

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
100V	8.5mΩ@10V	78A
	12.0mΩ@4.5V	

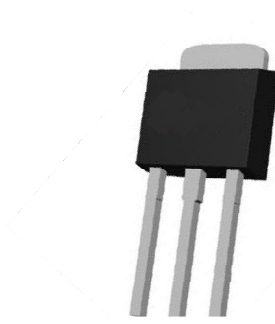
Feature

- Excellent gate charge x $R_{DS(on)}$ product(FOM)
- Very low on-resistance $R_{DS(on)}$
- Pb-free lead plating

Application

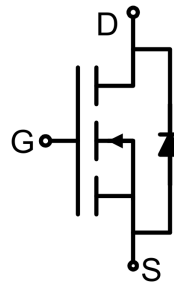
- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

Package

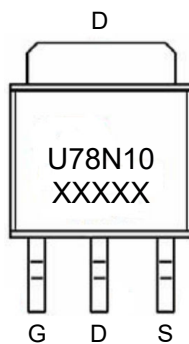


TO-251AB

Circuit diagram



Marking



Absolute maximum ratings (Ta=25°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	I_D	78	A
Drain Current-Continuous($T_C = 100^\circ\text{C}$)	$I_D (100^\circ\text{C})$	60	A
Pulsed Drain Current	I_{DM}	320	A
Power Dissipation	P_D	125	W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.2	$^\circ\text{C}/\text{W}$
Single pulse avalanche energy	E_{AS}	320	mJ
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55 ~ +150	$^\circ\text{C}$

Electrical characteristics ($T_A = 25^\circ\text{C}$, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$	100			V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 100\text{V}, V_{GS} = 0\text{V}$			1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$			±100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	1.2		2.2	V
Drain-source on-resistance ¹⁾	$R_{DS(on)}$	$V_{GS} = 10\text{V}, I_D = 39\text{A}$		7.2	8.5	m Ω
		$V_{GS} = 4.5\text{V}, I_D = 39\text{A}$		9.5	12.0	
Dynamic characteristics²⁾						
Input Capacitance	C_{iss}	$V_{DS} = 50\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$		4200		pF
Output Capacitance	C_{oss}			354		
Reverse Transfer Capacitance	C_{rss}			23		
Total Gate Charge	Q_g	$V_{DS} = 50\text{V}, V_{GS} = 10\text{V}, I_D = 39\text{A}$		65		nC
Gate-Source Charge	Q_{gs}			15.3		
Gate-Drain Charge	Q_{gd}			9		
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 50\text{V}, V_{GS} = 10\text{V}$ $I_D = 39\text{A}, R_{GEN} = 4.7\Omega$		15		nS
Turn-on rise time	t_r			10		
Turn-off delay time	$t_{d(off)}$			41		
Turn-off fall time	t_f			6		
Diode Forward Current ¹⁾	I_S				78	A
Diode Forward voltage	V_{DS}	$V_{GS} = 0\text{V}, I_S = 78\text{A}$			1.2	V
Reverse Recovery Time	t_{rr}	$T_J = 25^\circ\text{C}, I_F = I_S$ $di/dt = 100\text{A}/\mu\text{s}$ ¹⁾		101		nS
Reverse Recovery Charge	Q_{rr}			193		nC

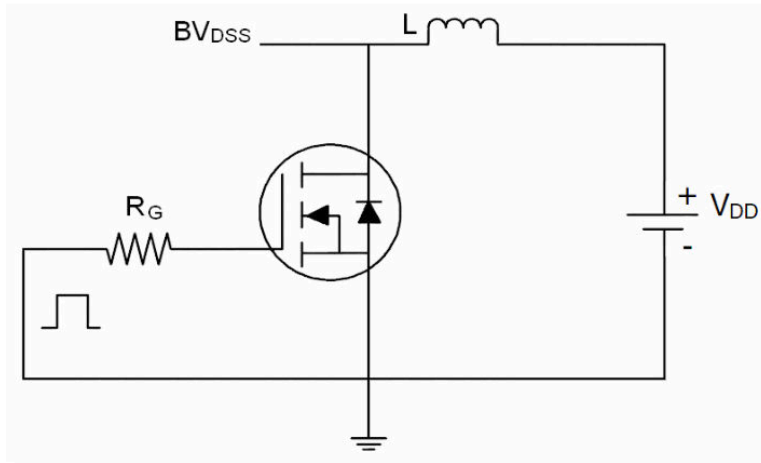
Notes:

1) Pulse Test: Pulse Width < 300 μs , Duty Cycle $\leq 2\%$.

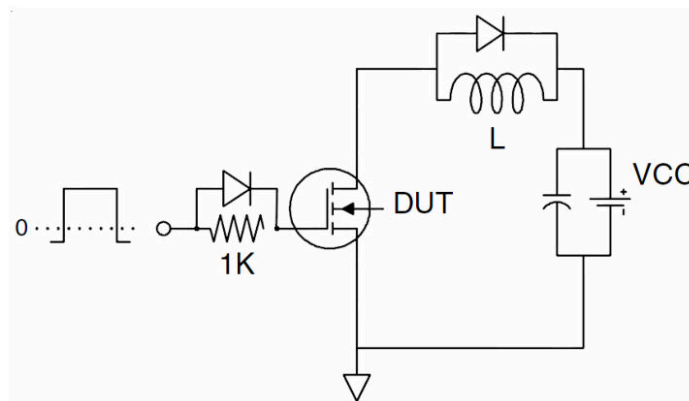
2) Guaranteed by design, not subject to production testing.

Test Circuit

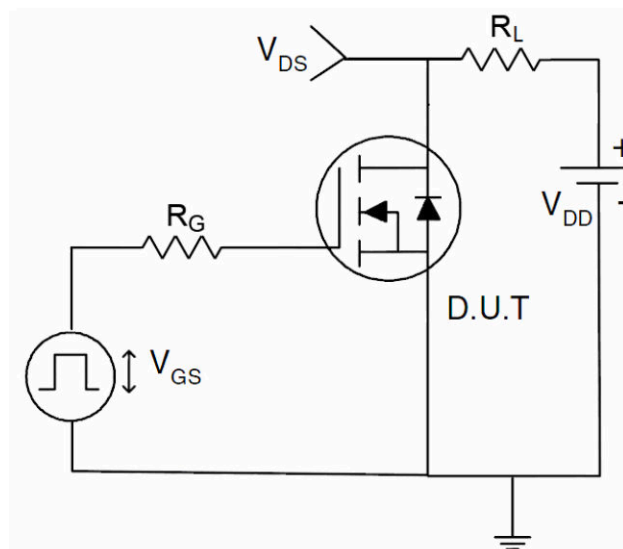
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



Typical Characteristics

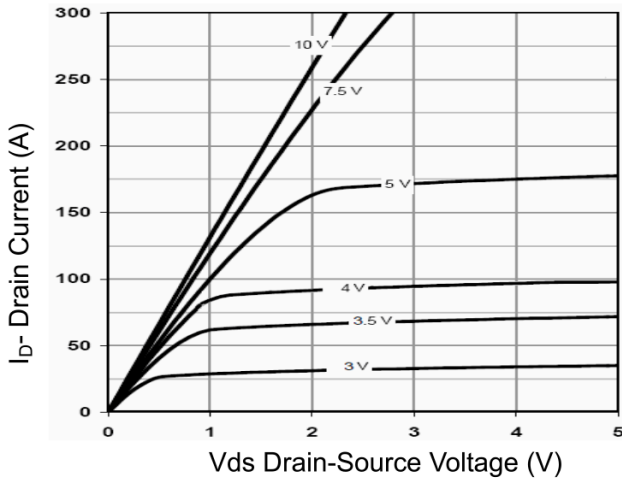


Figure 1 Output Characteristics

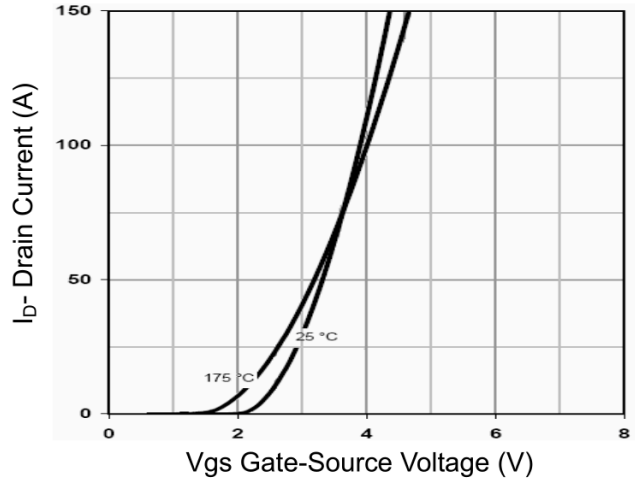


Figure 2 Transfer Characteristics

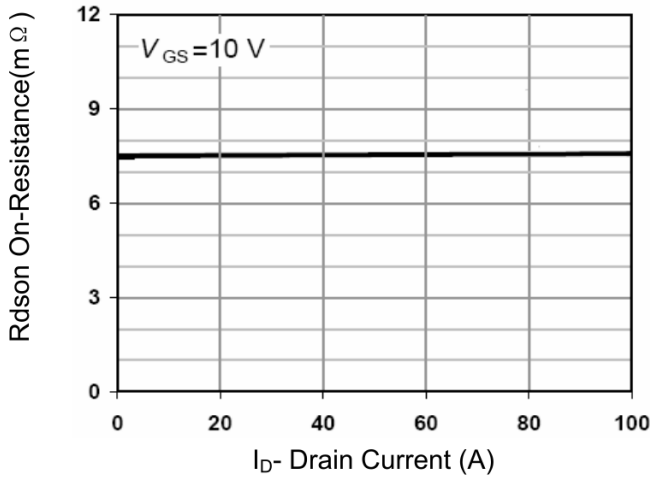


Figure 3 Rdson- Drain Current

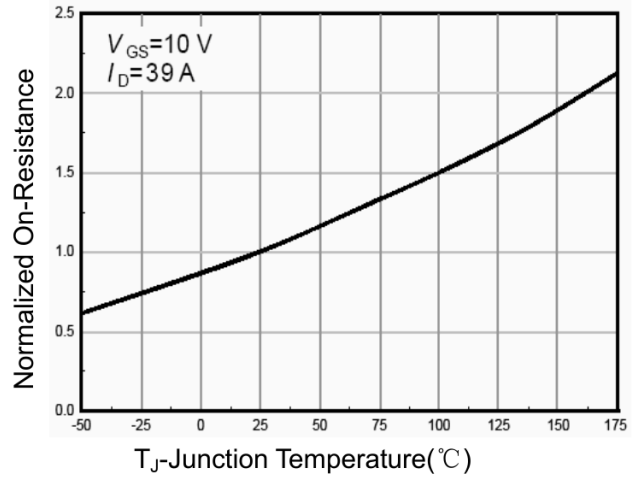


Figure 4 Rdson-Junction Temperature

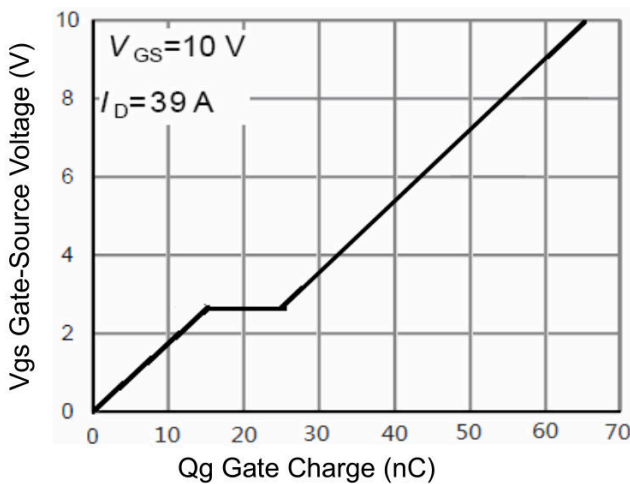


Figure 5 Gate Charge

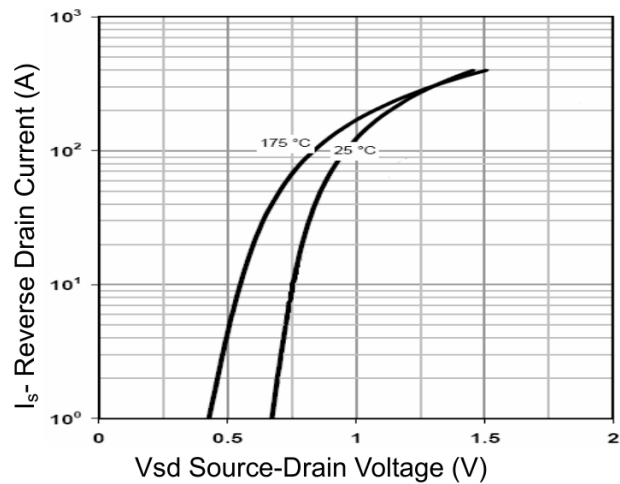


Figure 6 Source- Drain Diode Forward

Typical Characteristics

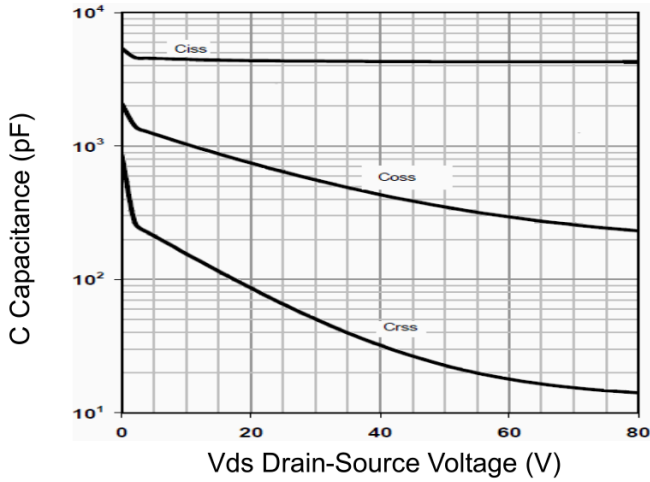


Figure 7 Capacitance vs Vds

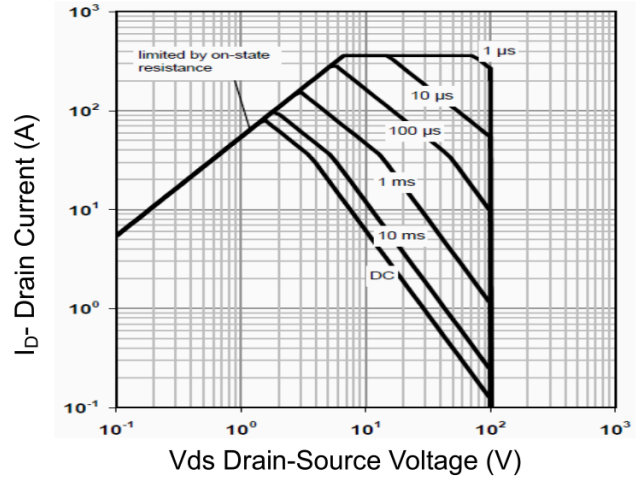


Figure 8 Safe Operation Area

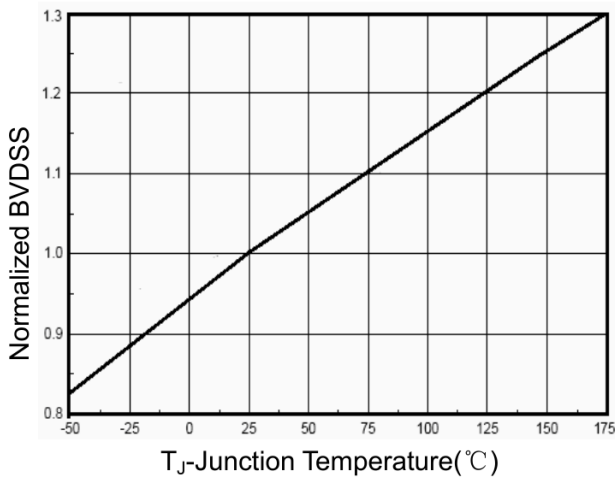


Figure 9 BV_{DSS} vs Junction Temperature

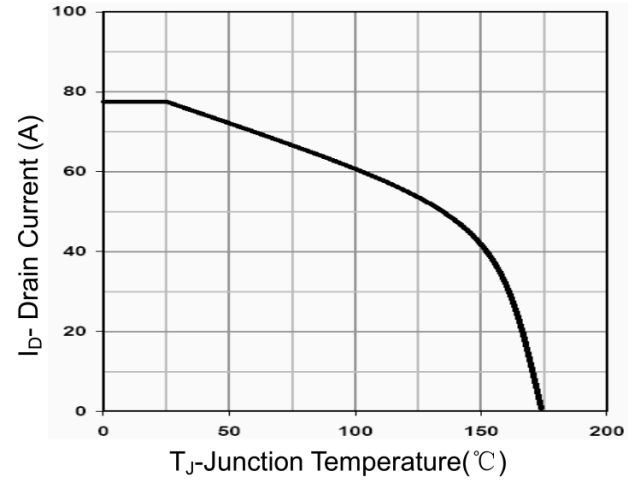


Figure 10 Current De-rating

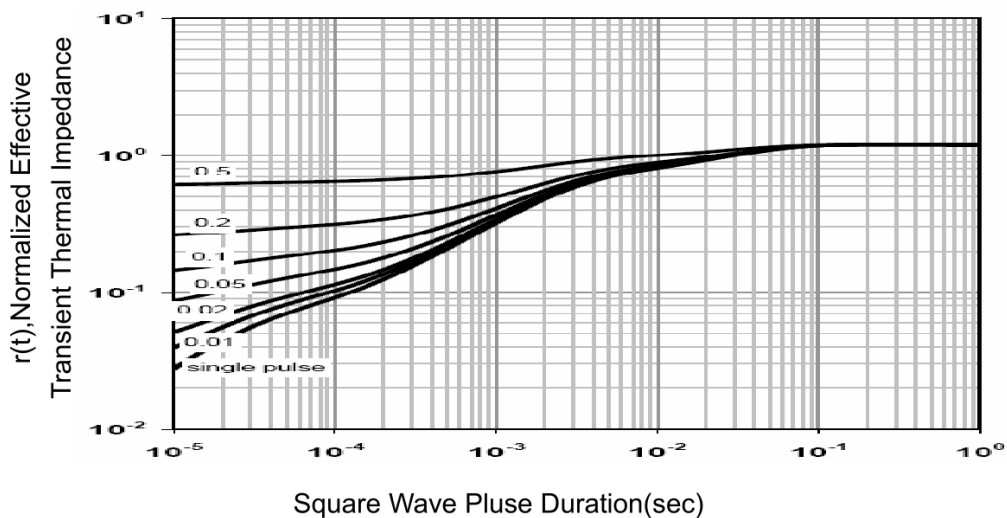
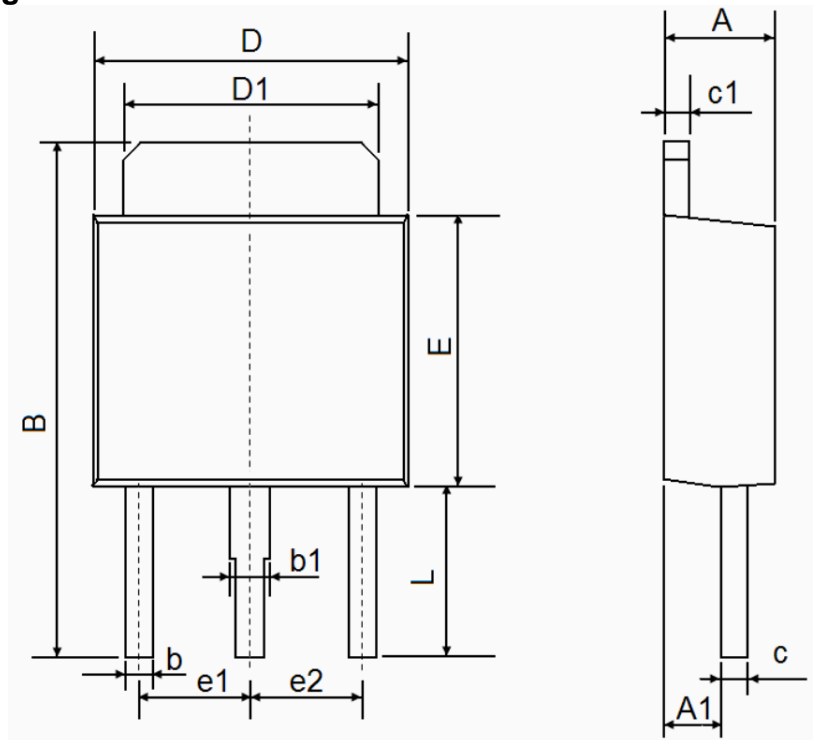


Figure 11 Normalized Maximum Transient Thermal Impedance

TO-251AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.250	2.350	0.089	0.093
A1	1.150	1.250	0.045	0.049
B	10.200	10.800	0.402	0.425
b	0.550	0.650	0.022	0.026
b1	0.750	0.850	0.030	0.033
c	0.480	0.540	0.019	0.021
c1	0.480	0.540	0.019	0.021
D	6.400	6.600	0.252	0.260
D1	5.250	5.350	0.207	0.211
E	5.400	5.600	0.213	0.220
e1	2.300 TYP.		0.091 TYP.	
e2	2.300 TYP.		0.091 TYP.	
L	3.300	3.700	0.130	0.146