V
Zero gate voltage drain current	V_{DS}=100V, V_{GS}=0V	I_{DSS}	-	-	5.0	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	$V_{GS(TH)}$	2.0	3.0	4.0	V
Static drain-source on-state resistance [2]	V_{GS}=10V, I_D=150A	$R_{DS(ON)}$	-	1.3	1.6	mΩ
	V_{GS}=6.0V, I_D=75A		-	1.7	2.2	
Gate resistance	V_{GS}=0V, f=1.0MHz	R_G	-	2.0	-	Ω

Dynamic electrical characteristics						
Characteristic	**Test condition**	**Symbol**	**Value**			**Unit**
			Min.	**Typ.**	**Max.**	
Input capacitance	V_{DS}=50V V_{GS}=0V f=1.0MHz	C_{ISS}	-	13113	-	pF
Output capacitance		C_{OSS}	-	2167	-	
Reverse transfer capacitance		C_{RSS}	-	25	-	

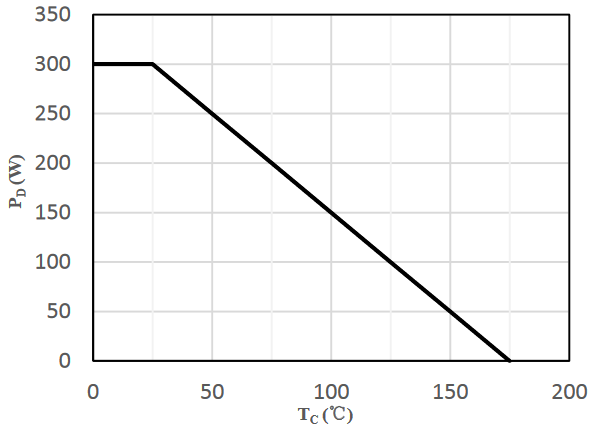
Switching characteristics						
Characteristic	**Test condition**	**Symbol**	**Value**			**Unit**
			Min.	**Typ.**	**Max.**	
Turn ON delay time [4]	V_{DD}=50V V_{GS}=10V I_D=100A R_G=1.8Ω	$t_{d(ON)}$	-	20	-	ns
Turn ON rise time [4]		t_r	-	13	-	
Turn OFF delay time [4]		$t_{d(OFF)}$	-	49	-	
Turn OFF fall time [4]		t_f	-	17	-	
Total gate-charge	V_{DD}=50V V_{GS}=10V I_D=100A	Q_G	-	211	-	nC
Gate to source charge		Q_{GS}	-	57	-	
Gate to drain (Miller) charge		Q_{GD}	-	59	-	

Source-drain diode characteristics						
Characteristic	**Test condition**	**Symbol**	**Value**			**Unit**
			Min.	**Typ.**	**Max.**	
Diode forward voltage [2]	I_S=100A, V_{GS}=0V	V_{SD}	-	0.8	1.2	V
Reverse recovery time	I_F=40A, V_{GS}=0V di/dt=100A/µs	t_{rr}	-	118	-	ns
Reverse recovery charge		Q_{rr}	-	346	-	nC

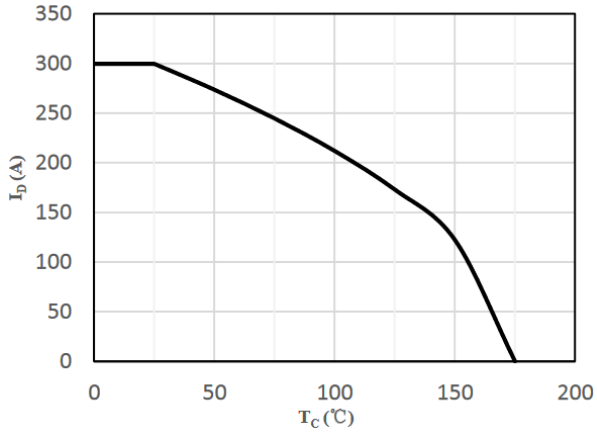
Notes:
1) The data tested when surface mounted on a 1 inch^2 FR-4 board with 2oz copper
2) The data tested by pulsed, pulse width ≤300µs, duty cycle ≤2%
3) The E_{AS} data shows max. rating. The test condition is V_{DD}=80V, V_{GS}=10V, L=50mH
4) Guaranteed by design, not subject to production

Typical characteristics

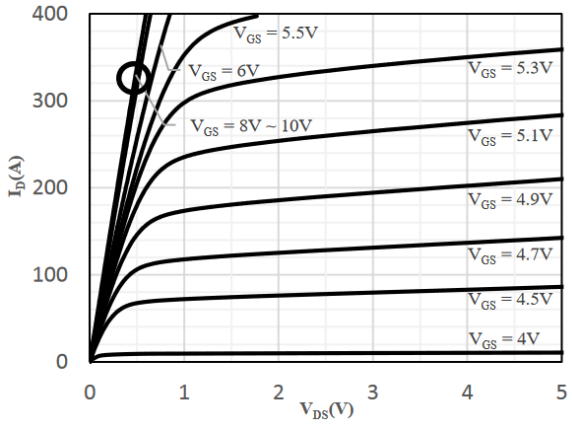
Power dissipation



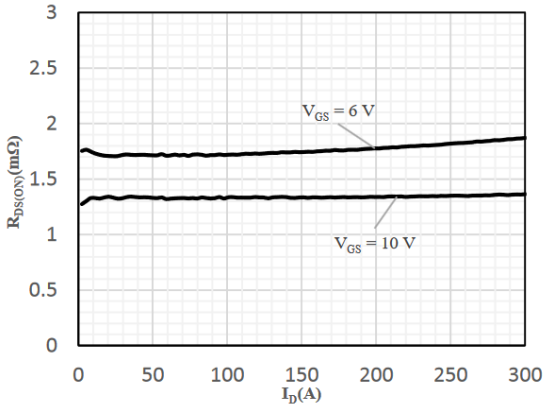
Drain current



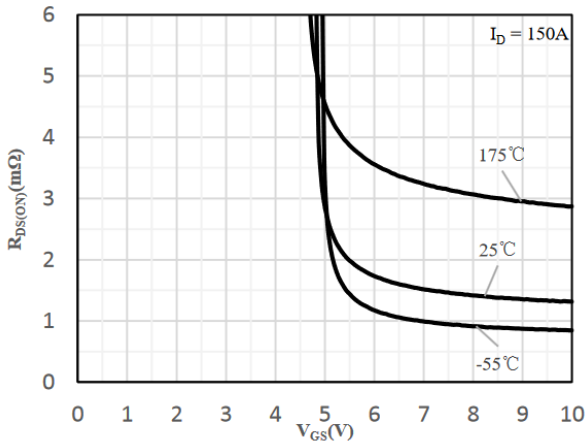
Typical output characteristics



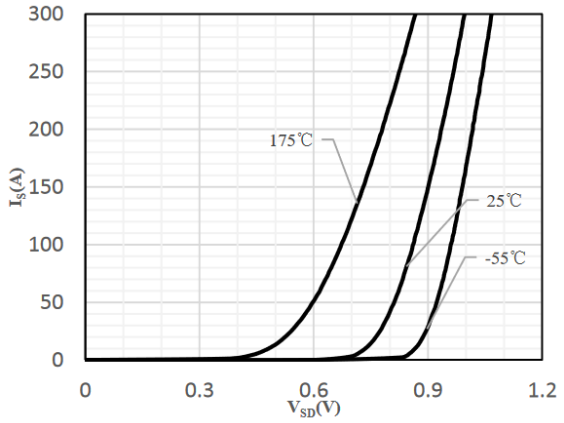
ON resistance vs. drain current and gate voltage



ON resistance vs. gate-source voltage

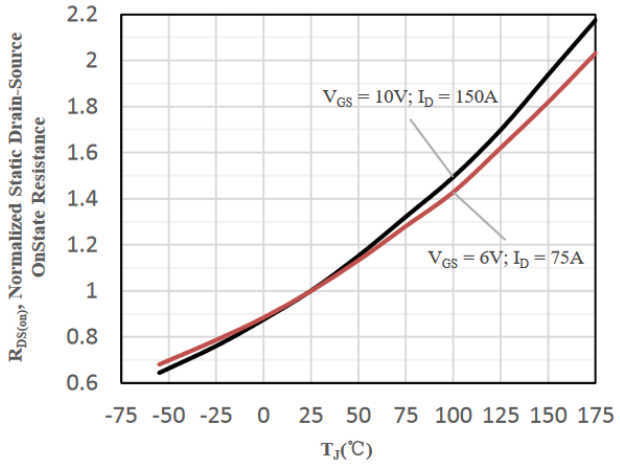


Body-diode characteristics

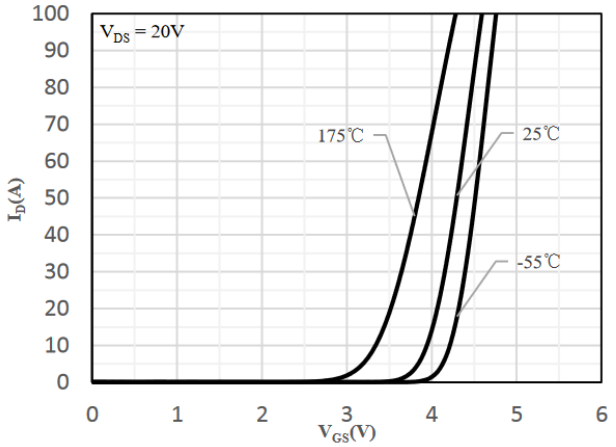


Typical characteristics

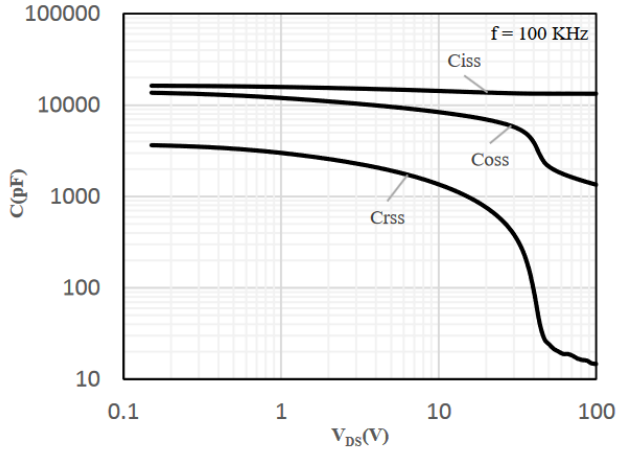
Normalized ON resistance vs. junction temperature



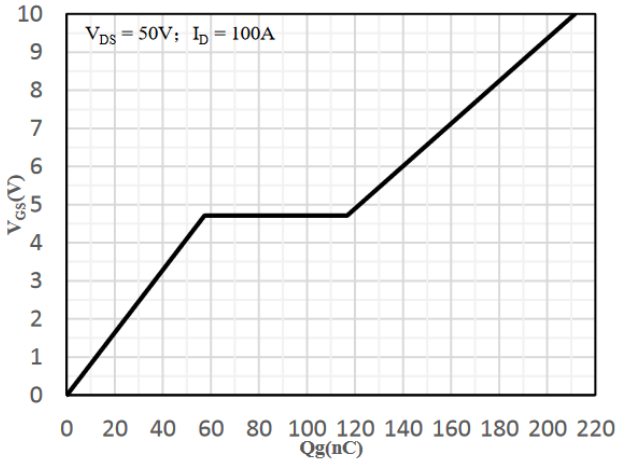
Transfer characteristics



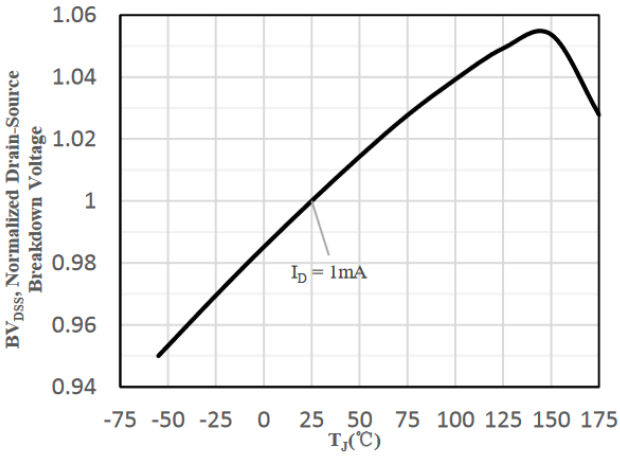
Capacitance characteristics



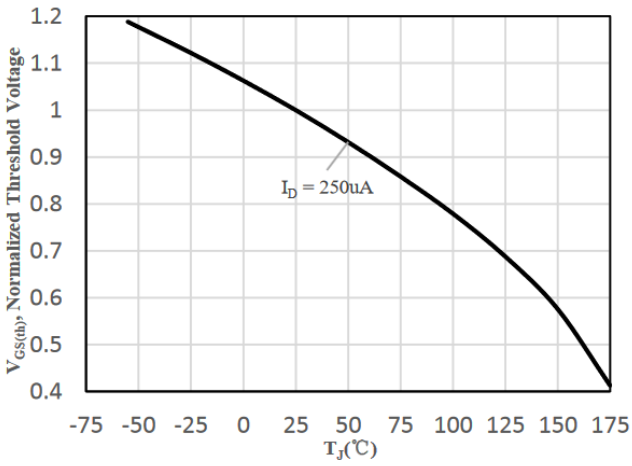
Gate charge characteristics



Normalized breakdown voltage vs. junction temperature

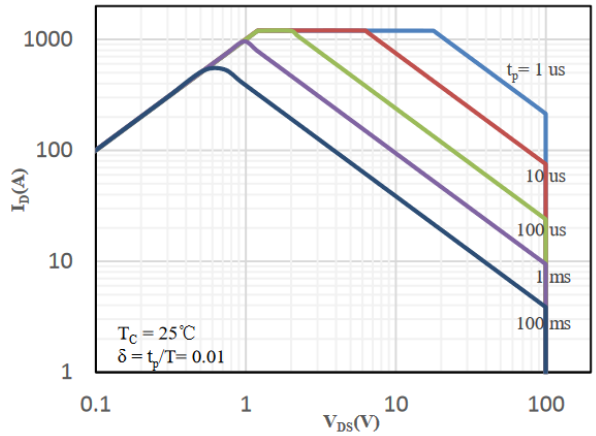


Normalized $V_{GS(TH)}$ vs. junction temperature

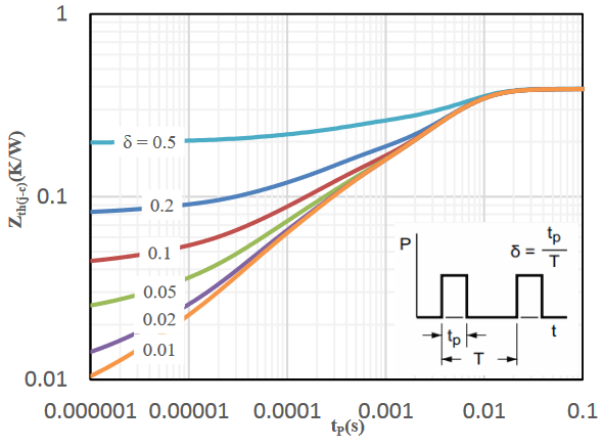


Typical characteristics

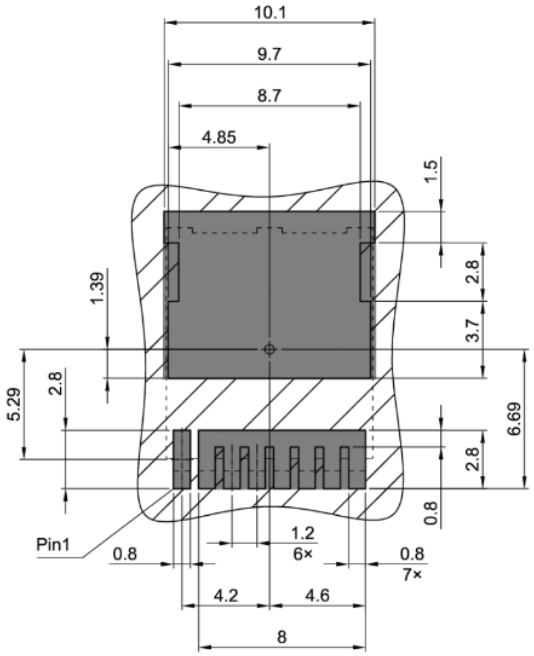
Safe operating area



Maximum transient thermal impedance



Suggested soldering pad layout



TOLL

Ordering information				
Part Number	**Marking**	**Package**	**Shipping Quantity**	**Dimensions**
AKS016N10TH-TL	016N10TH	TOLL	**2000 pcs / tape & reel**	---

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