

### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$
650V	$5\Omega@10V$	2A

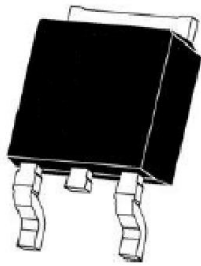
### Feature

- Fast switching capability
- Avalanche energy tested
- Improved dv/dt capability, high ruggedness

### Application

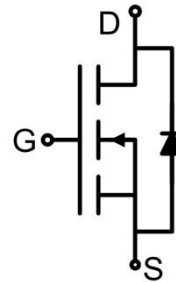
- Load switching
- Hard switched and high frequency circuits

### Package

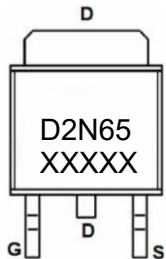


TO-252AB

### 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>	2	A
Pulsed Drain Current	I <sub>DM</sub>	8	A
Power Dissipation	P <sub>D</sub>	54	W
Single pulse avalanche energy <sup>3)</sup>	E <sub>AS</sub>	108	mJ
Peak Diode Recovery dv/dt <sup>4)</sup>	dv/dt	2.1	V/ns
Thermal Resistance from Junction to Ambient	R <sub>θJA</sub>	63	°C/W
Thermal Resistance, Junction-to-Case	R <sub>θJC</sub>	2.31	°C/W
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	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 1.0A		4.3	5	Ω
<b>Dynamic characteristics</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V, f = 1MHz		260		pF
Output Capacitance	C <sub>oss</sub>			30		
Reverse Transfer Capacitance	C <sub>rss</sub>			2.2		
Total Gate Charge <sup>1)</sup>	Q <sub>g</sub>	V <sub>DS</sub> = 520V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 2A, 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 <sup>1)</sup>	t <sub>d(on)</sub>	V <sub>DD</sub> = 325V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 2A, 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>				2	A
Diode Forward voltage <sup>1)</sup>	V <sub>DS</sub>	V <sub>GS</sub> = 0V, I <sub>S</sub> = 2A			1.4	V
Reverse Recovery Time	t <sub>rr</sub>	T <sub>J</sub> = 25°C, I <sub>S</sub> = 2A		370		nS
Reverse Recovery Charge	Q <sub>rr</sub>	di/dt = 100A/μs		0.95		uC

Notes:

- 1) Pulse Test: Pulse Width < 300μs, Duty Cycle ≤ 2%.
- 2) Essentially independent of operating temperature.
- 3) L = 30mH, I<sub>AS</sub> = 3.4A, V<sub>DD</sub> = 50V, R<sub>G</sub> = 25 Ω, Starting T<sub>J</sub> = 25°C
- 4) I<sub>SD</sub> ≤ 2A, di/dt ≤ 200A/μs, V<sub>DD</sub> ≤ BV<sub>DSS</sub>, Starting T<sub>J</sub> = 25°C

## Typical Characteristics

Fig.1 Drain Current vs. Gate-Source Voltage

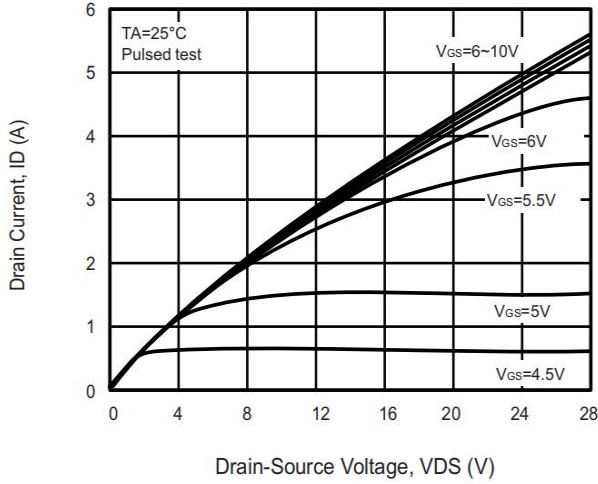


Fig.2 Drain-Source On-Resistance vs. Gate-Source Voltage

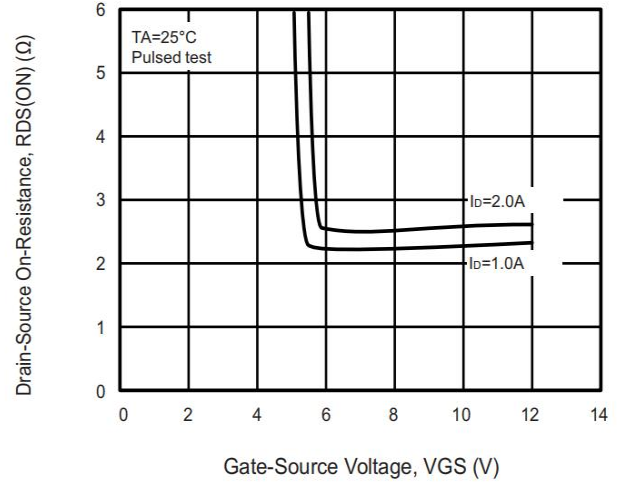


Fig.3 Gate Charge Characteristics

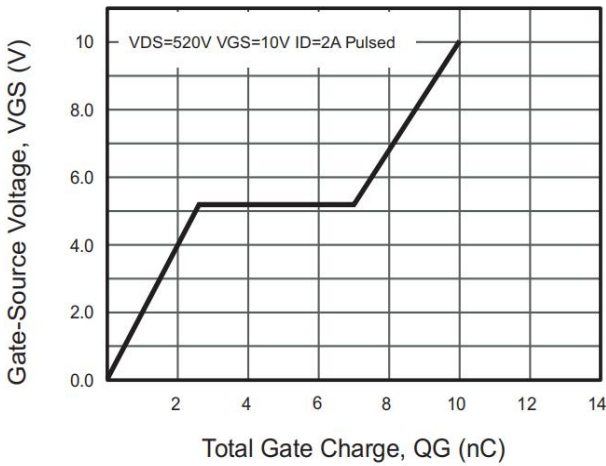


Fig.4 Capacitance Characteristics

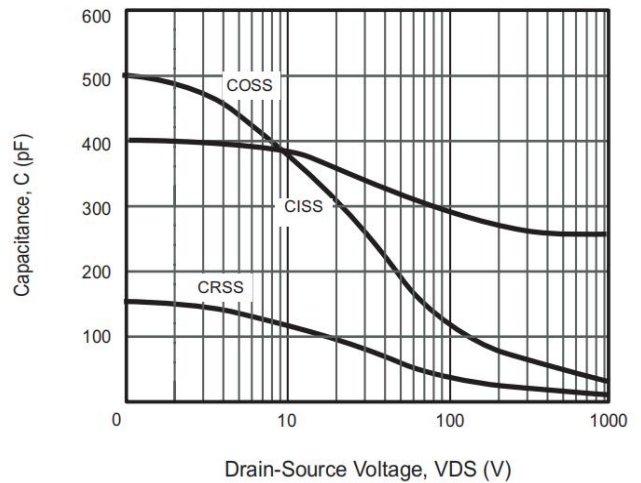


Fig.5 Drain-Source On-Resistance vs. Junction Temperature

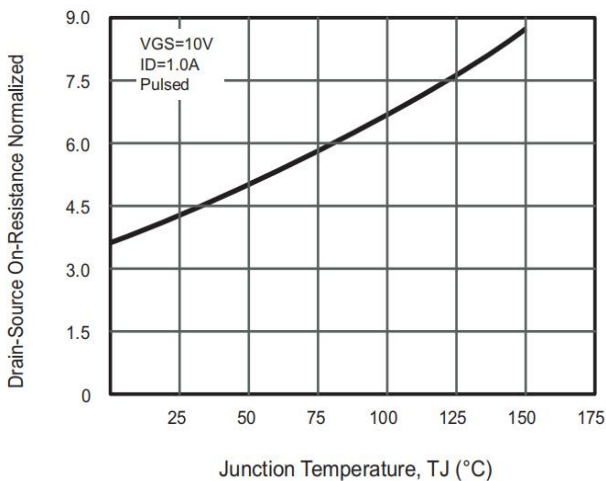
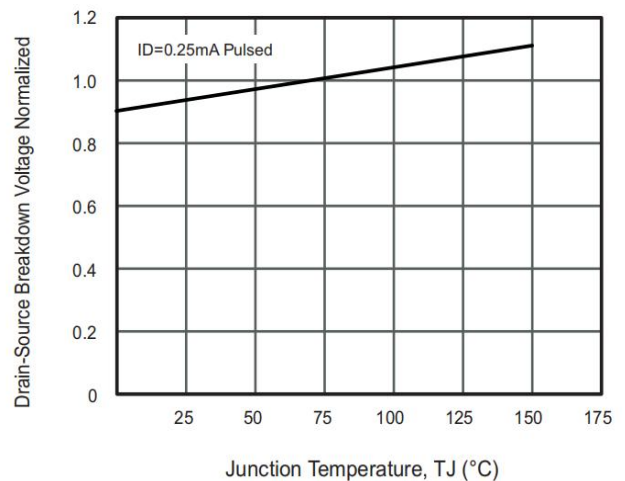


Fig.6 Breakdown Voltage vs. Junction Temperature



## Typical Characteristics

Fig.7 Gate Threshold Voltage vs. Junction Temperature

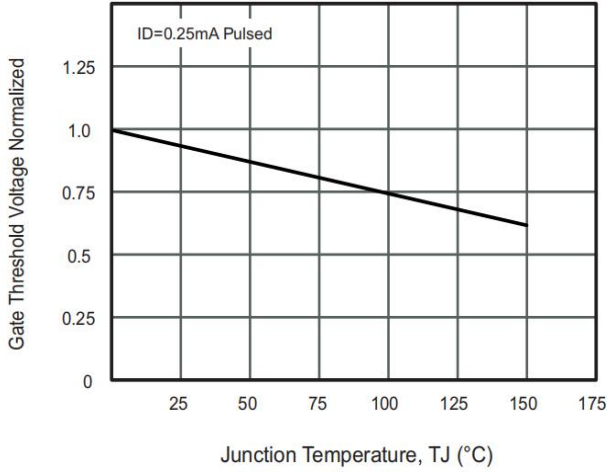


Fig.8 Source Current vs. Source-Drain Voltage

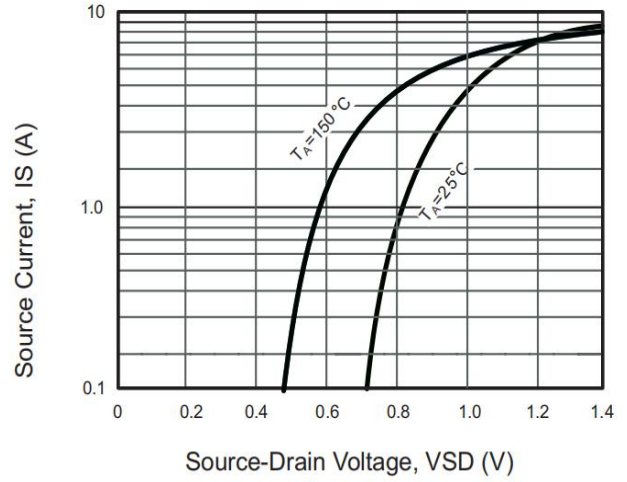


Fig.9 Drain Current vs. Gate-Source Voltage

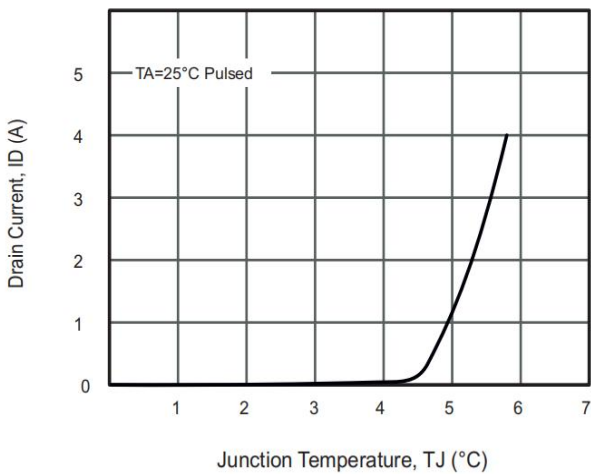


Fig.10 Drain-Source On-Resistance vs. Drain Current

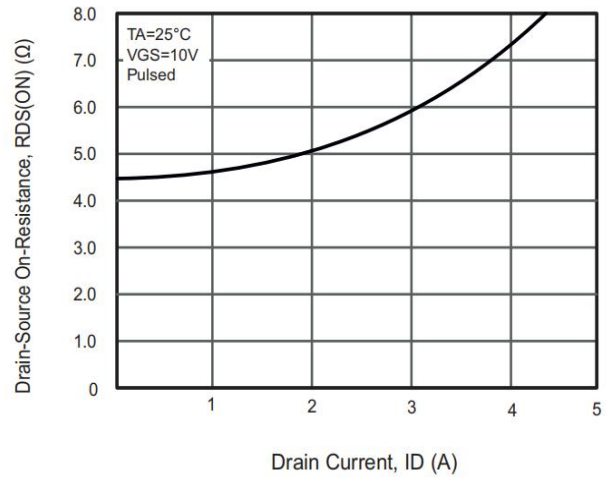


Fig.11 Drain Current vs. Junction Temperature

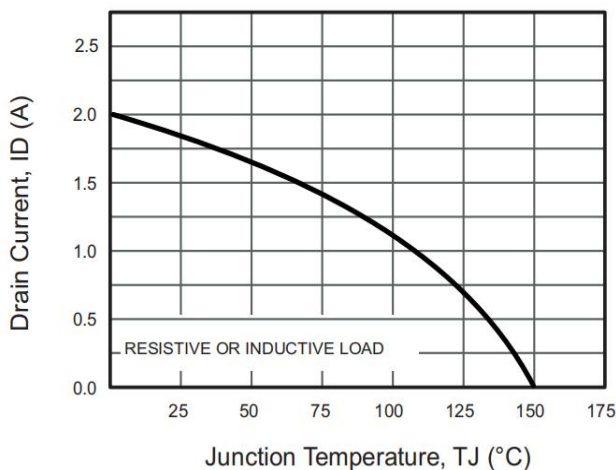
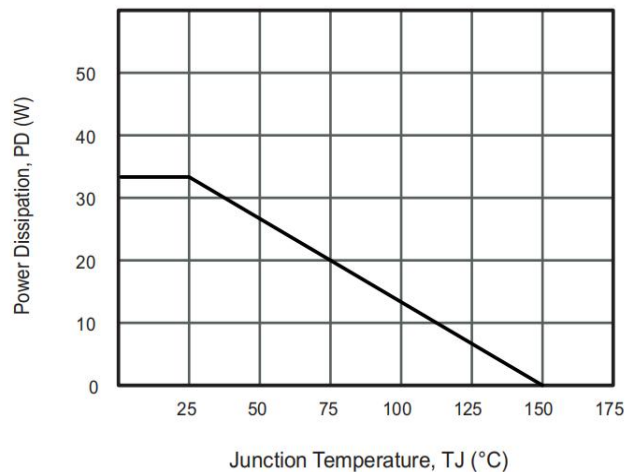
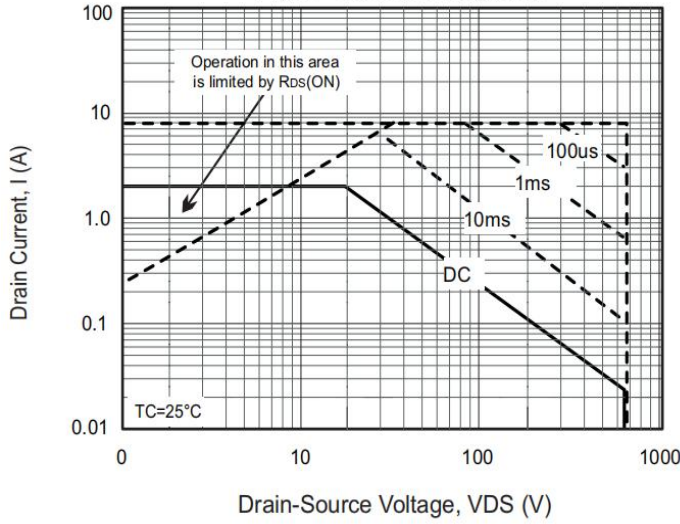


Fig.12 Power Dissipation vs. Junction Temperature

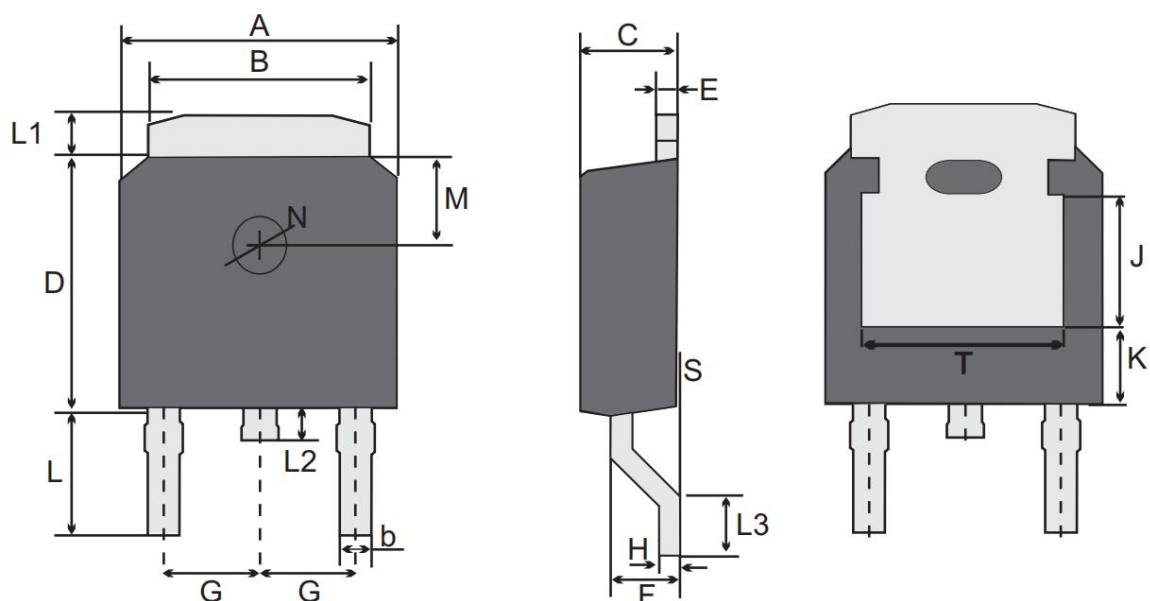


## Typical Characteristics

**Fig.13 Safe Operating Area**



### TO-252AB 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
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	0.550	0.018	0.022
L	2.700	3.100	0.106	0.122
L1	0.800	1.200	0.031	0.047
L2	0.600	1.000	0.024	0.039
L3	1.000	1.750	0.039	0.069
S	0.000	0.230	0.000	0.009
M	1.800 TYP.		0.071 TYP.	
N	1.300 TYP.		0.051 TYP.	
J	3.230 REF		0.127 REF	
K	1.750 REF		0.069 REF	
T	5.240 REF		0.206 REF	