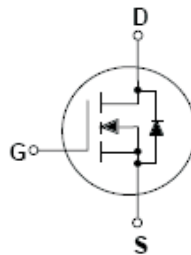
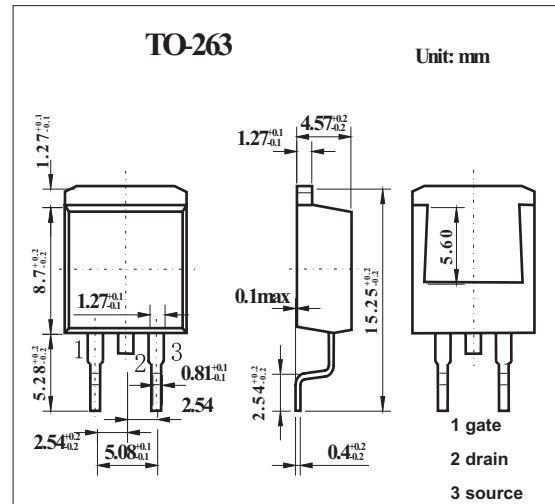


## N-Channel PowerTrench™ MOSFET

## KDB5690

## ■ Features

- 32 A, 60 V.  $R_{DS(ON)} = 0.027 \Omega$  @  $V_{GS} = 10 \text{ V}$   
 $R_{DS(ON)} = 0.032 \Omega$  @  $V_{GS} = 6 \text{ V}$
- Critical DC electrical parameters specified at elevated temperature.
- Rugged internal source-drain diode can eliminate the need for an external Zener diode transient suppressor.
- High performance trench technology for extremely low  $R_{DS(ON)}$ .
- 175°C maximum junction temperature rating.

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

Parameter	Symbol	Rating	Unit
Drain to Source Voltage	$V_{DS}$	60	V
Gate to Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current Continuous	$I_D$	32	A
Drain Current Pulsed		100	A
Power dissipation @ $T_c=25^\circ\text{C}$	$P_D$	58	W
Derate above $25^\circ\text{C}$	$P_D$	0.4	W/ $^\circ\text{C}$
Operating and Storage Temperature	$T_J, T_{STG}$	-65 to 175	$^\circ\text{C}$
Thermal Resistance Junction to Case	$R_{\theta JC}$	2.6	$^\circ\text{C}/\text{W}$
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	62.5	$^\circ\text{C}/\text{W}$

## KDB5690

## ■ Electrical Characteristics Ta = 25°C

Parameter	Symbol	Testconditions	Min	Typ	Max	Unit
Single Pulse Drain-Source Avalanche Energy *	WDSS	VDD = 30 V, ID = 32A			80	mJ
Maximum Drain-Source Avalanche Current	IAR				32	A
Drain-Source Breakdown Voltage	BVDSS	VGS = 0 V, ID = 250 μA	60			V
Breakdown Voltage Temperature Coefficient	$\frac{\Delta BVDSS}{\Delta T_J}$	ID = 250 μA, Referenced to 25°C		61		mV/°C
Zero Gate Voltage Drain Current	IDSS	VDS = 48 V, VGS = 0 V			1	μA
Gate-Body Leakage, Forward	IGSSF	VGS = 20 V, VDS = 0 V			100	nA
Gate-Body Leakage, Reverse	IGSSR	VGS = -20 V, VDS = 0 V			-100	nA
Gate Threshold Voltage	VGS(th)	VDS = VGS, ID = 250 μA	2	2.5	4	V
Gate Threshold Voltage Temperature Coefficient	$\frac{\Delta VGS(th)}{\Delta T_J}$	ID = 250 μA, Referenced to 25°C		-6.4		mV/°C
Static Drain-Source On-Resistance	RDS(on)	VGS = 10 V, ID = 16 A		0.021	0.027	mΩ
		VGS = 10 V, ID = 16 A, TJ = 125°C		0.042	0.055	
		VGS = 6 V, ID = 15 A,		0.024	0.032	
On-State Drain Current	ID(on)	VGS = 10 V, VDS = 5 V	50			A
Forward Transconductance	gFS	VDS = 5 V, ID = 16 A		32		S
Input Capacitance	Ciss	VDS = 25 V, VGS = 0 V, f = 1.0 MHz		1120		pF
Output Capacitance	Coss			160		pF
Reverse Transfer Capacitance	Crss			80		pF
Turn-On Delay Time	td(on)	VDD = 30 V, ID = 1 A, VGS = 10 V, RGEN = 6 Ω *		10	18	ns
Turn-On Rise Time	tr			9	18	ns
Turn-Off Delay Time	td(off)			24	39	ns
Turn-Off Fall Time	tf			10	18	ns
Total Gate Charge	Qg				23	33
Gate-Source Charge	Qgs	VDS = 1 V, ID = 16 A, VGS = 10 V *		3.9		nC
Gate-Drain Charge	Qgd			6.8		nC
Maximum Continuous Drain-Source Diode Forward Current	IS				32	A
Drain-Source Diode Forward Voltage	VSD	VGS = 0 V, IS = 16 A *		0.92	1.2	V

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