

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
-60V	8.5mΩ@-10V	-100A
	10mΩ@-4.5V	

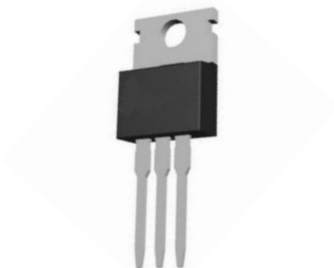
Feature

- Advanced trench technology
- Excellent $R_{DS(on)}$
- Low gate charge

Application

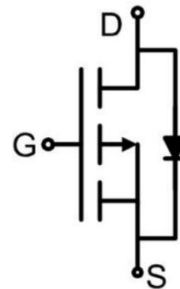
- Lithium battery protection
- Wireless impact
- Mobile phone fast charging

Package



TO-220AB

Circuit diagram



Marking



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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-60	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ¹⁾ ($V_{GS}=-10\text{V}$)	I_D	-100	A
Continuous Drain Current ¹⁾ ($V_{GS}=-10\text{V}$, $T_c=100^\circ\text{C}$)	$I_D (100^\circ\text{C})$	-65	A
Pulsed Drain Current ²⁾	I_{DM}	-300	A
Single Pulse Avalanche Energy ³⁾	E_{AS}	650	mJ
Power Dissipation ⁴⁾	P_D	142	W
Thermal Resistance from Junction to Case ¹⁾	$R_{\theta JC}$	0.88	$^\circ\text{C/W}$
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55 ~ +150	$^\circ\text{C}$

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

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =-250μA	-60			V
Zero gate voltage drain current	I _{DSS}	V _{DS} =-60V, V _{GS} =0V, T _J =25°C			1	μA
Gate-body leakage current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250μA	-1.2	-1.6	-2.5	V
Drain-source on-resistance ²⁾	R _{DS(on)}	V _{GS} =-10V, I _D =-20A		6.8	8.5	mΩ
		V _{GS} =-4.5V, I _D =-15A		7.8	10	
Dynamic characteristics ⁶⁾						
Input Capacitance	C _{iss}	V _{DS} =-25V, V _{GS} =0V, f =1MHz		8620		pF
Output Capacitance	C _{oss}			486		
Reverse Transfer Capacitance	C _{rss}			288		
Total Gate Charge	Q _g	V _{DS} =48V, V _{GS} =-10V I _D =-5A		141		nC
Gate-Source Charge	Q _{gs}			17		
Gate-Drain Charge	Q _{gd}			28.6		
Turn-on delay time	t _{d(on)}	V _{DS} =-48V, V _{GS} =-10V I _D =-1A, R _G =6Ω		70		nS
Turn-on rise time	t _r			205		
Turn-off delay time	t _{d(off)}			402		
Turn-off fall time	t _f			402		
Source-Drain Diode characteristics						
Diode Continuous Current ^{1,5)}	I _S				-100	A
Diode Forward voltage ²⁾	V _{SD}	V _{GS} =0V, I _S =-1A, T _J =25°C			-1.2	V

Notes:

- 1) The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2) The data tested by pulsed , pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
- 3) The EAS data shows Max. rating . The test condition is $V_{DS}=-48\text{V}$, $V_{GS}=-10\text{V}$, $L=0.1\text{mH}$, $I_{AS}=-80\text{A}$.
- 4) The power dissipation is limited by 150°C junction temperature.
- 5) The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.
- 6) Guaranteed by design, not subject to production testing.

Typical Characteristics

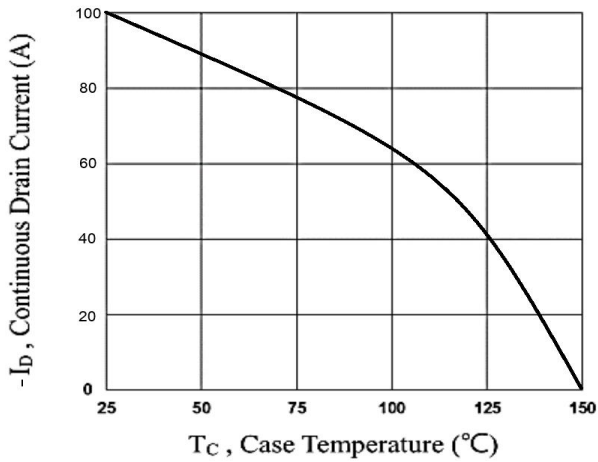


Fig.1 Typical Output Characteristics

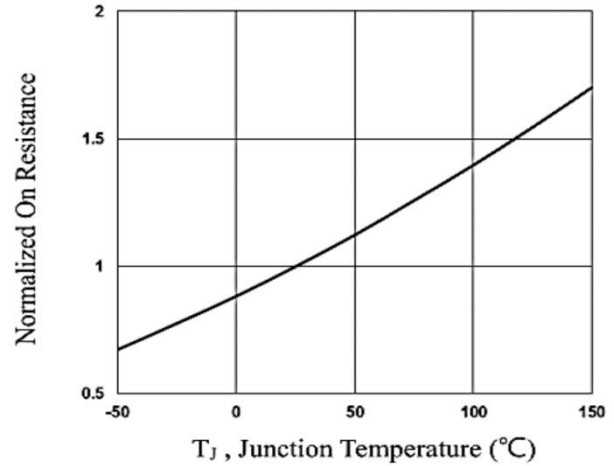


Fig.2 Normalized RDSON vs. TJ

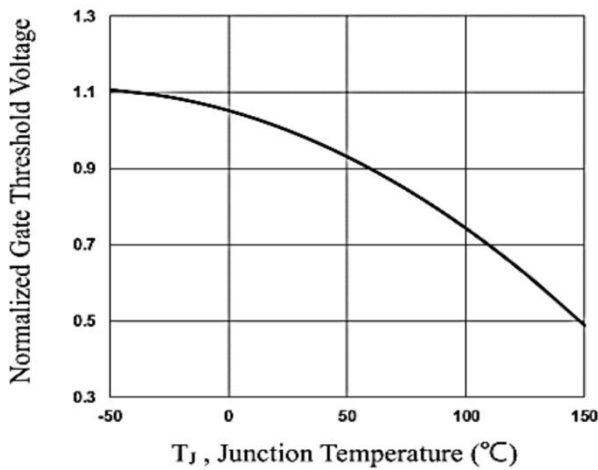


Fig.3 Normalized RDSON vs. TJ

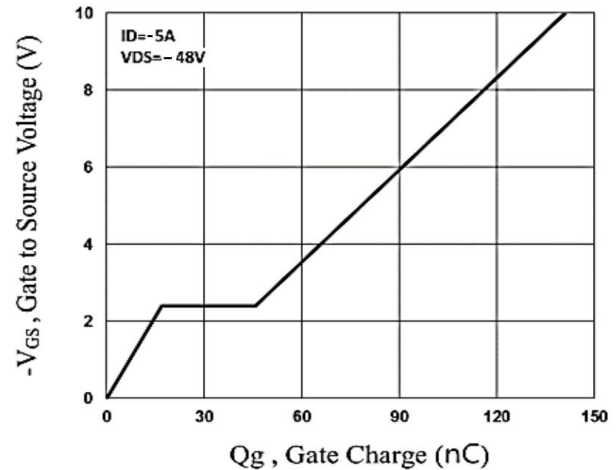


Fig.4 Normalized Vth vs. TJ

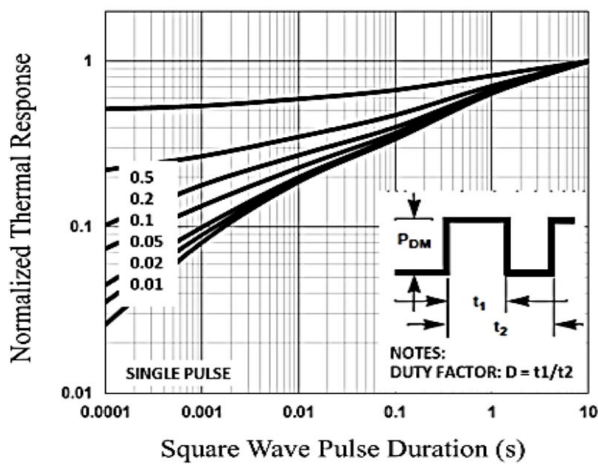


Fig.5 Normalized Transient Impedance

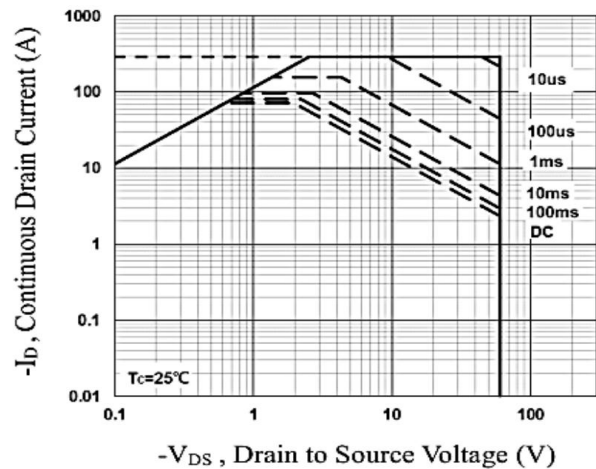
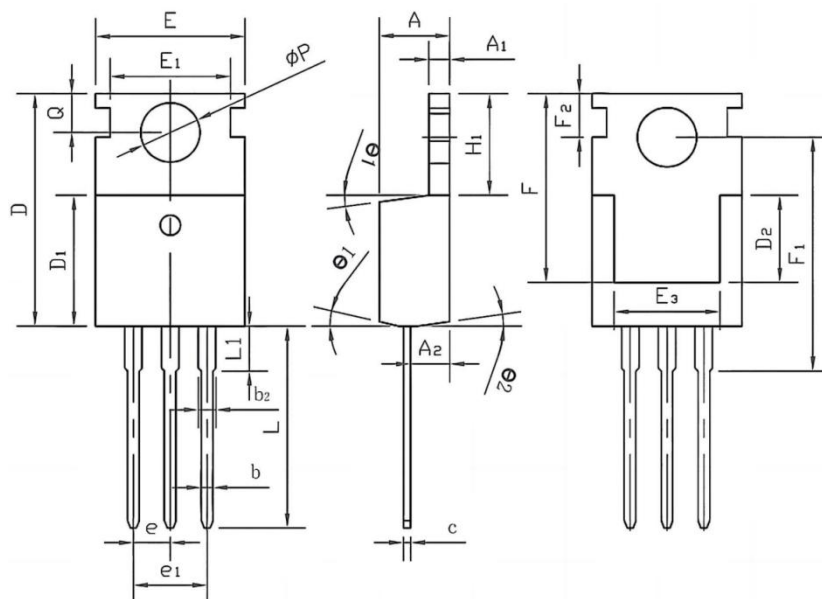


Fig.6 Maximum Safe Operation Area

TO-220AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.270	4.870	0.168	0.192
A1	1.150	1.450	0.045	0.057
A2	2.100	2.700	0.083	0.106
b	0.700	1.000	0.028	0.039
b2	1.170	1.500	0.046	0.059
D	0.400	0.650	0.016	0.026
D1	8.800	9.400	0.346	0.370
D2	5.700	7.000	0.224	0.276
E	9.700	10.300	0.382	0.406
E1	8.700 REF.		0.343 REF.	
E2	9.630	10.350	0.379	0.407
E3	7.000	8.400	0.276	0.331
e	0.370 BSC.		0.015 BSC.	
e1	0.100 BSC.		0.004 BSC.	
H1	6.000	6.850	0.236	0.270
L	12.750	13.900	0.502	0.547
L1	-	3.400	-	0.134
ϕP	3.450	3.750	0.136	0.148
Q	2.600	3.000	0.102	0.118
θ_1	4°	10°	4°	10°
θ_2	0°	6°	0°	6°
F	13.300	13.700	0.524	0.539
F1	15.500	16.300	0.610	0.642
F2	2.800	3.200	0.110	0.126