

H12N65IK

N-Channel Power MOSFET

Features

- New technology for high voltage device
- Low on-resistance and low conduction losses
- Small package
- Ultra Low Gate Charge cause lower driving requirements
- 100% Avalanche Tested
- ROHS compliant

Mechanical Data

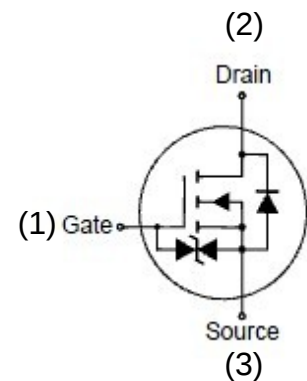
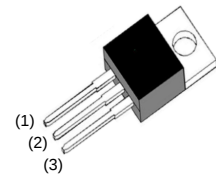
Case : Molded plastic body

Terminals : Solder plated, solderable per MIL-STD-750, Method 2026

Polarity : As marked

Mounting Position : Any

TO-220AB



Schematic diagram

Maximum Ratings And Electrical Characteristics

Ratings at 25°C ambient temperature unless otherwise specified. Single phase half-wave 60Hz, resistive or inductive load, for capacitive load current derate by 20%.

Table 1. Absolute Maximum Ratings (T_c=25°C)

Parameter	Symbol	H12N65IK	Unit
Drain-Source Voltage (V _{GS} =0V)	V _{DS}	650	V
Gate-Source Voltage (V _{DS} =0V) AC (f>1 Hz)	V _{GS}	±30	V
Continuous Drain Current at T _c =25°C	I _D (DC)	12.3	A
Continuous Drain Current at T _c =100°C	I _D (DC)	7.8	A
Pulsed drain current	I _{DM} (pulse)	37	A
Maximum Power Dissipation (T _c =25°C)	P _D	106	W
Single pulse avalanche energy (Note 2)	E _{AS}	165	mJ
Avalanche current (Note 1)	I _{AR}	1.95	A
Drain Source voltage slope, V _{DS} ≤ 400 V,	dv/dt	50	V/ns
Reverse diode dv/dt, V _{DS} ≤ 400 V, I _{SD} < I _D	dv/dt	15	V/ns
Operating Junction and Storage Temperature Range	T _J , T _{STG}	-55...+150	°C

Table 2. Thermal Characteristic

Parameter	Symbol	TYPE	Unit
Thermal Resistance, Junction-to-Case	R_{thJC}	1.20	$^{\circ}\text{C}/\text{W}$
Thermal Resistance, Junction-to-Ambient	R_{thJA}	62.5	$^{\circ}\text{C}/\text{W}$

Table 3. Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
On/off states						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	650			V
Zero Gate Voltage Drain Current(Tc=25℃)	I _{DSS}	V _{DS} =650V,V _{GS} =0V			1	μA
Zero Gate Voltage Drain Current(Tc=125℃)	I _{DSS}	V _{DS} =650V,V _{GS} =0V			100	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±30V,V _{DS} =0V			±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =250μA	2.0		4.0	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =7.5A		278	320	mΩ
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =50V,V _{GS} =0V, F=1.0MHz		870		pF
Output Capacitance	C _{Oss}			54		pF
Reverse Transfer Capacitance	C _{rss}			1.8		pF
Total Gate Charge	Q _g	V _{DS} =480V,I _D =11.5A, V _{GS} =10V		19		nC
Gate-Source Charge	Q _{gs}			6		nC
Gate-Drain Charge	Q _{gd}			6.5		nC
Switching times						
Turn-on Delay Time	t _{d(on)}	V _{DD} =380V,I _D =5.5A, R _G =3Ω,V _{GS} =10V		11		nS
Turn-on Rise Time	t _r			8		nS
Turn-Off Delay Time	t _{d(off)}			58	70	nS
Turn-Off Fall Time	t _f			9	14	nS
Source- Drain Diode Characteristics						
Source-drain current(Body Diode)	I _{SD}	T _C =25℃			11.5	A
Pulsed Source-drain current(Body Diode)	I _{SDM}				46	A
Forward on voltage	V _{SD}	T _J =25℃,I _{SD} =11.5A,V _{GS} =0V		0.9	1.2	V
Reverse Recovery Time	t _{rr}	T _J =25℃,I _F =5.8A, di/dt=100A/μs		220		nS
Reverse Recovery Charge	Q _{rr}			2.2		uC
Peak Reverse Recovery Current	I _{rrm}			19		A

Notes: 1.Repetitive Rating: Pulse width limited by maximum junction temperature

2. $T_J=25^{\circ}\text{C}, V_{DD}=50V, V_G=10V, R_G=25\Omega$

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (curves)

Figure1. Safe operating area

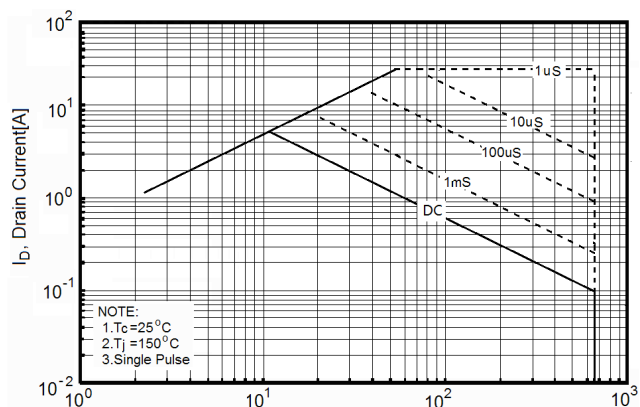


Figure2. Source-Drain Diode Forward Voltage

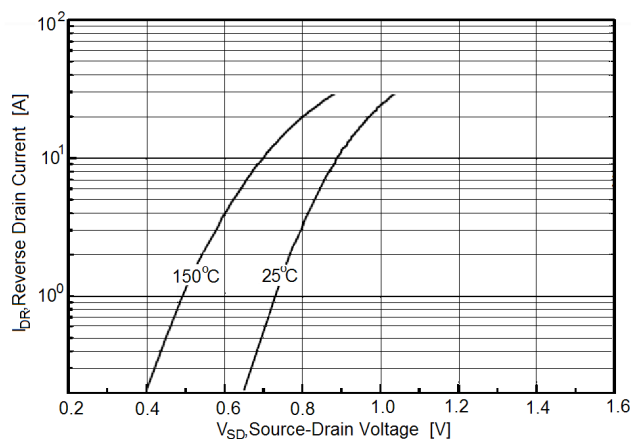


Figure3. Output characteristics

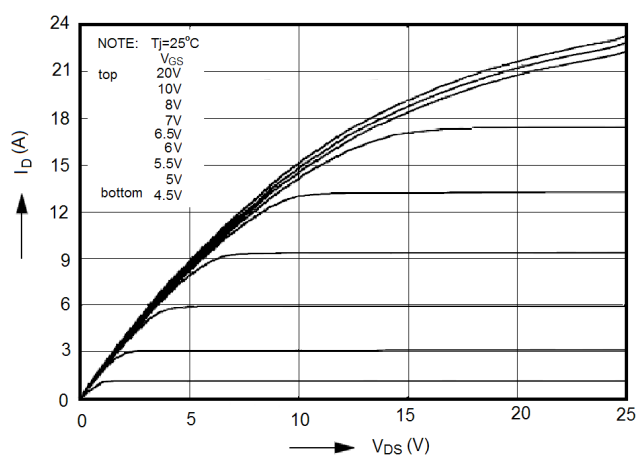


Figure4. Transfer characteristics

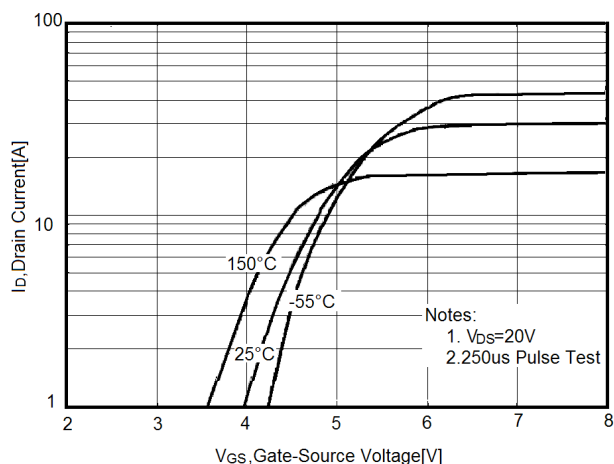


Figure5. Static drain-source on resistance

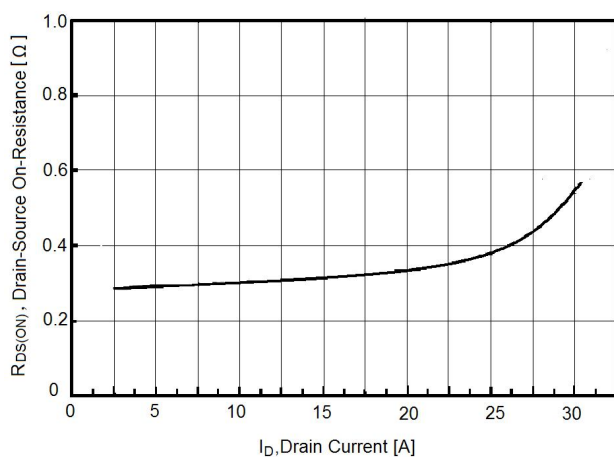


Figure6. $R_{DS(ON)}$ vs Junction Temperature

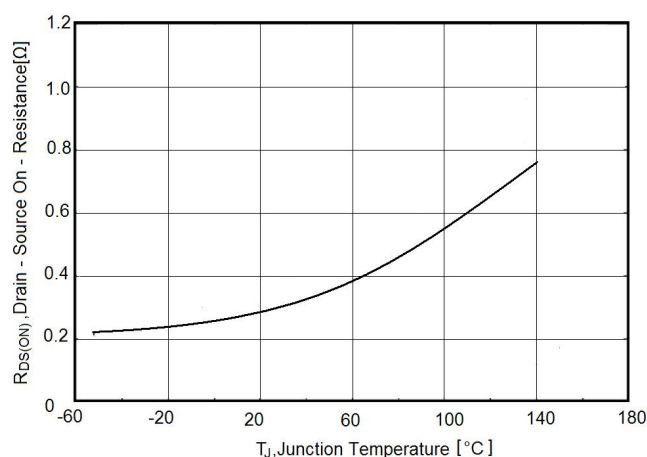


Figure7. Maximum I_D vs Junction Temperature

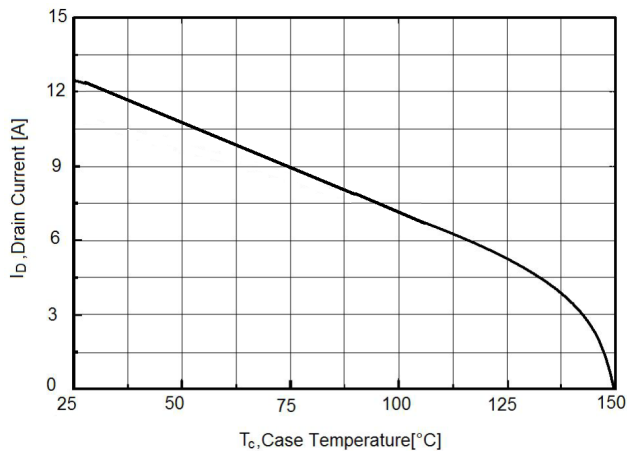


Figure8. Gate charge waveforms

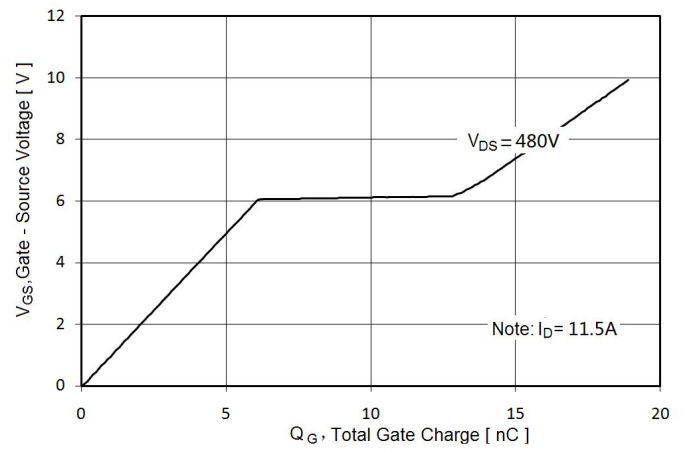


Figure9. Capacitance

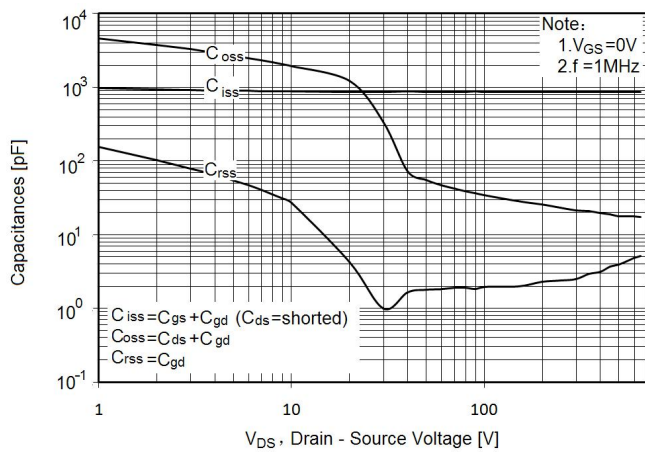
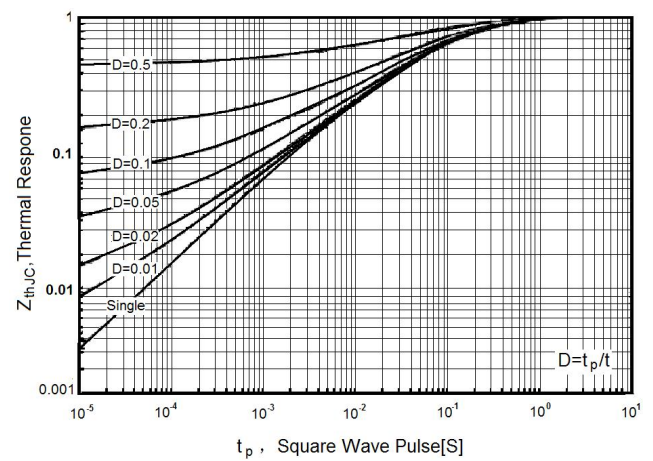
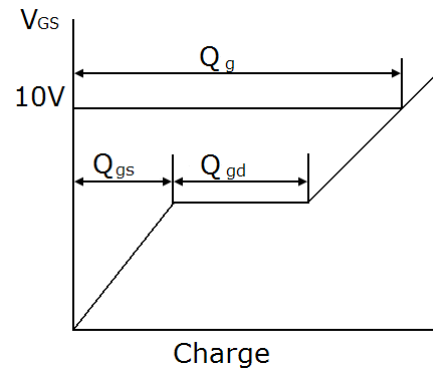
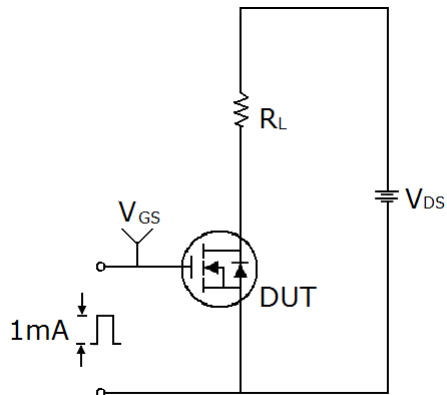


Figure10. Transient Thermal Impedance

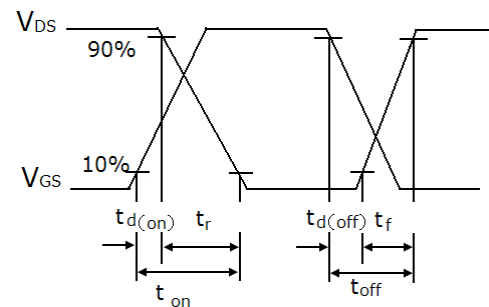
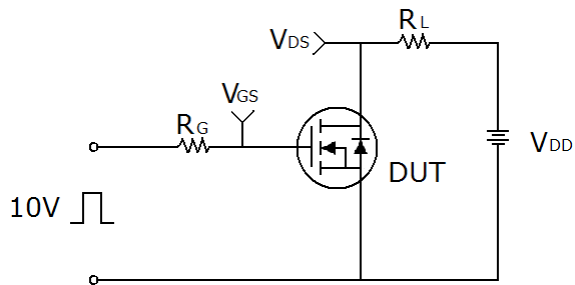


Test circuit

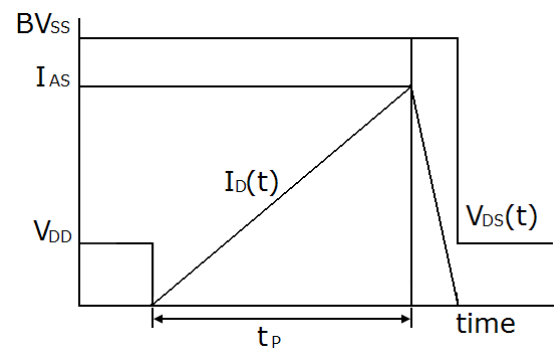
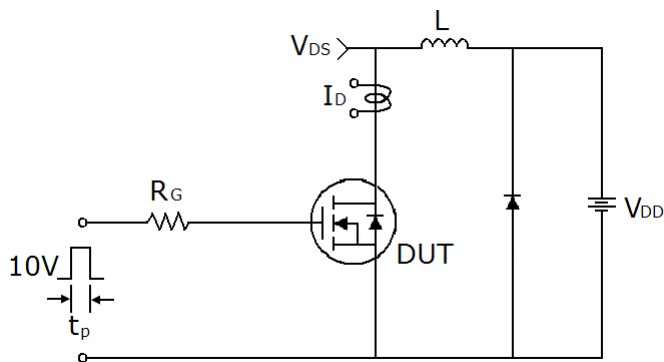
1) Gate charge test circuit & Waveform



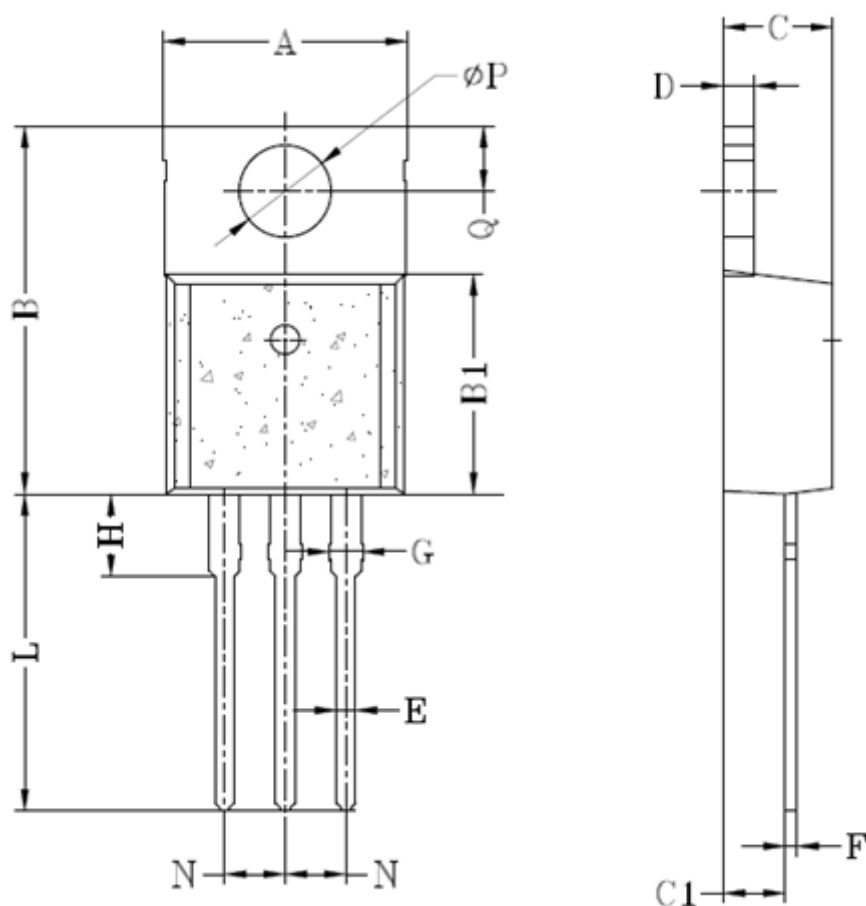
2) Switch Time Test Circuit:



3) Unclamped Inductive Switching Test Circuit & Waveforms



TO-220AB Package Outline Dimensions



Symbol	unit(mm)	
	MIN	MAX
A	10.0	10.4
B	15.2	15.6
B1	9.00	9.60
C	4.47	4.67
C1	2.28	2.88
D	1.20	1.40
E	0.70	0.90
F	0.40	0.60
G	1.27	1.47
H	3.20	3.70
L	12.95	13.55
N	2.34	2.74
Q	2.44	3.04
Ø P	3.74	3.94