

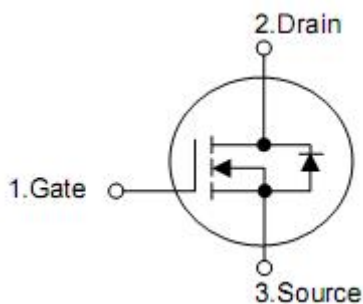
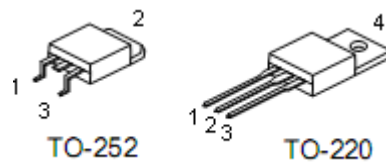
## 1. Applications

- n Adaptor
- n Charger
- n SMPS Standby Power

## 2. Features

- n RoHS Compliant
- n  $R_{DS(on)} = 0.7\Omega @ V_{GS} = 10\text{ V}$
- n Low gate charge minimize switching loss
- n Fast recovery body diode

## 3. Pin configuration



Pin	Function
1	Gate
2	Drain
3	Source
4	Drain

#### 4. Absolute maximum ratings

(T<sub>C</sub>=25 °C , unless otherwise specified)

Parameter	Symbol	Ratings		Units
		TO-252	TO-220	
Drain-source voltage	V <sub>DSS</sub>	500		V
Gate-source voltage	V <sub>GSS</sub>	±30		V
Continuous drain current	I <sub>D</sub>	9.0		A
Pulsed drain current at V <sub>GS</sub> =10V	I <sub>DM</sub>	28	32	A
Single pulse Avalanche energy	E <sub>AS</sub>	400		mJ
Peak diode recovery dv/dt	dv/dt	5.5		V/ns
Power dissipation	P <sub>D</sub>	120	120	W
		Derating factor above 25°C		W/°C
Soldering temperature distance of 1.6mm from case for 10seconds	T <sub>L</sub>	300		°C
Operating and Storage temperature range	T <sub>J</sub> &T <sub>STG</sub>	-55~+150		°C

Caution: Stresses greater than those listed in the “ Absolute maximum ratings” may cause permanent damage to the device.

#### 5. Thermal characteristics

Parameter	Symbol	Rating		Unit
		TO-252	TO-220	
Thermal resistance,Junction-to-case	θ <sub>JC</sub>	1.04		°C/W
Thermal resistance,Junction-to-ambient	θ <sub>JA</sub>	75	62	°C/W

## 6. Electrical characteristics

( $T_J=25^\circ\text{C}$ , unless otherwise notes)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-source breakdown voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	500	-	-	V
Gate source breakdown voltage	$V_{GSO}$	$I_{GS}=\pm 1mA$ (Open drain)	$\pm 30$	-	-	V
Drain-to-source leakage current	$I_{DSS}$	$V_{DS}=500V, V_{GS}=0V$	-	-	1	$\mu A$
		$V_{DS}=400V, V_{GS}=0V, T_J=125^\circ C$	-	-	100	$\mu A$
Gate-to-source leakage current	$I_{GSS}$	$V_{GS}=20V, V_{DS}=0V$	-	-	10	$\mu A$
		$V_{GS}=-20V, V_{DS}=0V$	-	-	-10	$\mu A$
<b>On characteristics</b>						
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	-	4.0	V
Static drain-source on-resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=4A$	-	0.7	0.9	$\Omega$
Forward transconductance	$g_{fs}$	$V_{DS}=15V, I_D=3A$	-	8.5	-	S
<b>Dynamic characteristics</b>						
Input capacitance	$C_{iss}$	$V_{DS}=25V, V_{GS}=0V, f=1.0MHz$	-	960	-	pF
Output capacitance	$C_{oss}$		-	110	-	pF
Reverse transfer capacitance	$C_{rss}$		-	10	-	pF
Gate resistance	$R_g$	$V_{DS}=0V, F=1MHz$	-	1.3	-	$\Omega$
Total gate charge	$Q_g$	$V_{DD}=30V, V_{GS}=0V-10V, I_D=8A(TO-252) I_D=9A(TO-220)$	-	24	-	nC
Gate-source charge	$Q_{gs}$		-	4.0	-	nC
Gate-drain (Miller) charge	$Q_{gd}$		-	10	-	nC
<b>Resistive switching characteristics</b>						
Turn-on delay time	$t_{d(ON)}$	$V_{DD}=250V, V_{GS}=10V, R_g=12\Omega, I_D=8A(TO-252) I_D=9A(TO-220)$	-	11	-	nS
Rise time	$t_{rise}$		-	17	-	
Turn-off delay time	$t_{d(OFF)}$		-	46	-	
Fall time	$t_{fall}$		-	22	-	
<b>Source-drain body diode characteristics</b> $T_J=25^\circ\text{C}$ , unless otherwise notes						
Diode forward voltage	$V_{SD}$	$V_{GS}=0V, I_S=8A(TO-252) I_S=9A(TO-220)$	-	-	1.5	V
Continuous source current(TO-252) <sup>2</sup>	$I_{SD}$	Intergra PN-diode in MOSFET	-	-	8	A
Continuous source current(TO-220) <sup>2</sup>	$I_{SD}$		-	-	9	A
Pulsed source current <sup>2</sup>	$I_{SM}$		-	-	32	A
Reverse recovery time	$t_{rr}$	$di_F/dt=100A/\mu s, V_{GS}=0V$	-	175	-	ns
Reverse recovery charge	$Q_{rr}$	$I_F=8A(TO-252) I_F=9A(TO-220)$	-	750	-	nC

Note: 1.  $T_J=25^\circ\text{C}$  to  $150^\circ\text{C}$

2. Pulse width  $\leq 380\mu s$ ; duty cycle  $\leq 2\%$ .

3. KIA finished product specifications please customer before placing order, should obtain the latest version of the finished product specifications.

**7. Typical operating characteristics**

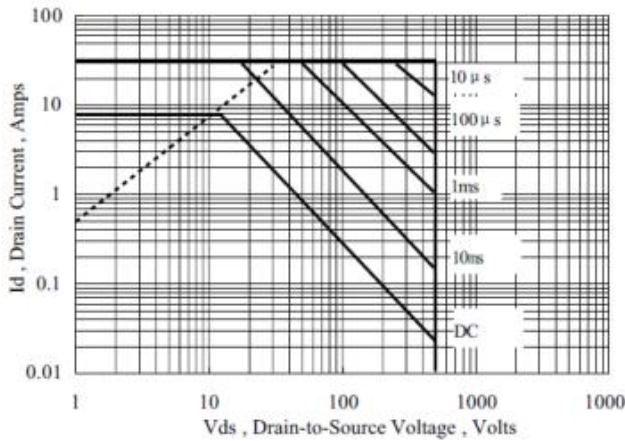


Figure 1 Maximum Forward Bias Safe Operating Area

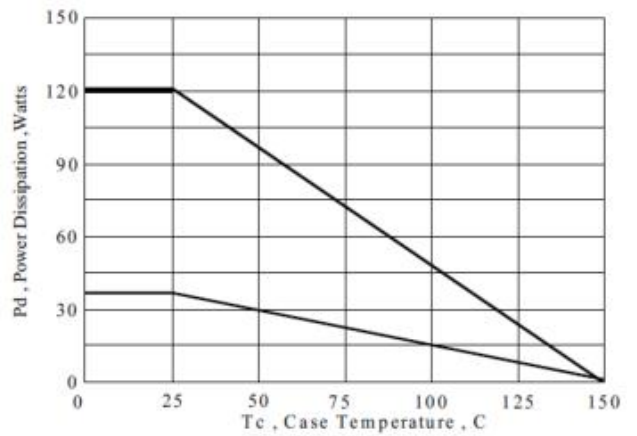


Figure 2 Maximum Power Dissipation vs Case Temperature

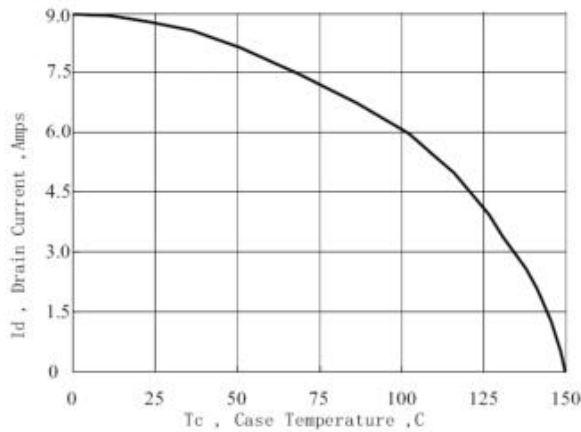


Figure 3 Maximum Continuous Drain Current vs Case Temperature

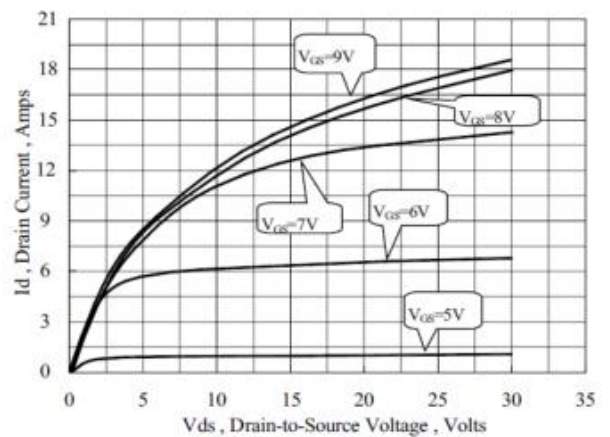


Figure 4 Typical Output Characteristics

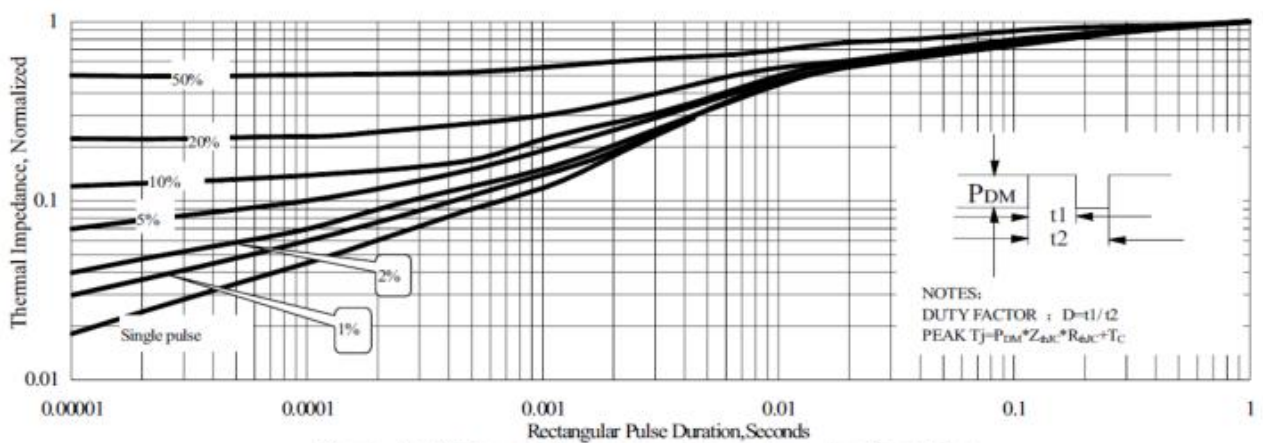


Figure 5 Maximum Effective Thermal Impedance, Junction to Case

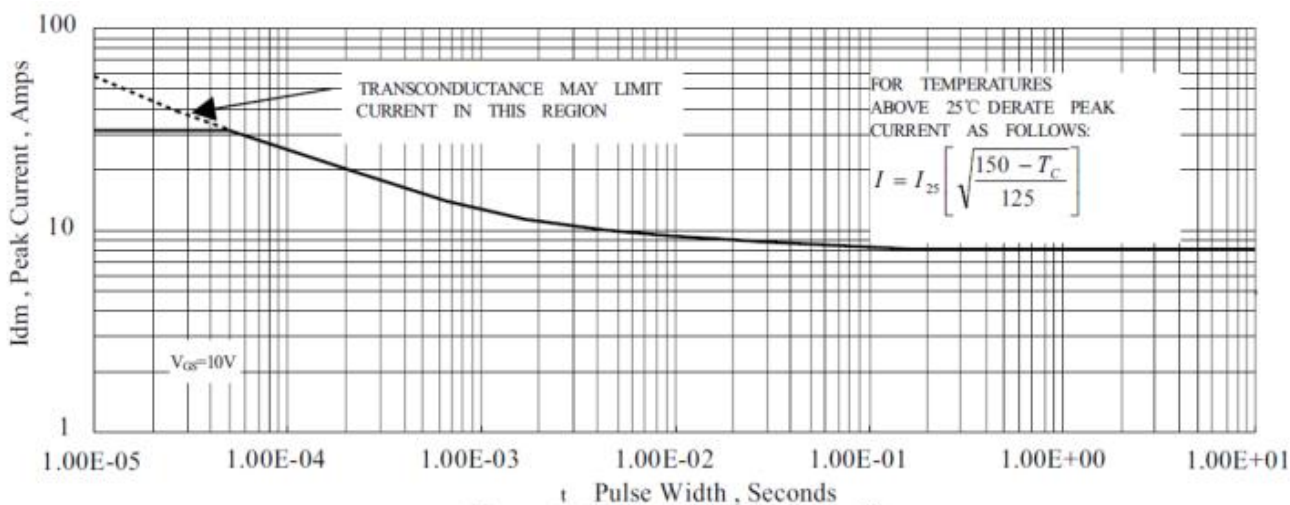


Figure 6 Maximum Peak Current Capability

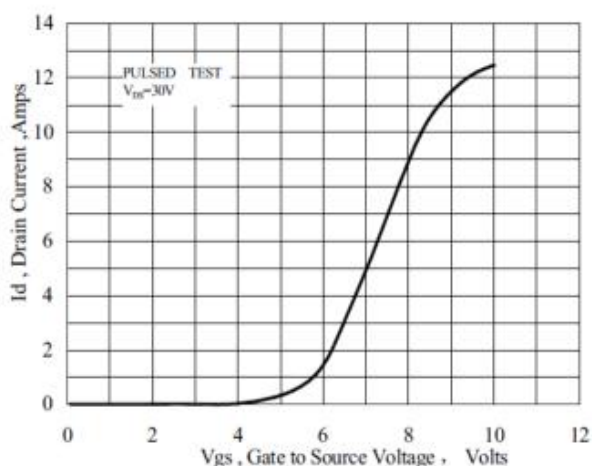


Figure 7 Typical Transfer Characteristics

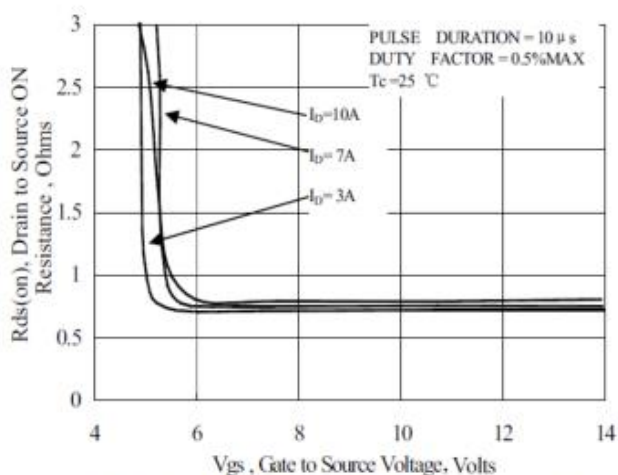


Figure 8 Typical Drain to Source ON Resistance vs Gate Voltage

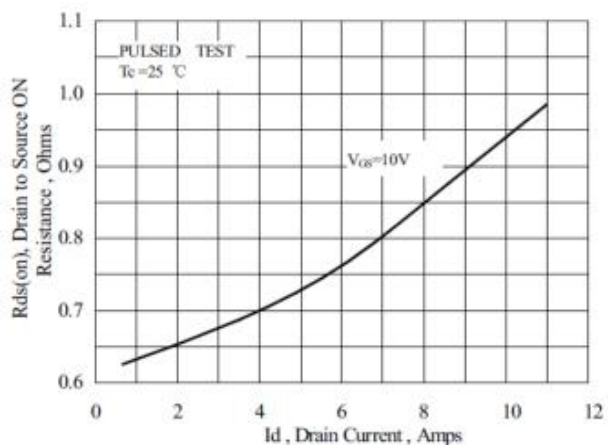


Figure 9 Typical Drain to Source ON Resistance vs Drain Current

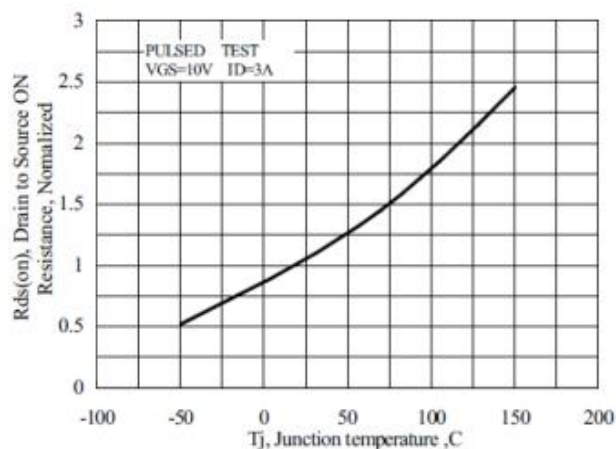


Figure 10 Typical Drain to Source ON Resistance vs Junction Temperature



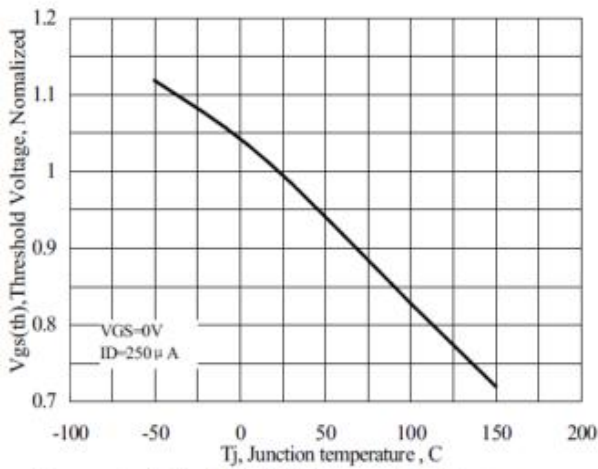


Figure 11 Typical Theshold Voltage vs Junction Temperature

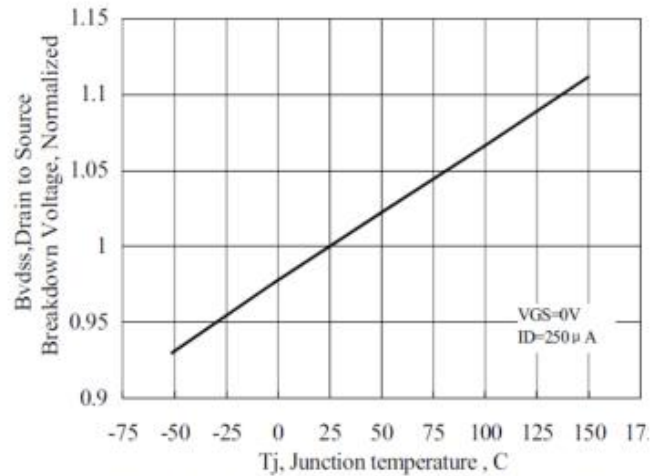


Figure 12 Typical Breakdown Voltage vs Junction Temperature

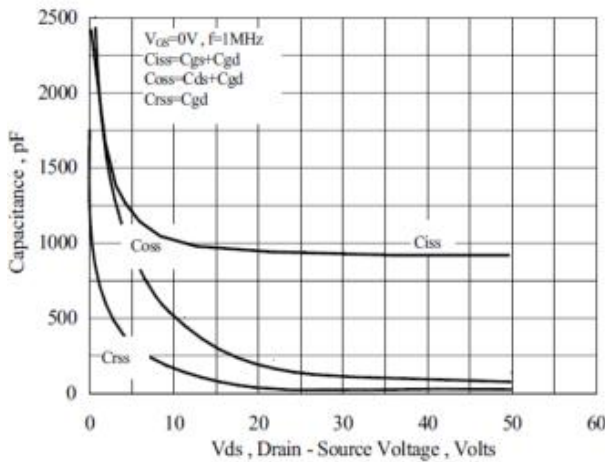


Figure 13 Typical Capacitance vs Drain to Source Voltage

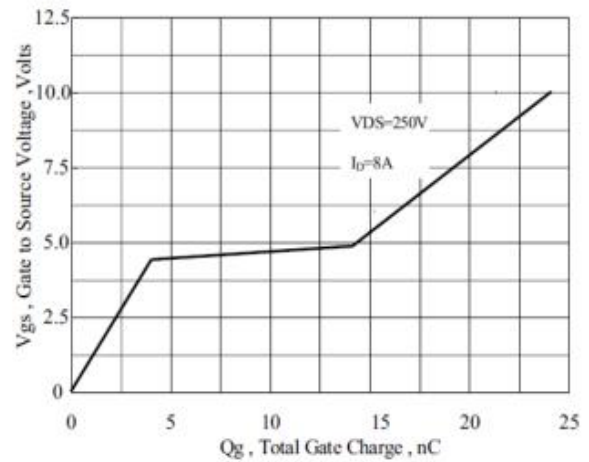


Figure 14 Typical Gate Charge vs Gate to Source Voltage

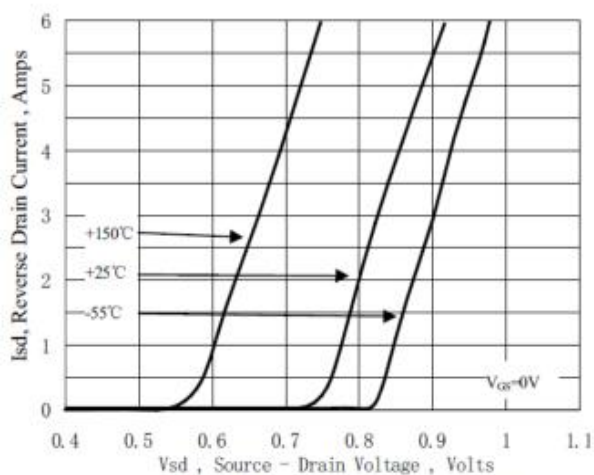


Figure 15 Typical Body Diode Transfer Characteristics

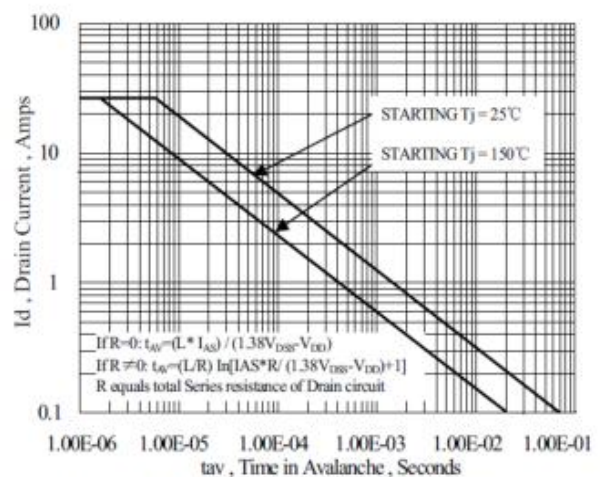


Figure 16 Unclamped Inductive Switching Capability