

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
100V	2.9mΩ@10V	240A

Feature

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

Application

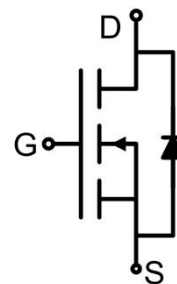
- Isolated DC
- Motor control
- Synchronous-rectification

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}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ¹⁾ ($T_A=25^{\circ}\text{C}$)	I_D	240	A
Continuous Drain Current ¹⁾ ($T_A=70^{\circ}\text{C}$)	$I_D (70^{\circ}\text{C})$	179	A
Pulsed Drain Current ²⁾	I_{DM}	1136	A
Single Pulse Avalanche Energy ³⁾	E_{AS}	1350	mJ
Power Dissipation ⁴⁾ ($T_A=25^{\circ}\text{C}$)	P_D	416	W
Thermal Resistance Junction to Case ¹⁾	$R_{\theta JC}$	0.3	$^{\circ}\text{C/W}$
Operating Junction Temperature	T_J	$-55 \sim +150$	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	$-55 \sim +150$	$^{\circ}\text{C}$

Electrical characteristics ($T_C=25^{\circ}\text{C}$, 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	100			V
Zero gate voltage drain current	I _{DSS}	V _{DS} =80V, V _{GS} =0V			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	2	2.9	4	V
Drain-source on-resistance	R _{DS(on)}	V _{GS} =10V, I _D =20A		2.4	2.9	mΩ
Dynamic characteristics ⁵⁾						
Input Capacitance	C _{iss}	V _{DS} =50V, V _{GS} =0V, f =1MHz		9256		pF
Output Capacitance	C _{oss}			1318		
Reverse Transfer Capacitance	C _{rss}			30		
Total Gate Charge	Q _g	V _{DS} =50V, V _{GS} =10V, I _D =20A		131		nC
Gate-Source Charge	Q _{gs}			46		
Gate-Drain Charge	Q _{gd}			27		
Turn-on delay time	t _{d(on)}	V _{DS} =50V, V _{GS} =10V R _L =2.5Ω, R _G =3Ω		33		nS
Turn-on rise time	t _r			33		
Turn-off delay time	t _{d(off)}			63		
Turn-off fall time	t _f			23		
Source-Drain Diode characteristics						
Diode Continuous Current	I _S	T _C =25°C			240	A
Diode Forward voltage	V _{SD}	V _{GS} =0V, I _S =1A			1	V
Reverse recover time	T _{rr}	I _F =20A, di/dt =100A/μs		91		nS
Reverse recovery charge	Q _{rr}			250		nC

Notes:

- 1) The data tested by surface mounted on a 1 inch² FR-4 board with 20Z 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 $V_{DS}=50\text{V}, V_{GS}=10\text{V}, L=0.5\text{mH}, I_{AS}=52\text{A}$.
- 4) The power dissipation is limited by 150°C junction temperature
- 5) Guaranteed by design, not subject to production testing.

Typical Characteristics

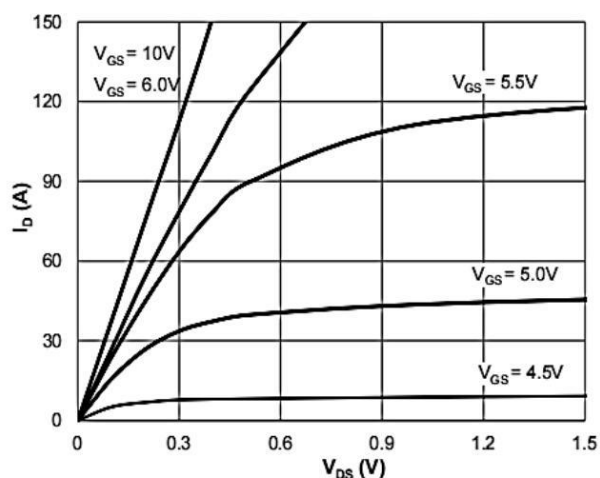


Figure 1: Saturation Characteristics

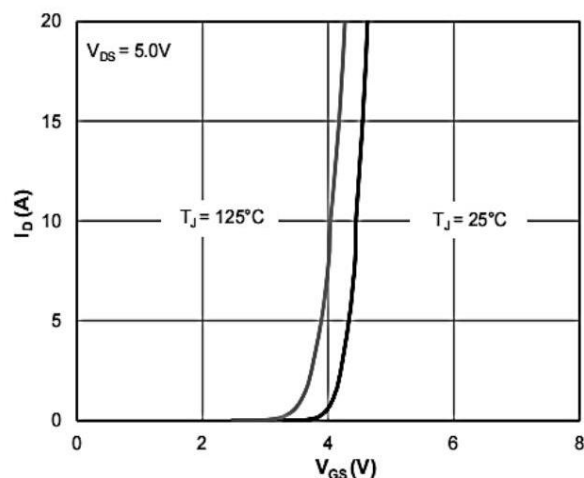


Figure 2: Transfer Characteristics

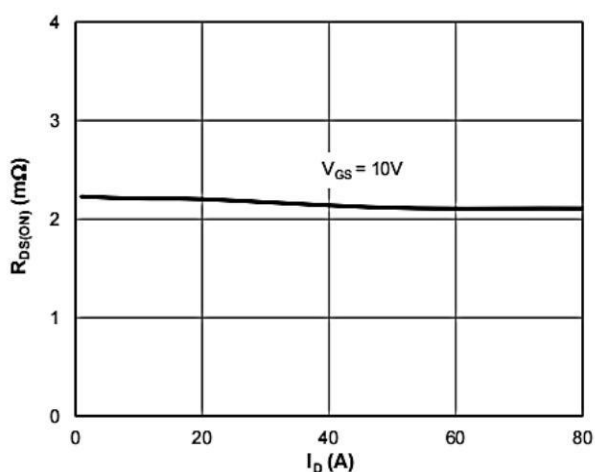


Figure 3: $R_{DS(on)}$ vs. Drain Current

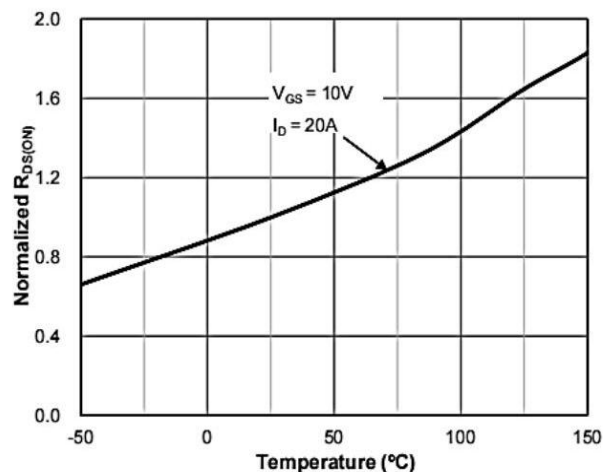


Figure 4: $R_{DS(on)}$ vs. Junction Temperature

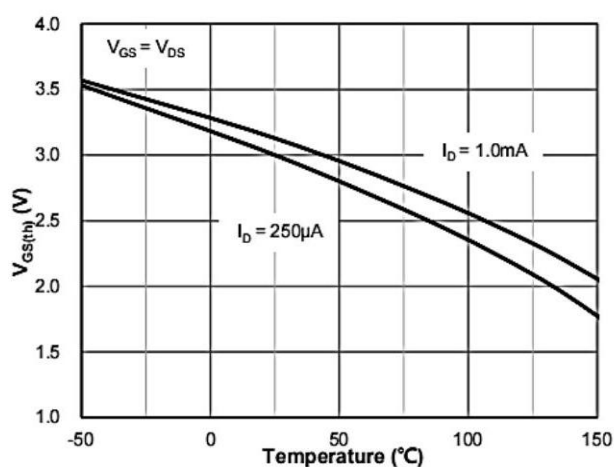


Figure 5: $V_{GS(th)}$ vs. Junction Temperature

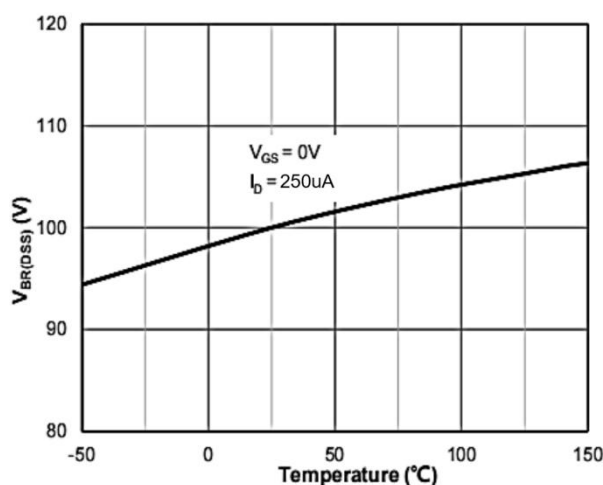


Figure 6: $V_{BR(DSS)}$ vs. Junction Temperature

Typical Characteristics

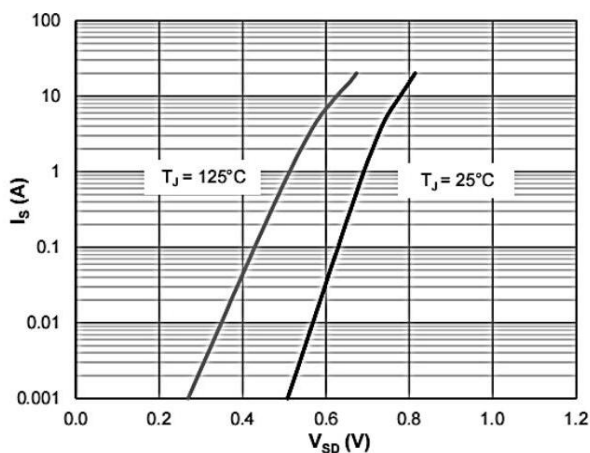


Figure 7: Body-Diode Characteristics

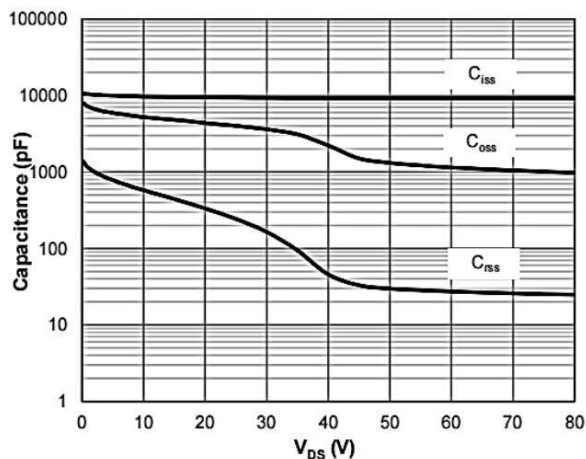


Figure 8: Capacitance Characteristics

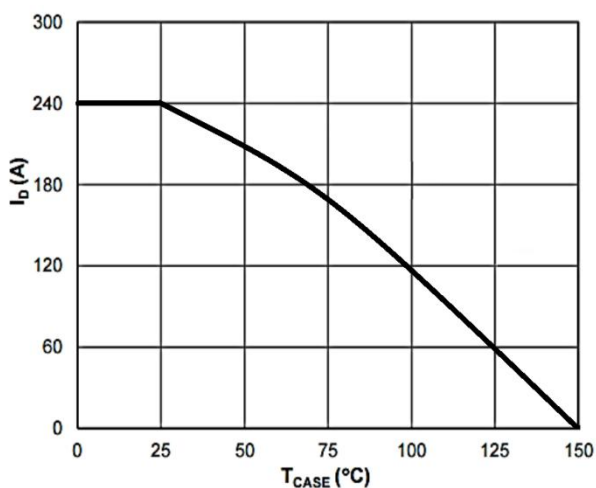


Figure 9: Current De-rating

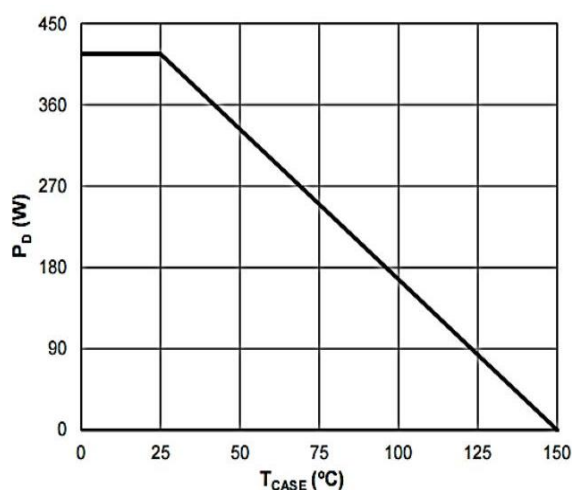


Figure 10: Power De-rating

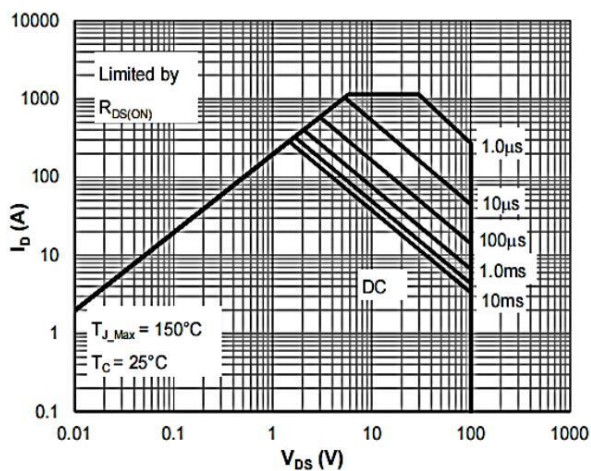


Figure 11: Maximum Safe Operating Area

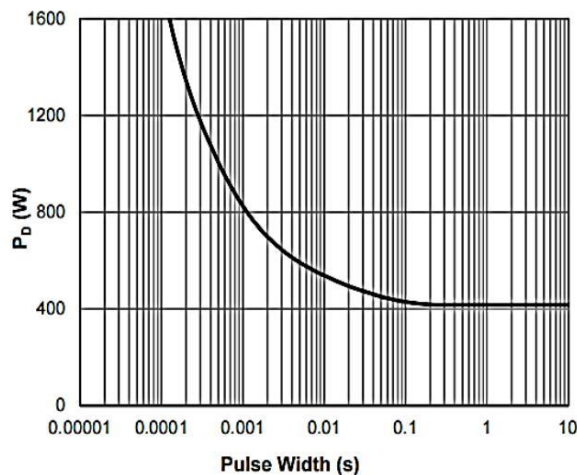


Figure 12: Single Pulse Power Rating, Junction-to-Case

Typical Characteristics

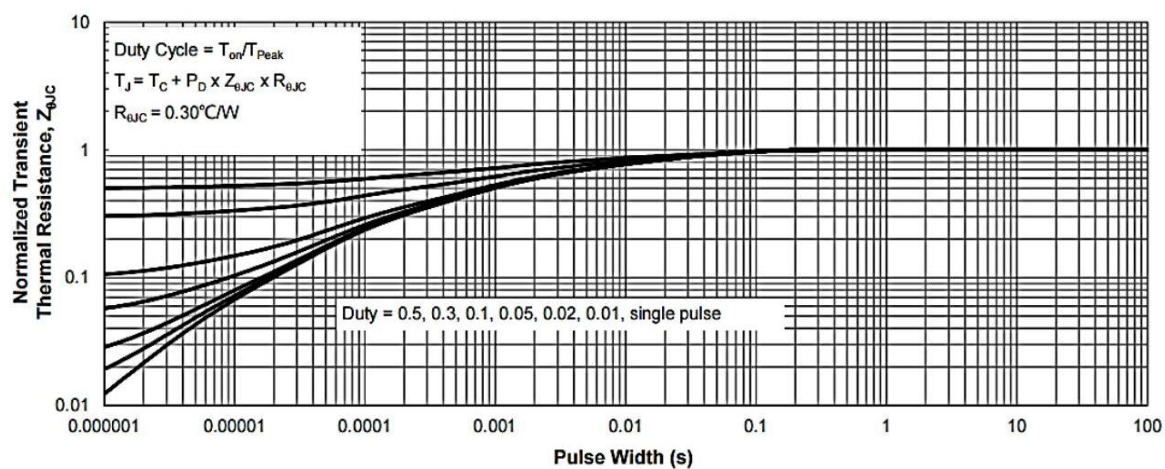
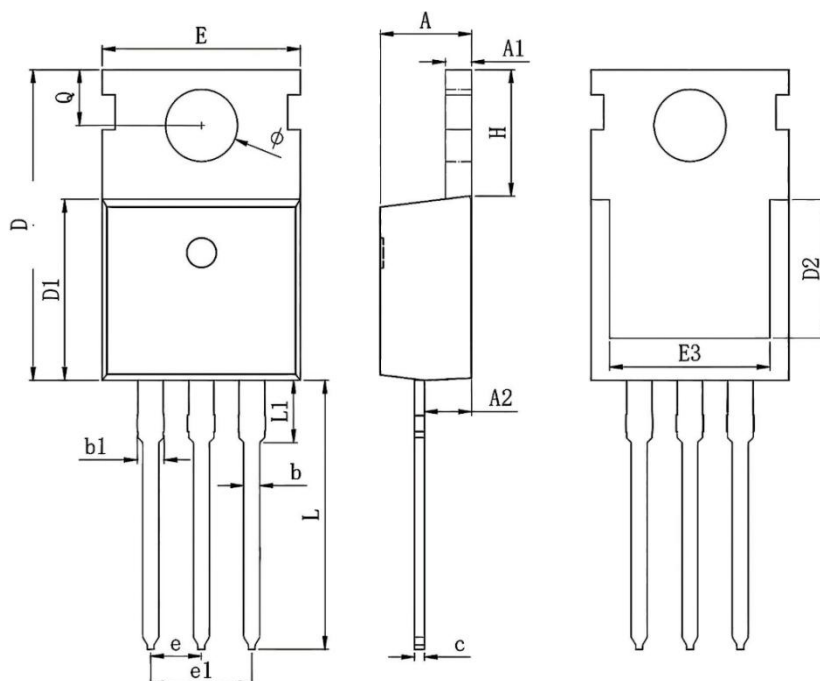


Figure 13: Normalized Maximum Transient Thermal Impedance

TO-220AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.250	4.700	0.167	0.185
A1	1.150	1.450	0.045	0.057
A2	2.150	2.550	0.085	0.100
b	0.650	0.950	0.026	0.037
b1	1.150	1.550	0.045	0.061
c	0.350	0.650	0.014	0.026
D	14.300	16.300	0.563	0.642
D1	8.800	9.400	0.346	0.370
D2	6.300 REF.		0.248 REF.	
E	9.700	10.300	0.382	0.406
E3	7.000	9.000	0.276	0.354
e	2.540 BSC.		0.100 BSC.	
e1	5.080 BSC.		0.200 BSC.	
L	12.700	13.900	0.500	0.547
L1	-	3.400	-	0.134
H	6.000	6.850	0.236	0.270
Q	2.600	3.000	0.102	0.118
φ	3.400	3.800	0.134	0.150