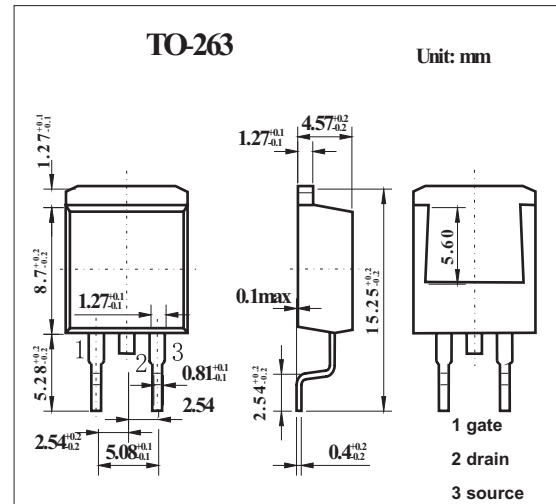
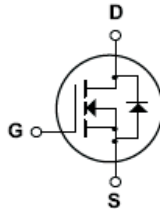


## 500V N-Channel MOSFET KQB4N50

### ■ Features

- 3.4A, 500 V.  $R_{DS(ON)} = 2.7 \Omega$  @  $V_{GS} = 10 V$
- Low gate charge (typical 10nC)
- Low  $C_{rss}$ (typical 6.0pF)
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability



### ■ Absolute Maximum Ratings $T_a = 25^\circ C$

Parameter	Symbol	Rating	Unit
Drain to Source Voltage	$V_{DSS}$	500	V
Drain Current Continuous ( $T_c=25^\circ C$ )	$I_D$	3.4	A
Drain Current Continuous ( $T_c=100^\circ C$ )		2.15	A
Drain Current Pulsed *1	$I_{DM}$	13.6	A
Gate-Source Voltage	$V_{GSS}$	$\pm 30$	V
Single Pulsed Avalanche Energy*2	$E_{AS}$	260	mJ
Avalanche Current *1	$I_{AR}$	3.4	A
Repetitive Avalanche Energy *1	$E_{AR}$	7	mJ
Peak Diode Recovery dv/dt *3	dv/dt	4.5	V/ns
Power dissipation @ $T_A=25^\circ C$	$P_D$	3.13	W
Power dissipation @ $T_c=25^\circ C$		70	W
Derate above $25^\circ C$		0.56	W/ $^\circ C$
Operating and Storage Temperature	$T_J, T_{STG}$	-55 to 150	$^\circ C$
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	$T_L$	300	$^\circ C$
Thermal Resistance Junction to Case	$R_{\theta JC}$	1.79	$^\circ C/W$
Thermal Resistance Junction to Ambient *4	$R_{\theta JA}$	40	$^\circ C/W$
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	62.5	$^\circ C/W$

\*1 Repetitive Rating:Pulse width limited by maximum junction temperature

\*2  $I = 40mA, I_{AS} = 3.4A, V_{DD} = 50V, R_G = 25 \Omega, Startion T_J = 25^\circ C$

\*3  $I_{SD} \leq 3.4A, di/dt \leq 200A/\mu S, V_{DD} \leq BV_{DSS}, Startiong T_J = 25^\circ C$

\*4 When mounted on the minimum pad size recommended (PCB Mount)

## KQB4N50

## ■ Electrical Characteristics Ta = 25°C

Parameter	Symbol	Testconditons	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μ A	500			V
Breakdown Voltage Temperature Coefficient	$\frac{\Delta BV_{DSS}}{\Delta T_J}$	I <sub>D</sub> = 250 μ A, Referenced to 25°C		0.38		mV/°C
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 500 V, V <sub>GS</sub> = 0 V			1	μ A
		V <sub>DS</sub> = 400 V, T <sub>C</sub> =125°C			10	μ A
Gate-Body Leakage Current,Forward	I <sub>GSSF</sub>	V <sub>GS</sub> = 30 V, V <sub>DS</sub> = 0 V			100	nA
Gate-Body Leakage Current,Reverse	I <sub>GSSR</sub>	V <sub>GS</sub> = -30 V, V <sub>DS</sub> = 0 V			-100	nA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μ A	3.0		5.0	V
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 1.7A		2.0	2.7	Ω
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> = 50 V, I <sub>D</sub> = 1.7A *		2.9		S
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 25 V, V <sub>GS</sub> = 0 V, f = 1.0 MHz		350	230	pF
Output Capacitance	C <sub>oss</sub>			55	45	pF
Reverse Transfer Capacitance	C <sub>rss</sub>			6	6	pF
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 250 V, I <sub>D</sub> = 3.4A, R <sub>G</sub> =25 Ω *		12	30	ns
Turn-On Rise Time	t <sub>r</sub>			45	100	ns
Turn-Off Delay Time	t <sub>d(off)</sub>			20	50	ns
Turn-Off Fall Time	t <sub>f</sub>			30	70	ns
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 400 V, I <sub>D</sub> = 3.4A, V <sub>GS</sub> = 10 V *		10	13	nC
Gate-Source Charge	Q <sub>gs</sub>			2.5		nC
Gate-Drain Charge	Q <sub>gd</sub>			4.7		nC
Maximum Continuous Drain-Source Diode Forward Current	I <sub>S</sub>				3.4	A
Maximum Pulsed Drain-Source Diode Forward Current	I <sub>SM</sub>				13.6	A
Drain-Source Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> = 0 V, I <sub>S</sub> = 3.4 A			1.4	V
Diode Reverse Recovery Time	t <sub>rr</sub>	V <sub>GS</sub> = 0 V, dI <sub>F</sub> /dt = 100 A/μ s, I <sub>S</sub> =3.4A*		210		ns
Diode Reverse Recovery Current	Q <sub>rr</sub>			1.15		nC

\* Pulse Test: Pulse Width ≤ 300 μ s, Duty Cycle ≤ 2.0%