

1500V N-Channel Power MOSFET

Description:

KW3N150KH the silicon N-channel EnhancedVDMOSFETs, is obtained by the self-aligned planar Technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy. The transistor can be used in various power switching circuit for system miniaturization and higher efficiency. The package form is TO-3P(H), which accords with the RoHS standard.

Features:

- Low on-resistance
- Low gate charge and Fast Switching
- 100% avalanche tested
- Rohs compliant

Mechanical Data:

- Case:TO-3PH Package

Application:

- Power switch circuit of adaptor and charger

Product Summary			
V _{DS}	R _{DS(on)} (Q)Typ	I _D (A)	Q _g (Typ)
1500V	5 @ 10V,1.5A	3.0	37.6nc

TO-3PH



Block Diagram

Pin Definition:

- 1.Gate
- 2.Drain
- 3.Source

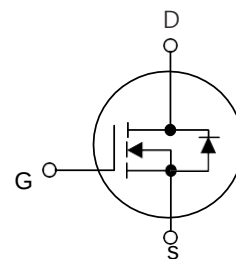


Table1 Absolute Maximum Ratings (T_C=25° C, unless otherwise specified)

Parameters	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	1500	V
Gate-Source Voltage	V _{GS}	±30	V
Contionous Drain Current	I _D	3	A
		1.8	
Pulsed Drain Current (Note 1)	I _{DM}	12	A
Single Pulse Avalanche Energy(Note 2)	EAS	227	mJ
Reverse Diode Recovery dv/dt(Note 3)	dv/dt	15	V/ns
Power Dissipation T _C =25°C	P _D	32	W
Operating Junction and Storage Temperature	T _J /T _{STG}	-55 ~ +150	°C

Table 2. Thermal Characteristics

Parameters	Symbol	Value	Unit
Thermal resistance Junction to Ambient	$R_{\theta JA}$	40	$^{\circ}\text{C/W}$
Thermal resistance Junction to Case	$R_{\theta JC}$	3.8	$^{\circ}\text{C/W}$

Table 3. Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise specified)

Parameters		Symbol	Test Conditions	Min	Typ	Max	Unit
Off Characteristics							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V,I _D =250μA	1500			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =1500V,V _{GS} =0V			25	μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =30V,V _{DS} =0V			100	nA
	Reverse		V _{GS} =-30V,V _{DS} =0V			-100	nA
On Characteristics(Note 4)							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} ,I _D =250μA	3.0		5.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V,I _D =1.5A		5	6.5	Ω
Dynamic Characteristics(Note 5)							
Input Capacitance		C _{ISS}	V _{DS} =25V,V _{GS} =0V,f=1MHz		2036		pF
Output Capacitance		C _{OSS}			98		pF
Reverse Transfer Capacitance		C _{RSS}			2.8		pF
Switching Characteristics (Note 5)							
Turn-On Delay Time		td(on)	V _{DD} =750V,I _D =3A, V _{GS} =10V,R _G =10Ω		35.8		ns
Turn-On Rise Time		tr			19.4		ns
Turn-Off Delay Time		td(off)			56		ns
Turn-Off Fall Time		tf			31.2		ns
Total Gate Charge		Q _G	V _{DS} =750V,I _D =3A, V _{GS} =10V		37.6		nC
Gate-Source Charge		Q _{GS}			9.9		nC
Gate-Drain Charge		Q _{GD}			14.4		nC
Drain-Source Diode Characteristics and Maximum Ratings							
Drain-Source Diode Forward Voltage		V _{SD}	V _{GS} =0V,I _S =3A			1.5	V
Maximum Continuous Drain-Source Diode Forward Current(Note 4)		I _S				3	A
Reverse Recovery Time		trr	V _{GS} =0V,I _S =3A		882		ns
Reverse Recovery Charge		Q _{RR}	dI _F /dt=100A/μs(Note 4)		6.5		μC

Notes : 1 Repetitive Rating:Pulse width limited by maximum junction temperature 2
 $L=10\text{mH}, I_D=6.7A$, Starting $T_J=25^{\circ}\text{C}$
 3 $I_{SD} \leq I_D, di/dt \leq 100A/\mu s, V_{DD} \leq BV_{DSS}$, starting $T_J=25^{\circ}\text{C}$
 4 Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$ 5
 Guaranteed by design, not subject to production

Figure 1. Output Characteristics

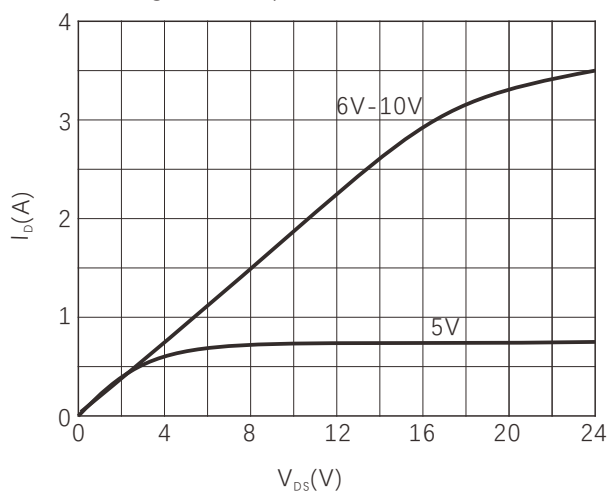


Figure 2. Transfer Characteristics

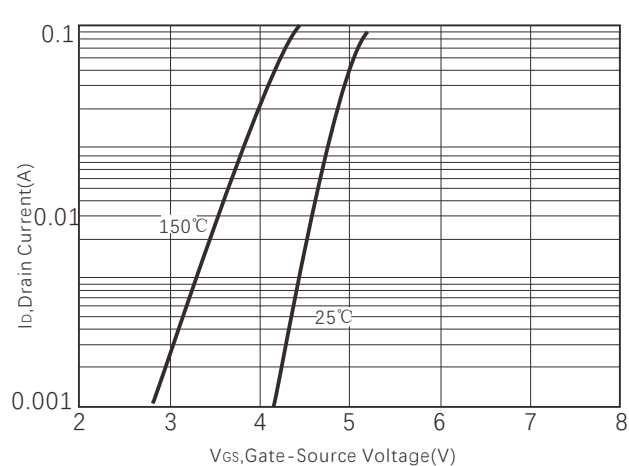


Figure 3. On-Resistance vs. Drain Current

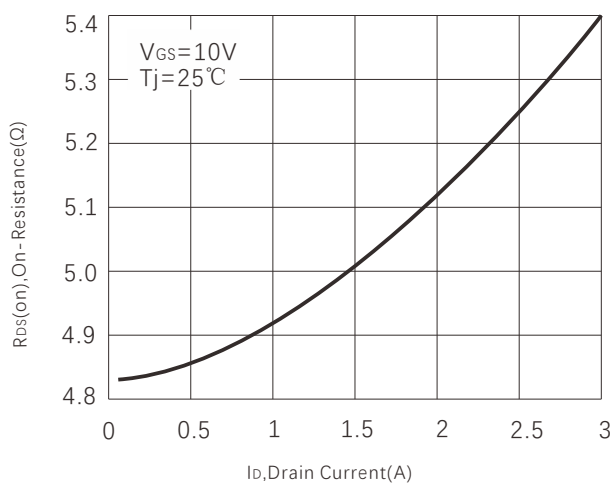


Figure 4. Capacitance

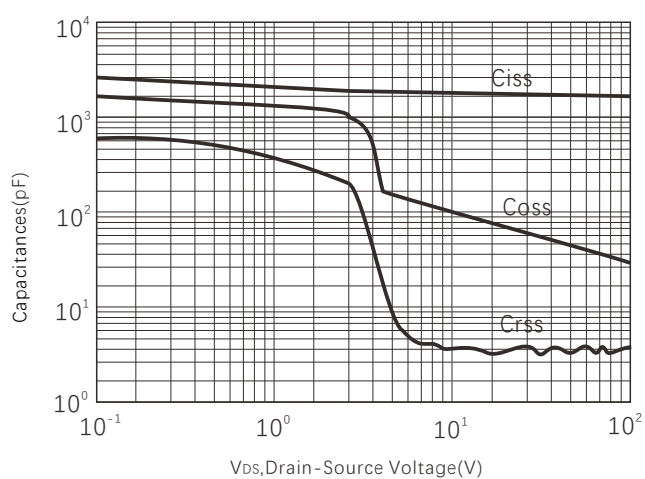


Figure 5. Gate charge

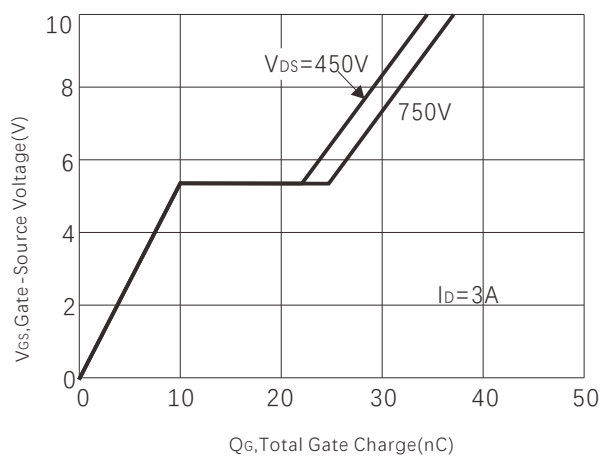


Figure 6. Typical Body Diode Transfer Characteristics

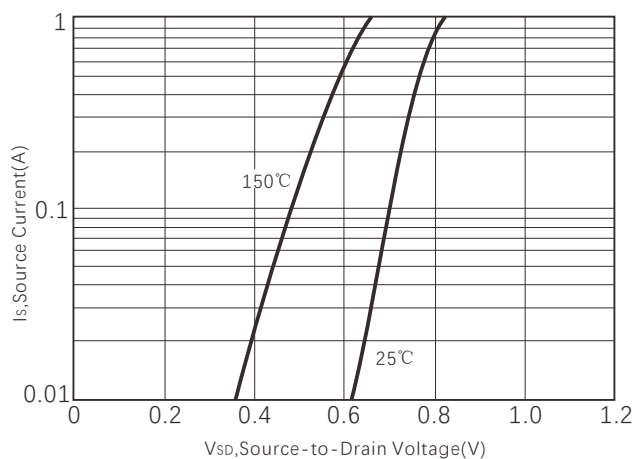


Figure 7. $R_{DS(ON)}$ vs Junction Temperature

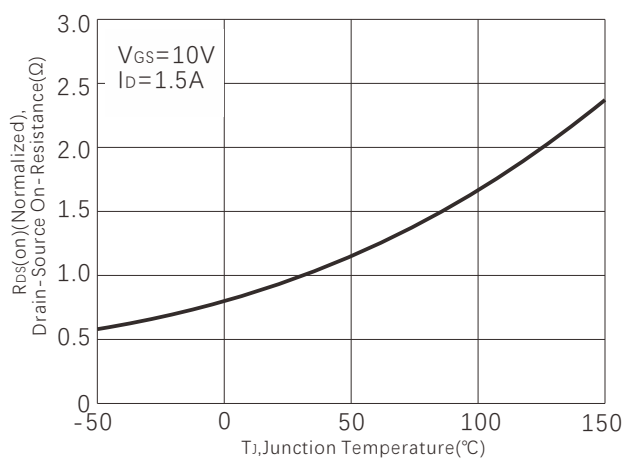


Figure 8. BV_{DSS} vs Junction Temperature

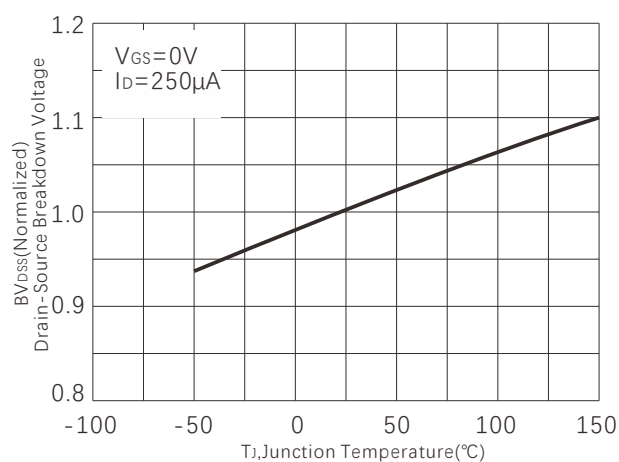


Figure 9. Safe operating area

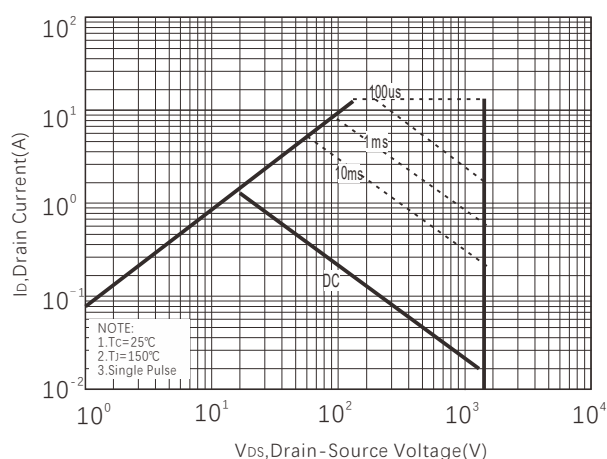


Figure 10. I_D Current De-rating

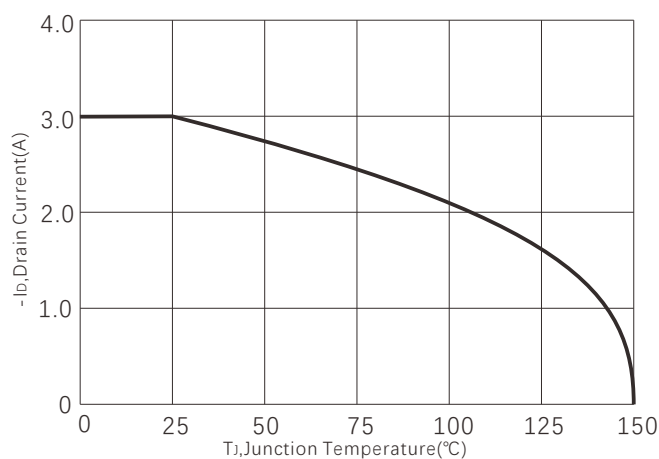
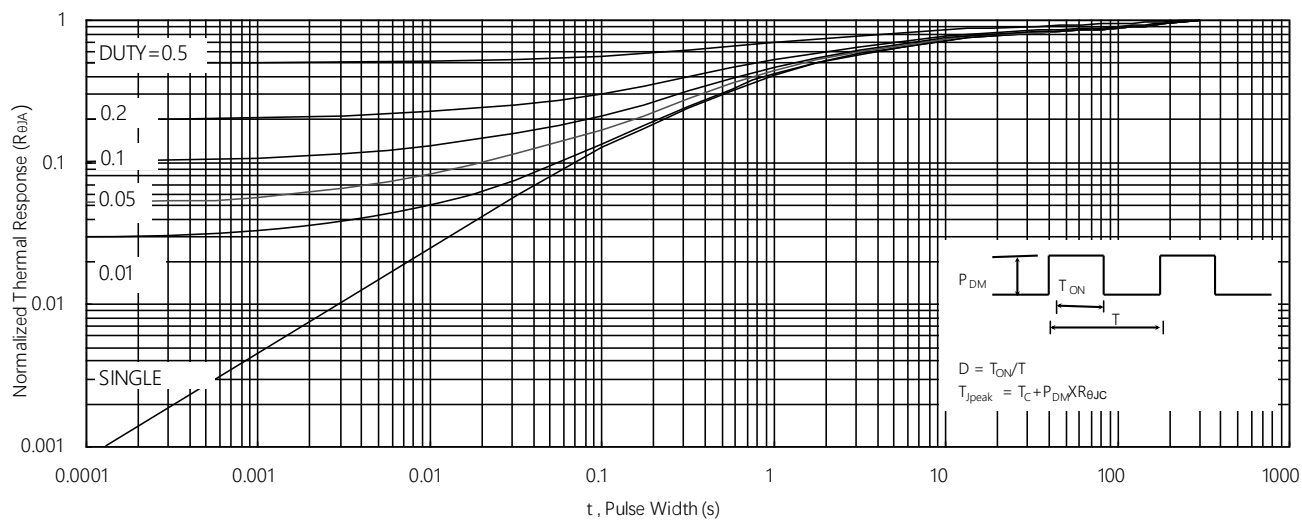
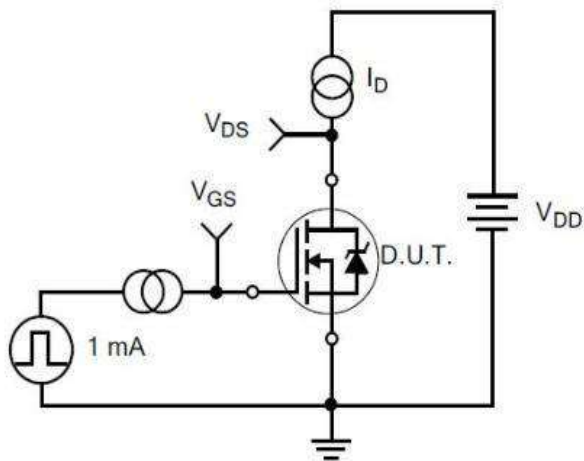


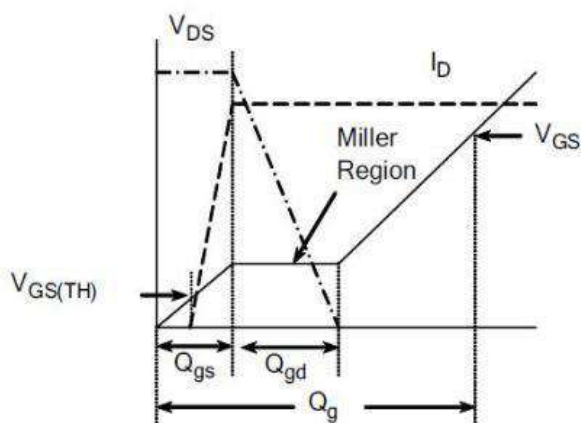
Figure 11. Normalized Maximum Transient Thermal Impedance



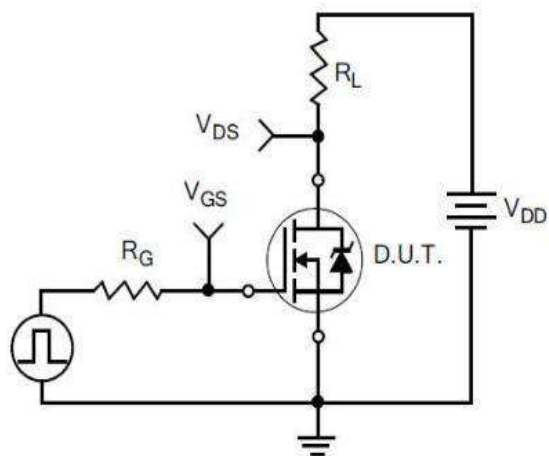
Typical Test Circuit



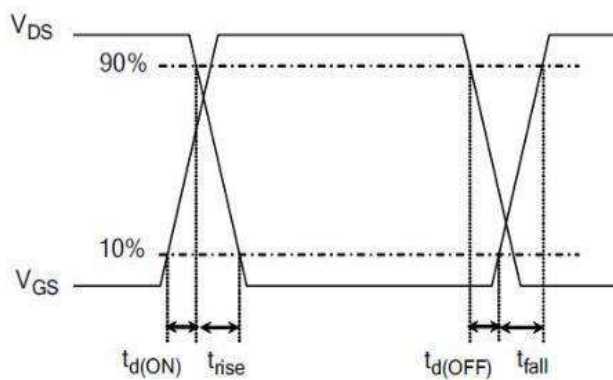
1) Gate Charge Test Circuit



2) Gate Charge Waveform

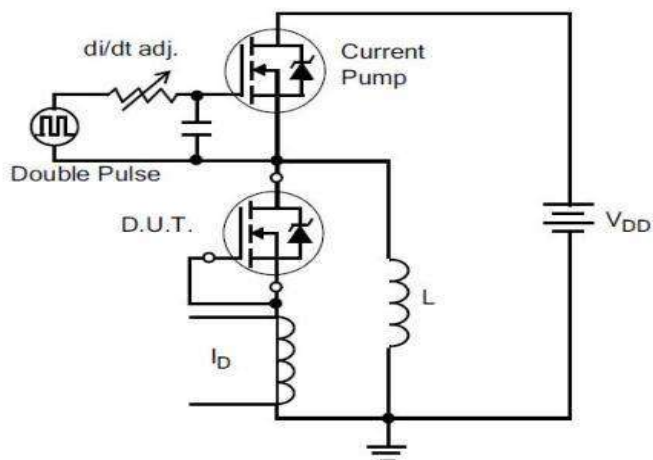


3) Resistive Switching Test Circuit

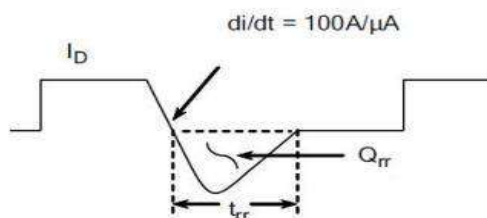


4) Resistive Switching Waveforms

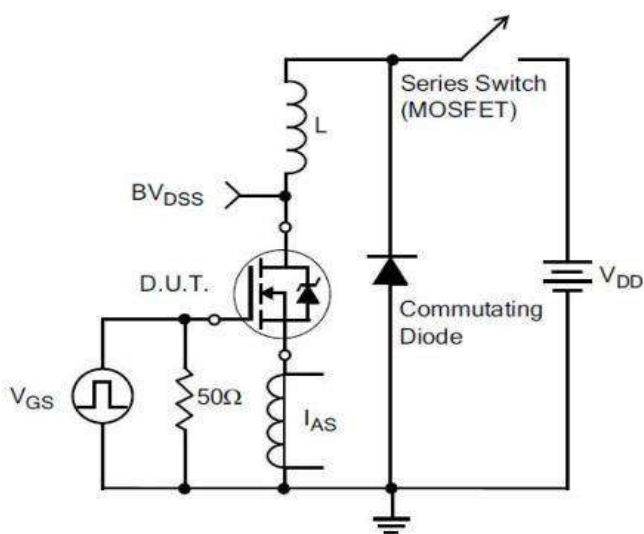
Typical Test Circuit



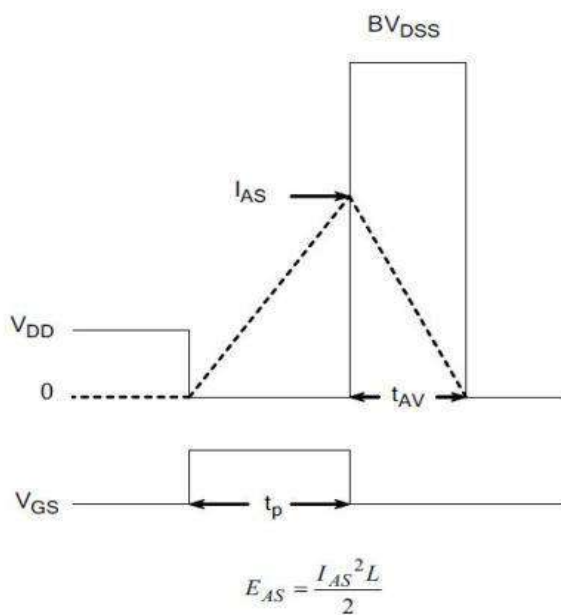
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform

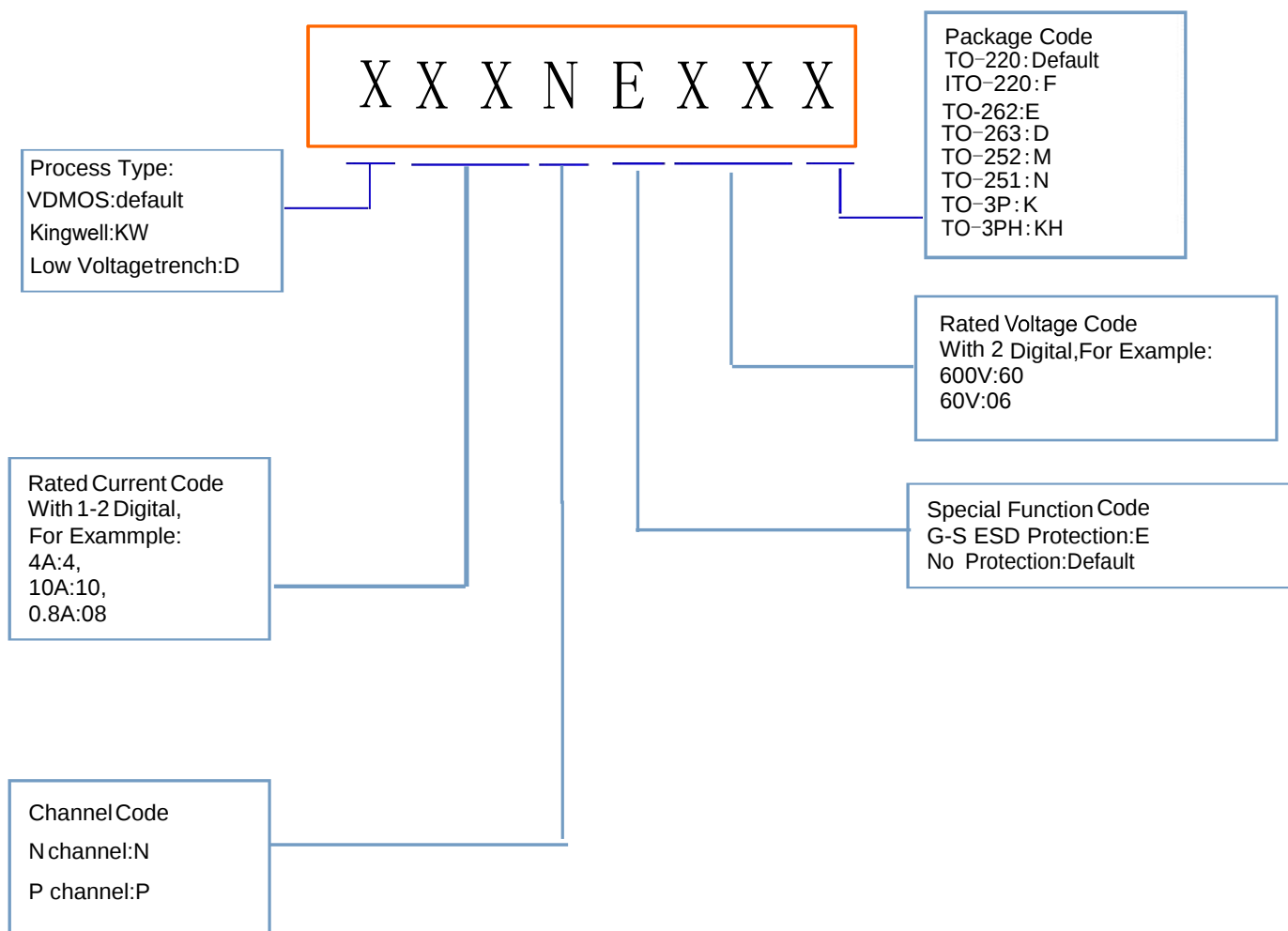


7) . Unclamped Inductive Switching Test Circuit



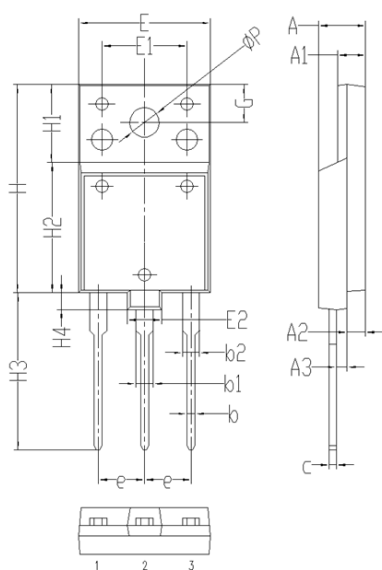
8) Unclamped Inductive Switching Waveforms

Product Names Rules



Dimensions

TO-3PH PACKAGE OUTLINE DIMENSIONS



Items	Values(mm)	
	MIN	MAX
A	5.25	5.85
A1	2.7	3.3
A2	1.8	2.4
A3	1.0	1.6
b	0.45	1.05
b1	1.7	2.3
b2	1.7	2.3
c	0.6	1.2
e	5.15	5.75
E	15.2	15.8
E1	9.7	10.3
E2	3.7	4.3
H	24.2	24.8
H1	8.9	9.5
H2	15.0	15.6
H3	17.9	19.1
H4	1.7	2.3
H5	4.7	5.3
G	4.2	4.8
Φ P	3.3	3.9