

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
800V	240mΩ@10V	19A

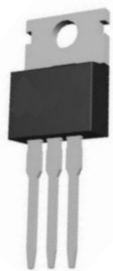
Feature

- Excellent package for heat dissipation
- High density cell design for low $R_{DS(on)}$
- ESD Protection

Application

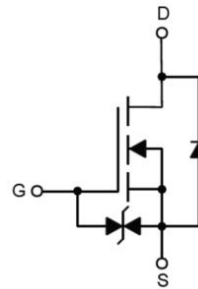
- Power switching application
- DC-DC convertor
- Uninterruptible Power Supply

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}	800	V
Gate-Source Voltage	V_{GS}	± 30	V
Continuous Drain Current ^{1,3)} ($V_{GS}=10\text{V}$)	I_D	19	A
Continuous Drain Current ^{1,3)} ($V_{GS}=10\text{V}$, $T_C=100^{\circ}\text{C}$)	$I_D(100^{\circ}\text{C})$	12	A
Pulsed Drain Current ($t_p \leq 10\mu\text{s}$)	I_{DM}	45	A
Single Pulse Avalanche Energy ²⁾	E_{AS}	202.5	mJ
Power Dissipation ^{1,3)}	P_D	240	W
Thermal Resistance Junction to Case	$R_{\theta JC}$	0.52	$^{\circ}\text{C/W}$
Operating Junction Temperature	T_J	$-55 \sim +150$	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	$-55 \sim +150$	$^{\circ}\text{C}$

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} =0V, I _D =250μA	800			V
Zero gate voltage drain current	I _{DSS}	V _{DS} =800V, V _{GS} =0V			1	μA
Gate-body leakage current	I _{GSS}	V _{DS} =0V, V _{GS} =±30V			±10	μA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2.2	3	3.8	V
Drain-source on-resistance	R _{DS(on)}	V _{GS} =10V, I _D =8.5A		200	240	mΩ
Dynamic characteristics ⁴⁾						
Input Capacitance	C _{iss}	V _{DS} =400V, V _{GS} =0V, f =1MHz		2200		pF
Output Capacitance	C _{oss}			43		
Reverse Transfer Capacitance	C _{rss}			1.9		
Total Gate Charge	Q _g	V _{DS} =400V, V _{GS} =10V, I _D =16A		48.6		nC
Gate-Source Charge	Q _{gs}			10		
Gate-Drain Charge	Q _{gd}			17.5		
Turn-on delay time	t _{d(on)}	V _{DS} =400V, V _{GS} =10V, I _D =16A R _G =3Ω		38.6		nS
Turn-on rise time	t _r			20.6		
Turn-off delay time	t _{d(off)}			43.3		
Turn-off fall time	t _f			13.2		
Source-Drain Diode characteristics						
Diode Continuous Current	I _S				19	A
Diode Forward voltage	V _{SD}	V _{GS} =0V, I _S =19A			1.2	V
Reverse recover time	T _{rr}	V _{GS} =0V, V _R =400V, I _F =16A di/dt =100A/us		340		nS
Reverse recovery charge	Q _{rr}			5713		nC
Peak reverse recovery current	I _{rrm}			28.5		A

Notes:

- 1) The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
- 2) $T_J=25^{\circ}\text{C}$, $V_G=10\text{V}$, $R_G=25\Omega$, $L=20\text{mH}$, $I_{AS}=4.5\text{A}$.
- 3) Thermal resistance from junction to soldering point (on the exposed drain pad).
- 4) Guaranteed by design, not subject to production testing.

Typical Characteristics

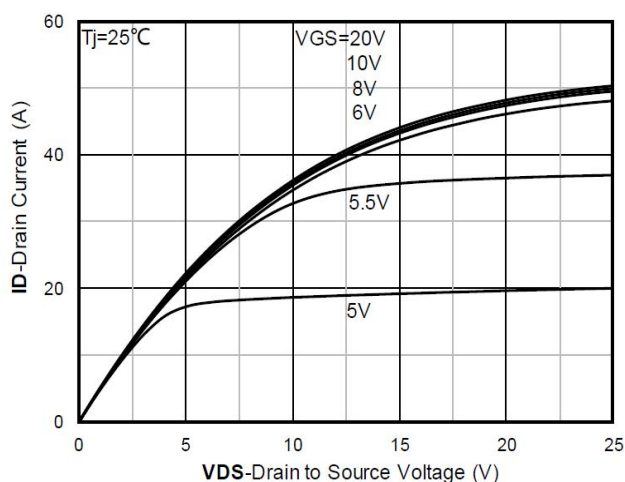


Figure 1. Output Characteristics; typical values

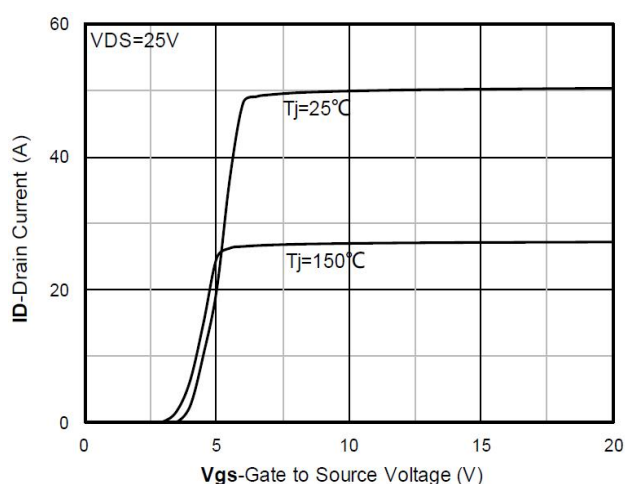


Figure 2. Transfer Characteristics; typical values

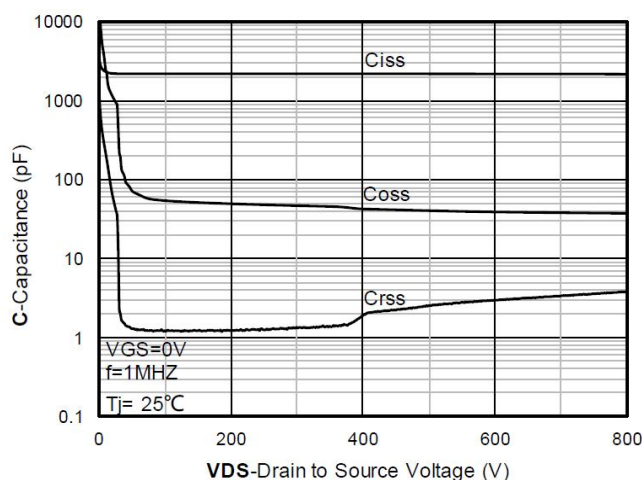


Figure 3. Capacitance Characteristics; typical values

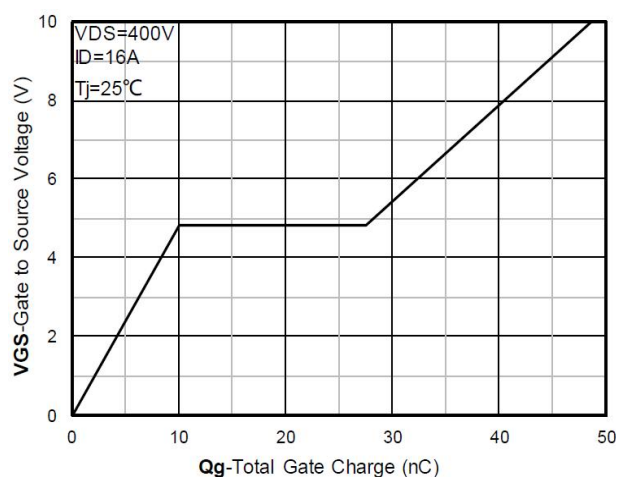


Figure 4. Gate Charge; typical values

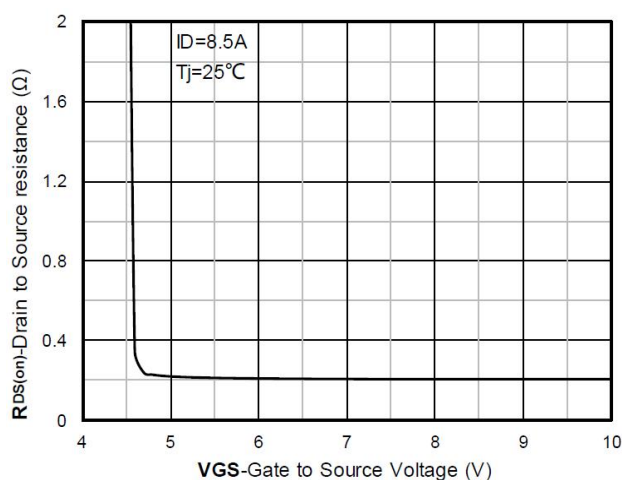


Figure 5. On-Resistance vs Gate to Source Voltage; typical values

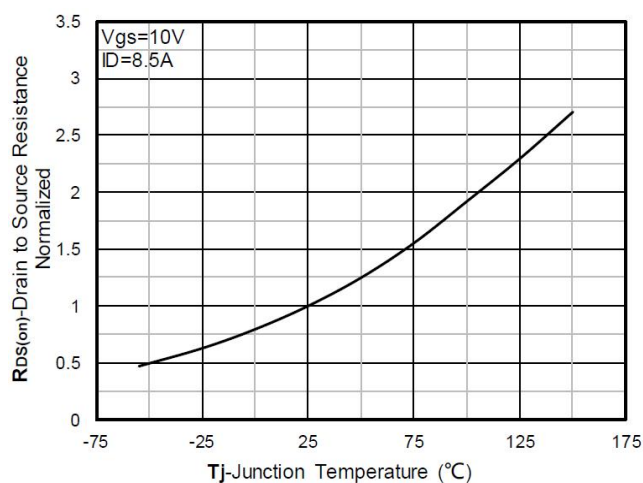


Figure 6. Normalized On-Resistance

Typical Characteristics

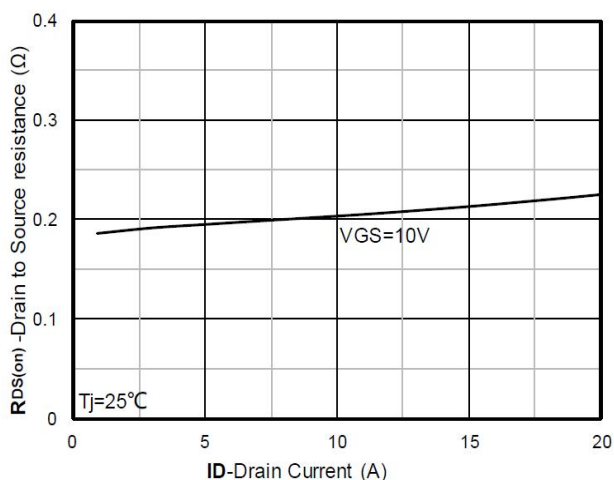


Figure 7. $R_{DS(on)}$ VS Drain Current; typical values

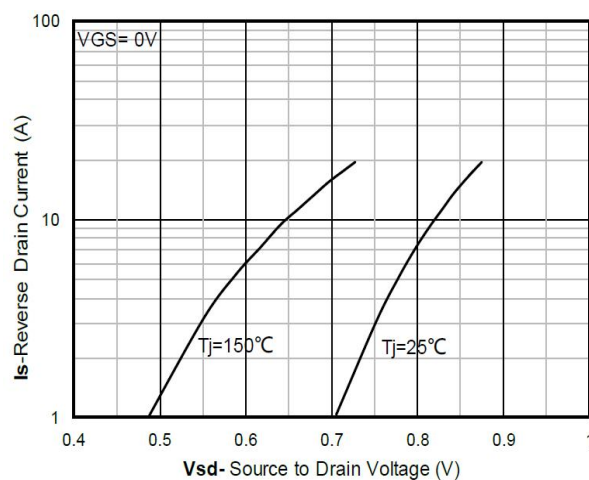


Figure 8. Forward characteristics of reverse diode; typical values

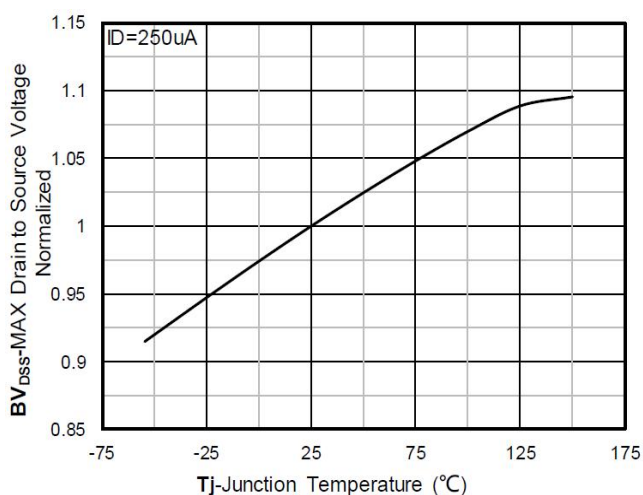


Figure 9. Normalized breakdown voltage

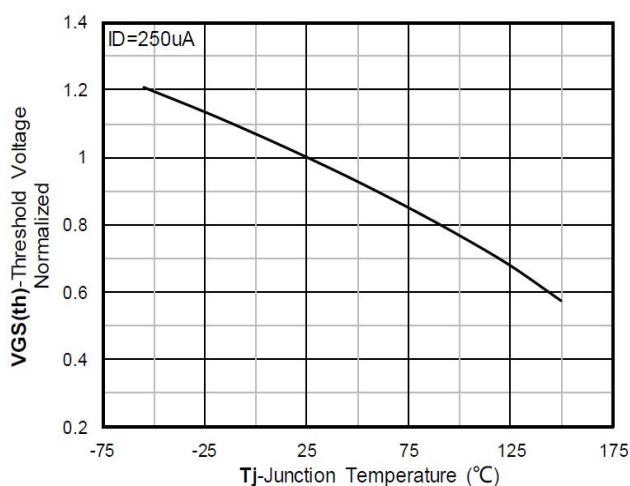


Figure 10. Normalized Threshold voltage

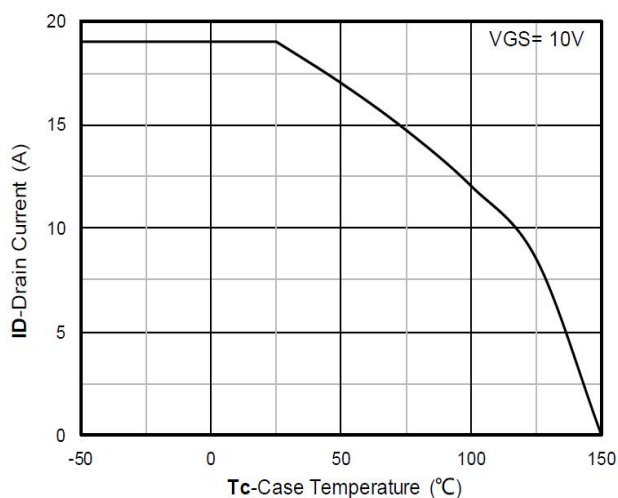


Figure 11. Current dissipation

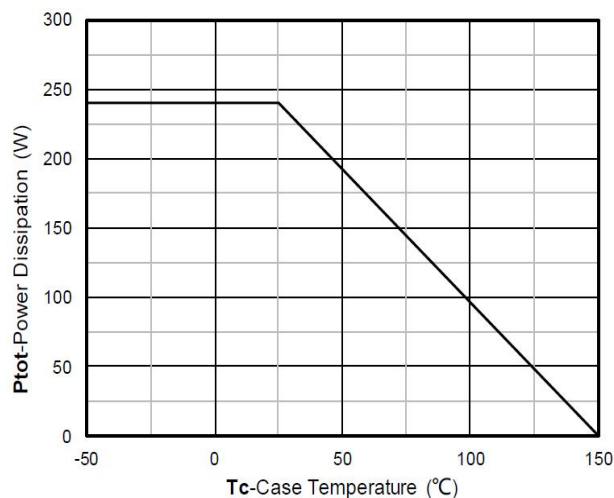


Figure 12. Power dissipation

Typical Characteristics

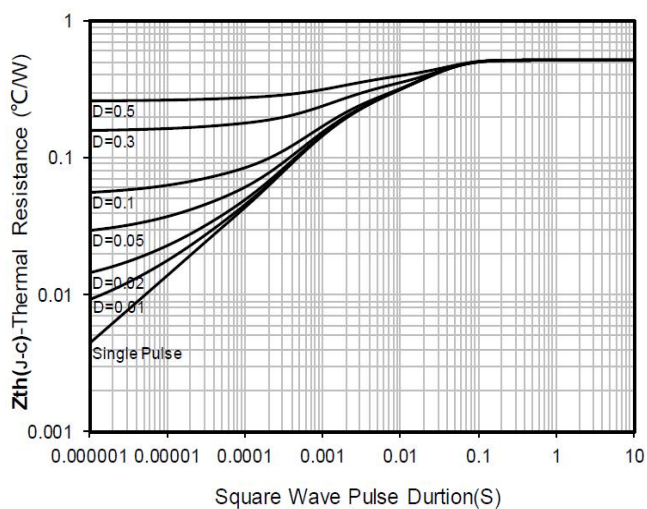


Figure 13. Maximum Transient Thermal Impedance

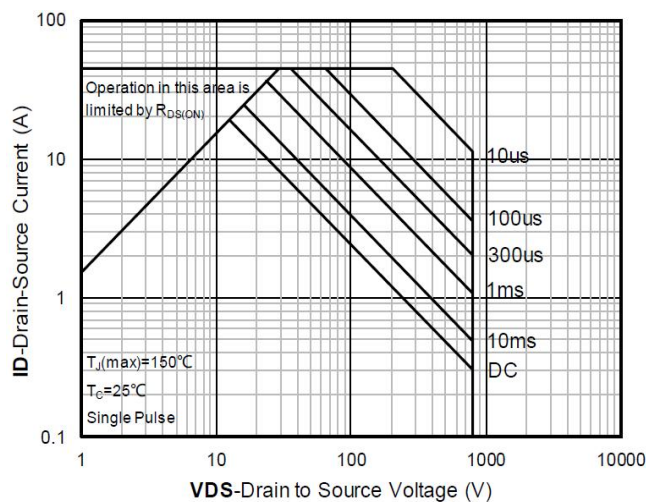
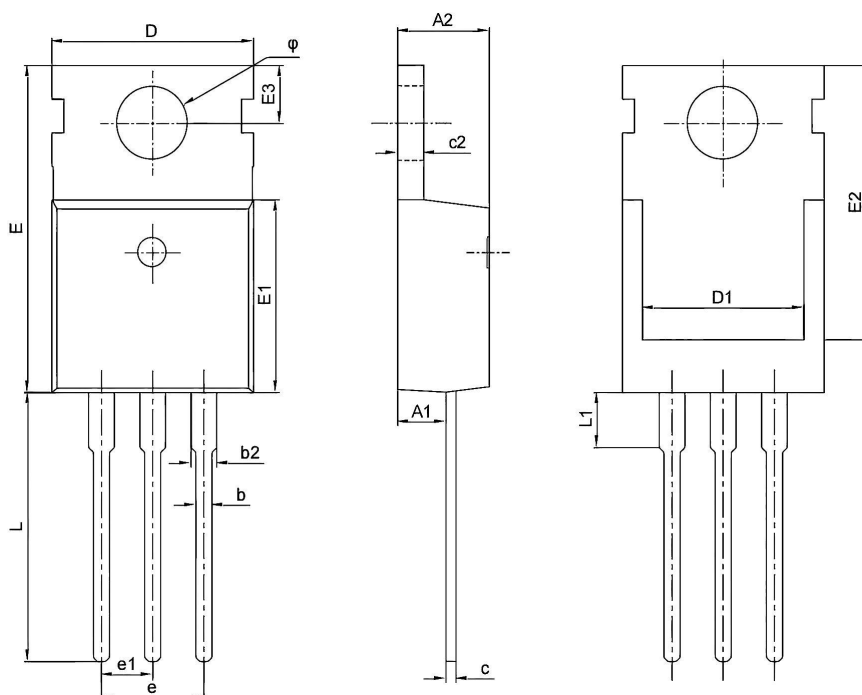


Figure 14. Safe Operation Area

TO-220AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A1	2.350	2.90	0.093	0.114
A2	4.470	4.670	0.176	0.184
b	0.710	0.910	0.028	0.036
b2	1.220	1.360	0.048	0.054
c	0.470	0.600	0.019	0.024
c2	1.200	1.400	0.047	0.055
D	9.700	10.370	0.382	0.408
D1	7.000	8.890	0.276	0.350
E	14.700	15.800	0.579	0.622
E1	8.900	9.470	0.350	0.373
E2	11.750	13.600	0.463	0.535
E3	2.740 BSC.		0.108 BSC.	
e	5.080 BSC.		0.200 BSC.	
e1	2.540 BSC.		0.100 BSC.	
L	12.900	14.800	0.508	0.583
L1	2.540	3.840	0.100	0.151
φ	3.600	3.900	0.142	0.154