



General Description

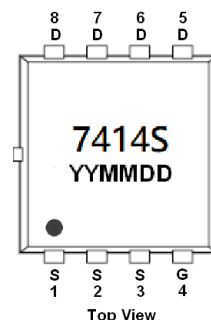
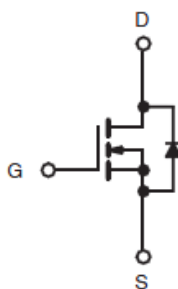
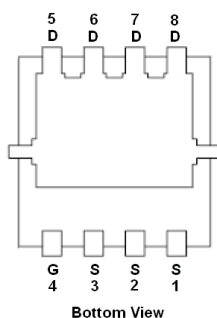
AFN7414S, N-Channel enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent $R_{DS(ON)}$, low gate charge.

These devices are particularly suited for low voltage power management, such as smart phone and notebook computer and other battery powered circuits, and low in-line power loss are needed in commercial industrial surface mount applications.

Features

- $I_D=20A, R_{DS(ON)}=5.2m\Omega@V_{GS}=10V$
- $I_D=15A, R_{DS(ON)}=7.2m\Omega@V_{GS}=4.5V$
- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability
- DFN3.3X3.3-8L package design

Pin Description (DFN3.3X3.3-8L)



Application

- DC-DC Converter
- POL

Pin Define

Pin	Symbol	Description
1	S	Source
2	S	Source
3	S	Source
4	G	Gate
5	D	Drain
6	D	Drain
7	D	Drain
8	D	Drain

Ordering Information

Part Ordering No.	Part Marking	Package	Unit	Quantity
AFN7414SFN308RG	7414S	DFN3.3X3.3-8L	Tape & Reel	5000 EA

※ YY year code

※ MM month code

※ DD date code

※ AFN7414SFN308RG : 13" Tape & Reel ; Pb- Free ; Halogen -Free



Absolute Maximum Ratings

($T_A=25^\circ\text{C}$ Unless otherwise noted)

Parameter	Symbol	Typical	Unit
Drain-Source Voltage	V_{DSS}	30	V
Gate -Source Voltage	V_{GSS}	± 20	V
Continuous Drain Current ($T_J=150^\circ\text{C}$)	I_{DSM}	$T_C=25^\circ\text{C}$	45
		$T_C=70^\circ\text{C}$	35
Pulsed Drain Current ($t=100\mu\text{s}$)	I_{DM}	$T_A=25^\circ\text{C}$	18
		$T_A=70^\circ\text{C}$	14
Continuous Source Current (Diode Conduction)	I_S	$T_C=25^\circ\text{C}$	20
		$T_A=25^\circ\text{C}$	3.2
Single Pulse Avalanche Current	I_{AS}	$L=0.1\text{mH}$	30
			E_{AS}
Power Dissipation	P_D	$T_C=25^\circ\text{C}$	20
		$T_C=75^\circ\text{C}$	12
Operating Junction Temperature	T_J	$T_A=25^\circ\text{C}$	3.2
		$T_A=75^\circ\text{C}$	2.0
Storage Temperature Range	T_{STG}	-55/150	$^\circ\text{C}$
Thermal Resistance-Junction to Ambient	$R_{\theta JA}$	28	$^\circ\text{C/W}$
Maximum Junction-to-Case (Drain)	$R_{\theta JA}$	4	

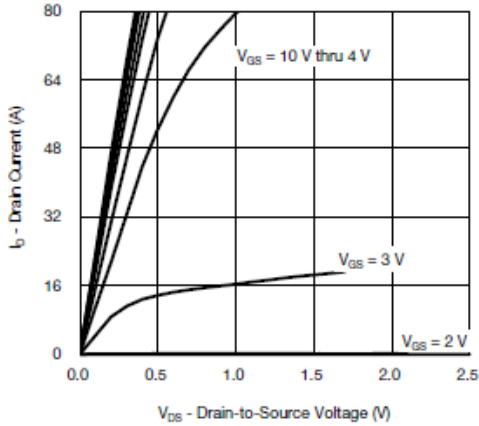
Electrical Characteristics

($T_A=25^\circ\text{C}$ Unless otherwise noted)

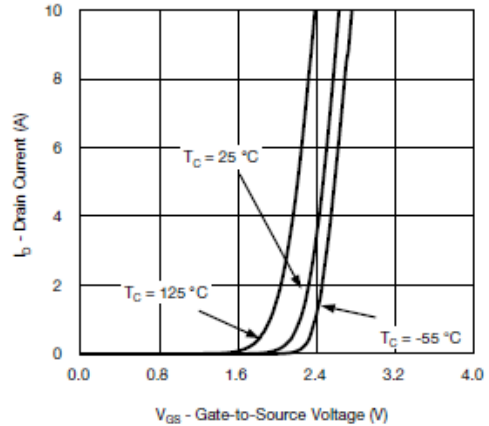
Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu\text{A}$	30			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1.0		2.5	
Gate Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=24V, V_{GS}=0V$			1	uA
		$V_{DS}=24V, V_{GS}=0V$ $T_J=85^\circ\text{C}$			10	
On-State Drain Current	$I_{D(on)}$	$V_{DS} \geq 5V, V_{GS}=10V$	30			A
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$		4.0	5.2	m Ω
		$V_{GS}=4.5V, I_D=15A$		6.0	7.2	
Forward Transconductance	g_{FS}	$V_{DS}=10V, I_D=10A$		60		S
Diode Forward Voltage	V_{SD}	$I_S=5A, V_{GS}=0V$		0.75	1.2	V
Dynamic						
Total Gate Charge	Q_g	$V_{DS}=15V, V_{GS}=4.5V$ $I_D=15A$		10	20	nC
Gate-Source Charge	Q_{gs}		5			
Gate-Drain Charge	Q_{gd}		2.0			
Gate Resistance	R_g	$f=1\text{MHz}$	0.4	1.7	3.4	Ω
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V$ $f=1\text{MHz}$		1250		pF
Output Capacitance	C_{oss}		420			
Reverse Transfer Capacitance	C_{rss}		32			
Turn-On Time	$t_{d(on)}$	$V_{DD}=15V, R_L=1.5\Omega$ $I_D=10A, V_{GEN}=10V$ $R_G=1\Omega$		10	20	ns
	t_r			10	20	
Turn-Off Time	$t_{d(off)}$			20	40	
	t_f			10	20	



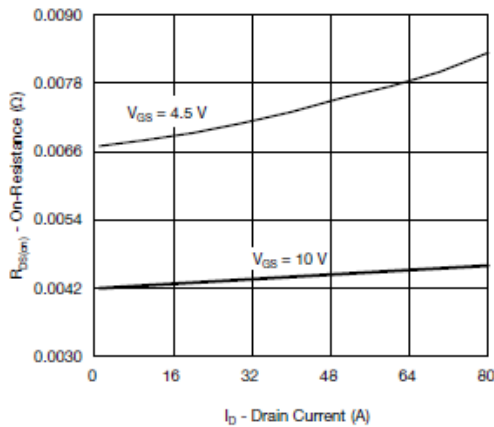
Typical Characteristics



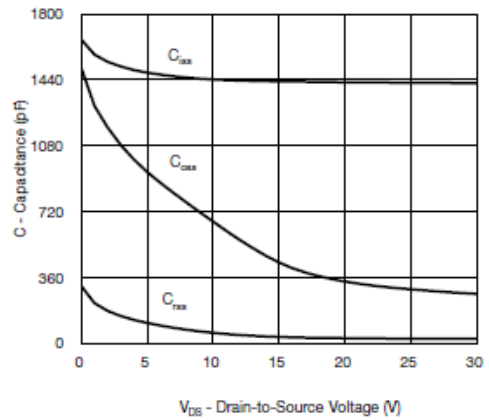
Output Characteristics



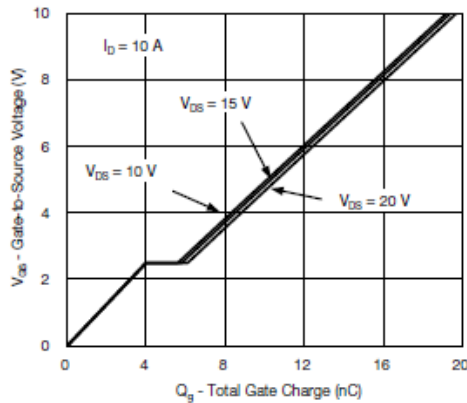
Transfer Characteristics



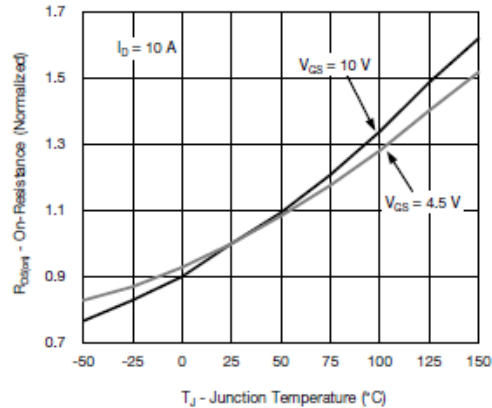
On-Resistance vs. Drain Current and Gate Voltage



Capacitance



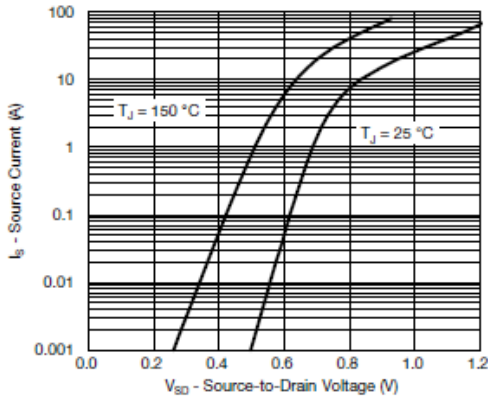
Gate Charge



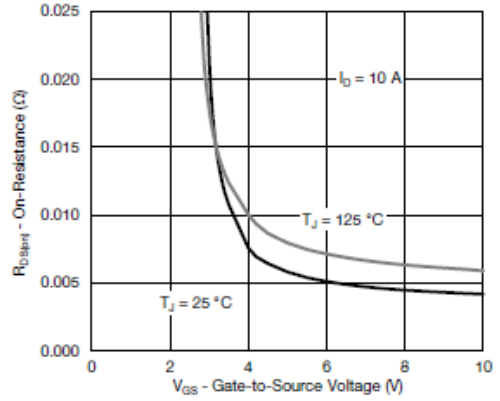
On-Resistance vs. Junction Temperature



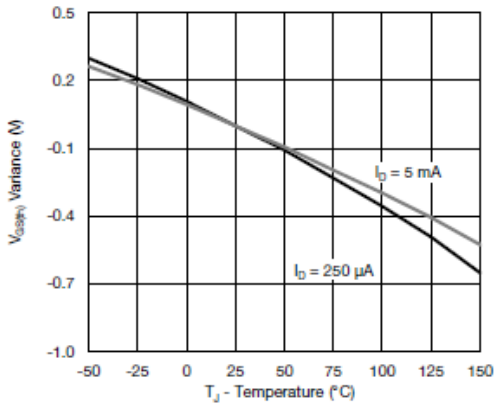
Typical Characteristics



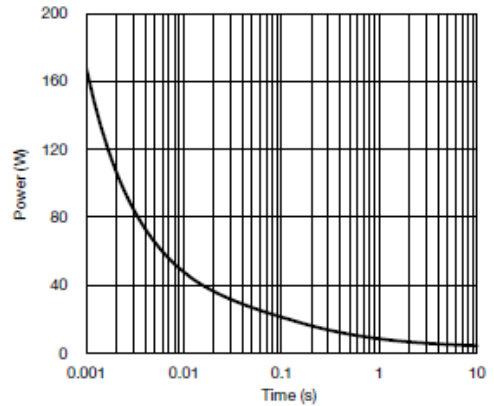
Source-Drain Diode Forward Voltage



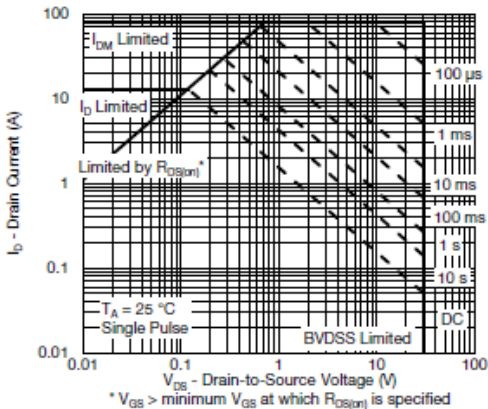
On-Resistance vs. Gate-to-Source Voltage



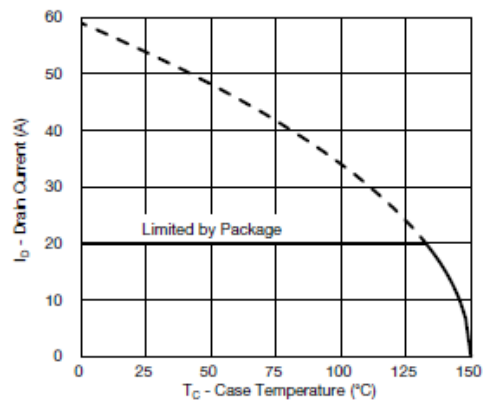
Threshold Voltage



Single Pulse Power, Junction-to-Ambient



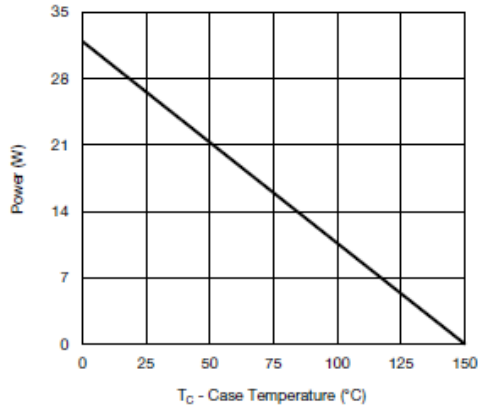
Safe Operating Area, Junction-to-Ambient



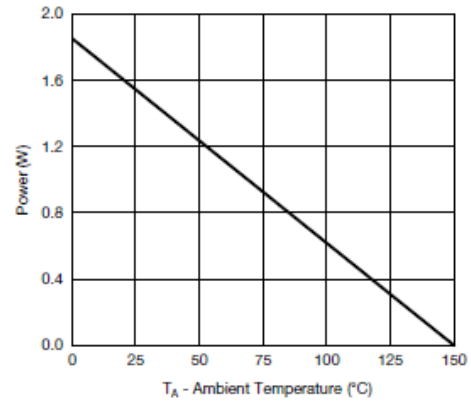
Current Derating ^a



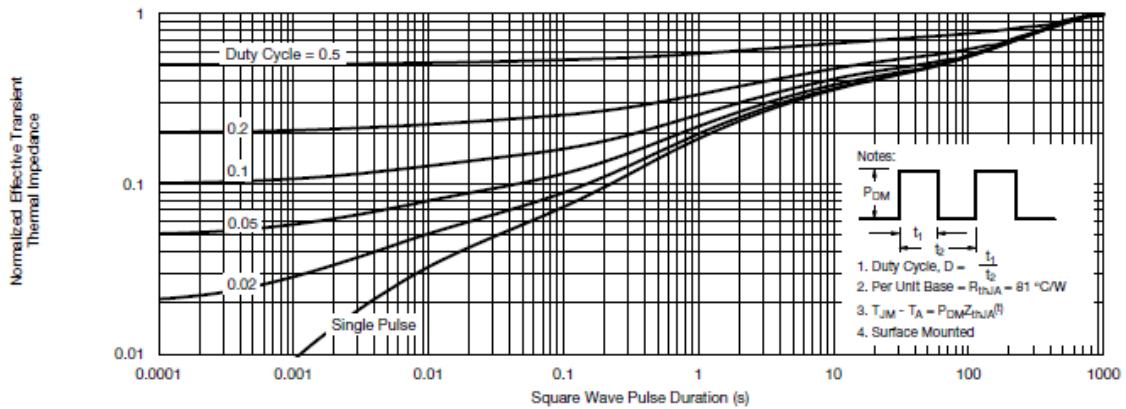
Typical Characteristics



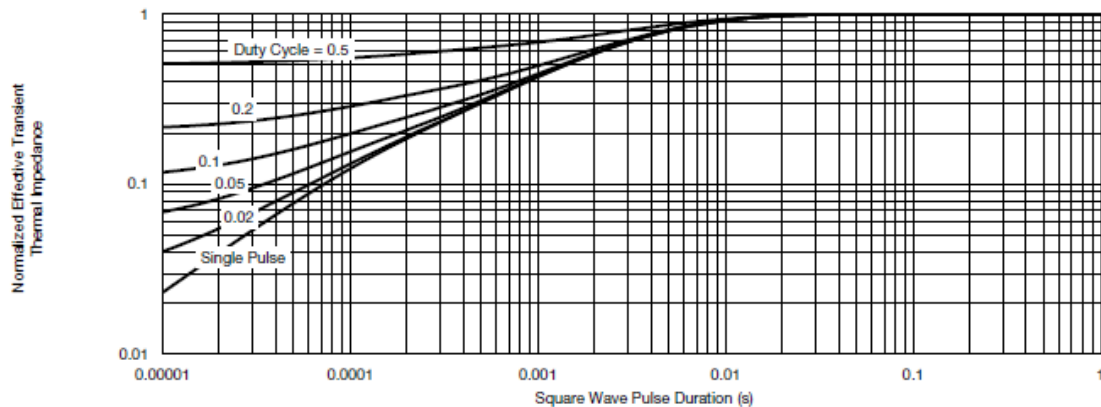
Power, Junction-to-Case



Power, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Ambient

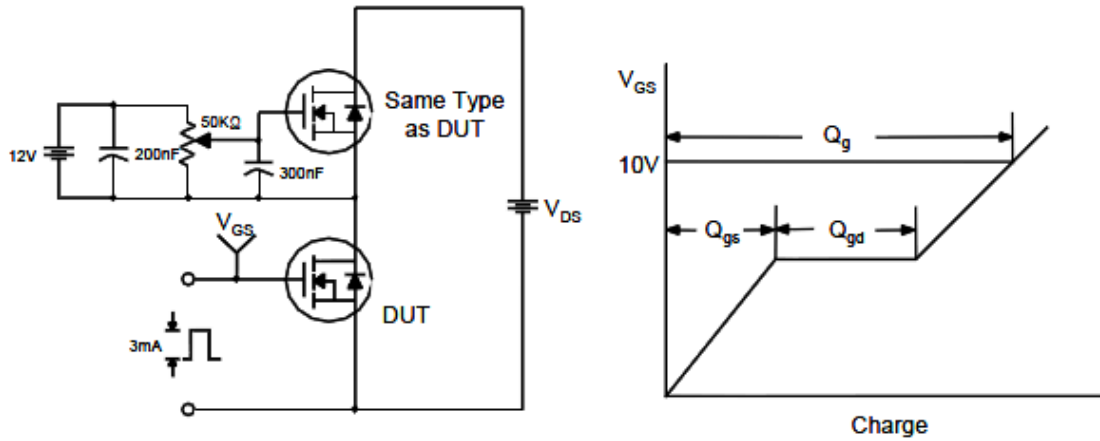


Normalized Thermal Transient Impedance, Junction-to-Case

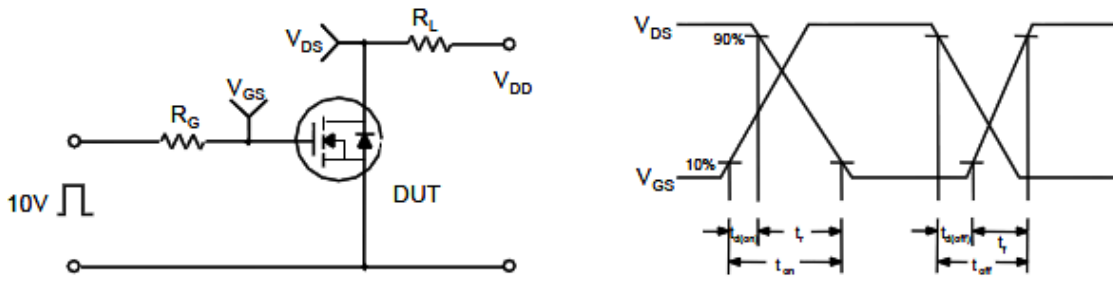


Typical Characteristics

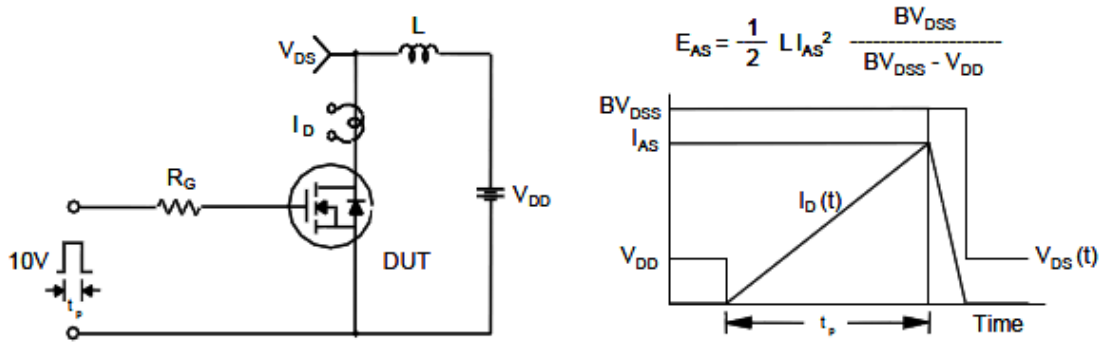
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

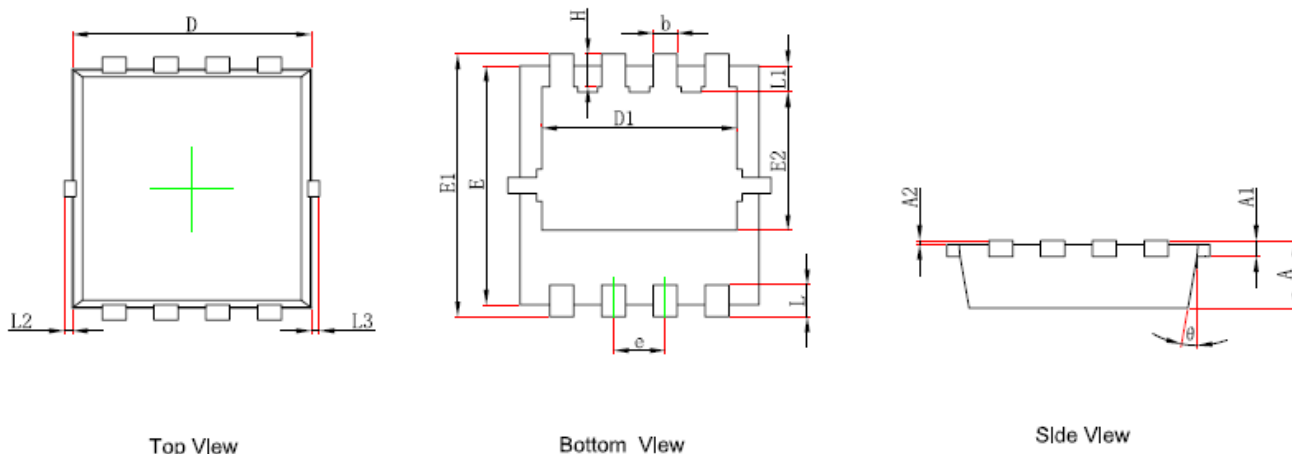


Unclamped Inductive Switching Test Circuit & Waveforms





Package Information (DFN3.3X3.3-8L)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.650	0.850	0.026	0.033
A1	0.152 REF.		0.006 REF.	
A2	0~0.05		0~0.002	
D	2.900	3.100	0.114	0.122
D1	2.300	2.600	0.091	0.102
E	2.900	3.100	0.114	0.122
E1	3.150	3.450	0.124	0.136
E2	1.535	1.935	0.060	0.076
b	0.200	0.400	0.008	0.016
e	0.550	0.750	0.022	0.030
L	0.300	0.500	0.012	0.020
L1	0.180	0.480	0.007	0.019
L2	0~0.100		0~0.004	
L3	0~0.100		0~0.004	
H	0.315	0.515	0.012	0.020
θ	9°	13°	9°	13°

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