Alfa-MOS Technology

AFN6870CS
100V N-Channel Enhancement Mode MOSFET

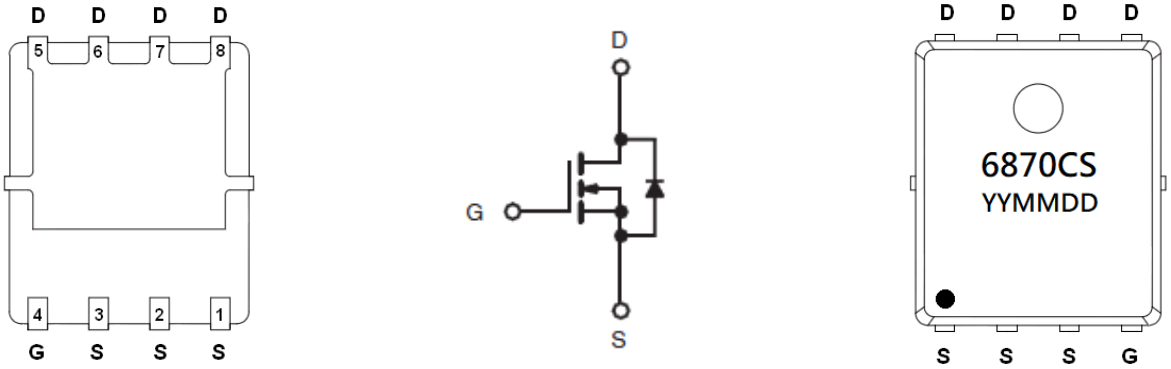
General Description

AFN6870CS, N-Channel enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent $R_{DS(ON)}$, low gate charge.
These devices are particularly suited for low voltage power management, and low in-line power loss are needed in commercial industrial surface mount applications.

Features

- 100V/20A, $R_{DS(ON)}$=5.8mΩ@V_{GS}=10V
- 100V/15A, $R_{DS(ON)}$=7.2mΩ@V_{GS}=4.5V
- Super high density cell design for extremely low $R_{DS\ (ON)}$
- DFN5X6-8L package design

Pin Description (DFN5X6-8L)



Application

- Networking / Telecom / Server
- LED Lighting Applications
- Quick Charger Applications
- DC-DC Primary Side Switch

Pin Define

Pin	Symbol	Description
1~3	S	Source
4	G	Gate
5~8	D	Drain

Ordering Information

Part Ordering No.	Part Marking	Package	Unit	Quantity
AFN6870CSFN568RG	6870CS	DFN5X6-8L	Tape & Reel	2500 EA

※ 6870CS : Parts Code
※ YYMMDD : Date Code
※ AFN6870CSFN568RG : 13”Tape & Reel ; Pb- Free ; Halogen- Free

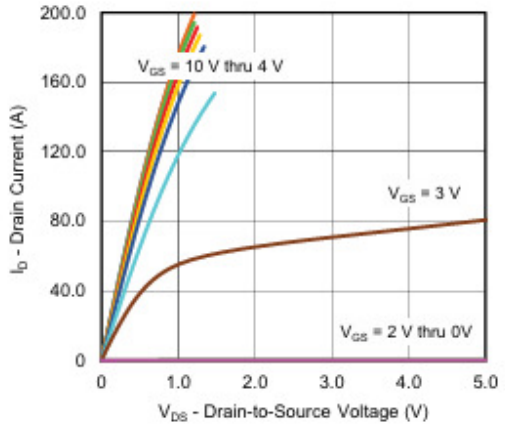
Absolute Maximum Ratings (T_A=25℃ Unless otherwise noted)

Parameter			Symbol	Typical		Unit
Drain-Source Voltage			V_{DSS}	100		V
Gate –Source Voltage			V_{GSS}	±20		V
Continuous Drain Current(T_J=150℃)	T_C=25℃	T_C=70℃	I_{DSM}	80	64	A
	T_A=25℃	T_A=70℃		24	18	
Pulsed Drain Current (t=100us)			I_{DM}	200		
Continuous Source Current(Diode Conduction)	T_C=25℃		I_S	94		
	T_A=25℃			4.9		
Single Pulse Avalanche Current	L=0.1mH		I_{AS}	40		
			E_{AS}	80		mJ
Power Dissipation	T_C=25℃	T_C=75℃	P_D	100	64	W
	T_A=25℃	T_A=75℃		5.4	3.4	
Operating Junction Temperature			T_J	-55/150		℃
Storage Temperature Range			T_{STG}			℃
Thermal Resistance-Junction to Ambient	t ≤ 10 s		$R_{\theta JA}$	18		℃/W
Maximum Junction-to-Case (Drain)	Steady-State		$R_{\theta JA}$	1.0		

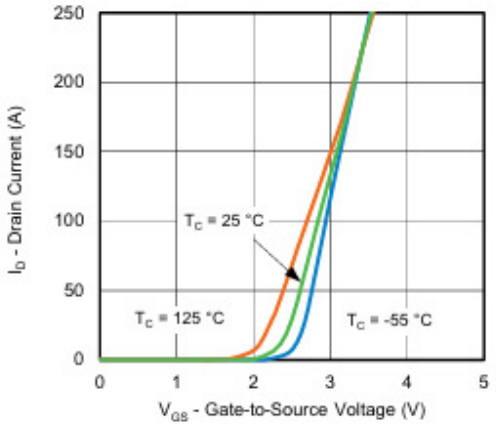
Electrical Characteristics (T_A=25℃ Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V,I_D=250uA	100			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250uA	1.0	1.7	2.5	
Gate Leakage Current	I_{GSS}	V_{DS}=0V,V_{GS}=±20V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=80V,V_{GS}=0V			1	uA
		V_{DS}=80V,V_{GS}=0V T_J=85℃			10	
On-State Drain Current	$I_{D(on)}$	V_{DS}≧10V,V_{GS}=10V	40			A
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=10V,I_D=20A		4.8	5.8	mΩ
		V_{GS}=4.5V,I_D=15A		6.2	7.2	
Forward Transconductance	g_{FS}	V_{DS}=15,I_D=15A		75		S
Diode Forward Voltage	V_{SD}	I_S=5A,V_{GS}=0V		0.75	1.2	V
Dynamic						
Total Gate Charge	Q_g	V_{DS}=50V,V_{GS}=4.5V I_D≡15A		32	65	nC
Gate-Source Charge	Q_{gs}			14		
Gate-Drain Charge	Q_{gd}			6.5		
Gate Resistance	R_g	f=1MHz	0.4	1.0	1.8	Ω
Input Capacitance	C_{iss}	V_{DS}=50V,V_{GS}=0V f=1MHz		4850		pF
Output Capacitance	C_{oss}			325		
Reverse Transfer Capacitance	C_{rss}			18		
Turn-On Time	$t_{d(on)}$	V_{DD}=50V,R_L=3.33Ω I_D≡15A,V_{GEN}=10V R_G=1Ω		15	30	ns
	t_r			20	40	
Turn-Off Time	$t_{d(off)}$			40	80	
	t_f			10	20	

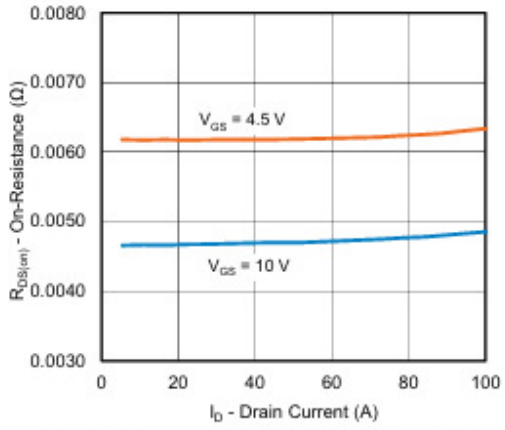
Typical Characteristics



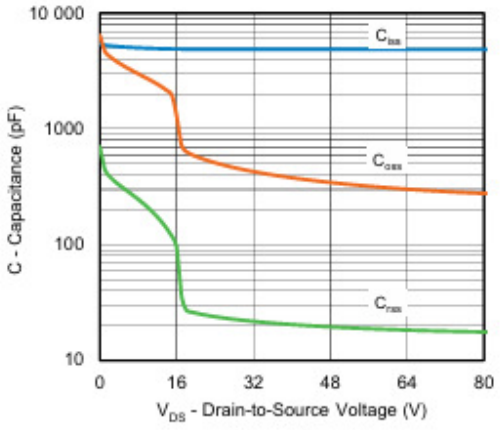
Output Characteristics



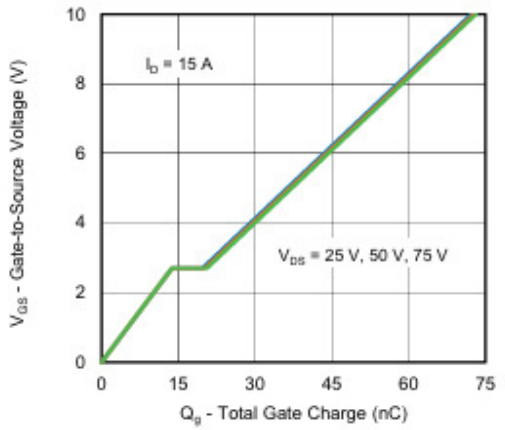
Transfer Characteristics



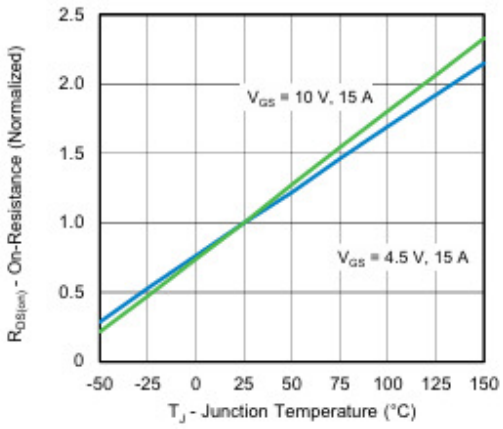
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

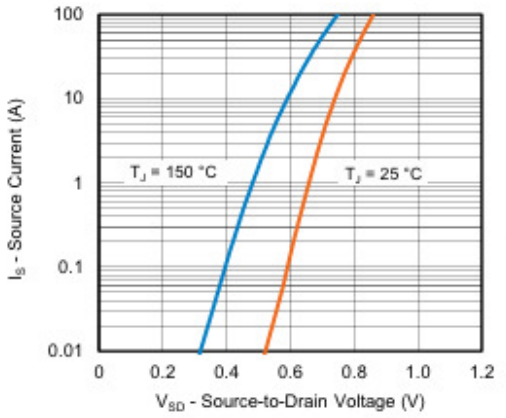


Gate Charge

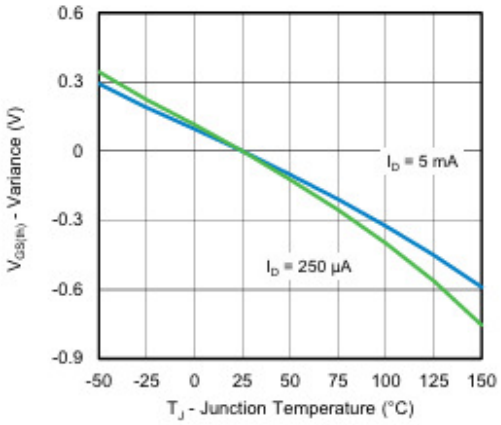


On-Resistance vs. Junction Temperature

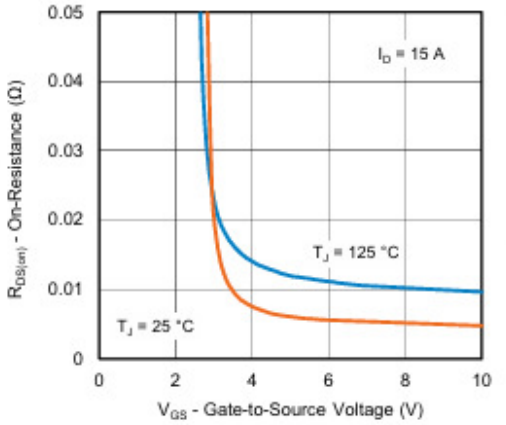
Typical Characteristics



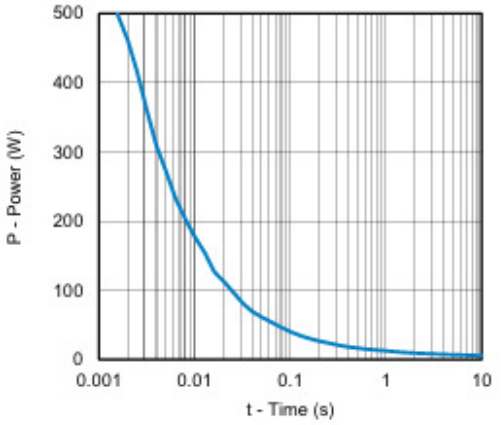
Source-Drain Diode Forward Voltage



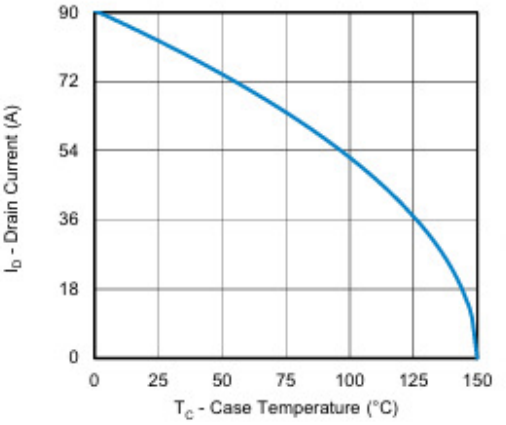
Threshold Voltage



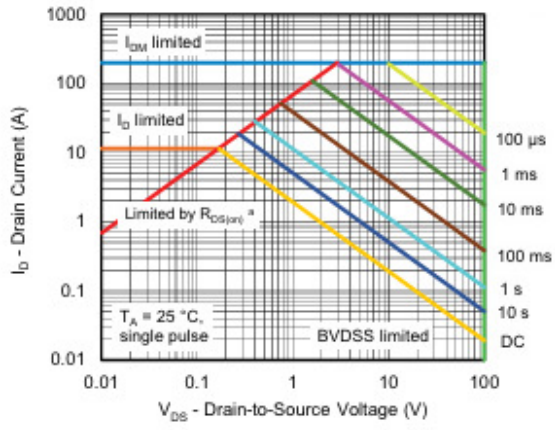
On-Resistance vs. Gate-to-Source Voltage



Single Pulse Power, Junction-to-Ambient

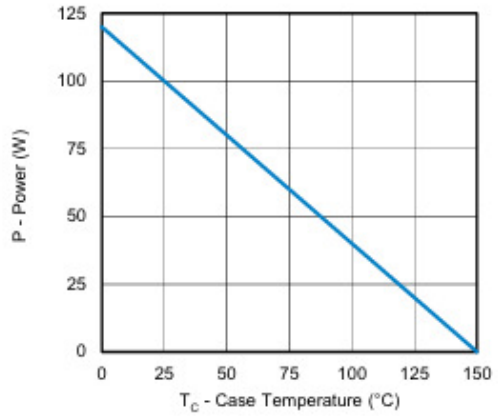


Current Derating [a]

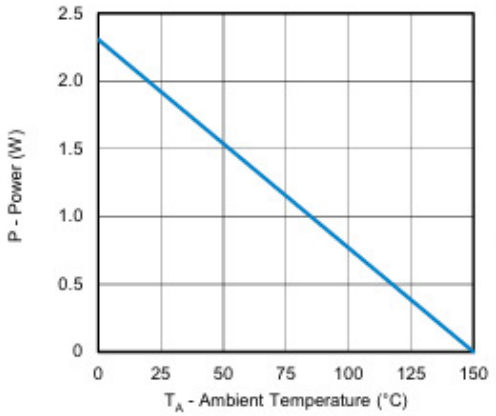


Safe Operating Area, Junction-to-Ambient

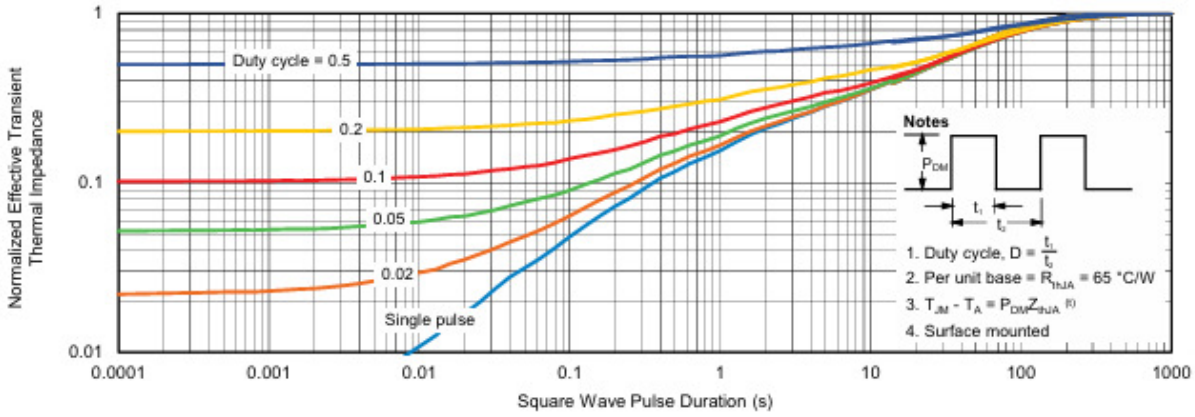
Typical Characteristics



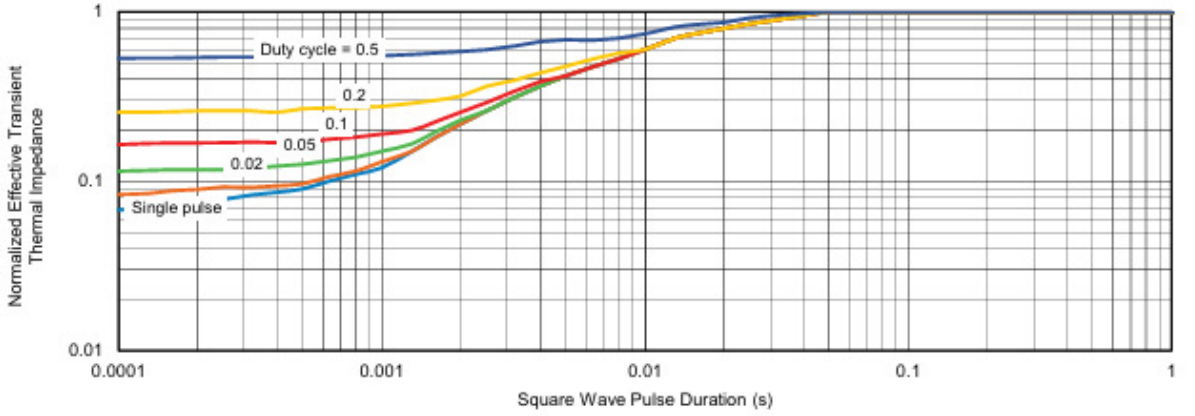
Power, Junction-to-Case



Power, Junction-to-Ambient



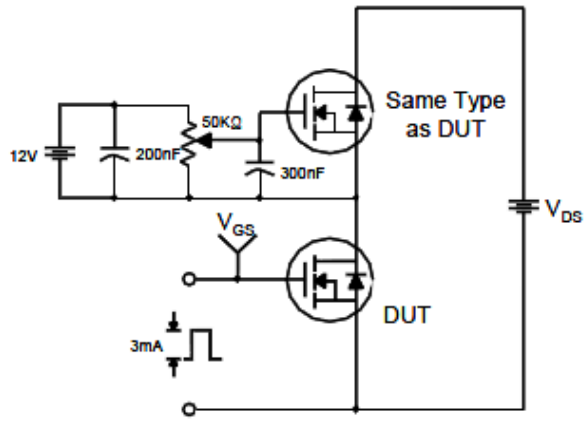
Normalized Thermal Transient Impedance, Junction-to-Ambient

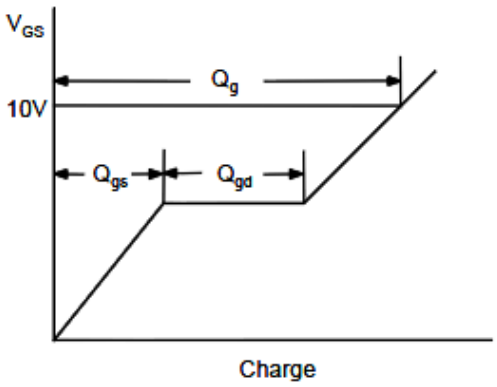


Normalized Thermal Transient Impedance, Junction-to-Case

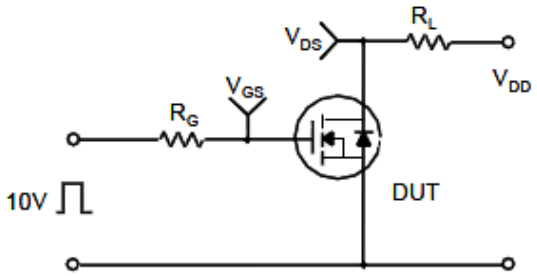
Typical Characteristics

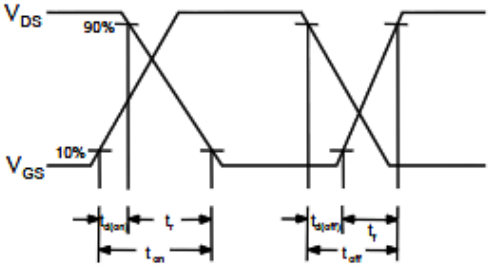
Gate Charge Test Circuit & Waveform



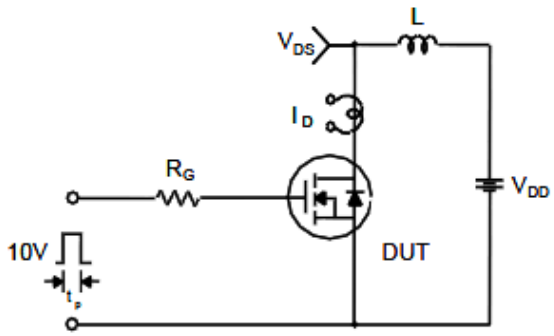


Resistive Switching Test Circuit & Waveforms

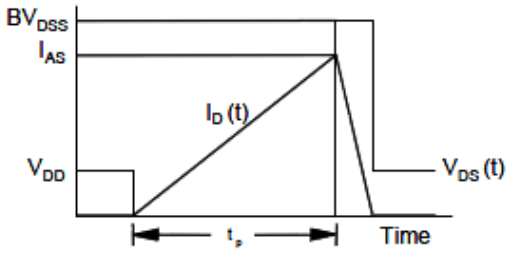




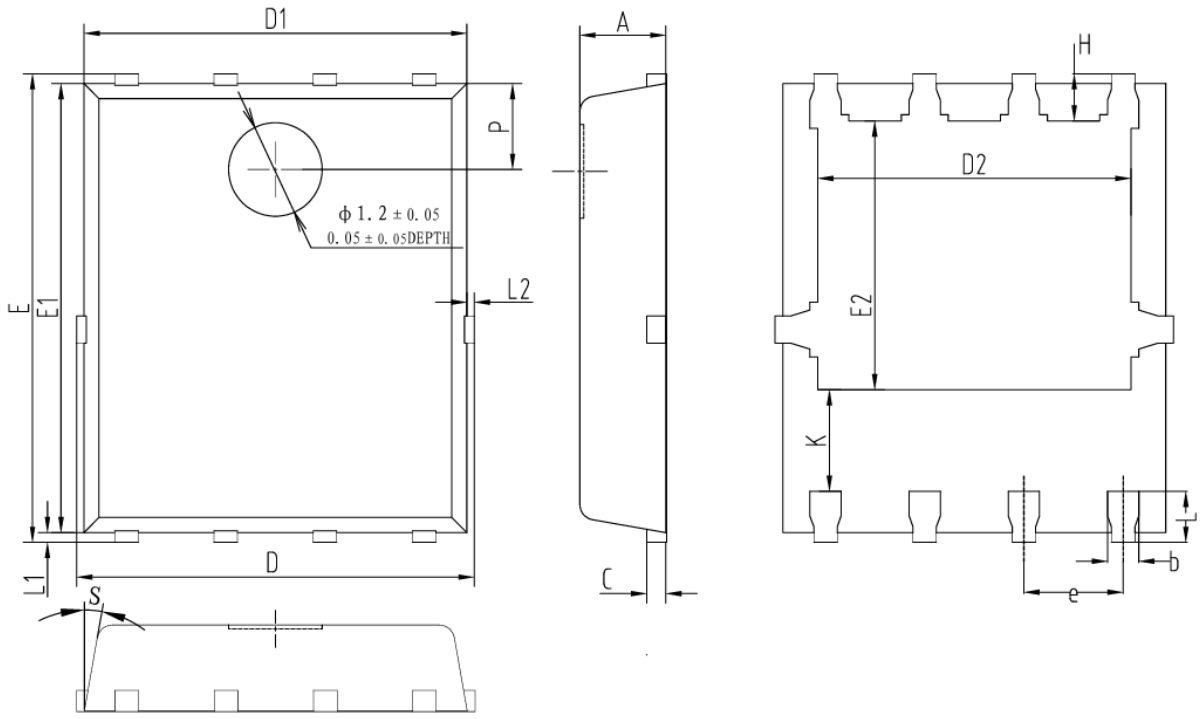
Unclamped Inductive Switching Test Circuit & Waveforms



$$E_{AS} = \frac{1}{2} L I_{AS}^2 \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$



Package Information (DFN5X6-8L)



COMMON DIMENSIONS (UNIT of MEASURE=MILLIMETER)											
SYMBOL	MIN	NOM	MAX	SYMBOL	MIN	NOM	MAX	SYMBOL	MIN	NOM	MAX
A	1.00	1.10	1.20	e	1.17	1.27	1.37	L	0.55	0.65	0.75
b	0.35	0.40	0.45	E	5.90	6.00	6.10	L1	0	0.10	0.20
c	0.19	0.25	0.30	E1	5.70	5.75	5.80	L2	0	0.10	0.20
D	4.80	5.10	5.20	E2	3.35	3.45	3.55	P	1.00	1.10	1.20
D1	4.80	4.90	5.00	H	0.50	0.60	0.70	S	8°	10°	12°
D2	3.90	4.00	4.10	K	1.20	1.30	1.40				

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