

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
60V	36mΩ@10V	30A
	45mΩ@4.5V	

Feature

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

Application

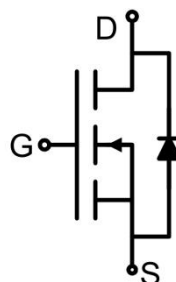
- LED lamp
- Load switch
- Uninterruptible power supply

Package



TO-251AB

Circuit diagram



Marking



Absolute maximum ratings ($T_J=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ¹⁾ ($V_{GS}=10\text{V}$, $T_C=25^{\circ}\text{C}$)	I_D	30	A
Continuous Drain Current ¹⁾ ($V_{GS}=10\text{V}$, $T_C=100^{\circ}\text{C}$)	$I_{D(100^{\circ}\text{C})}$	13	A
Pulsed Drain Current	I_{DM}	74	A
Single Pulse Avalanche Energy ²⁾	E_{AS}	22	mJ
Power Dissipation ³⁾ ($T_C=25^{\circ}\text{C}$)	P_D	31.3	W
Thermal Resistance Junction to Case ¹⁾	$R_{\theta JC}$	4.8	$^{\circ}\text{C/W}$
Operating Junction Temperature	T_J	$-55 \sim +175$	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	$-55 \sim +175$	$^{\circ}\text{C}$

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

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	60			V
Zero gate voltage drain current	I_{DSS}	$V_{DS}=48V, V_{GS}=0V$			1	μA
Gate-body leakage current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2	1.6	2.5	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=15A$		28	36	m Ω
		$V_{GS}=4.5V, I_D=7A$		38	45	
Dynamic characteristics ⁴⁾						
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V, f=1MHz$		1027		pF
Output Capacitance	C_{oss}			65		
Reverse Transfer Capacitance	C_{rss}			46		
Total Gate Charge	Q_g	$V_{DS}=48V, V_{GS}=10V, I_D=15A$		19		nC
Gate-Source Charge	Q_{gs}			2.5		
Gate-Drain Charge	Q_{gd}			5		
Turn-on delay time	$t_{d(on)}$	$V_{DS}=30V, V_{GS}=10V, I_D=15A$ $R_G=3.3\Omega$		2.8		nS
Turn-on rise time	t_r			16.6		
Turn-off delay time	$t_{d(off)}$			21.2		
Turn-off fall time	t_f			5.6		
Source-Drain Diode characteristics						
Diode Forward Current ¹⁾	I_S	$V_D=V_G=0V$, Force Current			30	A
Diode Forward voltage ²⁾	V_{SD}	$V_{GS}=0V, I_S=1A$			1.2	V
Reverse recovery time	T_{rr}	$I_F=15A, di/dt=100A/\mu s$		12.2		nS
Reverse recovery charge	Q_{rr}			7.3		nC

Notes:

- 1) The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- 2) The test condition is $T_J=25^{\circ}\text{C}$, $V_{DD}=48\text{V}$, $V_G=10\text{V}$, $R_G=25\Omega$, $L=0.1\text{mH}$, $I_{AS}=13\text{A}$.
- 3) The power dissipation is limited by 175°C junction temperature.
- 4) Guaranteed by design, not subject to production.

Typical Characteristics

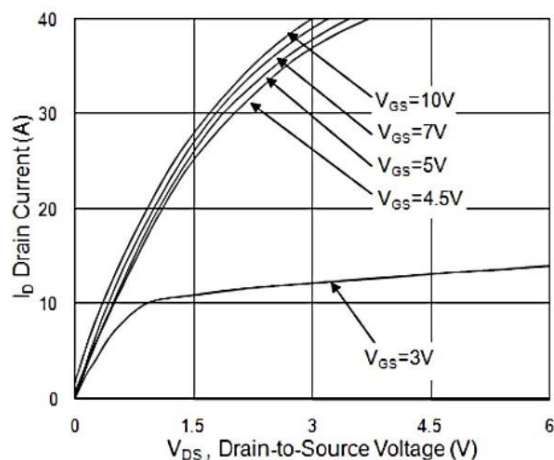


Fig.1 Typical Output Characteristics

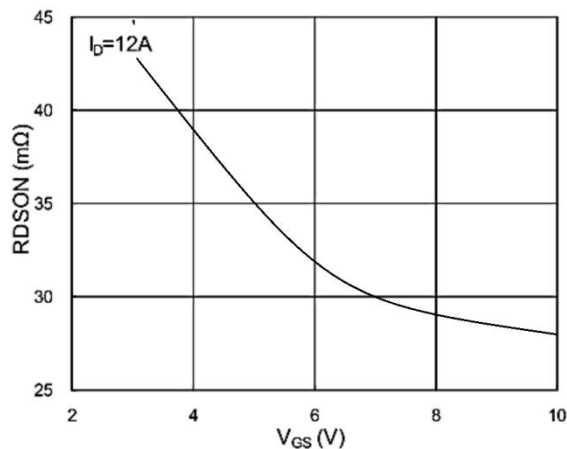


Fig.2 On-Resistance vs. Gate-Source

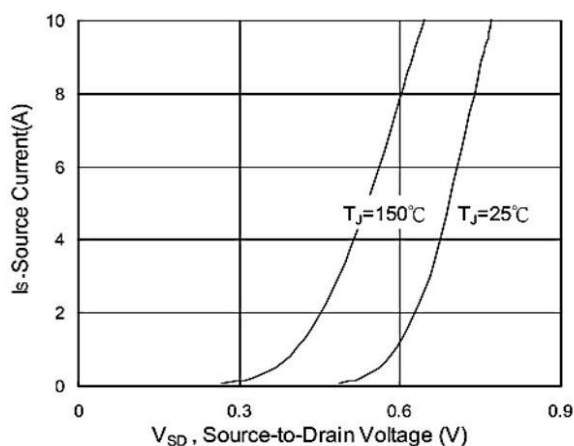


Fig.3 Forward Characteristics Of Reverse

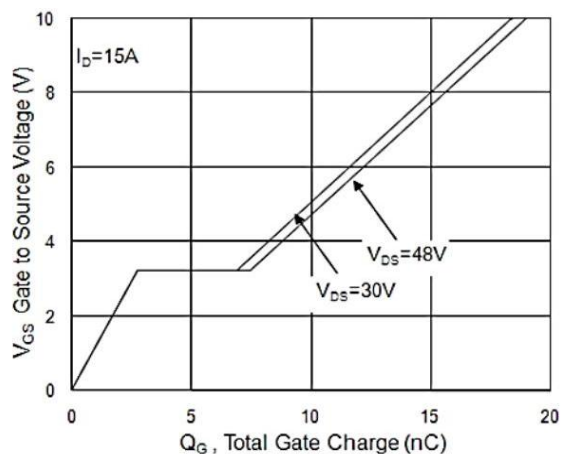


Fig.4 Gate-Charge Characteristics

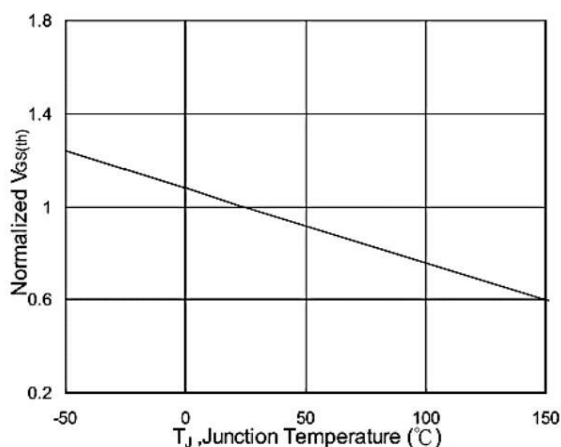


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

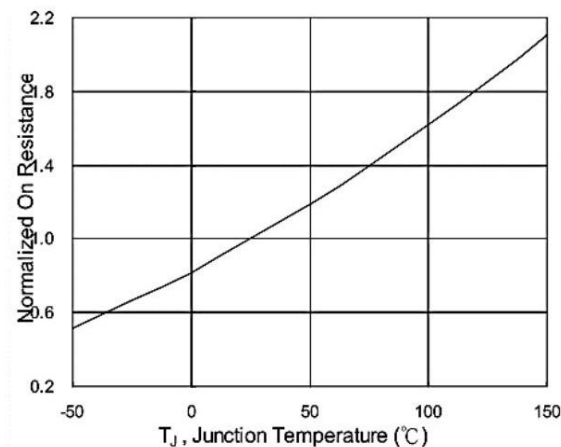


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

Typical Characteristics

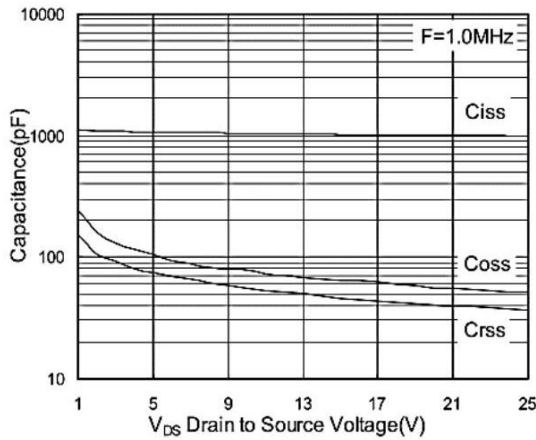


Fig.7 Capacitance

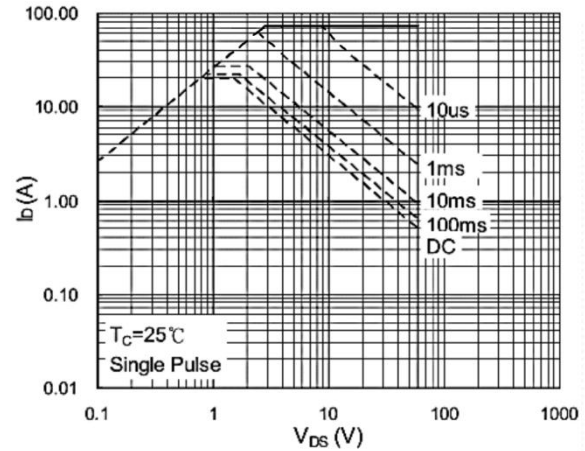


Fig.8 Safe Operating Area

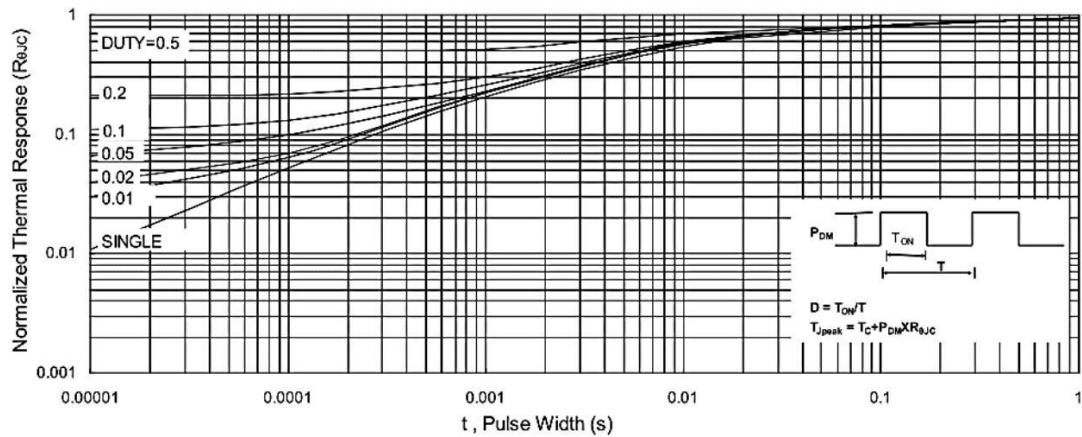


Fig.9 Normalized Maximum Transient Thermal Impedance

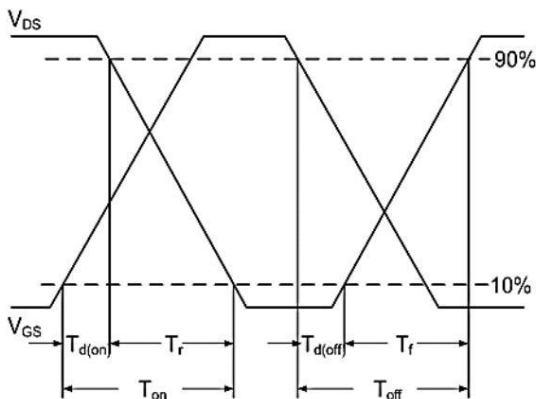


Fig.10 Switching Time Waveform

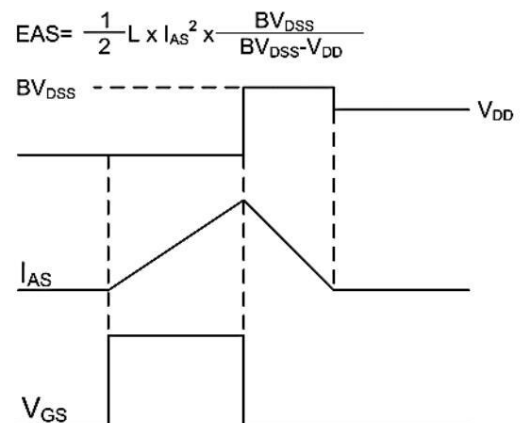
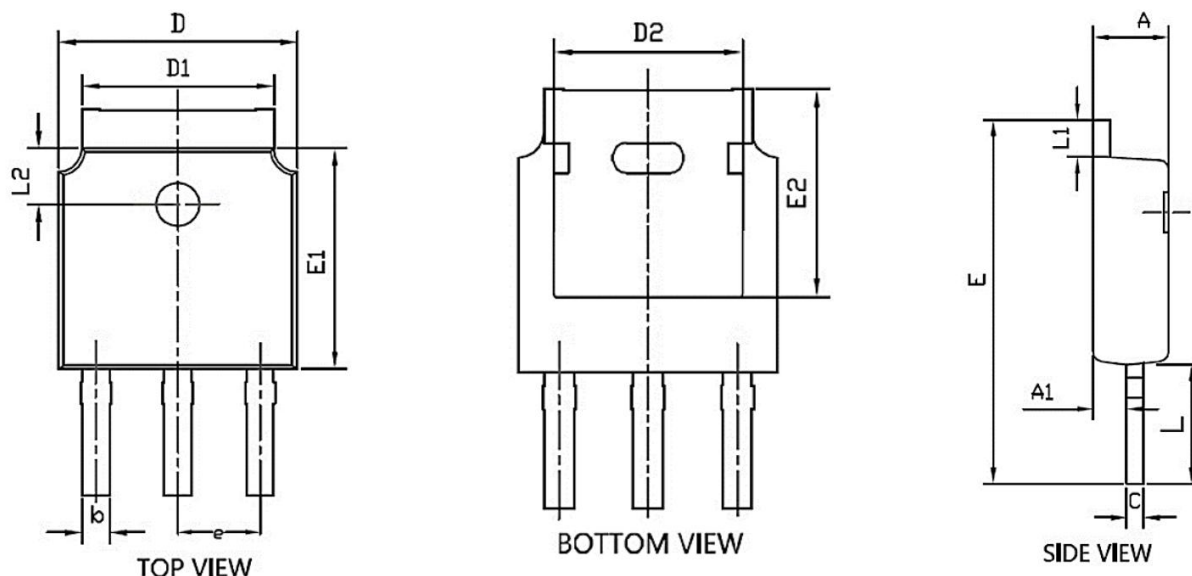


Fig.11 Unclamped Inductive Switching Waveform

TO-251AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.900	1.100	0.035	0.043
b	0.660	0.860	0.026	0.034
C	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.150	5.450	0.203	0.215
D2	4.600	4.950	0.181	0.195
E	10.400	11.500	0.409	0.453
E1	6.000	6.200	0.236	0.244
E2	5.400 REF.		0.213 REF.	
e	2.286 BSC.		0.090 BSC.	
L	3.500	4.300	0.138	0.169
L1	0.900	1.270	0.035	0.050
L2	1.400	1.900	0.055	0.075