

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
200V	30mΩ@10V	62A

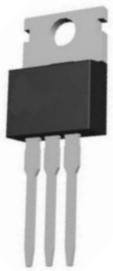
Feature

- Low $R_{DS(on)}$
- Suffix "-Q1" for AEC-Q101

Application

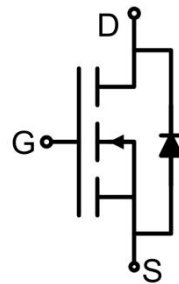
- Power switching application
- DC-DC convertor

Package

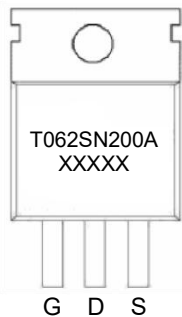


TO-220AB

Circuit diagram



Marking



Absolute maximum ratings($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	200	V
Gate-Source Voltage	V_{GS}	± 30	V
Continuous Drain Current ($T_C=25^{\circ}\text{C}$)	I_D	62	A
Continuous Drain Current ($T_C=100^{\circ}\text{C}$)	$I_D(100^{\circ}\text{C})$	39	A
Pulsed Drain Current ¹⁾	I_{DM}	240	A
Single Pulse Avalanche Energy ²⁾	E_{AS}	318.6	mJ
Power Dissipation ($T_C=25^{\circ}\text{C}$)	P_D	227.2	W
Thermal Resistance Junction to Case	$R_{\theta JC}$	0.55	$^{\circ}\text{C}/\text{W}$
Operating Junction Temperature	T_J	-55 ~ +150	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	-55 ~ +150	$^{\circ}\text{C}$

Electrical characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0\text{V}, I_D=10\text{mA}$	200			V
Zero gate voltage drain current	I_{DSS}	$V_{DS}=160\text{V}, V_{GS}=0\text{V}$			1	μA
Gate-body leakage current	I_{GSS}	$V_{DS}=0\text{V}, V_{GS}=\pm 24\text{V}$			± 100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	3	3.8	5	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS}=10\text{V}, I_D=30\text{A}$		25	30	m Ω
Dynamic characteristics³⁾						
Input Capacitance	C_{iss}	$V_{DS}=100\text{V}, V_{GS}=0\text{V}, f=1\text{MHz}$		4125		pF
Output Capacitance	C_{oss}			237		
Reverse Transfer Capacitance	C_{rss}			18		
Total Gate Charge	Q_g	$V_{DS}=100\text{V}, V_{GS}=10\text{V}, I_D=30\text{A}$		71.8		nC
Gate-Source Charge	Q_{gs}			25.2		
Gate-Drain Charge	Q_{gd}			22.9		
Turn-on delay time	$t_{d(on)}$	$V_{DS}=100\text{V}, V_{GS}=10\text{V}, I_D=30\text{A}$ $R_G=3.3\Omega$		34		nS
Turn-on rise time	t_r			80		
Turn-off delay time	$t_{d(off)}$			22		
Turn-off fall time	t_f			37		
Source-Drain Diode characteristics						
Diode Continuous Current	I_S				62	A
Diode Forward voltage	V_{SD}	$V_{GS}=0\text{V}, I_S=1\text{A}$			1.2	V
Reverse recover time	T_{rr}	$I_F=30\text{A}, di/dt=-100\text{A}/\mu\text{s}$		151		nS
Reverse recovery charge	Q_{rr}			775		nC

Notes:

- 1) Repetitive rating: pulse width limited by max. junction temperature $T_{J(MAX)}=150^{\circ}\text{C}$.
- 2) Limited by $T_{J(MAX)}=150^{\circ}\text{C}$, starting $T_J=25^{\circ}\text{C}$, $V_{GS}=10\text{V}$, $R_G=25\Omega$, $L=0.5\text{mH}$, $I_{AS}=35.7\text{A}$.
- 3) Guaranteed by design, not subject to production testing.

Typical Characteristics

Fig. 1 Typical Output Characteristics

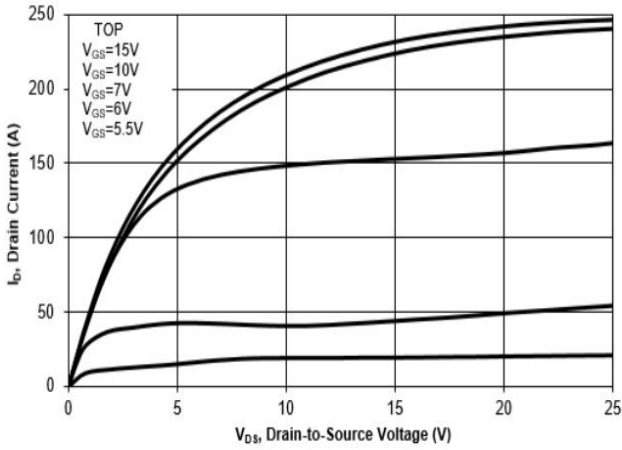


Fig. 2 Typical Transfer Characteristics

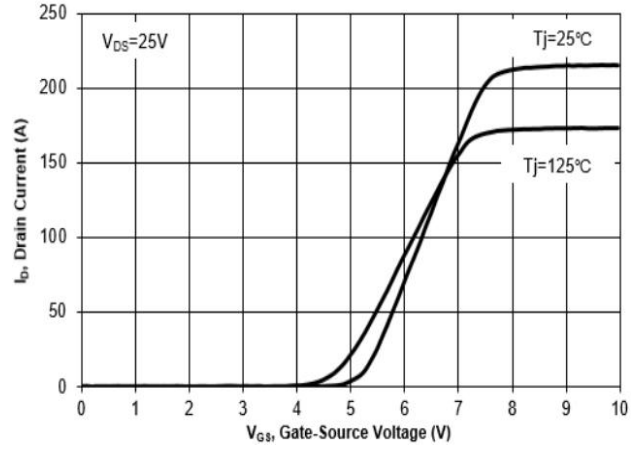


Fig. 3 on-Resistance vs. Drain Current

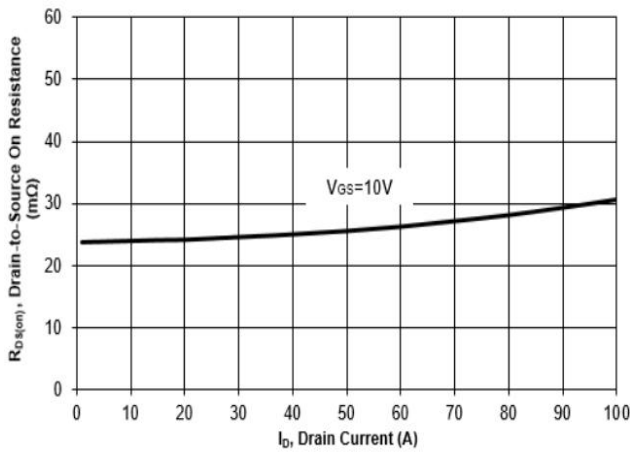


Fig. 4 on-Resistance vs. Gate to Source Voltage

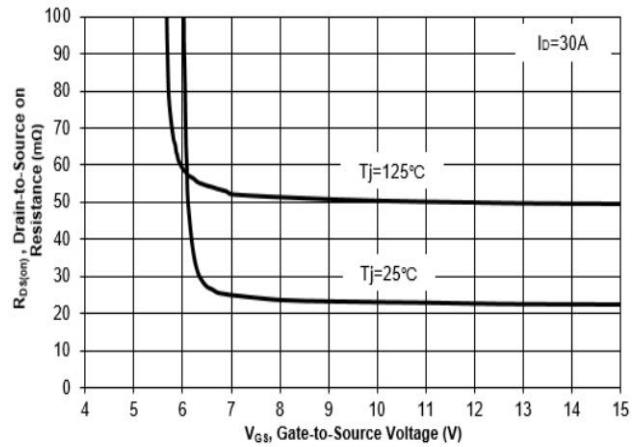


Fig. 5 on-Resistance vs. T_J

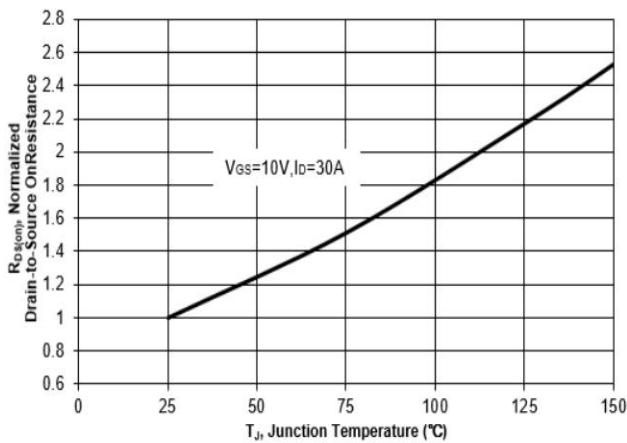
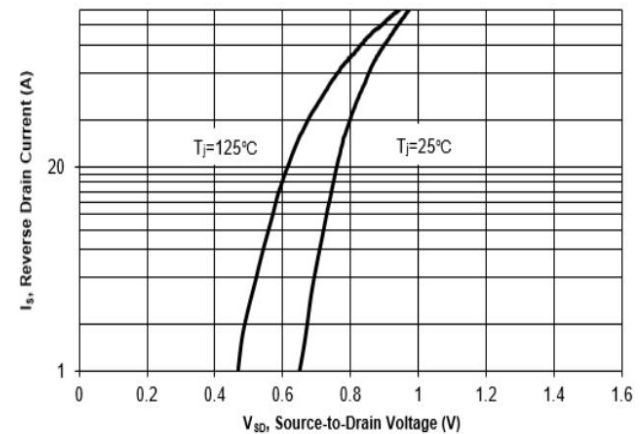


Fig. 6 Typical Body-Diode Forward Characteristics



Typical Characteristics

Fig. 7 Typical Junction Capacitance

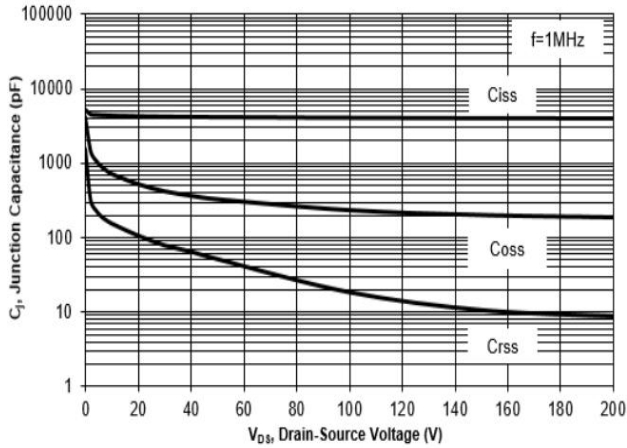


Fig. 8 Drain-Source Leakage Current vs. T_j

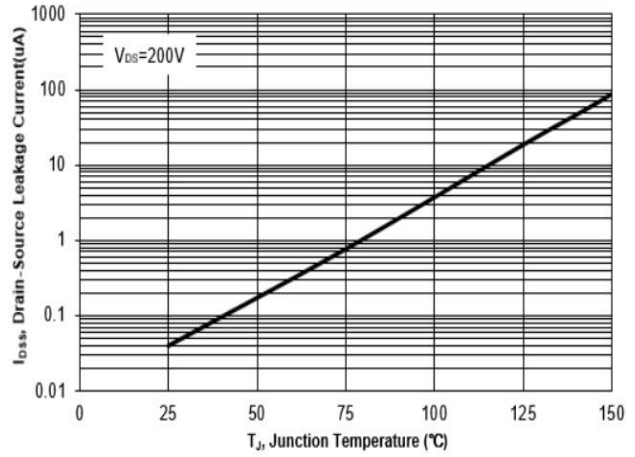


Fig. 9 $V_{(BR)DSS}$ vs. Junction Temperature

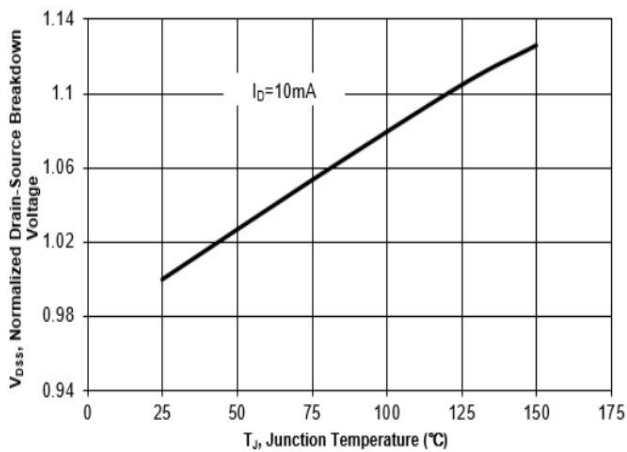


Fig. 10 Gate Threshold Variation vs. T_j

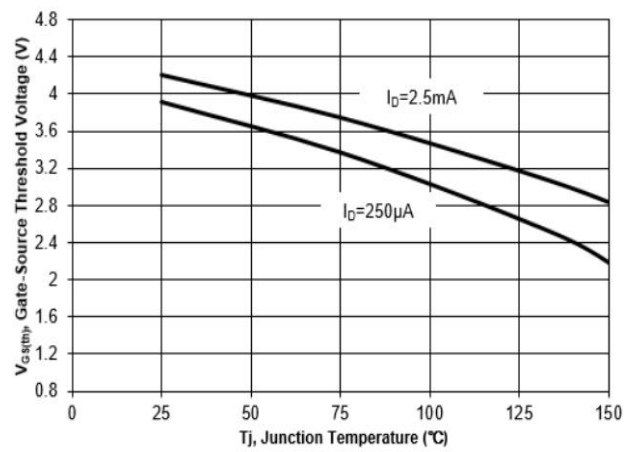


Fig. 11 Gate Charge

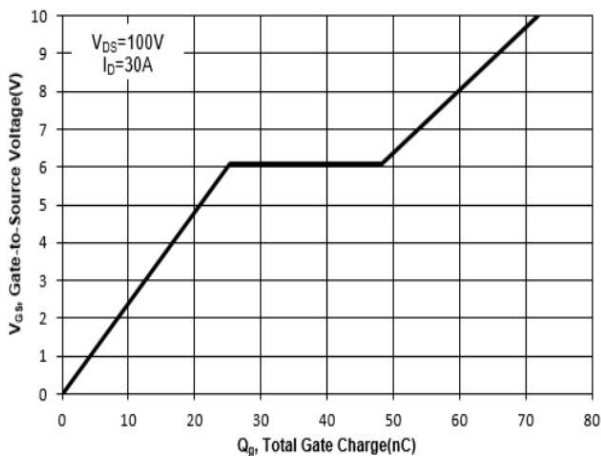
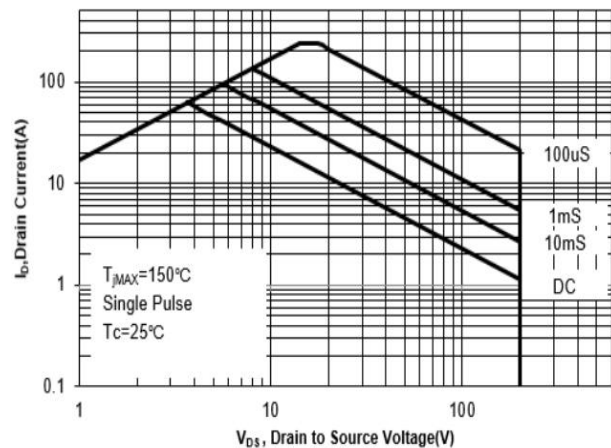


Fig. 12 Safe Operation Area



Typical Characteristics

Fig. 13 Normalized Maximum Transient Thermal Impedance($z_{\theta JC}$)

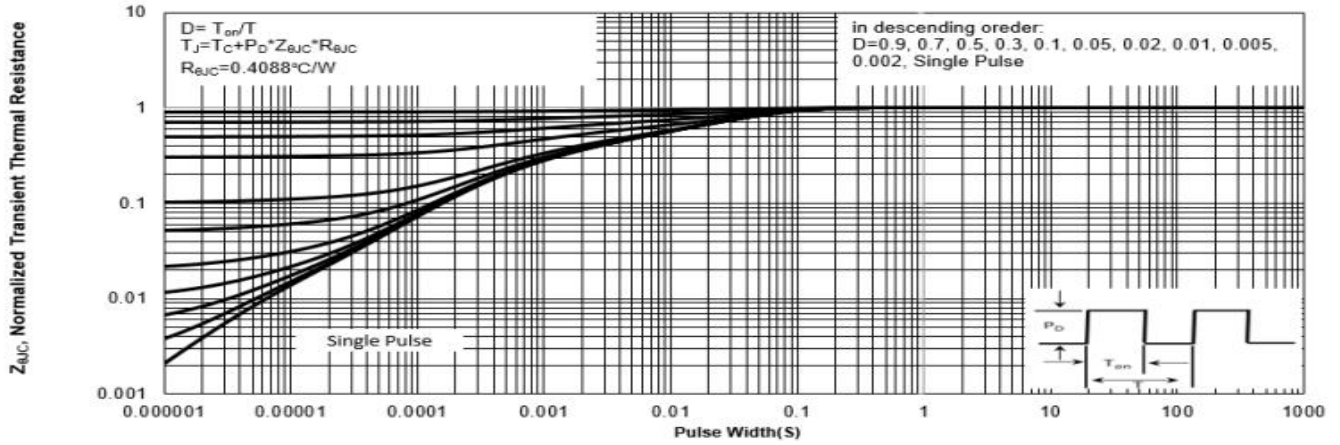
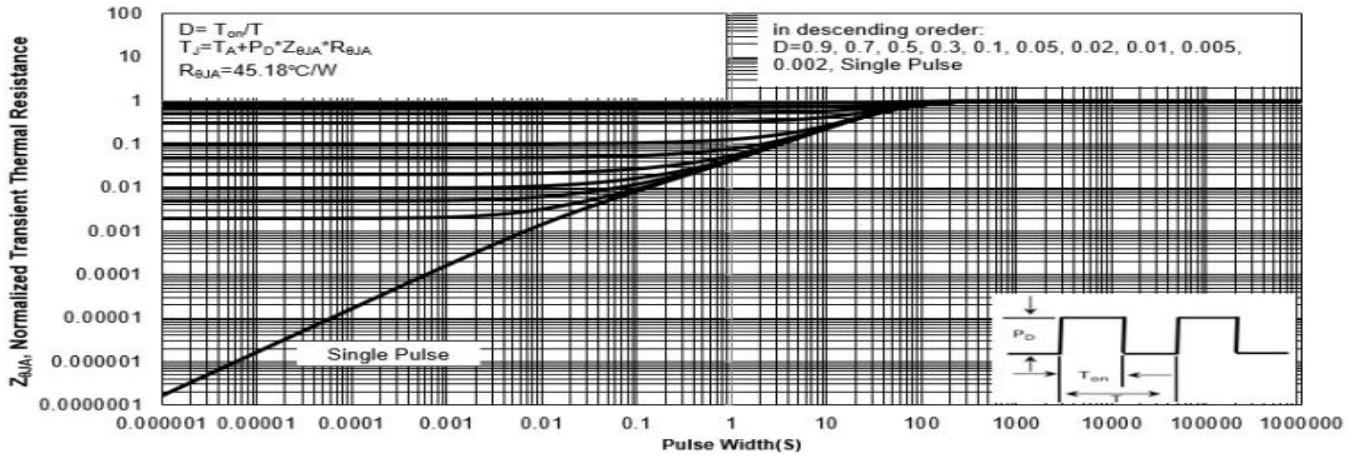
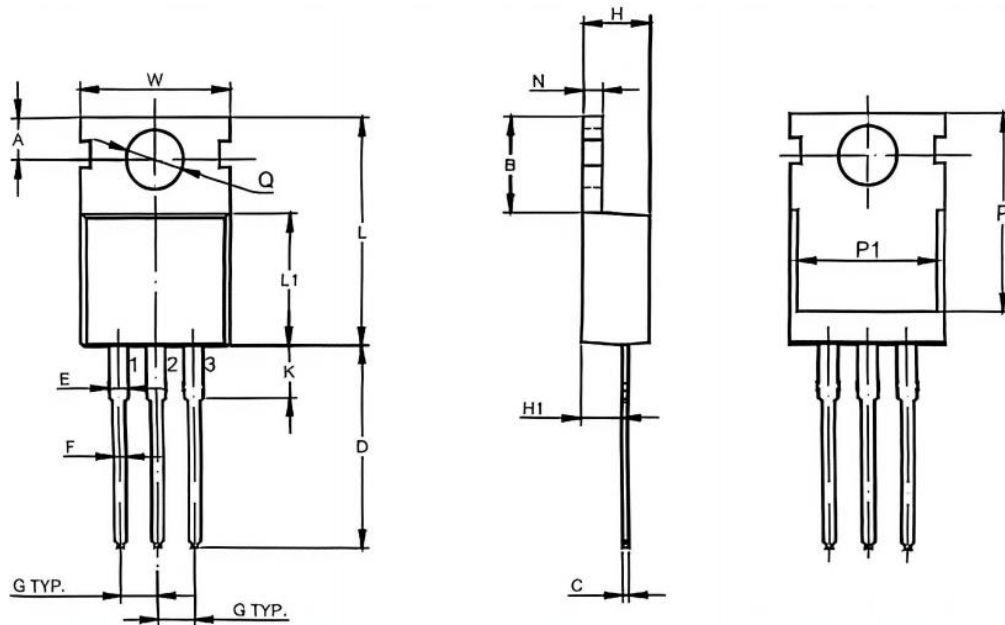


Fig. 14 Normalized Maximum Transient Thermal Impedance($z_{\theta JA}$)



TO-220AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.700	2.900	0.106	0.114
B	6.400	6.800	0.252	0.268
C	0.300	0.700	0.012	0.028
D	11.000	15.000	0.433	0.591
E	1.100	1.500	0.043	0.059
F	0.700	0.900	0.028	0.035
G	2.540 TYP.		0.100 TYP.	
W	9.800	10.200	0.386	0.402
H	4.300	4.700	0.169	0.185
H1	2.200	2.500	0.087	0.098
K	2.700	3.100	0.106	0.122
L	14.800	16.800	0.583	0.661
L1	9.000	9.400	0.354	0.370
N	1.200	1.400	0.047	0.055
P	12.700	13.300	0.500	0.524
P1	7.600	8.200	0.299	0.323
Q	3.500	3.700	0.138	0.146