

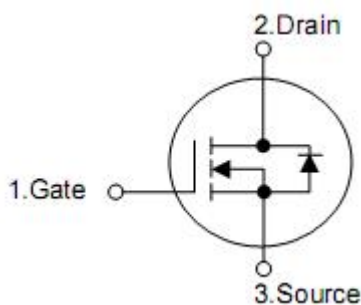
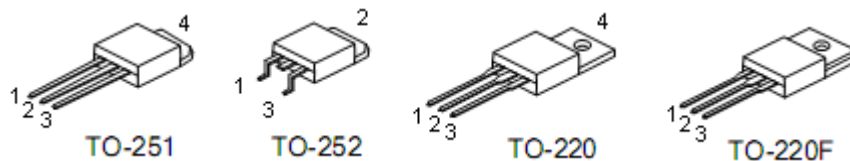
1. Description

The KIA50N06 is three-terminal silicon device with current conduction capability of about 50A, fast switching speed. Low on-state resistance, breakdown voltage rating of 60V, and max threshold voltages of 4 volt. It is mainly suitable electronic ballast, and low power switching

2. Features

- n $R_{DS(ON)}=18m\Omega@V_{GS}=10V$.
- n Ultra low gate charge (typical 30nC)
- n Low reverse transfer capacitance
- n Fast switching capability
- n 100% avalanche energy specified
- n Improved dv/dt capability

3. Pin configuration



Pin	Function
1	Gate
2	Drain
3	Source
4	Drain

4. Absolute maximum ratings

Parameter	Symbol	Value	Unit	
Drain to source voltage	V_{DSS}	60	V	
Gate to source voltage	V_{GSS}	± 20	V	
Continuous drain current	$T_J=25\text{ }^\circ\text{C}$	I_D	50	A
	$T_J=100\text{ }^\circ\text{C}$	I_D	35	A
Drain current pulsed (note1)	I_{DM}	200	A	
Single pulsed avalanche energy (note2)	E_{AS}	480	mJ	
Repetitive avalanche energy (note1)	E_{AR}	13	mJ	
Peak diode recovery dv/dt (note3)	dv/dt	7	V/ns	
Total power dissipation($T_J=25\text{ }^\circ\text{C}$)	P_D	130	W	
Derating factor above 25 °C	P_D	0.9	W/ °C	
Operating junction temperature	T_J	-55 ~ +150	°C	
Storage temperature	T_{STG}	-55 ~ +150	°C	

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

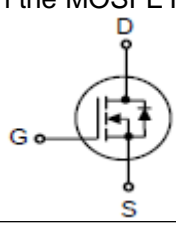
Absolute maximum ratings are stress ratings only and functional device operation is not implied.

5. Thermal resistance

Parameter	Symbol	Typ	Max	Units
Thermal resistance, junction-to-case	θ_{JC}		1.15	°C/W
Thermal resistance, case-to-sink	θ_{CS}	0.5		°C/W
Thermal resistance, junction-to-ambient	θ_{JA}		62.5	°C/W

6. Electrical characteristics

(T_J=25°C, unless otherwise notes)

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Off characteristics						
Drain-source breakdown voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	60			V
Breakdown voltage temperature coefficient	ΔBV _{DSS} /ΔT _J	I _D =250μA, referenced to 25 °C		0.07		V/°C
Drain-source leakage current	I _{DSS}	V _{DS} =60V, V _{GS} =0V			1	μA
		V _{DS} =48V, T _C =125 °C			1	μA
Gate-source leakage current	I _{GSS}	V _{GS} =20V, V _{DS} =0V			100	nA
Gate-source leakage Reverse		V _{GS} =-20V, V _{DS} =0V			-100	nA
On characteristics						
Gate threshold voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2.0		4.0	V
Static drain-source on-state resistance	R _{DS(ON)}	V _{GS} =10V, I _D =25A		18	23	mΩ
Dynamic characteristics						
Input capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1MHz		900	1220	pF
Output capacitance	C _{OSS}			430	550	pF
Reverse transfer capacitance	C _{RSS}			80	100	pF
Switching characteristics						
Turn-on delay time	t _{D(ON)}	V _{DD} =30V, I _D =25A, R _G =50Ω (note4,5)		40	60	ns
Rise time	t _R			100	200	ns
Turn-off delay time	t _{D(OFF)}			90	180	ns
Fall time	t _F			80	160	ns
Total gate charge	Q _G	V _{DS} =48V, V _{GS} =10V, I _D =50A (note4,5)		30	40	nC
Gate-source charge	Q _{GS}			9.6		nC
Gate-drain charge (miller charge)	Q _{GD}			10		nC
Source-drain diode ratings and characteristics						
Diode forward voltage	V _{SD}	V _{GS} =0V, I _S =50A			1.5	V
Continuous source current	I _S	Integral reverse p-n junction diode in the MOSFET 			50	A
Pulsed source current	I _{SM}					200
Reverse recovery time	t _{RR}	V _{GS} =0V, I _S =50A		54		ns
Reverse recovery charge	Q _{RR}	dI _F /dt=100A/μs(note4)		81		μC

Note:1. repetitive rating:pulse width limited by junction temperature

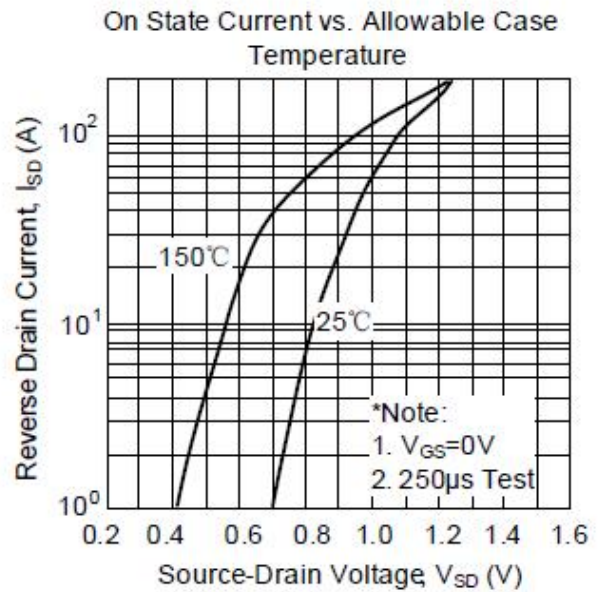
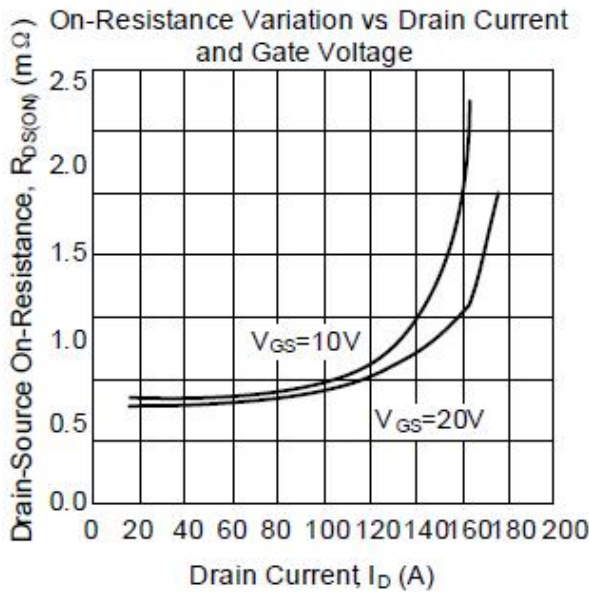
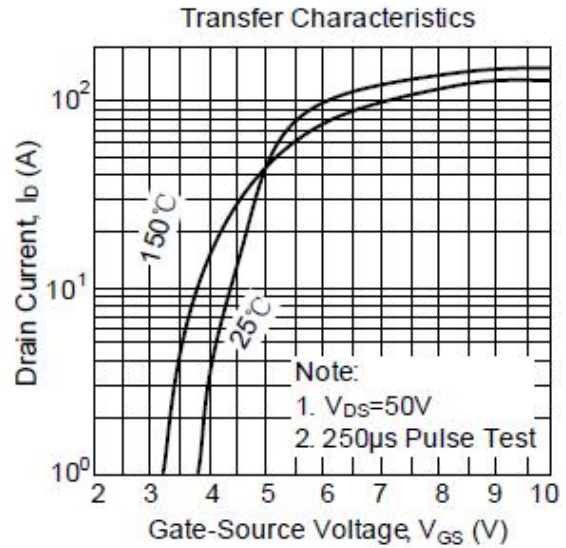
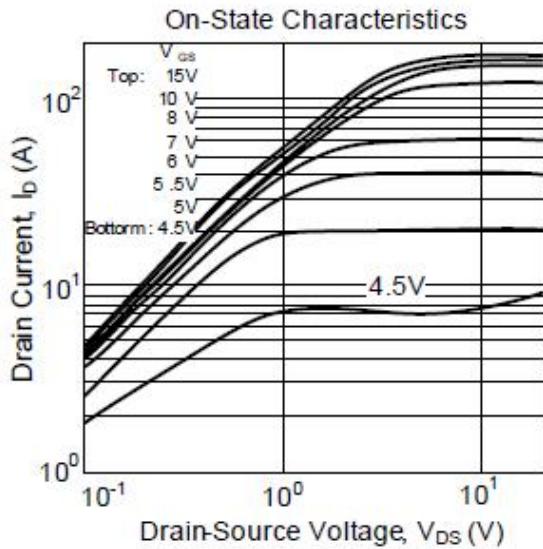
2.L=0.5mH, I_{AS}=50A, V_{DD}=25V, R_G=0Ω, starting T_J=25°C

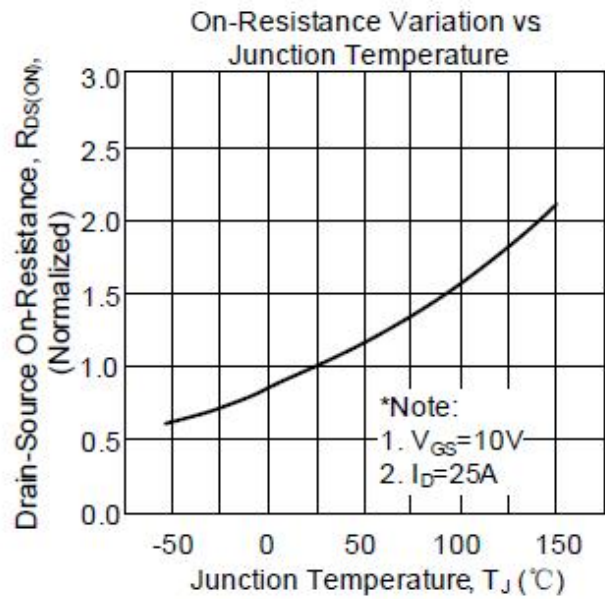
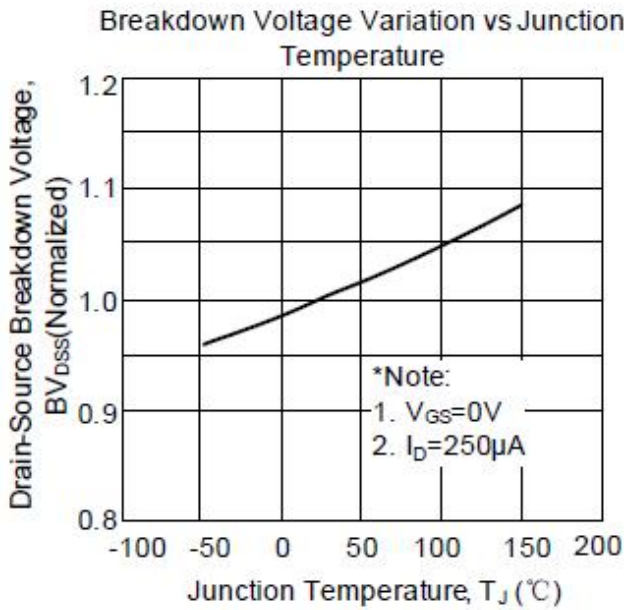
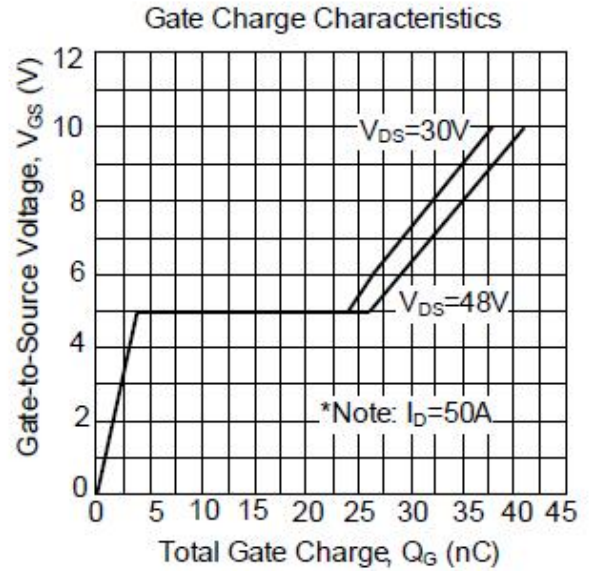
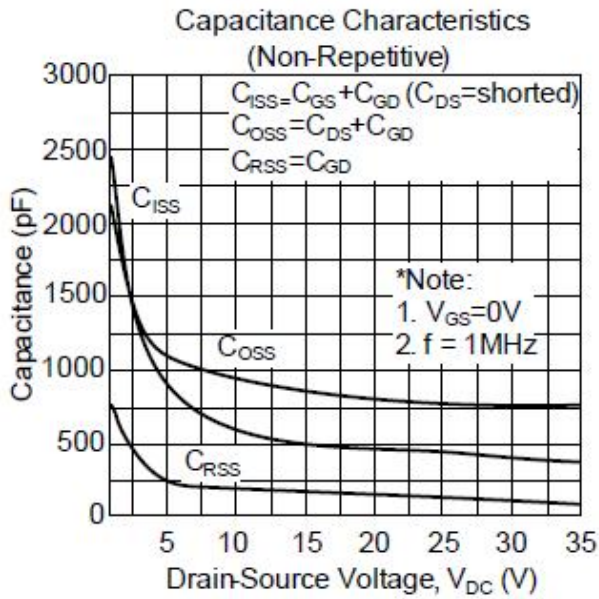
3. I_{SD}≤50A, di/dt≤300A/μs, V_{DD}≤BV_{DSS}, starting T_J=25 °C

4. Pulse test:pulse width≤300μs, duty cycle≤2%

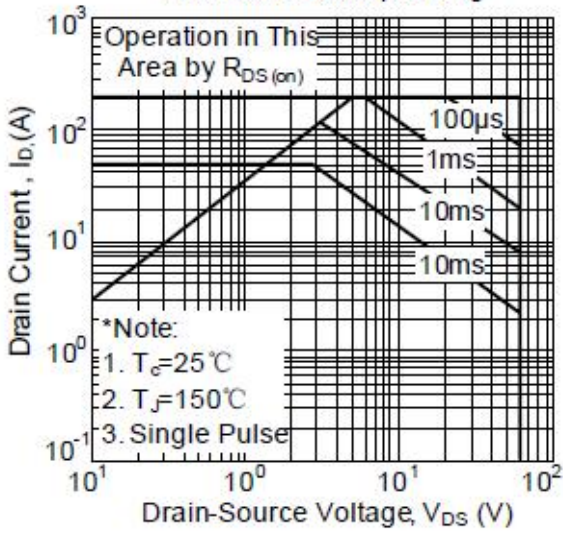
5. Essentially independent of operating temperature

7. Typical characteristics

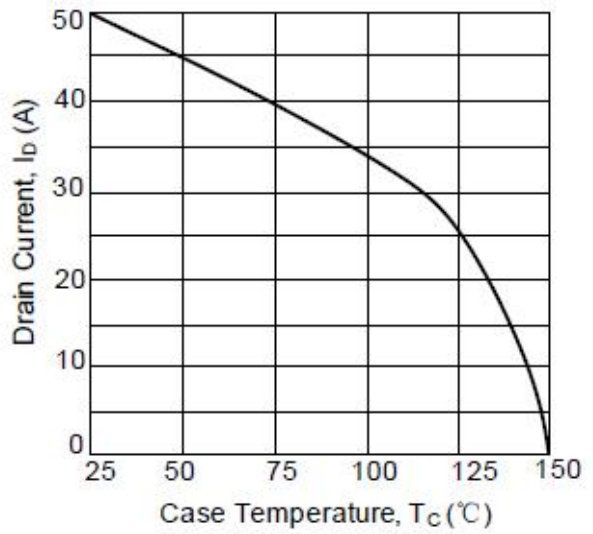




Maximum Safe Operating



Maximum Drain Current vs Case Temperature



Transient Thermal Response Curve

