

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
650V	140mΩ@10V	28A

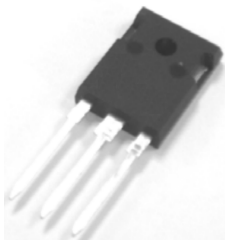
Feature

- Low on-resistance and low conduction losses
- Ultra Low Gate Charge cause lower driving requirements
- Optimized body diode reverse recovery performance

Application

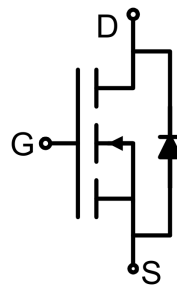
- Power factor correction
- Switched mode power supplies
- Uninterruptible Power Supply
- LLC Half-bridge

Package

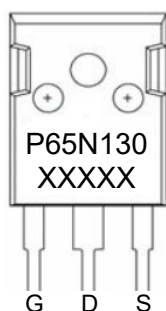


TO-247AB

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	28	A
Pulsed Drain Current	I_{DM}	112	A
Power Dissipation	P_D	260	W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.48	°C/W
Single pulse avalanche energy	E_{AS}	676	mJ
Junction Temperature	T_J	150	°C
Storage Temperature	T_{STG}	-55 ~ +150	°C

Electrical characteristics (T_A=25 °C, unless otherwise noted)

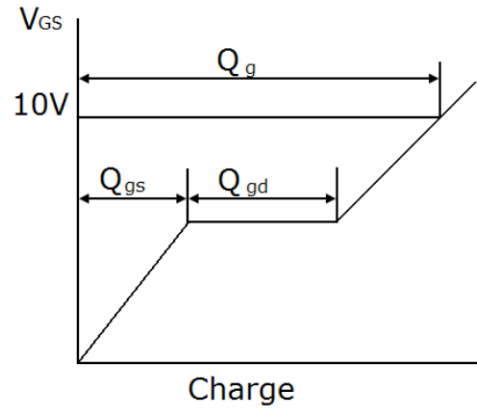
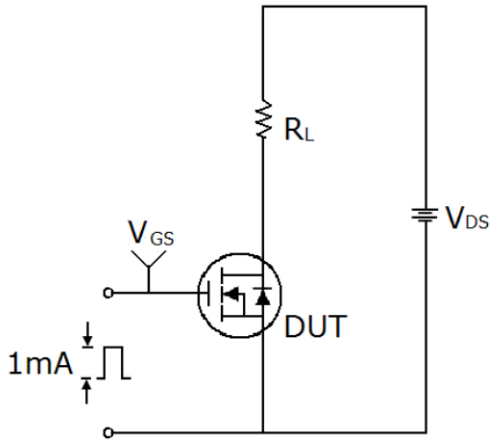
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	650			V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 650V, V_{GS} = 0V$			1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$			±100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	3		4	V
Drain-source on-resistance ¹⁾	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 14A$		110	140	mΩ
Dynamic characteristics²⁾						
Input Capacitance	C_{iss}	$V_{DS} = 50V, V_{GS} = 0V, f = 1MHz$		2070		pF
Output Capacitance	C_{oss}			120		
Reverse Transfer Capacitance	C_{rss}			0.5		
Total Gate Charge	Q_g	$V_{DS} = 480V, V_{GS} = 10V, I_D = 28A$		37.5		nC
Gate-Source Charge	Q_{gs}			13		
Gate-Drain Charge	Q_{gd}			11.5		
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 380V, V_{GS} = 10V, I_D = 14A, R_{GEN} = 2.3\Omega$		14		nS
Turn-on rise time	t_r			12		
Turn-off delay time	$t_{d(off)}$			65		
Turn-off fall time	t_f			11		
Source-Drain Diode characteristics						
Diode Forward Current ¹⁾	I_S				28	A
Diode Forward voltage	V_{DS}	$V_{GS} = 0V, I_S = 28A$			1.2	V
Reverse Recovery Time	t_{rr}	$T_J = 25^\circ C, I_F = 14A, di/dt = 100A/\mu s$ ¹⁾		190		nS
Reverse Recovery Charge	Q_{rr}			2		μC

Notes:

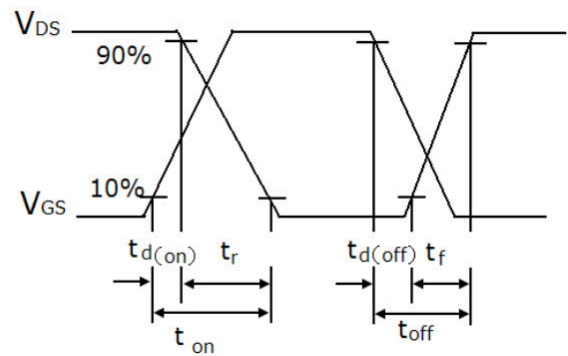
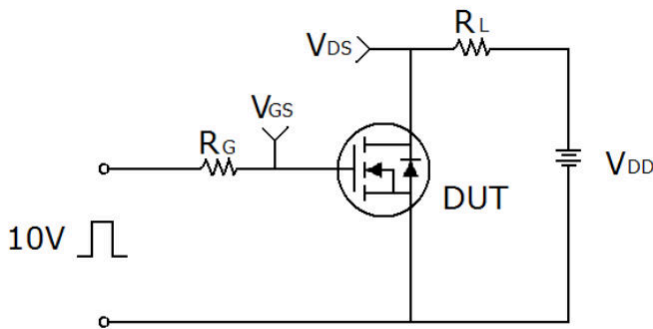
- 1) Pulse Test: Pulse Width < 300μs, Duty Cycle ≤2%.
- 2) Guaranteed by design, not subject to production testing.

Test Circuit

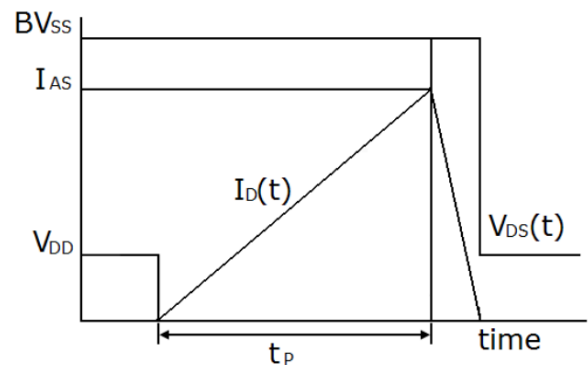
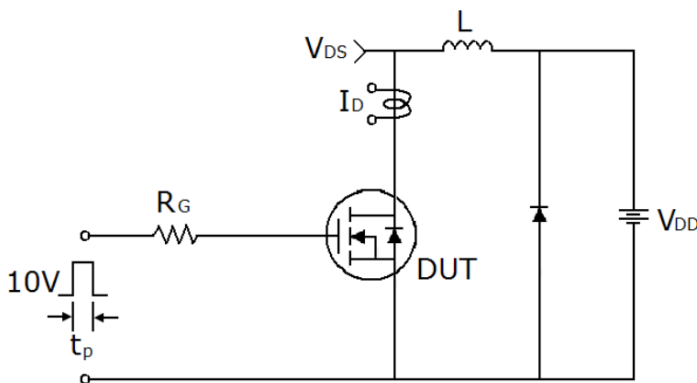
1) Gate charge test circuit & Waveform



2) Switch Time Test Circuit



3) Unclamped Inductive Switching Test Circuit & Waveforms



Typical Characteristics

Figure1. Safe operating area

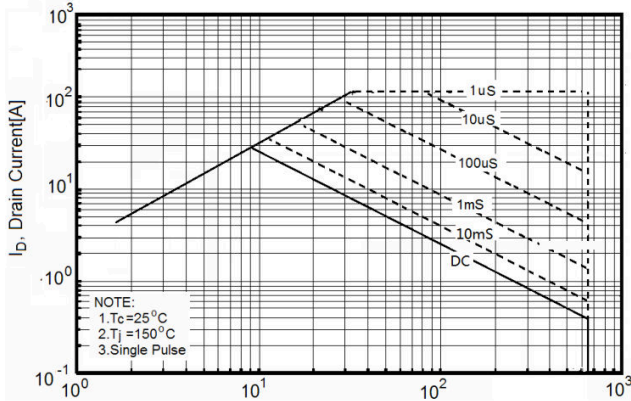


Figure2. Transient Thermal Impedance

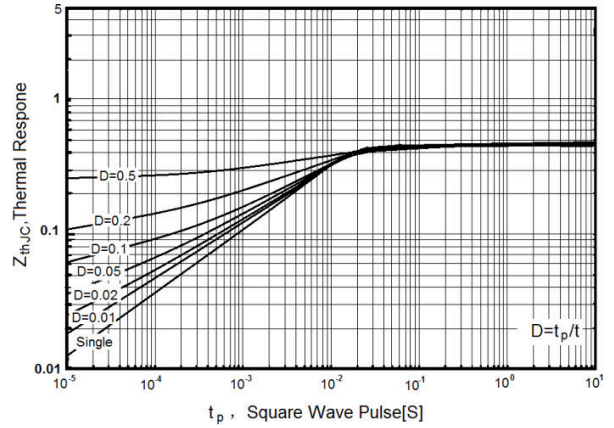


Figure3. Source-Drain Diode Forward Voltage

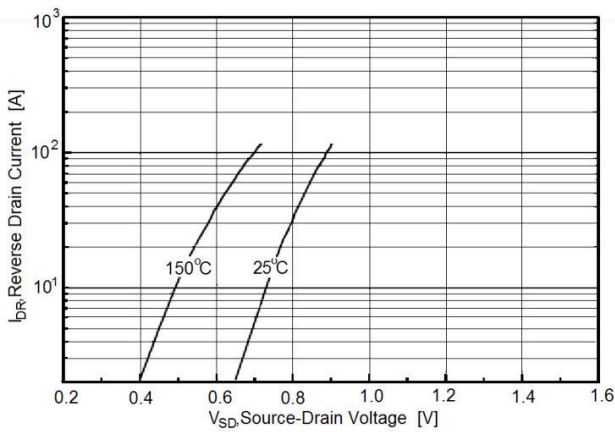


Figure4. Output characteristics

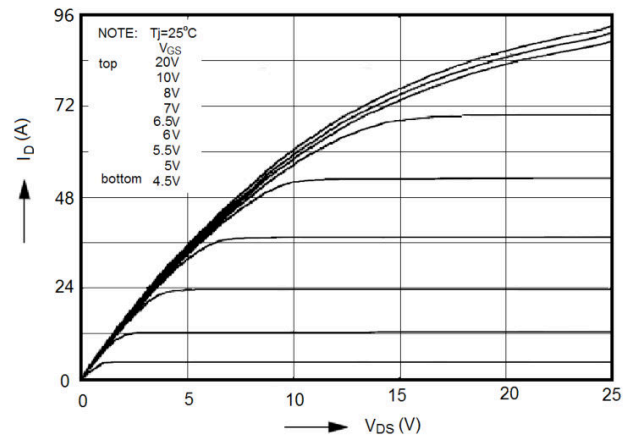


Figure5. Transfer characteristics

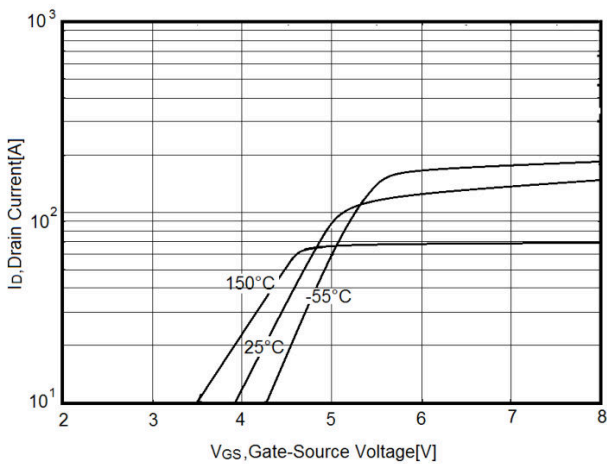
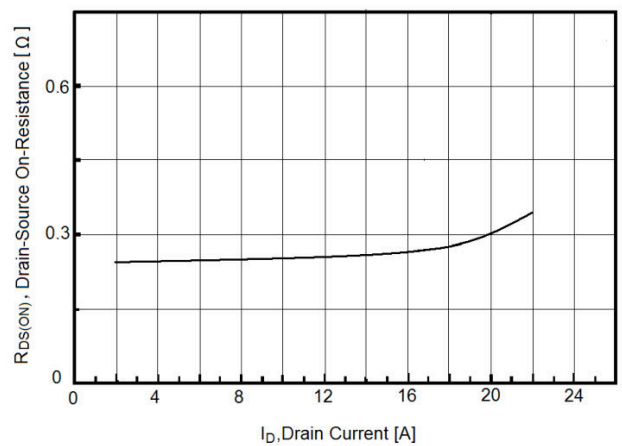


Figure6. Static drain-source on resistance



Typical Characteristics

Figure7. $R_{DS(ON)}$ vs Junction Temperature

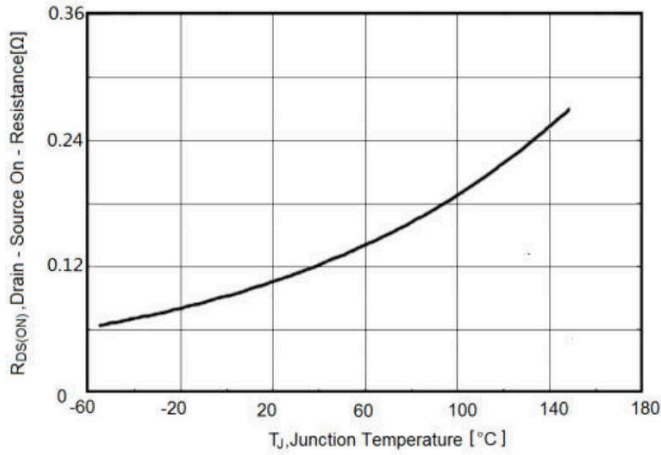


Figure8. BV_{DSS} vs Junction Temperature

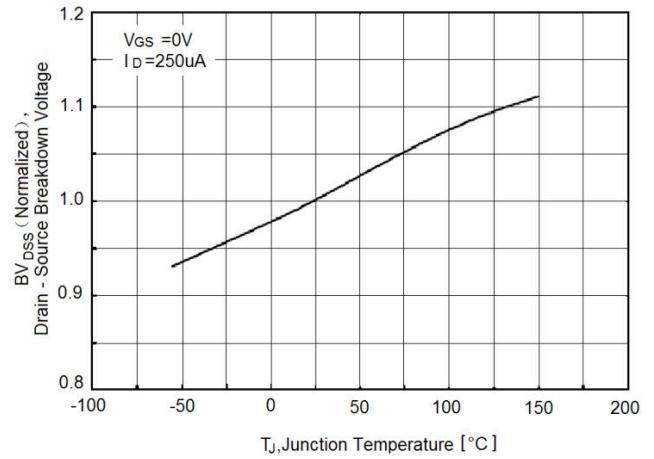


Figure9. Maximum I_D vs Junction Temperature

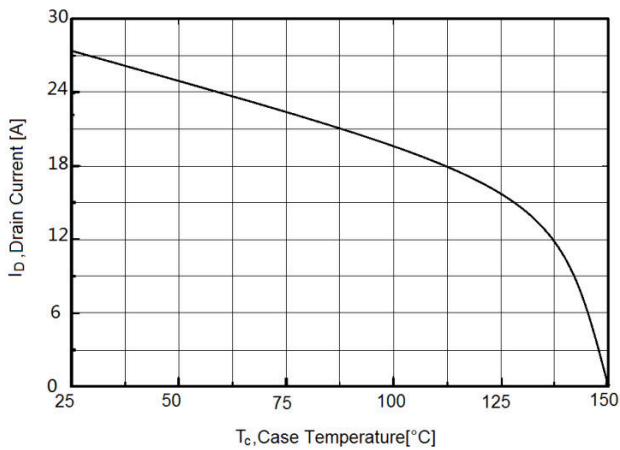


Figure10. Gate charge waveforms

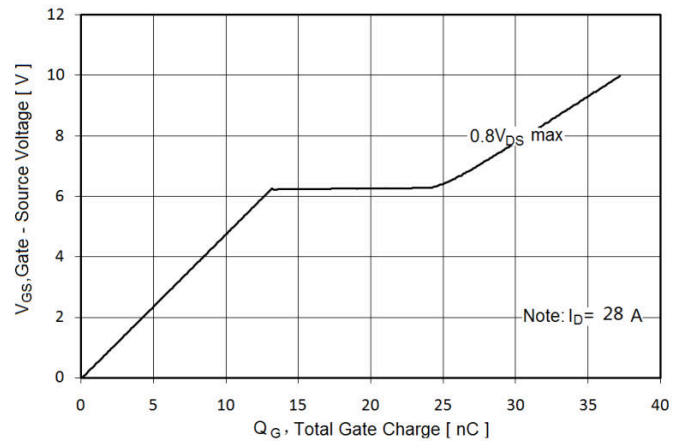
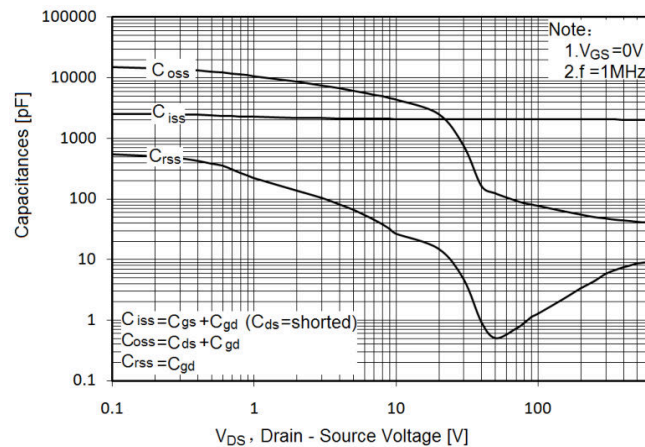
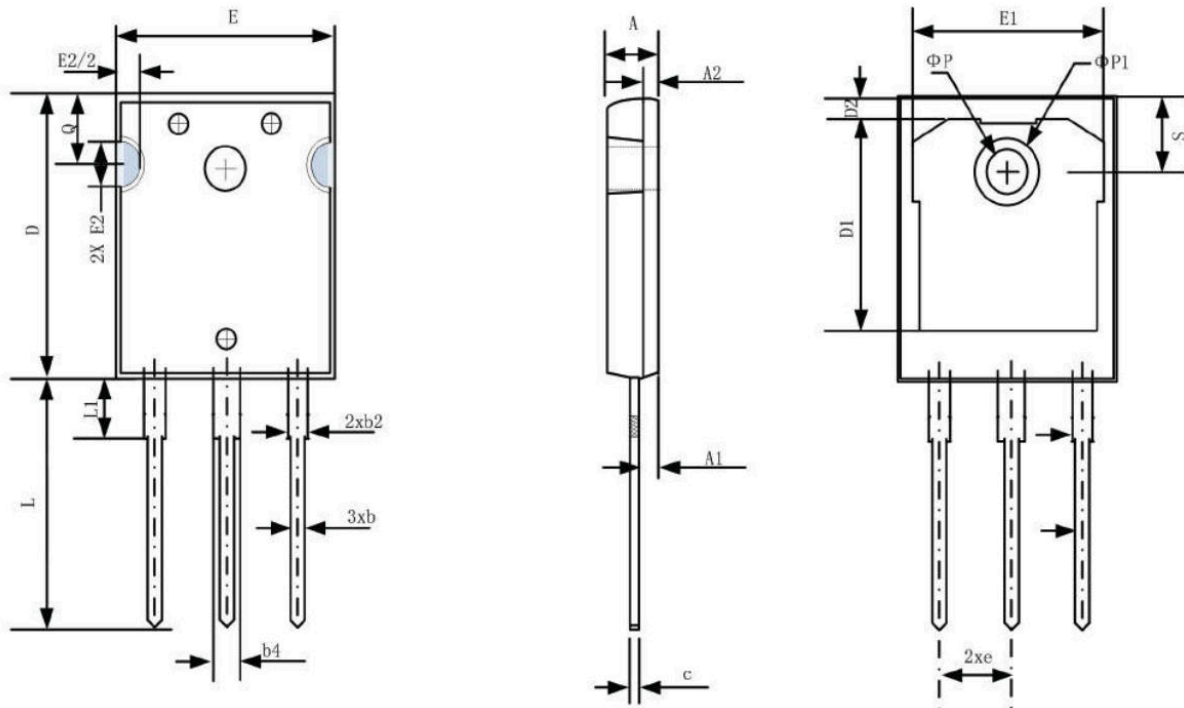


Figure11. Capacitance



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	2.550	0.090	0.100
A2	1.500	2.490	0.059	0.098
b	1.120	1.330	0.044	0.052
b2	1.910	2.390	0.075	0.094
b4	2.870	3.220	0.113	0.127
c	0.550	0.690	0.022	0.027
D	20.800	21.100	0.819	0.831
D1	16.250	17.650	0.640	0.695
D2	0.510	1.350	0.020	0.053
E	15.750	16.130	0.620	0.635
E1	13.460	14.160	0.530	0.557
E2	4.320	5.490	0.170	0.216
e	5.440 BSC		0.214 BSC	
L	19.810	20.320	0.780	0.800
L1	4.100	4.400	0.161	0.173
ΦP	3.560	3.650	0.140	0.144
ΦP1	7.190 REF		0.283 REF	
Q	5.390	6.200	0.212	0.244
S	6.040	6.300	0.238	0.248