

### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$
650V	1.1Ω@10V	4A

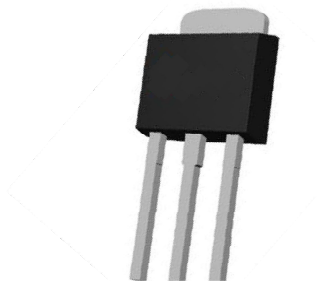
### Feature

- Low Crss
- Low gate charge
- Fast switching

### Application

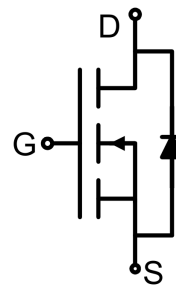
- Power factor correction
- Switched mode power supplies
- Uninterruptible Power Supply

### Package



TO-251AB

### Circuit diagram



### Marking



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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	650	V
Gate-Source Voltage	$V_{GS}$	±30	V
Continuous Drain Current	$I_D$	4	A
Pulsed Drain Current	$I_{DM}$	16	A
Power Dissipation	$P_D$	41	W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3	°C/W
Single pulse avalanche energy	$E_{AS}$	27	mJ
Junction Temperature	$T_J$	150	°C
Storage Temperature	$T_{STG}$	-55 ~ +150	°C

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

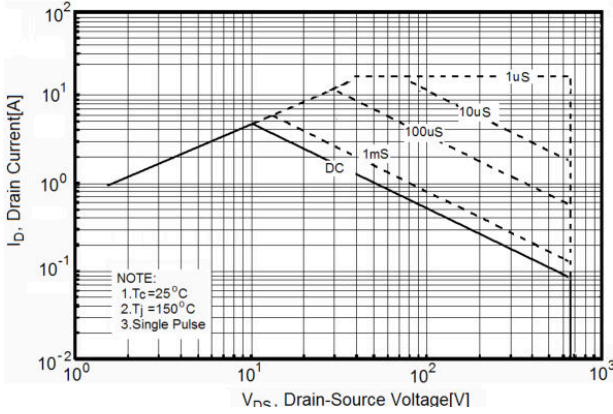
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	650			V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 650V, V_{GS} = 0V$			1	μA
Gate-body leakage current	$I_{GSS}$	$V_{GS} = \pm 20V, V_{DS} = 0V$			±100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	3		4	V
Drain-source on-resistance <sup>1)</sup>	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 2A$		0.95	1.1	Ω
<b>Dynamic characteristics<sup>2)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 50V, V_{GS} = 0V, f = 1MHz$		304		pF
Output Capacitance	$C_{oss}$			18		
Reverse Transfer Capacitance	$C_{rss}$			0.6		
Total Gate Charge	$Q_g$	$V_{DS} = 480V, V_{GS} = 10V, I_D = 4A$		8.8		nC
Gate-Source Charge	$Q_{gs}$			2.3		
Gate-Drain Charge	$Q_{gd}$			4		
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 380V, V_{GS} = 10V, I_D = 2.5A, R_{GEN} = 5\Omega$		8		nS
Turn-on rise time	$t_r$			4		
Turn-off delay time	$t_{d(off)}$			52		
Turn-off fall time	$t_f$			9		
<b>Source-Drain Diode characteristics</b>						
Diode Forward Current <sup>1)</sup>	$I_S$				4	A
Diode Forward voltage	$V_{DS}$	$V_{GS} = 0V, I_S = 4A$			1.2	V
Reverse Recovery Time	$t_{rr}$	$T_J = 25^\circ C, I_F = 2A, di/dt = 100A/\mu s^{-1}$		200		nS
Reverse Recovery Charge	$Q_{rr}$			0.6		μC

Notes:

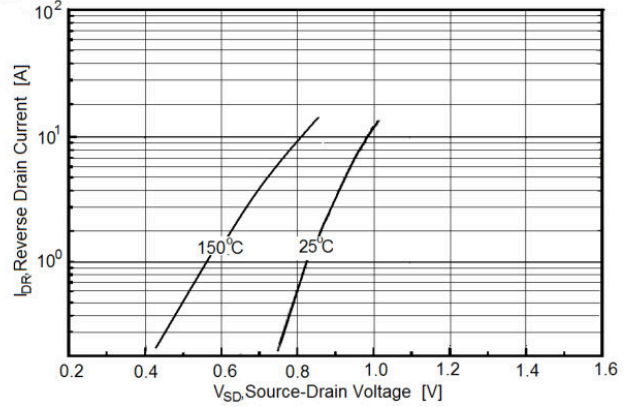
- 1) Pulse Test: Pulse Width < 300μs, Duty Cycle ≤2%.
- 2) Guaranteed by design, not subject to production testing.

## Typical Characteristics

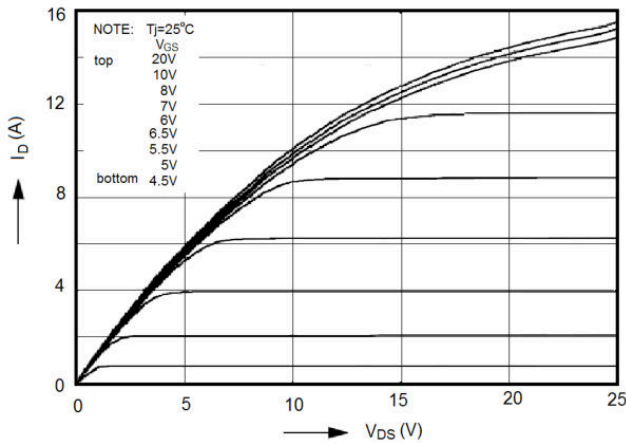
**Figure1. Safe operating area**



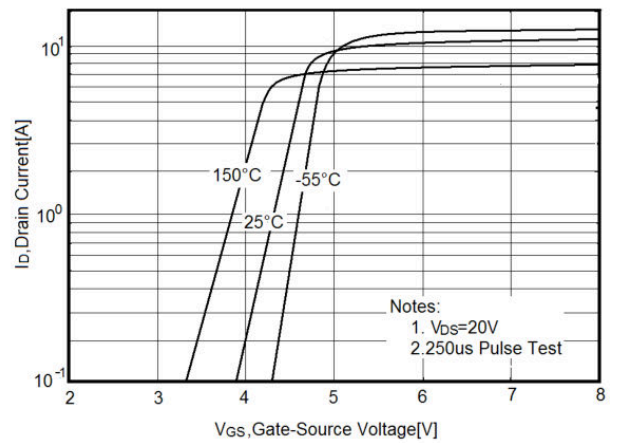
**Figure2. Source-Drain Diode Forward Voltage**



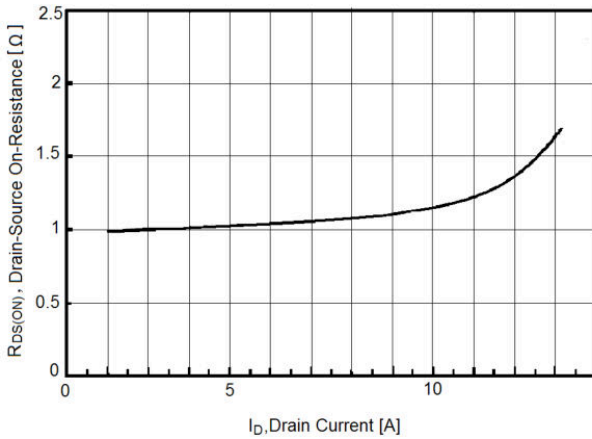
**Figure3. Output characteristics**



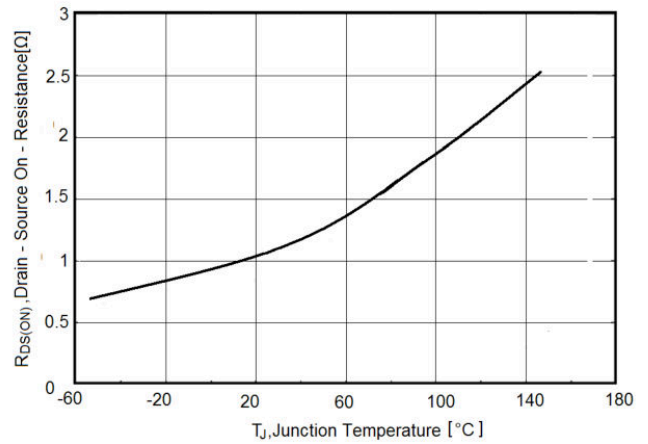
**Figure4. Transfer characteristics**



**Figure5. Static drain-source on resistance**

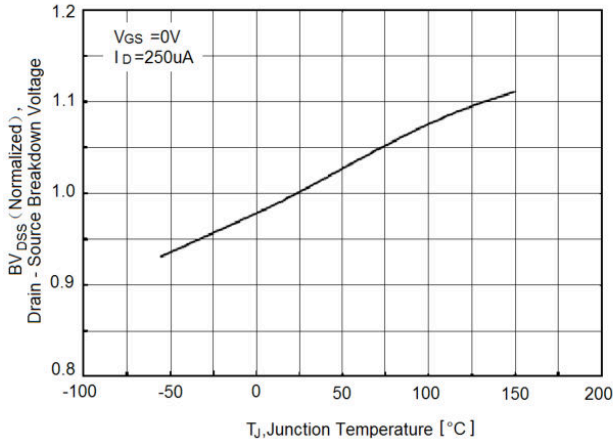


**Figure6. RDS(ON) vs Junction Temperature**

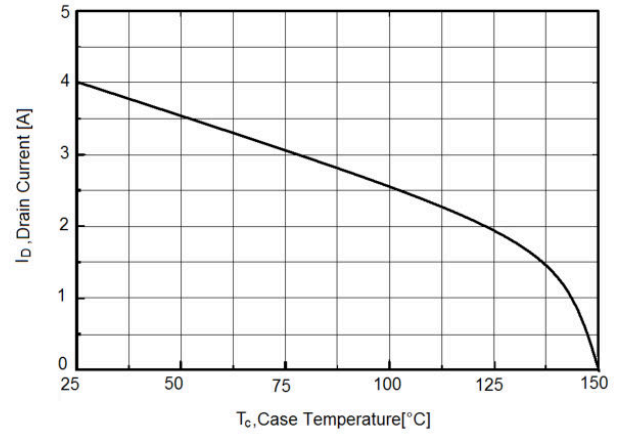


## Typical Characteristics

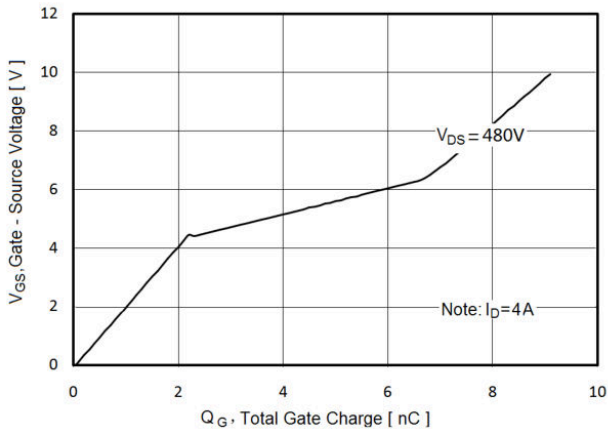
**Figure7.  $BV_{DSS}$  vs Junction Temperature**



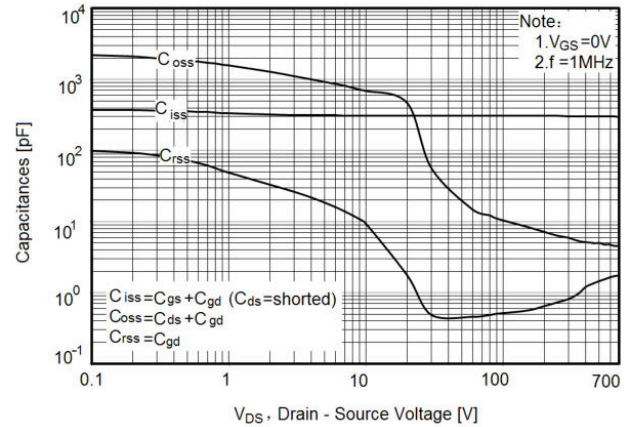
**Figure8. Maximum  $I_D$  vs Junction Temperature**



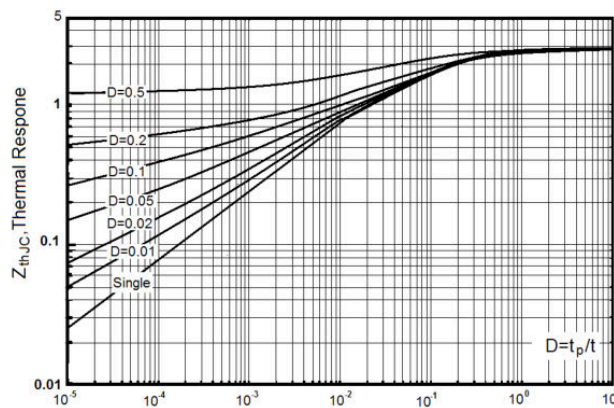
**Figure9. Gate charge waveforms**



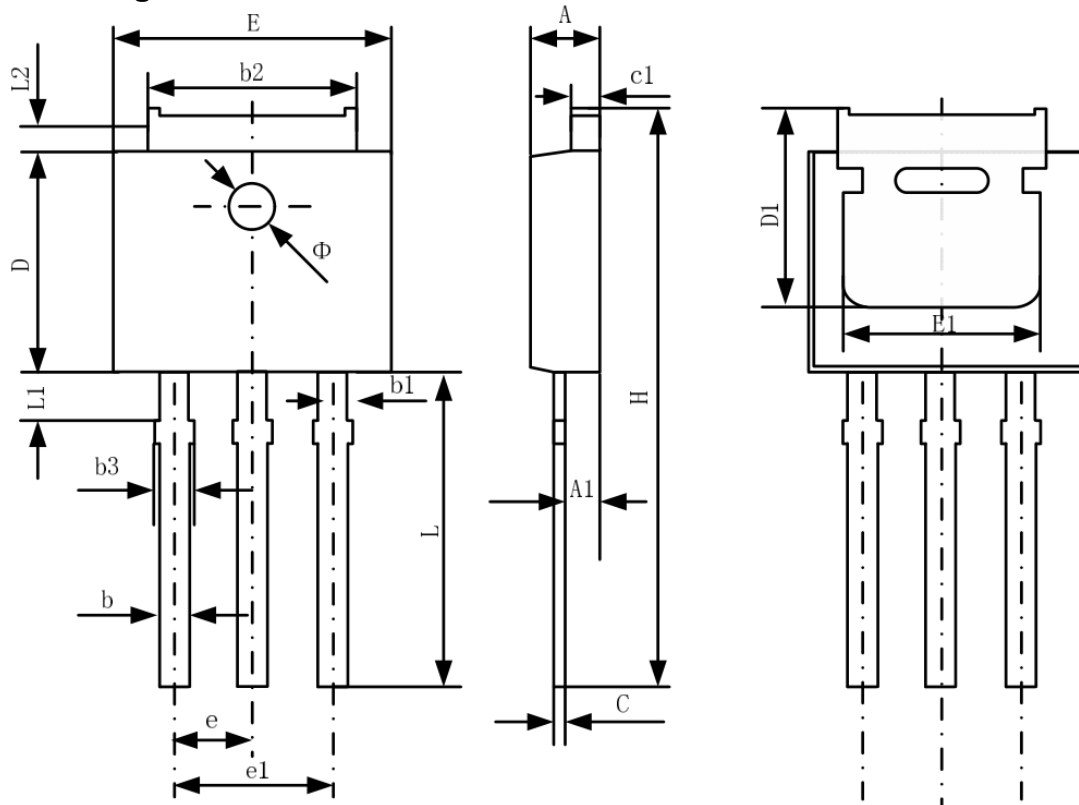
**Figure10. Capacitance**



**Figure11. Transient Thermal Impedance**



### TO-251AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.20	2.35	0.087	0.093
A1	0.90	1.10	0.035	0.043
b	0.56	0.69	0.022	0.027
b1	0.77	0.90	0.030	0.035
b2	5.23	5.43	0.206	0.214
b3		1.05	0.000	0.041
C	0.46	0.59	0.018	0.023
c1	0.46	0.59	0.018	0.023
D	6.00	6.20	0.236	0.244
D1	5.20		0.205	
E	6.50	6.70	0.256	0.264
E1	4.60	5.00	0.181	
e	2.24	2.34	0.088	0.092
e1	4.47	4.67	0.176	0.184
H	16.18	16.78	0.637	0.661
L	9.00	9.60	0.354	0.378
L1	0.95	1.35	0.037	0.053
L2	0.90	1.25	0.035	0.049