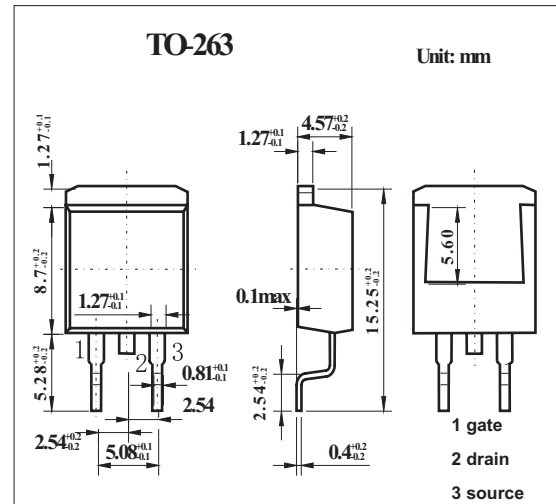
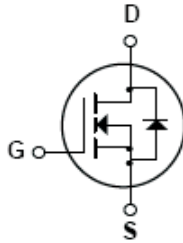


## 500V N-Channel MOSFET KQB2N50

### ■ Features

- 2.1A, 500 V.  $R_{DS(ON)} = 5.3 \Omega$  @  $V_{GS} = 10$  V
- Low gate charge (typical 6.0nC)
- Low  $C_{rss}$ (typical 4.0pF)
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability



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

Parameter	Symbol	Rating	Unit
Drain to Source Voltage	$V_{DSS}$	500	V
Drain Current Continuous ( $T_c=25^\circ\text{C}$ )	$I_D$	2.1	A
Drain Current Continuous ( $T_c=100^\circ\text{C}$ )		1.33	A
Drain Current Pulsed *1	$I_{DM}$	8.4	A
Gate-Source Voltage	$V_{GSS}$	$\pm 30$	V
Single Pulsed Avalanche Energy*2	$E_{AS}$	120	mJ
Avalanche Current *1	$I_{AR}$	2.1	A
Repetitive Avalanche Energy *1	$E_{AR}$	5.5	mJ
Peak Diode Recovery dv/dt *3	dv/dt	4.5	V/ns
Power dissipation @ $T_A=25^\circ\text{C}$	$P_D$	3.13	W
Power dissipation @ $T_c=25^\circ\text{C}$		55	W
Derate above $25^\circ\text{C}$		0.44	W/ $^\circ\text{C}$
Operating and Storage Temperature	$T_J, T_{STG}$	-55 to 150	$^\circ\text{C}$
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	$T_L$	300	$^\circ\text{C}$
Thermal Resistance Junction to Case	$R_{\theta JC}$	2.27	$^\circ\text{C}/\text{W}$
Thermal Resistance Junction to Ambient *4	$R_{\theta JA}$	40	$^\circ\text{C}/\text{W}$
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	62.5	$^\circ\text{C}/\text{W}$

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

\*2  $I=50\text{mA}, I_{AS}=2.1\text{A}, V_{DD}=50\text{V}, R_G=25 \Omega$ , Startion  $T_J=25^\circ\text{C}$

\*3  $I_{SD} \leq 2.1\text{A}, di/dt \leq 200\text{A}/\mu\text{S}, V_{BD} \leq B_{VDSS}$ , Startiong  $T_J=25^\circ\text{C}$

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

## KQB2N50

## ■ 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		0.48		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> = 1.05A		4.2	3.7	Ω
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> = 50 V, I <sub>D</sub> = 1.05A *		1.45		S
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 25 V, V <sub>GS</sub> = 0 V, f = 1.0 MHz		180	230	pF
Output Capacitance	C <sub>oss</sub>			30	40	pF
Reverse Transfer Capacitance	C <sub>rss</sub>			4	6	pF
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 250 V, I <sub>D</sub> = 2.1A, R <sub>G</sub> =25 Ω *		6	20	ns
Turn-On Rise Time	t <sub>r</sub>			25	60	ns
Turn-Off Delay Time	t <sub>d(off)</sub>			10	30	ns
Turn-Off Fall Time	t <sub>f</sub>			20	50	ns
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 400 V, I <sub>D</sub> = 2.1A, V <sub>GS</sub> = 10 V *		6.0	8.0	nC
Gate-Source Charge	Q <sub>gs</sub>			1.3		nC
Gate-Drain Charge	Q <sub>gd</sub>			3.0		nC
Maximum Continuous Drain-Source Diode Forward Current	I <sub>S</sub>				2.1	A
Maximum Pulsed Drain-Source Diode Forward Current	I <sub>SM</sub>				8.4	A
Drain-Source Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> = 0 V, I <sub>S</sub> = 2.1 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> =2.1A		195		ns
Diode Reverse Recovery Current	Q <sub>rr</sub>			0.69		μ C

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