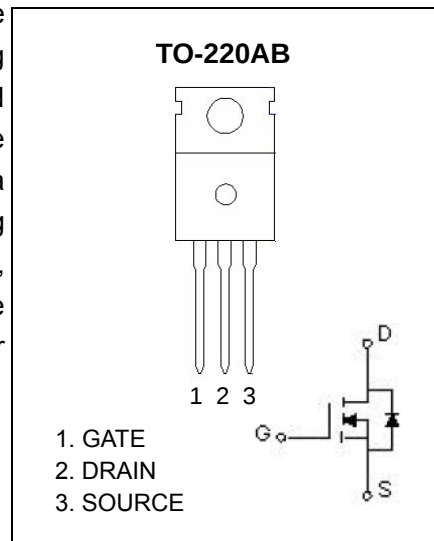


TO-220AB Plastic-Encapsulate MOSFETS

7N60 N-Channel Power MOSFET

General Description

The high voltage MOSFET uses an advanced termination scheme to provide enhanced voltage-blocking capability without degrading performance over time. In addition, this advanced MOSFET is designed to withstand high energy in avalanche and commutation modes. The new energy efficient design also offers a drain-to-source diode with a fast recovery time. Designed for high voltage, high speed switching applications in power suppliers, converters and PWM motor controls, these devices are particularly well suited for bridge circuits where diode speed and commutating safe operating areas are critical and offer additional and safety margin against unexpected voltage transients.



FEATURES

- Robust High Voltage Termination
- Avalanche Energy Specified
- Source-to-Drain Diode Recovery Time Comparable to a Discrete Fast Recovery Diode
- Diode is Characterized for Use in Bridge Circuits
- I_{DSS} and $V_{DS(on)}$ Specified at Elevated Temperature

Maximum ratings ($T_a=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source voltage	V_{DS}	600	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current	I_D	7	A
Pulsed Drain Current	I_{DM}	20	
Power Dissipation	P_D	2	W
Single Pulsed Avalanche Energy*	E_{AS}	530	mJ
Thermal Resistance, Junction-to-Ambient	R_{thJA}	62.5	$^{\circ}\text{C}/\text{W}$
Junction Temperature	T_J	150	$^{\circ}\text{C}$
Storage Temperature	T_{stg}	-50 ~ +150	

* E_{AS} condition: $T_J=25^{\circ}\text{C}$, $V_{DD}=50\text{V}$, $V_{GS}=10\text{V}$, $L=19.5\text{mH}$, $I_L=7\text{A}$, $R_G=0\Omega$

Electrical characteristics (T_a=25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage (V _{GS} = 0 V, I _D = 250 μ A)	V _{(BR)DSS}	600			V
Drain-Source Leakage Current (V _{DS} = 600 V, V _{GS} = 0 V) (V _{DS} = 480 V, V _{GS} = 0 V, T _J = 125°C)	I _{DSS}			1 100	μ A
Gate-Source Leakage Current-Forward (V _{gsf} = 30 V, V _{DS} = 0 V)	I _{GSSF}			100	nA
Gate-Source Leakage Current-Reverse (V _{gsr} = 30 V, V _{DS} = 0 V)	I _{GSSR}			100	nA
Gate Threshold Voltage (V _{DS} = V _{GS} , I _D = 250 μ A)	V _{GS(th)}	2.0		4.0	V
Static Drain-Source On-Resistance (V _{GS} = 10 V, I _D = 3.5A) *	R _{DS(on)}			1.3	Ω
Forward Transconductance (V _{DS} = 50 V, I _D = 3.9A) *	g _{FS}	5.0			S
Input Capacitance	(V _{DS} = 25 V, V _{GS} = 0 V, f = 1.0 MHz)	C _{iss}	1380	1600	pF
Output Capacitance		C _{oss}	115	190	pF
Reverse Transfer Capacitance		C _{rss}	23	25	pF
Turn-On Delay Time	(V _{DD} = 300 V, I _D = 7.0 A, V _{GS} = 10 V, R _G = 9.1 Ω) *	t _{d(on)}	30	80	ns
Rise Time		t _r	80	165	ns
Turn-Off Delay Time		t _{d(off)}	125	160	ns
Fall Time		t _f	85	120	ns
Total Gate Charge	(V _{DS} = 480 V, I _D = 7.0 A, V _{GS} = 10 V)*	Q _g	38	50	nC
Gate-Source Charge		Q _{gs}	6.4		nC
Gate-Drain Charge		Q _{gd}	15		nC
Internal Drain Inductance (Measured from the drain lead 0.25" from package to center of die)	L _D		4.5		nH
Internal Drain Inductance (Measured from the source lead 0.25" from package to source bond pad)	L _S		7.5		nH
SOURCE-DRAIN DIODE CHARACTERISTICS					
Forward On-Voltage(1)	(I _S = 7.0 A, d _{IS} /d _t = 100A/ μ s)	V _{SD}		1.4	V
Forward Turn-On Time		t _{on}	**		ns
Reverse Recovery Time		t _{rr}	415		ns

* Pulse Test: Pulse Width $\leq$ 300 μ s, Duty Cycle $\leq$ 2%

** Negligible, Dominated by circuit inductance