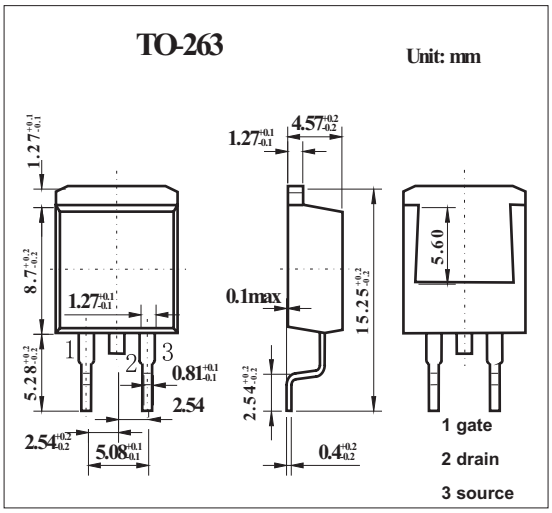
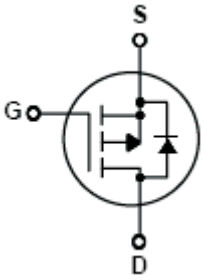
400V P-Channel MOSFET

KQB4P40



Features

- 3.5A, -400V, $R_{DS(on)}$ = 3.1 Ω @V_{GS} = -10 V
- Low gate charge (typical 18 nC)
- Low C_{rss} (typical 11 pF)
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability



Absolute Maximum Ratings Ta = 25℃

Parameter	Symbol	Rating	Unit
Drain to Source Voltage	V_{DSS}	-400	V
Drain Current Continuous Tc=25℃	I_D	-3.5	A
Drain Current Continuous Tc=100℃		-2.2	A
Drain Current - Pulsed (Note 1)	I_{DM}	-14	A
Gate-Source Voltage	V_{GSS}	±30	V
Single Pulsed Avalanche Energy (Note 2)	E_{AS}	260	mJ
Avalanche Current (Note 1)	I_{AR}	-3.5	A
Repetitive Avalanche Energy (Note 1)	E_{AR}	8.5	mJ
Peak Diode Recovery dv/dt (Note 3)	dv/dt	-4.5	V/ns
Power dissipation @ Ta=25℃	P_D	3.13	W
Power dissipation @ Tc=25℃		85	W
Derate above 25℃		0.68	W/℃
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to 150	℃
Maximum lead temperature for soldering purposes,1/8" from case for 5 seconds	T_L	300	℃
Thermal Resistance Junction to Case	$R_{\theta JC}$	1.47	℃/W
Thermal Resistance Junction to Ambient *	$R_{\theta JA}$	40	℃/W
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	62.5	℃/W

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

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■ Electrical Characteristics Ta = 25℃

Parameter	Symbol	Testconditons	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	B_{VDSS}	V_{GS} = 0 V, I_D = -250 μA	-400			V
Breakdown Voltage Temperature Coefficient	$\frac{\Delta BV_{DSS}}{\Delta T_J}$	I_D = -250 μA, Referenced to 25℃		0.36		V/℃
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -400 V, V_{GS} = 0 V			-1	μA
		V_{DS} = -320V, T_C=125℃			-10	μA
Gate-Body Leakage, Forward	I_{GSSF}	V_{GS} = -30 V, V_{DS} = 0 V			-100	nA
Gate-Body Leakage, Reverse	I_{GSSR}	V_{GS} = 30V, V_{DS} = 0 V			100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250 μA	-3.0		-5.0	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = -10 V, I_D = -1.75A		2.44	3.1	Ω
Forward Transconductance	g_{FS}	V_{DS} = -50 V, I_D = -1.75 A		2.7		S
Input Capacitance	C_{iss}	V_{DS} = -25 V, V_{GS} = 0 V,f = 1.0 MHz		520	680	pF
Output Capacitance	C_{oss}			80	105	pF
Reverse Transfer Capacitance	C_{rss}			11	15	pF
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = -200 V, I_D = -3.5 A,R_G = 25 Ω (Note4,5)		13	35	ns
Turn-On Rise Time	tr			55	120	ns
Turn-Off Delay Time	$t_{d(off)}$			35	80	ns
Turn-Off Fall Time	tf			37	85	ns
Total Gate Charge	Q_g	V_{DS} = -320 V, I_D = -3.5 A,V_{GS} = -10 V(Note4,5)		18	23	nC
Gate-Source Charge	Q_{gs}			5.8		nC
Gate-Drain Charge	Q_{gd}			9.4		nC
Maximum Continuous Drain-Source Diode Forward Current	I_S				-3.5	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				-14	A
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = -3.5 A			-5	V
Reverse Recovery Time	t_{rr}	V_{GS} = 0 V, I_S = -3.5 A, dI_F / dt = 100 A/μs (Note 4)		260		ns
Reverse Recovery Charge	Q_{rr}			1.4		μc

Note:

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. L = 37mH, I_{AS} = -3.5A, V_{DD} = -50V, R_G = 25 Ω , Starting T_J = 25℃
3. I_{SD} ≤ -3.5A, di/dt ≤ 200A/μs, V_{DD} ≤ B_{VDSS}, Starting T_J = 25℃
4. Pulse Test : Pulse width ≤300 μs, Duty cycle ≤ 2%
5. Essentially independent of operating temperature