

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
650V	36mΩ@10V	70A

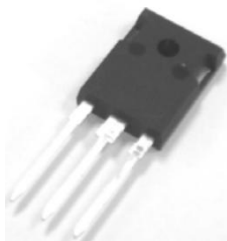
Feature

- New technology for high voltage device
- Ultra low on-resistance and ultra low conduction losses
- Ultra Low Gate Charge cause lower driving requirements
- Diode reverse recovery speed is super fast
- High reliability

Application

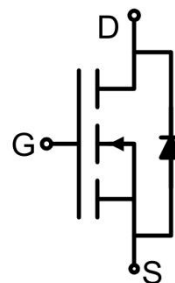
- Power factor correction (PFC)
- Switched mode power supplies (SMPS)
- Uninterruptible Power Supply (UPS)
- On-board charger (OBC)

Package



TO-247AB

Circuit diagram



Marking



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

Parameter	Symbol	Value	Unit
Drain-Source Voltage ($V_{GS}=0\text{V}$)	V_{DS}	650	V
Gate-Source Voltage ($V_{DS}=0\text{V}$) AC ($f > 1\text{Hz}$)	V_{GS}	± 30	V
Gate-Source Voltage ($V_{DS}=0\text{V}$) DC	V_{GS}	± 20	V
Continuous Drain Current	I_D	70	A
Continuous Drain Current ($T_C=100^{\circ}\text{C}$)	$I_D(100^{\circ}\text{C})$	49	A
Pulsed Drain Current ¹⁾	I_{DM}	210	A
Single pulse avalanche energy ²⁾	E_{AS}	784	mJ
Power Dissipation	P_D	488	W
Thermal Resistance Junction to Case	$R_{\theta JC}$	0.31	$^{\circ}\text{C/W}$
Operating Junction Temperature	T_J	$-55 \sim +175$	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	$-55 \sim +175$	$^{\circ}\text{C}$

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

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=1mA$	650			V
Zero gate voltage drain current	I_{DSS}	$V_{DS}=650V, V_{GS}=0V, T_C=25^{\circ}C$			10	μA
Gate-body leakage current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 200	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=3mA$	3.5	4.2	5	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=35A$		30	36	m Ω
Dynamic characteristics ³⁾						
Input Capacitance	C_{iss}	$V_{DS}=50V, V_{GS}=0V, f=1MHz$		7727		pF
Output Capacitance	C_{oss}			263		
Reverse Transfer Capacitance	C_{rss}			25.1		
Total Gate Charge	Q_g	$V_{DS}=400V, V_{GS}=10V, I_D=40A$		125		nC
Gate-Source Charge	Q_{gs}			57		
Gate-Drain Charge	Q_{gd}			34		
Turn-on delay time	$t_{d(on)}$	$V_{DS}=380V, V_{GS}=10V, I_D=40A$ $R_G=4\Omega$		54		nS
Turn-on rise time	t_r			37		
Turn-off delay time	$t_{d(off)}$			127		
Turn-off fall time	t_f			5		
Source-Drain Diode characteristics						
Diode Forward Current	I_S	$T_C=25^{\circ}C$			70	A
Diode Forward voltage	V_{SD}	$V_{GS}=0V, I_S=70A, T_J=25^{\circ}C$			1.2	V
Reverse Recovery Time	T_{rr}	$I_F=40A, di/dt=-100A/\mu s$ $T_J=25^{\circ}C$		185		nS
Reverse Recovery Charge	Q_{rr}			1.6		μC
Peak Reverse Recovery Current	I_{rrm}			16		A

Notes:

- 1) Repetitive Rating: Pulse width limited by maximum junction temperature.
- 2) $T_J=25^{\circ}\text{C}$, $V_{DS}=50\text{V}$, $V_G=10\text{V}$, $R_G=25\Omega$.
- 3) Guaranteed by design, not subject to production testing.

Typical Characteristics

Figure1. Safe operating area

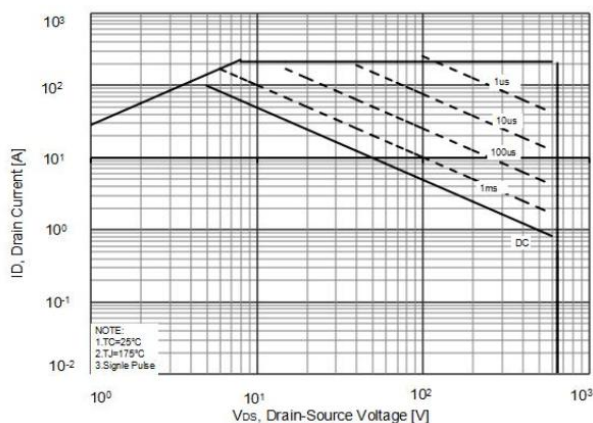


Figure2. Source-Drain Diode Forward Voltage

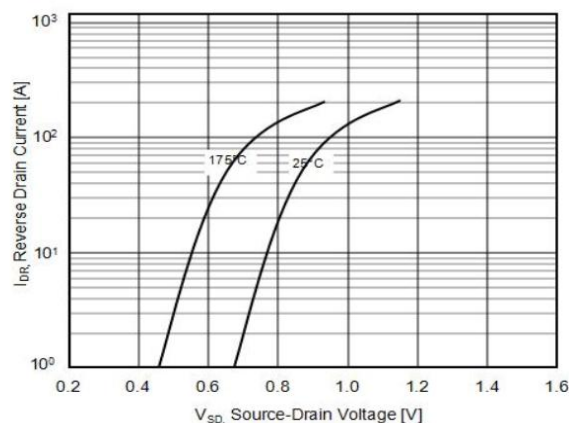


Figure3. Output characteristics (25°C)

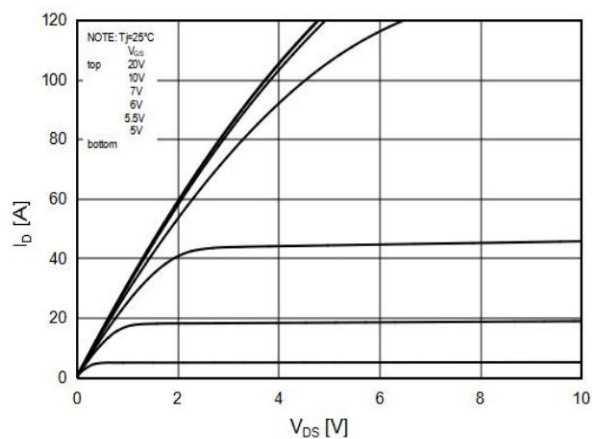


Figure4. Transfer characteristics

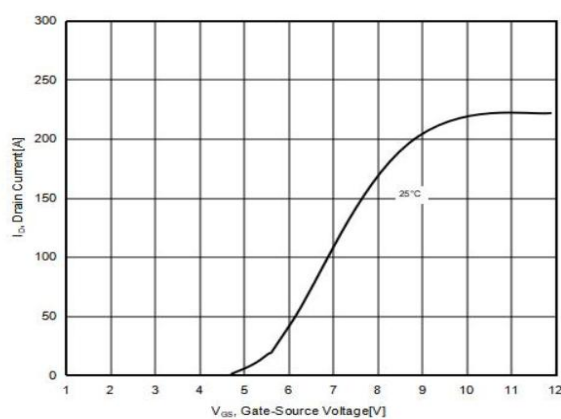


Figure5. Static drain-source on resistance

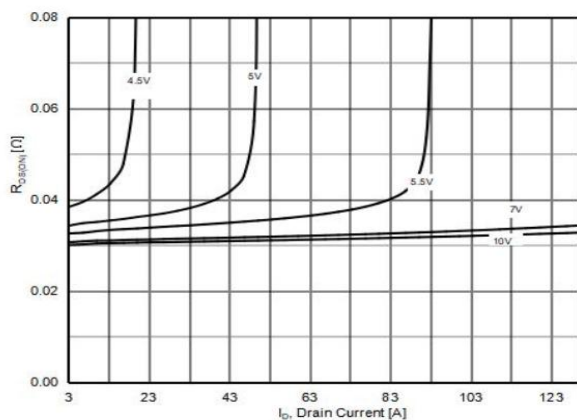
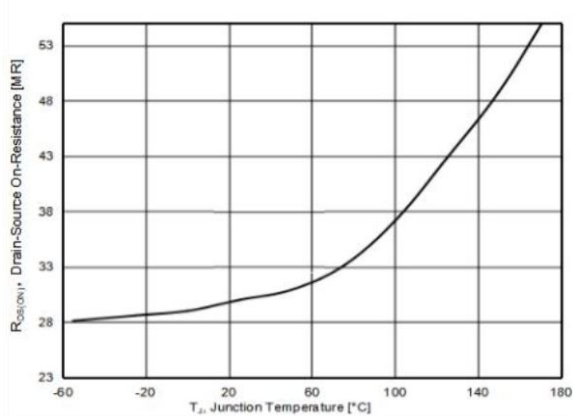


Figure6. $R_{DS(on)}$ vs Junction Temperature



Typical Characteristics

Figure7. BV_{DSS} vs Junction Temperature

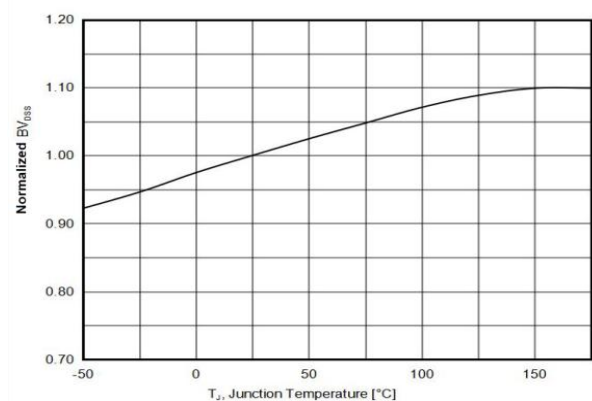


Figure8. Maximum I_D vs Junction Temperature

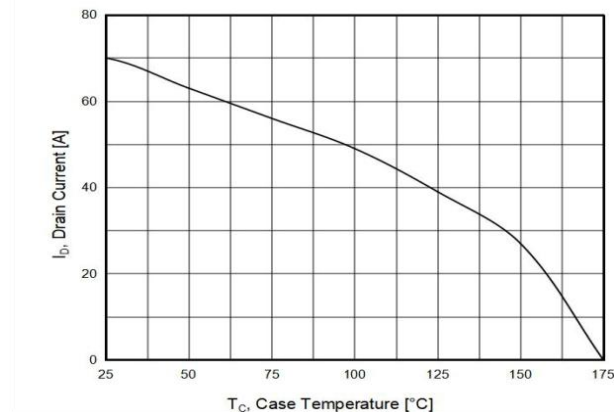


Figure9. Gate charge waveforms

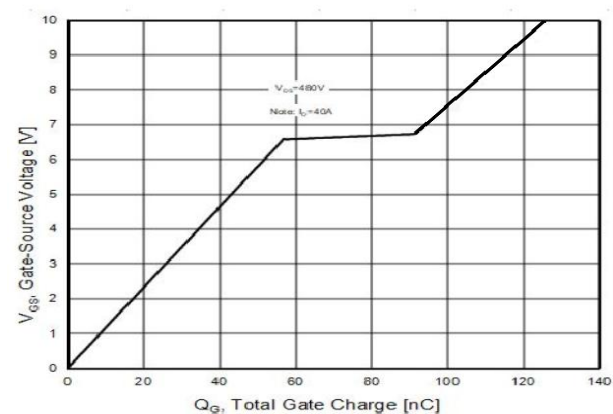


Figure10. Capacitance

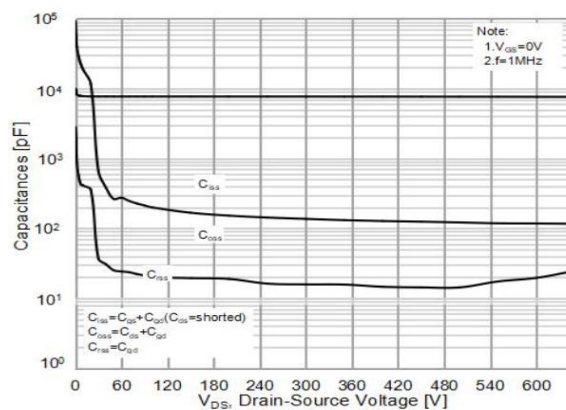
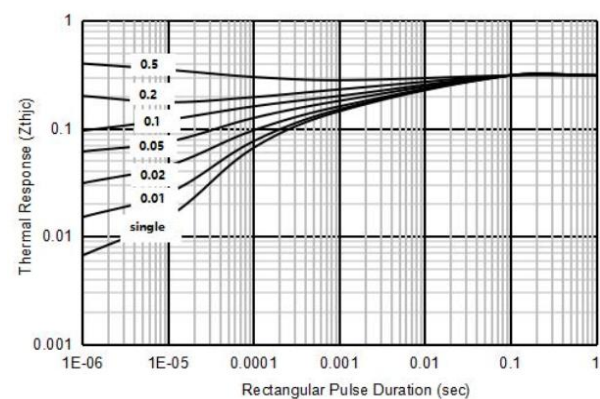
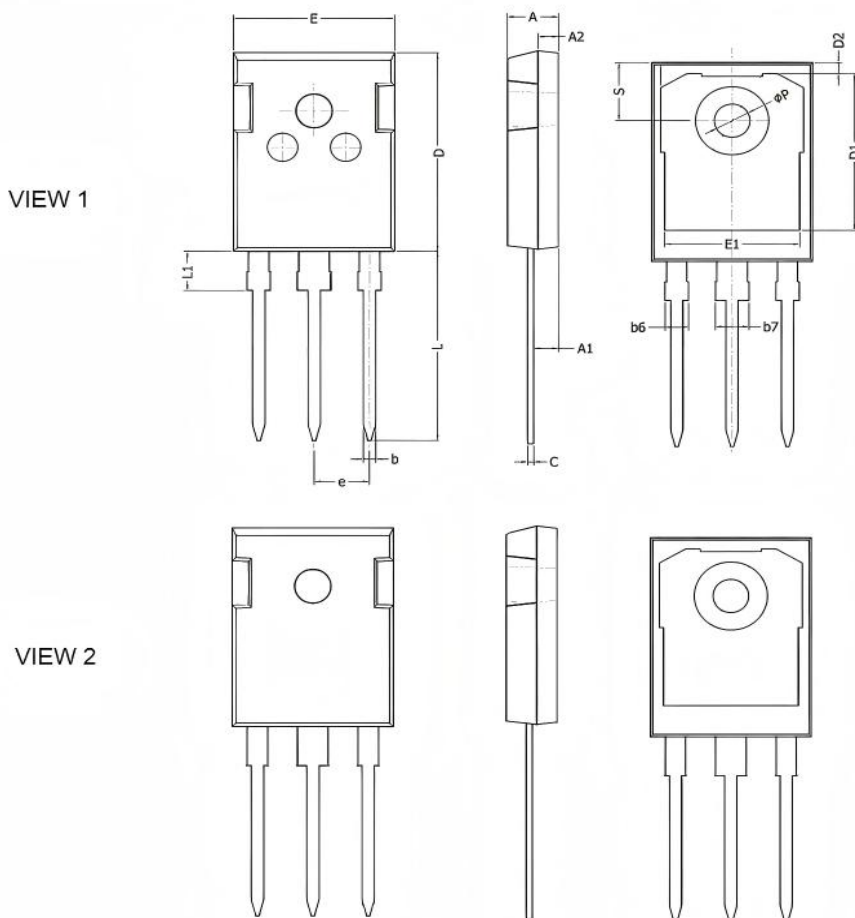


Figure11. Transient Thermal Impedance



TO-247AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.830	5.210	0.190	0.205
A1	2.290	2.540	0.090	0.100
A2	1.900	2.160	0.075	0.085
b	1.070	1.330	0.042	0.052
b6	1.91	2.410	0.075	0.095
b7	2.87	3.380	0.113	0.133
C	0.550	0.680	0.022	0.027
D	20.800	21.100	0.819	0.831
D1	16.250	17.650	0.640	0.695
D2	0.950	1.350	0.037	0.053
E	15.700	16.130	0.618	0.635
E1	12.380	13.500	0.487	0.531
e	5.440 BSC.		0.214 BSC.	
L	19.800	20.320	0.780	0.800
L1	4.100	4.400	0.161	0.173
P	3.400	3.650	0.134	0.144
S	6.000	6.400	0.236	0.252