

### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$
650V	2.1Ω@10V	5A

### Feature

- Avalanche energy tested
- Low gate charge
- Fast switching capability

### Application

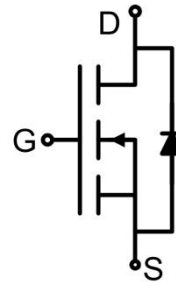
- Power factor correction
- Switched mode power supplies
- Uninterruptible power supply

### Package



TO-251AB

### Circuit diagram



### Marking



### Absolute maximum ratings (Ta=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DS</sub>	650	V
Gate-Source Voltage	V <sub>GS</sub>	±30	V
Continuous Drain Current	I <sub>D</sub>	5	A
Continuous Drain Current (100°C)	I <sub>D</sub> (100°C)	3.2	A
Pulsed Drain Current	I <sub>DM</sub>	20	A
Power Dissipation	P <sub>D</sub>	50	W
Thermal Resistance, Junction-to-Ambient	R <sub>θJA</sub>	63	°C/W
Thermal Resistance, Junction-to-Case	R <sub>θJC</sub>	2.5	°C/W
Single pulse avalanche energy	E <sub>AS</sub>	108	mJ
Junction Temperature	T <sub>J</sub>	150	°C
Storage Temperature	T <sub>STG</sub>	-55 ~ +150	°C

### Electrical characteristics (T<sub>A</sub>=25 °C, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	650			V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> = 650V, V <sub>GS</sub> = 0V			1	μA
Gate-body leakage current	I <sub>GSS</sub>	V <sub>GS</sub> = ±30V, V <sub>DS</sub> = 0V			±100	nA
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	2.0		4.0	V
Drain-source on-resistance <sup>1)</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 2.5A		1.8	2.1	Ω
<b>Dynamic characteristics<sup>2)</sup></b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V, f = 1MHz		870		pF
Output Capacitance	C <sub>oss</sub>			104		
Reverse Transfer Capacitance	C <sub>rss</sub>			13		
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 520V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 5A I <sub>G</sub> = 1mA		8.97		nC
Gate-Source Charge	Q <sub>gs</sub>			2.51		
Gate-Drain Charge	Q <sub>gd</sub>			4.02		
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> = 100V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 5A, R <sub>GEN</sub> = 25Ω		8.4		nS
Turn-on rise time	t <sub>r</sub>			22.4		
Turn-off delay time	t <sub>d(off)</sub>			15.1		
Turn-off fall time	t <sub>f</sub>			24.1		
<b>Source-Drain Diode characteristics</b>						
Diode Forward Current	I <sub>S</sub>				5	A
Diode Forward voltage <sup>1)</sup>	V <sub>DS</sub>	V <sub>GS</sub> = 0V, I <sub>S</sub> = 5A			1.4	V
Reverse Recovery Time	t <sub>rr</sub>	T <sub>J</sub> = 25°C, I <sub>F</sub> = 5A di/dt = 100A/μs <sup>1)</sup>		370		nS
Reverse Recovery Charge	Q <sub>rr</sub>			0.95		μC

Notes:

1) Pulse Test: Pulse Width < 300μs, Duty Cycle ≤2%.

2) Guaranteed by design, not subject to production testing.

## Typical Characteristics

Fig.1 Drain Current vs. Gate-Source Voltage

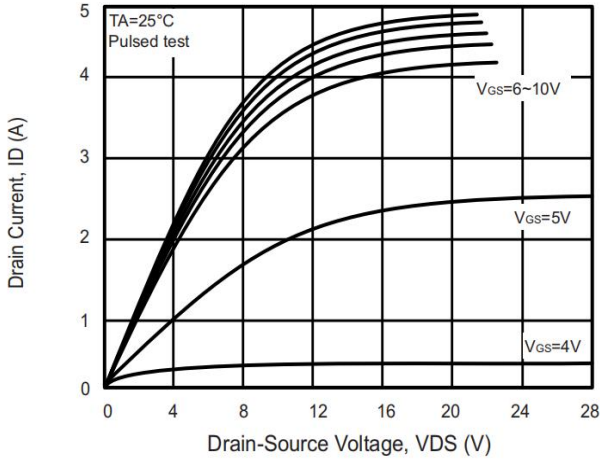


Fig.2 Drain-Source On-Resistance vs. Gate-Source Voltage

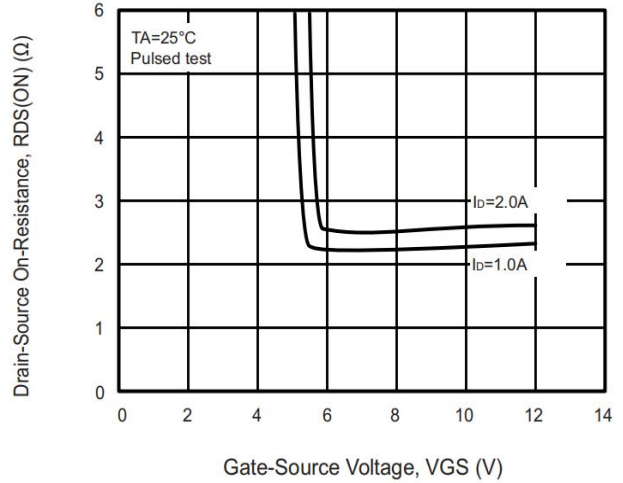


Fig.3 Gate Charge Characteristics

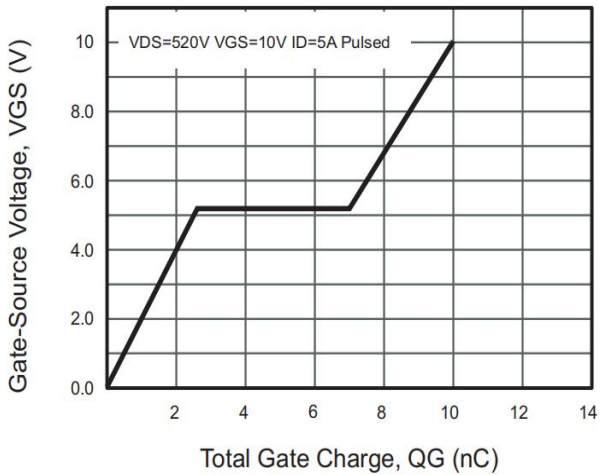


Fig.4 Capacitance Characteristics

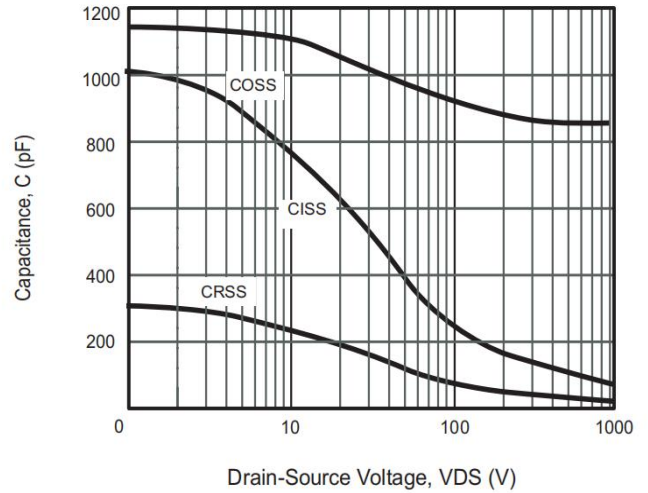


Fig.5 Drain-Source On-Resistance vs. Junction Temperature

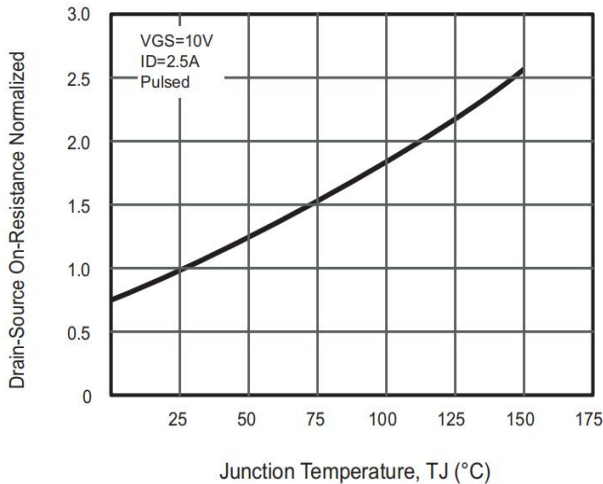
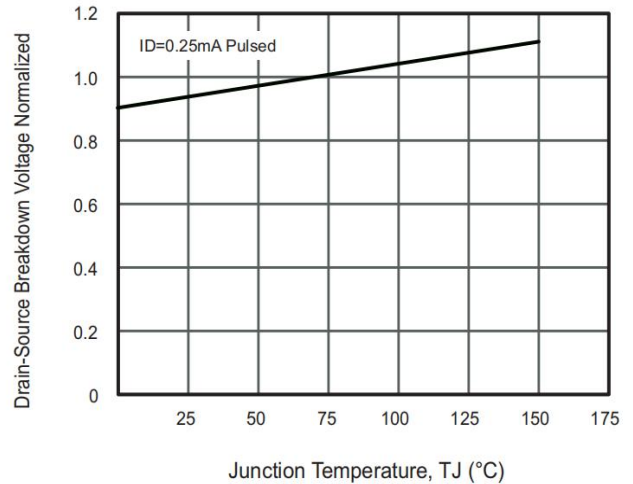


Fig.6 Breakdown Voltage vs. Junction Temperature



## Typical Characteristics

Fig.7 Gate Threshold Voltage vs. Junction Temperature

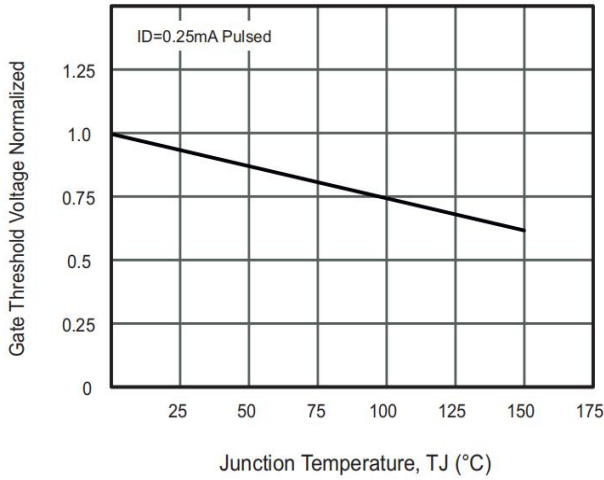


Fig.8 Source Current vs. Source-Drain Voltage

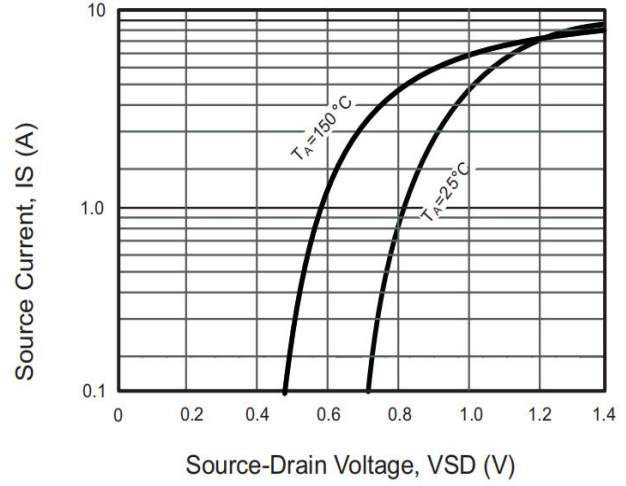


Fig.9 Drain Current vs. Gate-Source Voltage

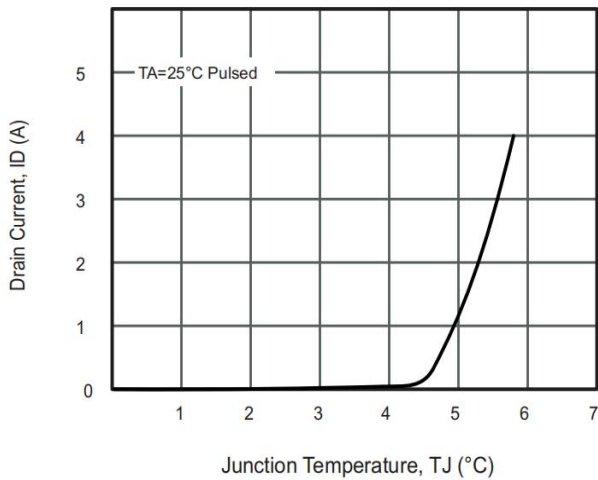


Fig.10 Drain-Source On-Resistance vs. Drain Current

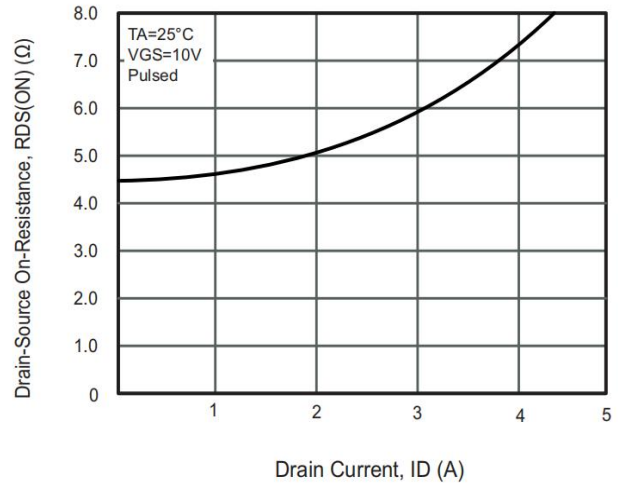


Fig.11 Drain Current vs. Junction Temperature

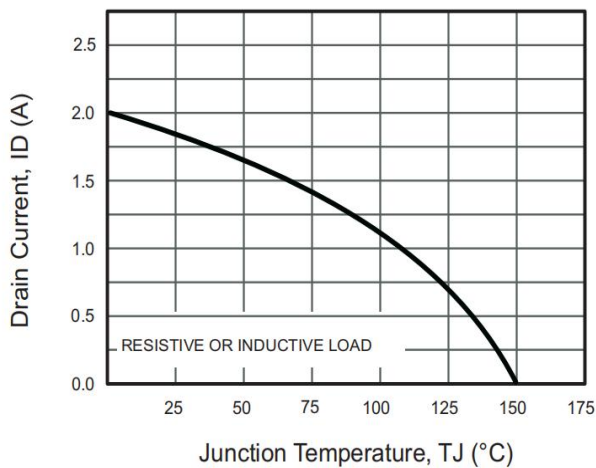
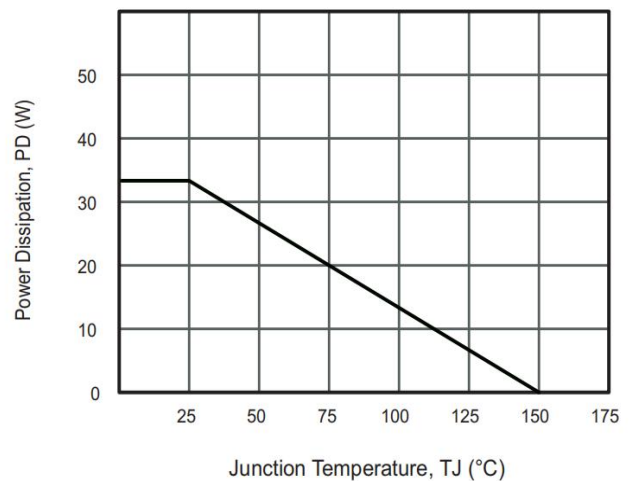
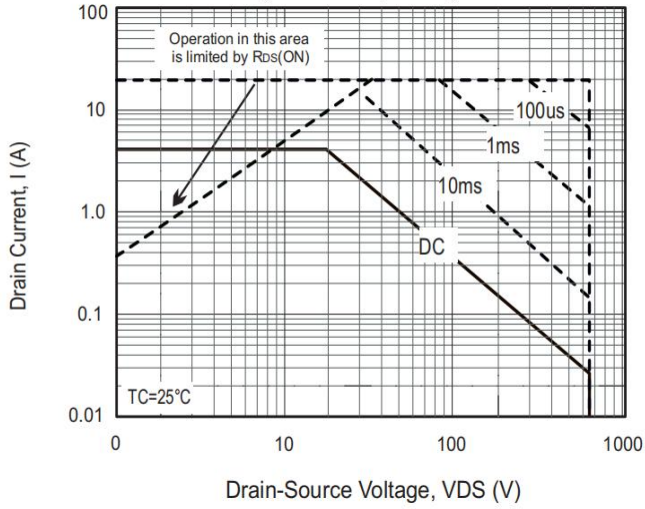


Fig.12 Power Dissipation vs. Junction Temperature

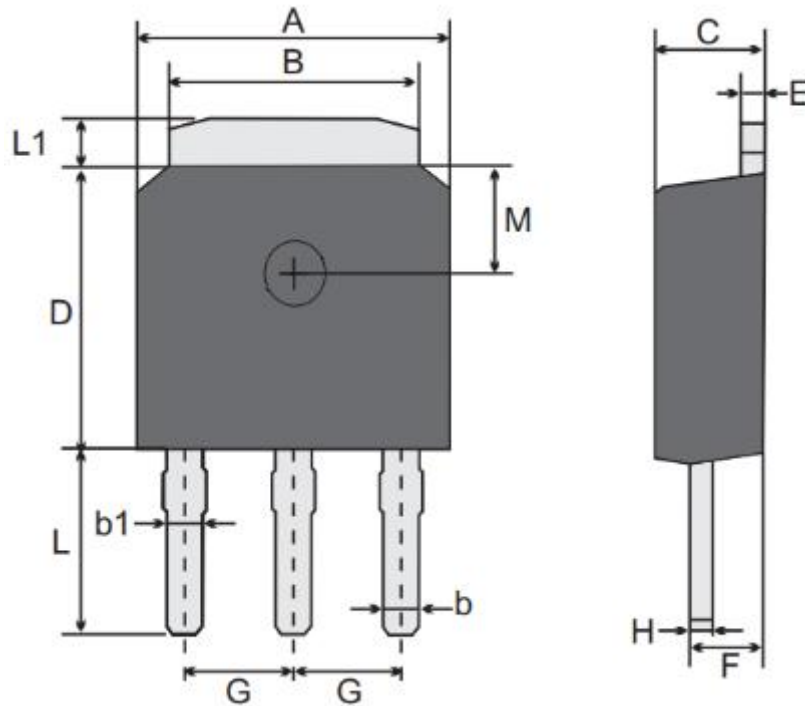


## Typical Characteristics

Fig.13 Safe Operating Area



### TO-251AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	6.300	6.700	0.248	0.264
B	5.100	5.500	0.201	0.217
b	0.300	0.800	0.012	0.031
b1	0.760	0.900	0.030	0.035
C	2.100	2.500	0.083	0.098
D	5.900	6.300	0.232	0.248
E	0.400	0.600	0.016	0.024
F	1.300	1.800	0.051	0.071
G	2.290 TYP.		0.090 TYP.	
H	0.450	0.600	0.018	0.024
L	3.500	4.500	0.138	0.177
L1	0.800	1.250	0.031	0.049
M	1.800 TYP.		0.070 TYP.	