

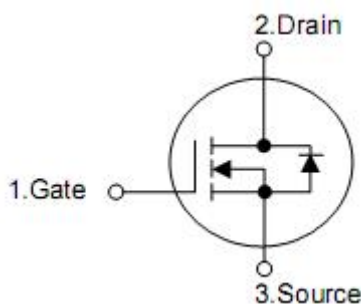
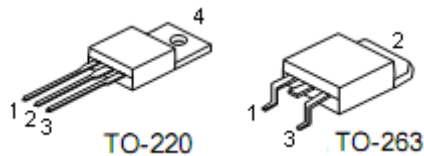
1. Description

The KIA840H N-Channel enhancement mode silicon gate MOSFET is designed for high voltage, high speed power switching applications such as switching regulators, switching solenoid, motor drivers, relay drivers.

2. Features

- n $R_{DS(on)} = 0.65\Omega$ @ $V_{GS} = 10\text{ V}$
- n Low gate charge (typical 30nC)
- n Fast switching capability
- n 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

(TC= 25 °C , unless otherwise specified)

Parameter	Symbol	Rating	Units
Drain-source voltage	V_{DSS}	500	V
Drain current	I_D	Tc=25 °C	9.0
		Tc=100 °C	5.4
Drain current pulsed (note 1)	I_{DP}	36	A
Gate-source voltage	V_{GSS}	±30	V
Single pulsed avalanche energy (note 2)	E_{AS}	360	mJ
Repetitive avalanche energy (note 1)	E_{AR}	13.5	mJ
Peak diode recovery dv/dt (note 3)	dv/dt	4.5	V/ns
Power dissipation	P_D	Tc=25 °C	135
		derate above 25 °C	1.07
Junction temperature	T_J	+150	°C
Storage temperature	T_{STG}	-55 ~ +150	°C

5. Thermal characteristics

Parameter	Symbol	Rating	Unit
Thermal resistance,Junction-to-case	R_{thJC}	0.93	°C/W
Thermal resistance,case-to-sink typ.	R_{thCS}	0.5	°C/W
Thermal resistance,Junction-to-ambient	R_{thJA}	62.5	°C/W

6. Electrical characteristics

(T_J=25°C, unless otherwise notes)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Off Characteristics						
Drain-source breakdown voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	500			V
Breakdown voltage temperature coefficient	ΔBV _{DSS} /ΔT _J	I _D =250μA,		0.57		V/°C
Zero gate voltage drain current	I _{DSS}	V _{DS} =500V, V _{GS} =0V			1	μA
		V _{DS} =400V, T _C =125 °C			10	μA
Gate-body leakage current	Forward	V _{GS} =30V, V _{DS} =0V			100	nA
	Reverse	V _{GS} =-30V, 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-resistance	R _{DS(on)}	V _{GS} =10V, I _D =4.5A		0.65	0.80	Ω
Dynamic characteristics						
Input capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V f=1.0MHz		790	1030	pF
Output capacitance	C _{oss}			130	170	pF
Reverse transfer capacitance	C _{rss}			24	30	pF
Switching characteristics						
Turn-on delay time	t _{d(on)}	V _{DD} =250V, I _D =9.0A, R _G =25Ω (note4,5)		20	45	ns
Turn-on rise time	t _r			65	140	ns
Turn-off delay time	t _{d(off)}			93	195	ns
Turn-off fall time	t _f			64	125	ns
Total gate charge	Q _g	V _{DS} =400V, I _D =9.0A , V _{GS} =10V (note4,5)		28	35	nC
Gate-source charge	Q _{gs}			4	-	nC
Gate-drain charge	Q _{gd}			15	-	nC
Drain-source diode characteristics and maximum rating						
Drain-source diode forward voltage	V _{SD}	V _{GS} =0V, I _{SD} =9.0A			1.4	V
Continuous Drain-source current	I _{SD}				9.0	A
Pulsed Drain-source current	I _{SM}				36.0	A
Reverse recovery time	t _{rr}	I _S =9.0A,		335		ns
Reverse recovery charge	Q _{rr}	dI _{SD} /dt=100A/μs (note4)		2.95		μC

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

2. L=8mH, I_{AS}=9.0A, V_{DD}=50V, R_G=25Ω, starting T_J=25°C

3. I_{SD}≤9.0A, di/dt≤200A/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. Test circuits and waveforms

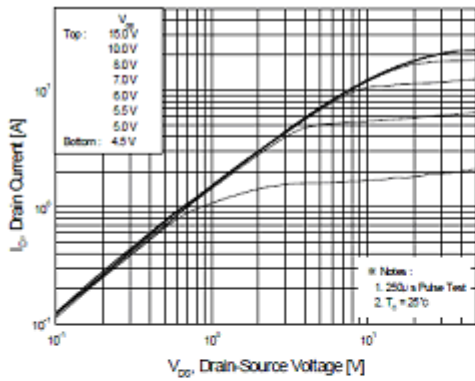


Figure 1. On-Region Characteristics

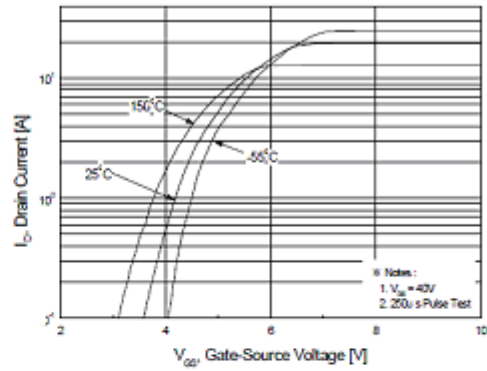


Figure 2. Transfer Characteristics

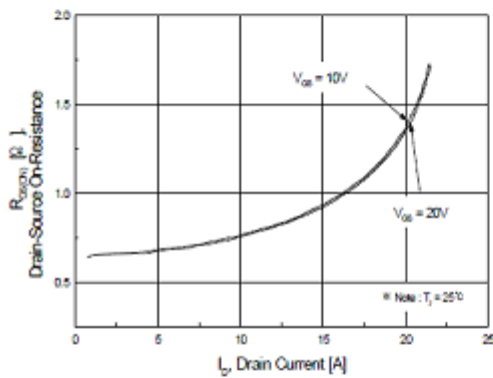


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

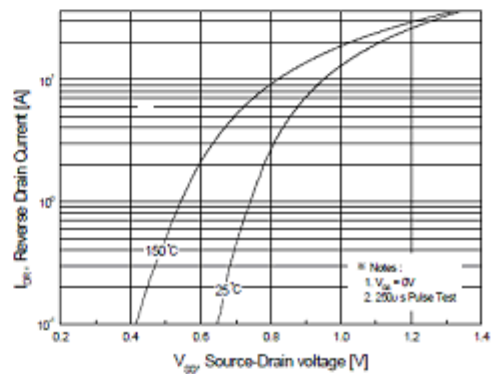


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

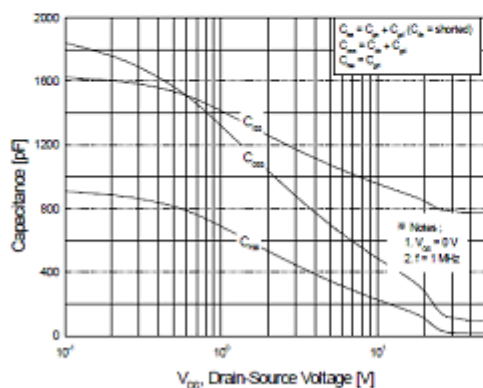


Figure 5. Capacitance Characteristics

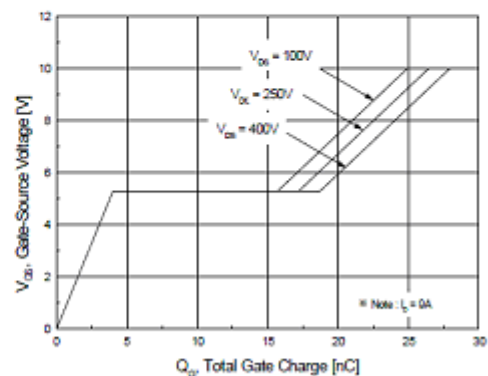


Figure 6. Gate Charge Characteristics

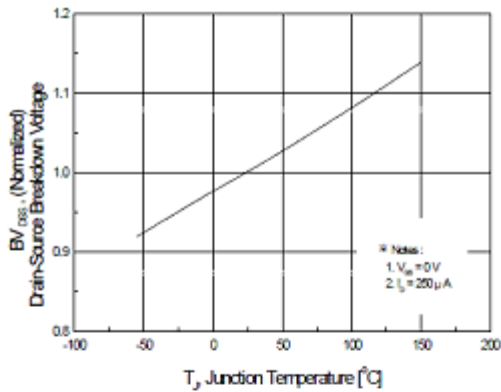


Figure 7. Breakdown Voltage Variation vs Temperature

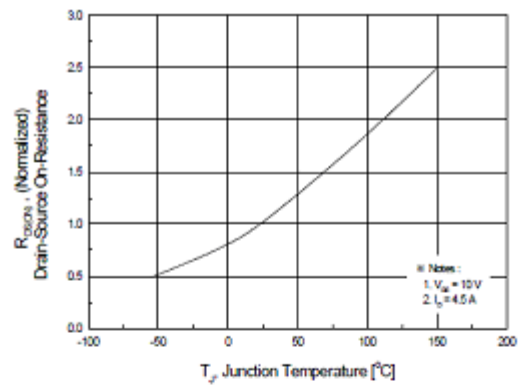


Figure 8. On-Resistance Variation vs Temperature

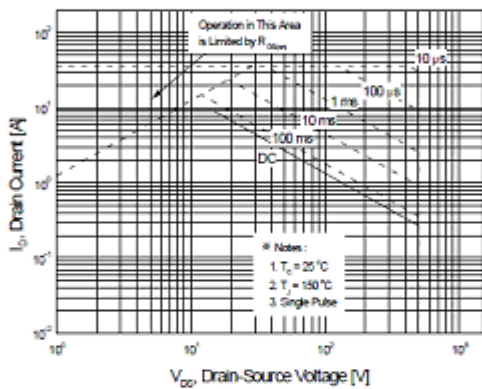


Figure 9. Maximum Safe Operating Area

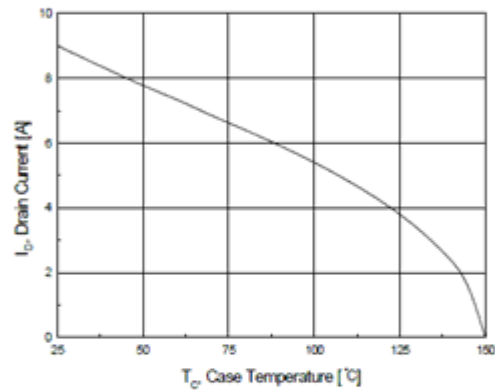


Figure 10. Maximum Drain Current vs Case Temperature

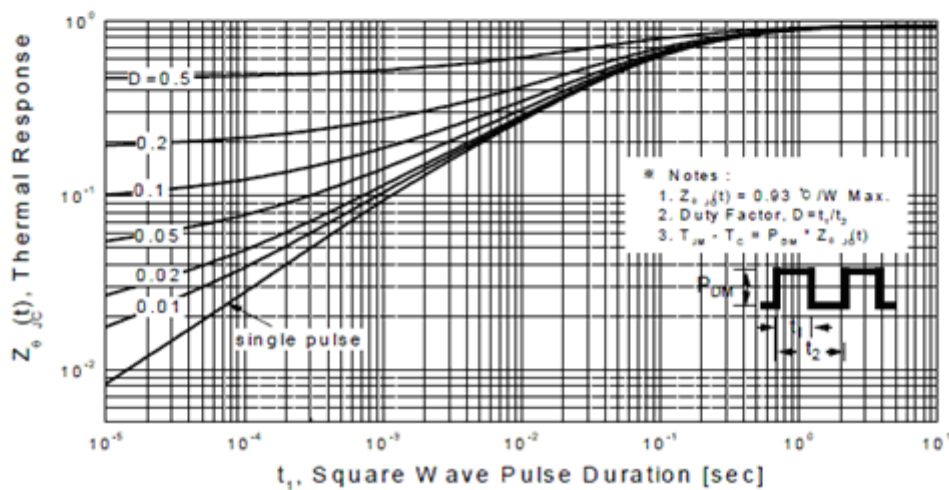


Figure 11. Transient Thermal Response Curve