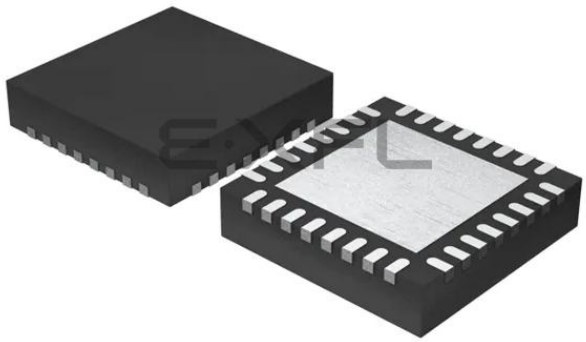

Welcome to E-XFL.COM

What is "Embedded - Microcontrollers"?

"Embedded - Microcontrollers" refer to small, integrated circuits designed to perform specific tasks within larger systems. These microcontrollers are essentially compact computers on a single chip, containing a processor core, memory, and programmable input/output peripherals. They are called "embedded" because they are embedded within electronic devices to control various functions, rather than serving as standalone computers. Microcontrollers are crucial in modern electronics, providing the intelligence and control needed for a wide range of applications.

Applications of "Embedded - Microcontrollers"

Details	
Product Status	Discontinued at Digi-Key
Core Processor	ARM® Cortex®-M0+
Core Size	32-Bit Single-Core
Speed	25MHz
Connectivity	I²C, IrDA, SmartCard, SPI, UART/USART
Peripherals	Brown-out Detect/Reset, DMA, I²S, POR, PWM, WDT
Number of I/O	24
Program Memory Size	32KB (32K x 8)
Program Memory Type	FLASH
EEPROM Size	-
RAM Size	4K x 8
Voltage - Supply (Vcc/Vdd)	1.98V ~ 3.8V
Data Converters	A/D 4x12b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 85°C (TA)
Mounting Type	Surface Mount
Package / Case	32-VQFN Exposed Pad
Supplier Device Package	32-QFN (6x6)
Purchase URL	https://www.e-xfl.com/product-detail/silicon-labs/efm32hg210f32g-b-qfn32r

7KHUH LV DOVR D UHDG RQO\ SDJH LQ WKH LQIRUPDWLRQ EORFN
5HDG DQG ZULWH RSHUDWLRQV DUH VXSSRUWHG LQ WKH HQHUJ\

'LUHFW 0HPRU\ $FFHVV &RQWUROOHU '0$

7KH 'LUHFW 0HPRU\ $FFHVV '0$ FRQWUROOHU SHUIRUPV PHPRU
7KLV KDV WKH EHQHILW RI UHGXFLQJ WKH HQHUJ\ FRQVXPSWLR
WKH V\VWHP WR VWD\ LQ ORZ HQHUJ\ PRGHV ZKHQ PRYLQJ IRU
IURP WKH ([WHUQDO %XV ,QWHUIDFH WR D 3:0 JHQHUDWLQJ WLPH
FRQWUROOHU OLFHQVHG IURP $50

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(QHUJ\ 0DQDJHPHQW 8QLW (08

7KH (QHUJ\ 0DQDJHPHQW 8QLW (08 PDQDJH DOO WKH ORZ HQHU
WUROOHUV (DFK HQHUJ\ PRGH PDQDJHV LI WKH &38 DQG WKH Y
FDQ DOVR EH XVHG WR WXUQ RII WKH SRZHU WR XQXVHG 65$0 EO

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7KH &ORFN 0DQDJHPHQW 8QLW &08 LV UHVSRQVLEOH IRU FRQWU
()0 +* 7KH &08 SURYLGHV WKH FDSDELOLW\ WR WXUQ RQ DQG
SHULSKHUDO PRGXOHV LQ DGGLWLRQ WR HQDEOH GLVDEOH DQG
RI IOH[LELOLW\ HQDEOHV VRIWZDUH WR PLQLPL]H HQHUJ\ FRQVX
SRZHU RQ SHULSKHUDOV DQG RVFLOODWRUV WKDW DUH LQDFWLY

:DWFKGRJ :'2*

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FDWLRQ UHOLDELOLW\ 7KH IDLOXUH PD\ H J EH FDXVHG E\ DQ
VRIWZDUH IDLOXUH

3HULSKHUDO 5HIOH[6\VWHP 356

7KH 3HULSKHUDO 5HIOH[6\VWHP 356 V\VWHP LV D QHWZRUN Z
FRPPXQLFDWH GLUHFWO\ ZLWK HDFK RWKHU ZLWKRXW LQYROYL
5HIOH[VLJQDOV DUH FDOOHG SURGXFHUV 7KH 356 URXWHV WKHV
DSSOLFDWLRQV GHSHQGLQJ RQ WKH GDWD UHFHLYHG 7KH IRUP
WULJJHUV DQG RWKHU IXQFWLRQDOLW\ FDQ EH DSSOLHG E\ WKH

,QWHU ,QWHJUDWHG &LUFXLW ,QWHUIDFH , &

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ERWK D PDVWHU DQG D VODYH DQG VXSSRUWV PXOWL PDVWHU E
PRGH SOXV VSHHGV DUH VXSSRUWHG DOORZLQJ WUDQVPLVVLRQ
6ODYH DUELWUDWLRQ DQG WLPHRXWV DUH DOVR SURYLGHG WR D
7KH LQWHUIDFH SURYLGHV &RPPRQ &RQWUROOHU V WR WKH ILQH JUDLQHG
SURFHVV DQG FORVH WR DXWRPDWLF WUDQVIHUV $XWRPDWLF U
HQHUJ\ PRGHV

8QLYHUVDO 6\QFKURQRXV $V\QFKURQRXV 5HF $57

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VHULDO , 2 PRGXOH ,W VXSSRUWV IXOO GXSOH[DV\QFKURQRXV
0LFUR:LUH DQG ZLUH ,W FDQ DOVR LQWHUIDFH ZLWK ,62 6P

$GYDQFHG (QFU\SWLRQ 6WDQGDUG $FFHOHUD

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*HQHUDO 3XUSRVH ,QSXW 2XWSXW *3,2

,Q WKH ()0 +* WKHUH DUH *HQHUDO 3XUSRVH ,QSXW 2XWSX SRUWV ZLWK XS WR SLQV HDFK 7KHVH SLQV FDQ LQGLYLGXDOO DGYDQFHG FRQILJXUDWLRQV OLNH RSHQ GUDLQ ILOWHULQJ DQG IRU WKH SLQV 7KH *3,2 SLQV FDQ DOVR EH RYHUULGGHQ E\ SH RXWSXWV RU 86$57 FRPPXQLFDWLRQ ZKLFK FDQ EH URXWHG WR VXSSRUWV XS WR DV\QFKURQRXV H[WHUQDO SLQ LQWHUUXSW GHYLFH $OVR WKH LQSXW YDOXH RI D SLQ FDQ EH URXWHG W SHULSKHUDOV

&RQILJXUDWLRQ 6XPPDU\

7KH IHDWXUHV RI WKH ()0 +* LV D VXEVHW RI WKH IHDWXUH V 0DQXDO 7DEOHGHVSULEHV GHYLFH VSHFLILF LPSOHPHQWDWLRQ

7DEOH &RQILJXUDWLRQ 6XPPDU\

0RGXOH	&RQILJXUDWLRQ	3LQ &RQQHFWLRQV
&RUWH[0	)XOO FRQILJXUDWLRQ	1$
'%*	)XOO FRQILJXUDWLRQ	'%*B6:&/. '%*B6:',2
06&	)XOO FRQILJXUDWLRQ	1$
'0$	)XOO FRQILJXUDWLRQ	1$
508	)XOO FRQILJXUDWLRQ	1$
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:'2*	)XOO FRQILJXUDWLRQ	1$
356	)XOO FRQILJXUDWLRQ	1$
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86$57	)XOO FRQILJXUDWLRQ ZL	86 B&/. 86 B&6
86$57	)XOO FRQILJXUDWLRQ ZL	86 B&/. 86 B&6
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7,0(5	)XOO FRQILJXUDWLRQ	7,0 B&&> @
57&	)XOO FRQILJXUDWLRQ	1$
3&17	)XOO FRQILJXUDWLRQ	3&17 B&&> @ UHJLVWHU
$&03	)XOO FRQILJXUDWLRQ	$&03 B&+> @ $&03 B2
9&03	)XOO FRQILJXUDWLRQ	1$
$'&	)XOO FRQILJXUDWLRQ	$'& B&+> @

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		0+] +);2 DOO SHULSKHUDO FORFNV GLVDEOHG 9 7$0% &				$ 0+]
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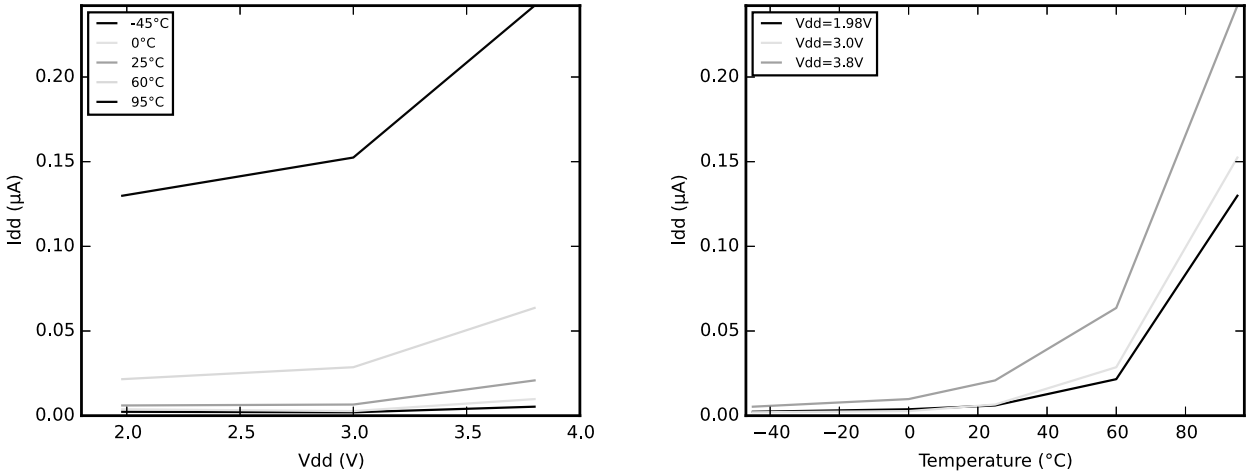

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7DEOH (QHUJ\ 0RGHV 7UDQVLWLRQV

6\PERO	3DUDPHWHU	0LQ	7\S	0D[	8QLW
W	7UDQVLWLRQ WLPH IURP (0 WR	(0			+) &25(&/. F\FOHV
W	7UDQVLWLRQ WLPH IURP (0 WR	(0			V
W	7UDQVLWLRQ WLPH IURP (0 WR	(0			V
W	7UDQVLWLRQ WLPH IURP (0 WR	(0			V

3RZHU 0DQDJHPHQW

7KH ()0 +* UHTXLUHV WKH $9''B[9''B'5(* DQG ,29''B[SLQV WR E RSWLRQDO ILOWHU DW WKH 3&% OHYHO)RU SUDFWLFDO VFKHP QRWH $1 ()0 +DUGZDUH 'HVLJQ &RQVLGHUDWLRQV

7DEOH 3RZHU 0DQDJHPHQW

6\PERO	3DUDPHWHU	&RQGLWLRQ	0LQ	7\S	0D[	8QLW
9%2'H[WKU	%2' WKUHVKROG RQ IDOOLQJ H[WHUQDO VXSSO\ YROWDJH(0					9
9%2'H[WKU	%2' WKUHVKROG RQ ULVLQJ H[WHUQDO VXSSO\ YROWDJH					9
W5(6(7	'HOD\ IURP UHVHW UHOHDVH XQWLO LV UHOHDVHG IRU QRUPDO SURJUDP H[HFXWLRQ VWDUWV	3RZHU RQ 5HVHW 3%XRZQ RXW 5HVHW DQG SLQ UHVHW				V
&'(&283/(	9ROWDJH UHJXODWRU GHFRXSOLQJ FDSDFLWRU RU WRU	([WHUQDO FDSDFLWRU UHFRPPHQGHG $SSOLFDWLRQ FLUFXLW EHWZHHQ '(&283/(SLQ DQG *5281'				)

)ODVK

7DEOH)ODVK

6\PERO	3DUDPHWHU	&RQGLWLRQ	0LQ	7\S	0D[	8QLW
(&)/$6+	)ODVK HUDVH F\FOHV EHIRUH IDLOXUH					F\FOHV
5(7)/$6+	)ODVK GDWD UHWHQWLRQ	7$0% &				K
		7$0% &				\HDUV
		7$0% &				\HDUV
W:B352*	:RUG ELW SURJUDPPLQJ WLPH					V
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W%(5$6(	'HYLFH HUDVH WLPH					PV
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W:5,7(	:ULWH FXUUHQW					P$
9)/$6+	6XSSO\ YROWDJH GXULQJ IODVK HUDVH DQG ZULWH					9

0HDVXUHG DW &

*HQHUDO 3XUSRVH ,QSXW 2XWSXW

7DEOH *3,2

6\PERO	3DUDPHWHU	&RQGLWLRQ	0LQ	7\S	0D[	8QLW
9,2,/	,QSXW ORZ YROWDJH				9,	9
9,2,+	,QSXW KLJK YROWDJH		9,			9
9,22+	2XWSXW KLJK YROWDJH FRQGLWLRQ '5,9(02'(67$1'$5'	6RXUFLQJ ,, P$ 9 *3,2B3[B&75/ '5,9(02'(/2:(67		9,		9
		6RXUFLQJ ,, P$ 99 *3,2B3[B&75/ '5,9(02'(/2:(67		9,		9

6\PERO	3DUDPHWHU	&RQGLWLRQ	0LQ	7\S	0D[	8QLW
	E\ WKH JOLWFK VXS SUHVVLRQ ILOWHU					
W,22)	2XWSXW IDOO WLPH	*3,2B3[B&75/ ’5,9(02’(&/ /2:(67 DQG ORDG FDSDFL WDQFH & S)				QV
		*3,2B3[B&75/ ’5,9(02’(&/ /2: DQG ORDG FDSDFLWDQFH &/ S)				QV
9,2+<67	, 2 SLQ K\VWHUHVLV 9,27+5 9,27+5	9	9,			9

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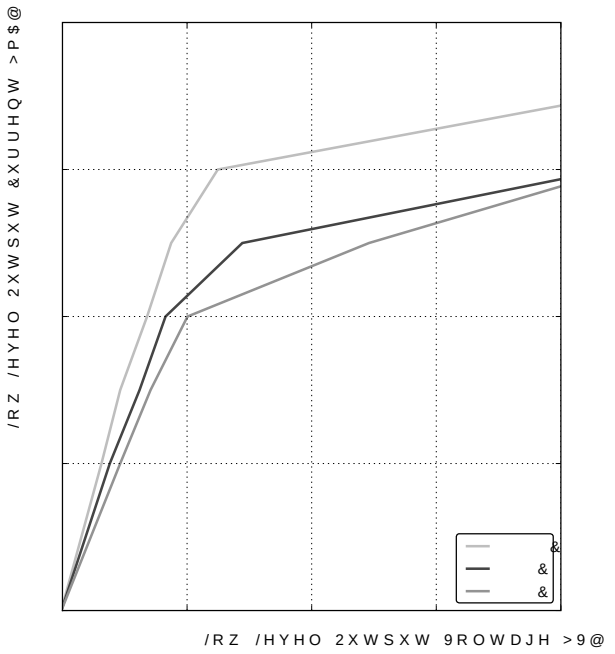

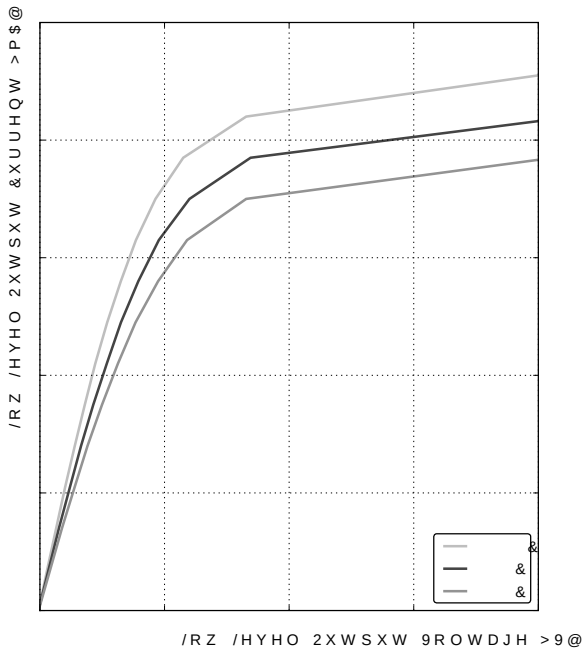

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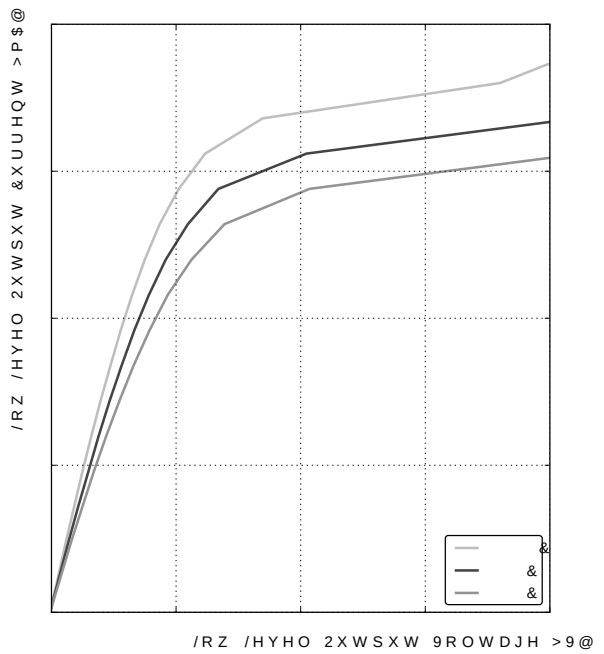

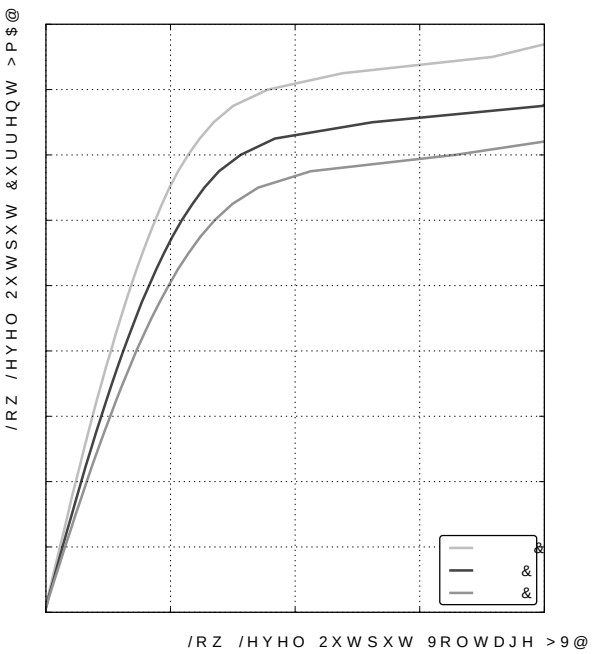

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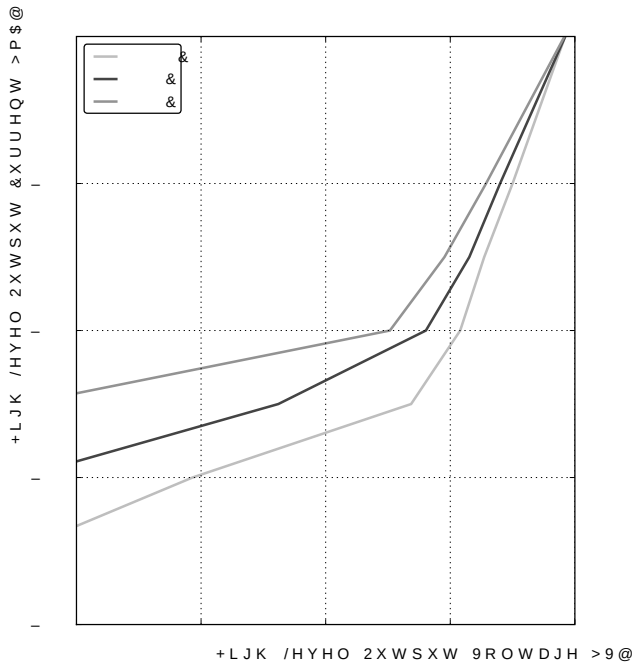

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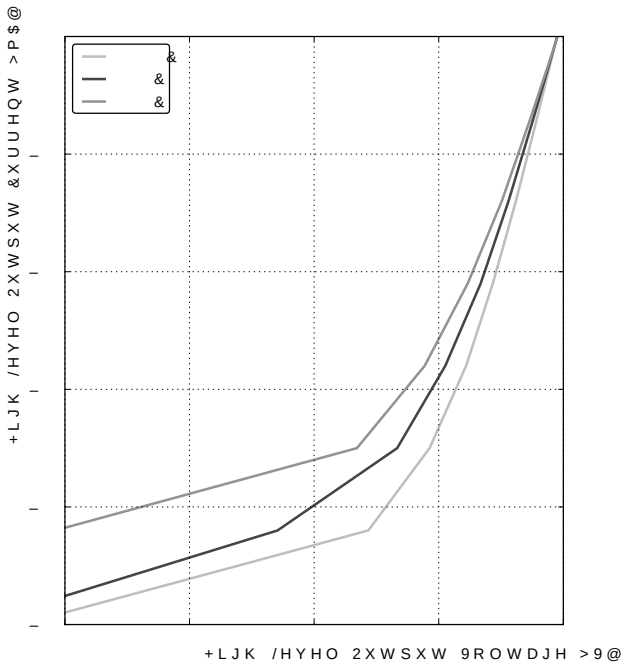

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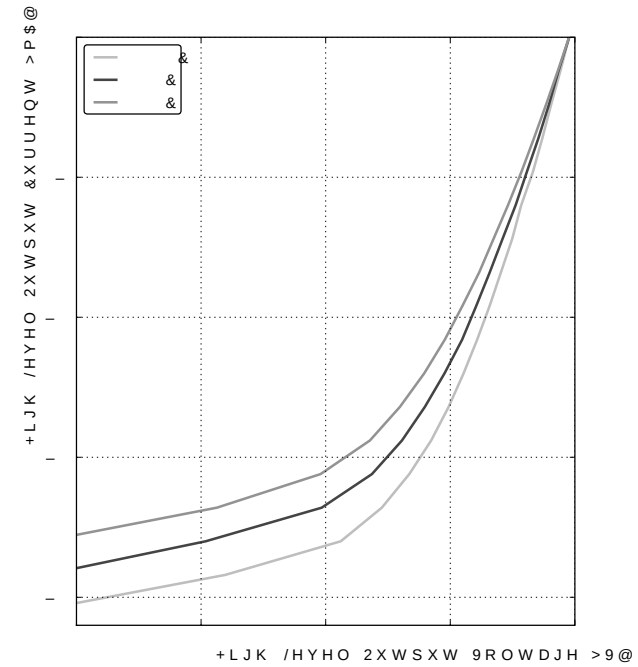

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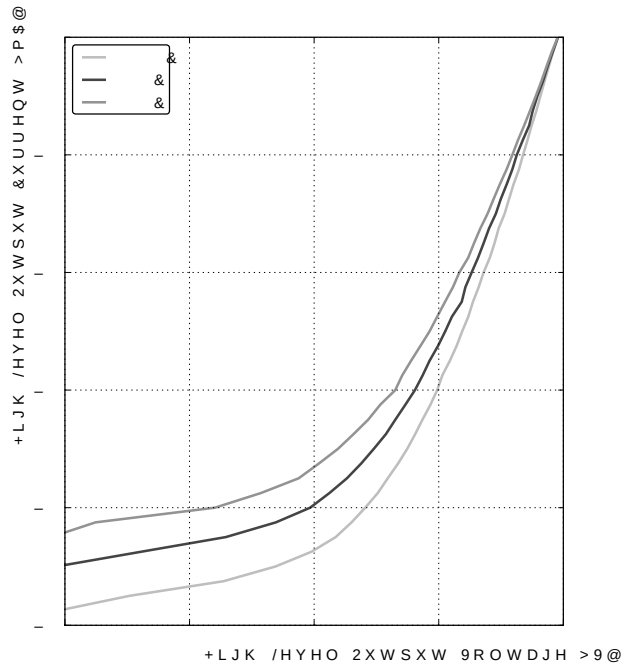

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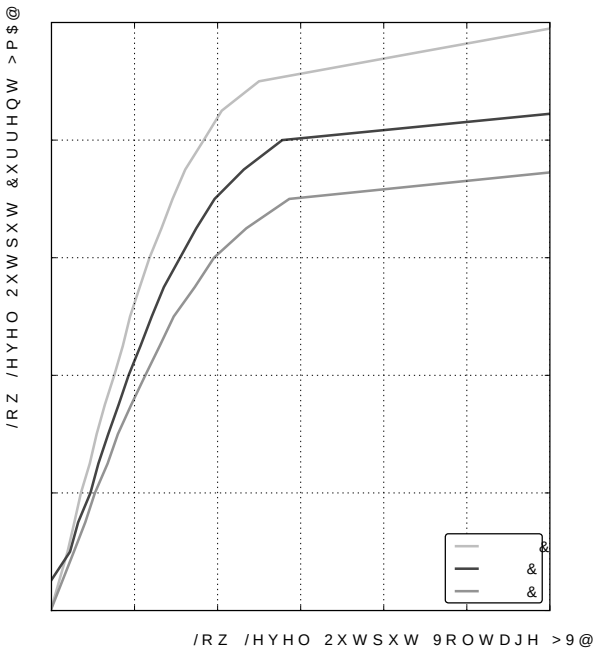

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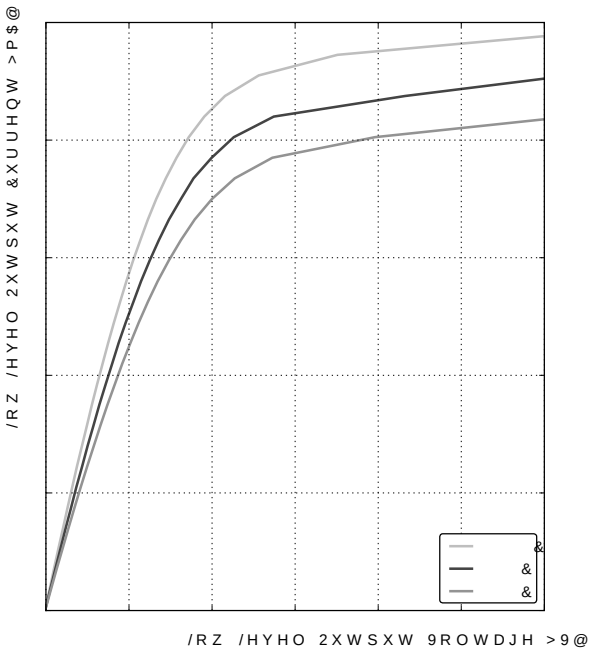

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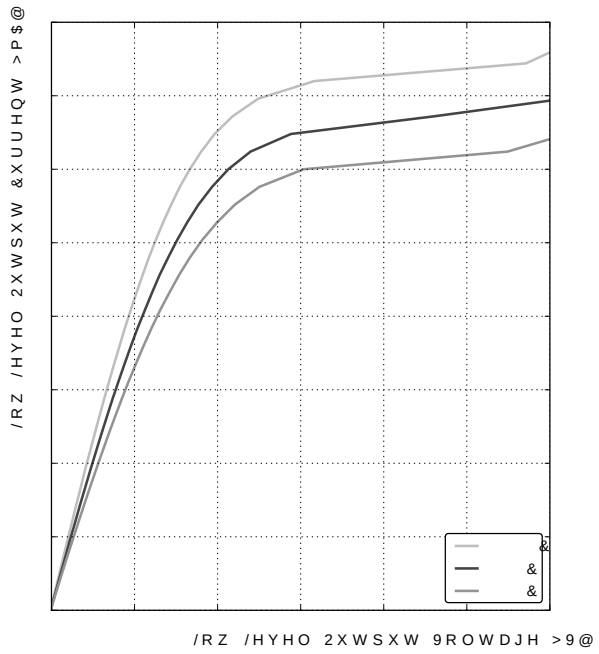

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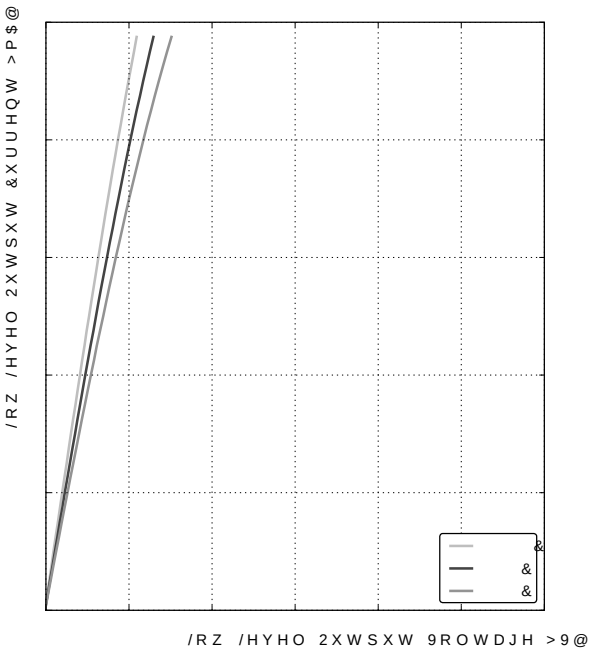

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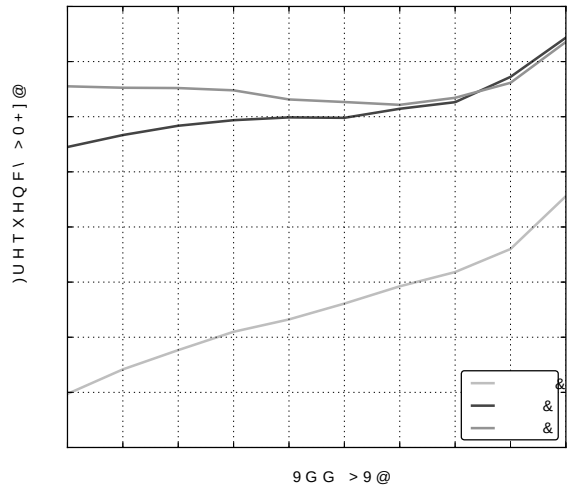

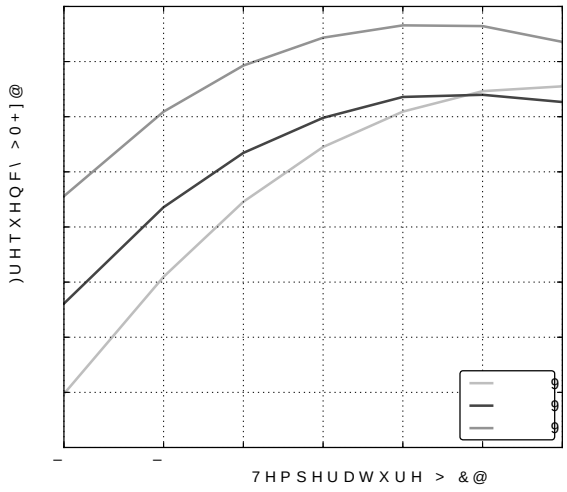

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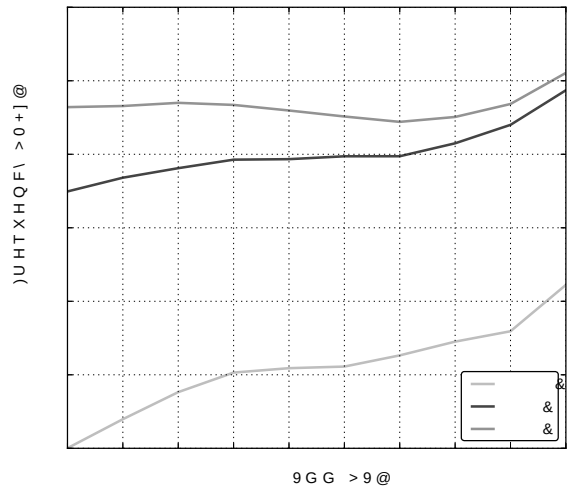

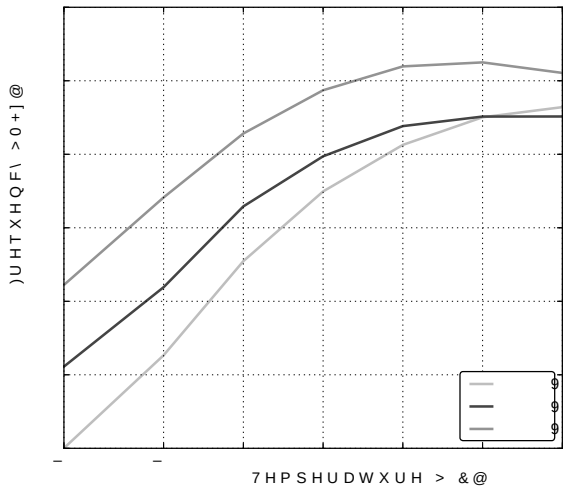

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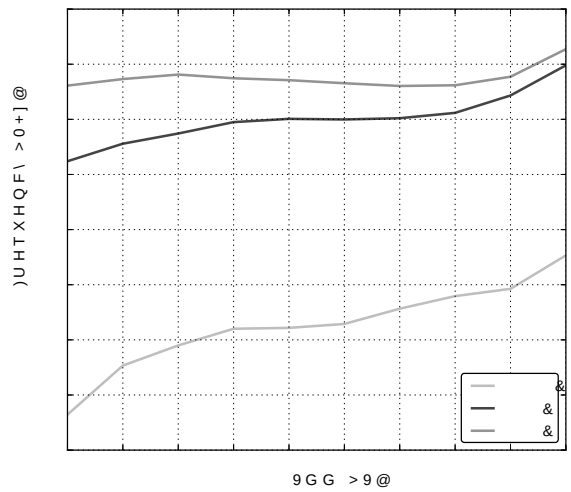

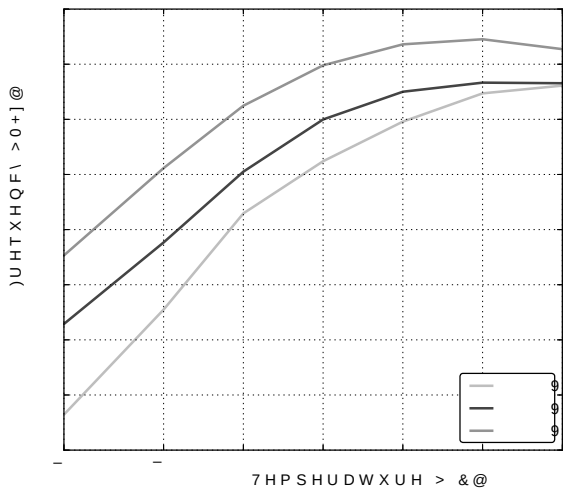

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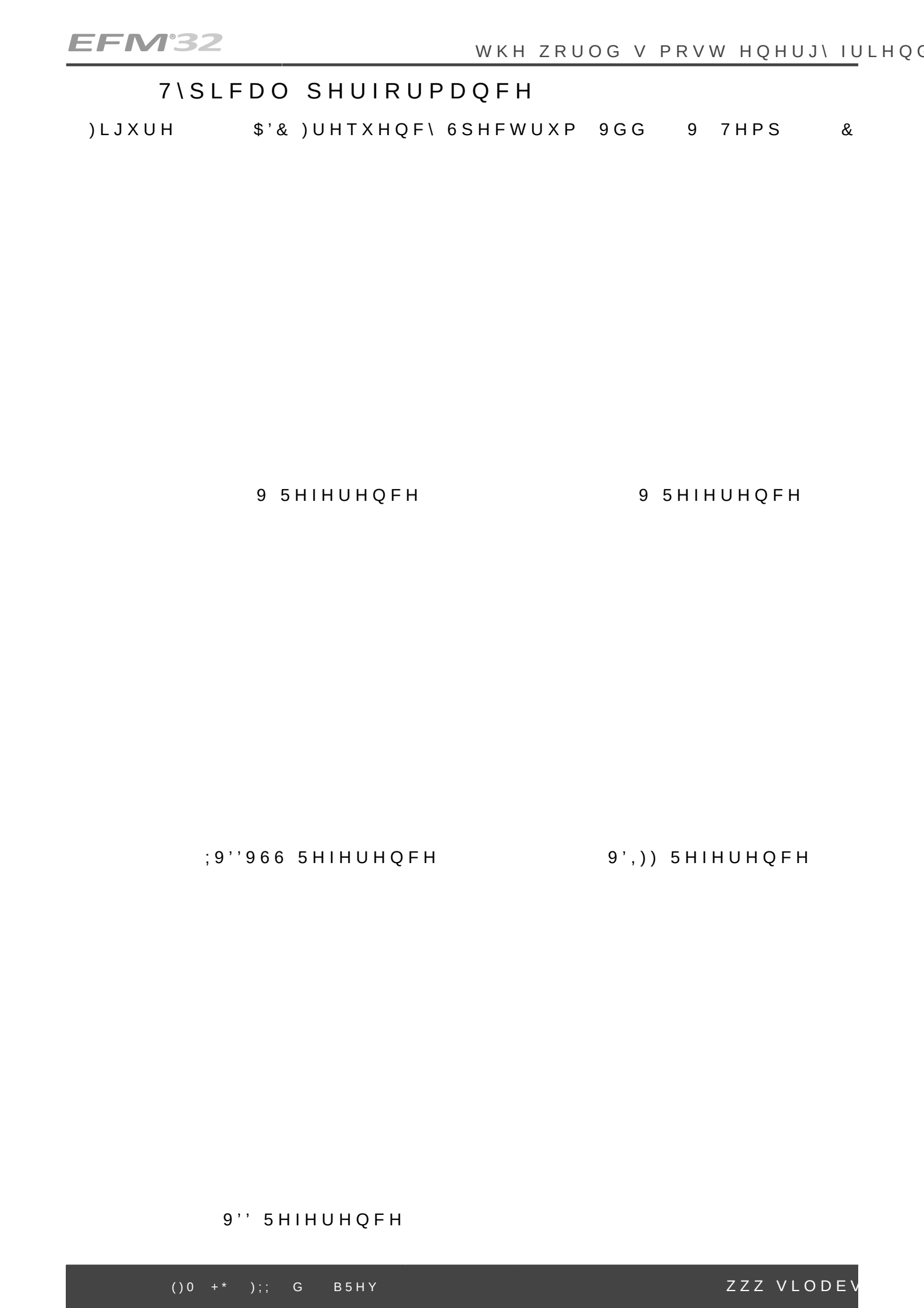
		06DPSOHV V ELW GLIIHUHQ WLDO LQWHUQDO 9 UHIHUHQFH				G%
		06DPSOHV V ELW GLIIHUHQ WLDO 9 UHIHUHQFH				G%
		06DPSOHV V ELW GLIIHUHQ WLDOUHI9IHUHQFH				G%
		06DPSOHV V ELW GLIIHUHQ WLDO UHI9IHUHQFH				G%
		N6DPSOHV V ELW VLQ JOH HQGHG LQWHUQDO 9 UHIHU HQFH				G%
		N6DPSOHV V ELW VLQJOH HQGHG LQWHUQDO 9 UHIHUHQFH				G%
		N6DPSOHV V ELW VLQJOH HQGHG UHI9IHUHQFH				G%
		N6DPSOHV V ELW GLIIHU HQWLDO LQWHUQDO 9 UHIHUHQFH				G%
		N6DPSOHV V ELW GLIIHU HQWLDO LQWHUQDO 9 UHIHUHQFH				G%
		N6DPSOHV V ELW GLIIHU HQWLDO 9 UHIHUHQFH				G%
		N6DPSOHV V ELW GLIIHU HQWLDOUHI9IHUHQFH				G%
		N6DPSOHV V ELW GLIIHU HQWLDOUHI9IHUHQFH				G%
6)'5$'&	6SXULRXV)UHH\ QDPLF 5DQJH 6) '5	06DPSOHV V ELW VLQJOH HQGHG LQWHUQDO 9 UHIHU HQFH				G%F
		06DPSOHV V ELW VLQJOH HQGHG LQWHUQDO 9 UHIHUHQFH				G%F
		06DPSOHV V ELW VLQJOH HQGHG UHI9IHUHQFH				G%F
		06DPSOHV V ELW GLIIHUHQ WLDO LQWHUQDO 9 UHIHUHQFH				G%F
		06DPSOHV V ELW GLIIHUHQ WLDO LQWHUQDO 9 UHIHUHQFH				G%F
		06DPSOHV V ELW GLIIHUHQ WLDOUHI9IHUHQFH				G%F
		06DPSOHV V ELW GLIIHUHQ WLDO UHI9IHUHQFH				G%F
		06DPSOHV V ELW GLIIHUHQ WLDO 9 UHIHUHQFH				G%F
		N6DPSOHV V ELW VLQ JOH HQGHG LQWHUQDO 9 UHIHU HQFH				G%F
		N6DPSOHV V ELW VLQJOH HQGHG LQWHUQDO 9 UHIHUHQFH				G%F

7\SLFDO SHUIRUPDQFH

)LJXUH $'&)UHTXHQF\ 6SHFWUXP 9GG 9 7HPS &



9ROWDJH &RPSDUDWRU 9&03

7DEOH 9&03

6\PERO	3DUDPHWHU	&RQGLWLRQ	0LQ	7\S	0D[	8QLW
9 9&03,1	,QSXW YROWDJH UDQJH			9,,		9
9 9&03&0	9&03 &RPPRQ 0RGH YROWDJH UDQJH			9,,		9
,9&03	$FWLYH FXUUHQW	%,$6352* E DQG +$/)%,$6 LQ 9&03QB&75/ UHJLVWHU				$
		%,$6352* E DQG +$/)%,$6 LQ 9&03QB&75/ UHJLVWHU /35()				$
W 9&035()	6WDUWXS WLPH 12 UHIHU HQFH JHQHUDWRU					V
9 9&032))6(7	2IIVHW YROWDJH	6LQJOH HQGHG				P9
		'LIIHUHQWLDO				P9
9 9&03+<67	9&03 K\VWHUHVLV					P9
W 9&0367$57	6WDUWXS WLPH					V

7KH,,9WULJJHU OHYHO FDQ EH FRQILJXUHG E\ VHWWLQJ WKH 75,* DFFRUGDQFH ZLWK WKH IROORZLQJ HTXDWLRQ

9&03 7ULJJHU /HYHO DV D)XQFWLRQ RI /HYHO 6HWWL

9,, 7ULJJHU /HYHO 9 î75,*/(9(/

, &

7DEOH , & 6WDQGDUG PRGH 6P

6\PERO	3DUDPHWHU	0LQ	7\S	0D[	8QLW
I 6&/	6&/ FORFN IUHTXHQF\				N+]
W /2:	6&/ FORFN ORZ WLPH				V
W +,*+	6&/ FORFN KLJK WLPH				V
W 68 '$7	6'$ VHW XS WLPH				QV
W +' '$7	6'$ KROG WLPH				QV
W 68 67$	5HSHDWHG 67$57 FRQGLWLRQ VHW XS WLPH				V
W +' 67$	5HSHDWHG 67$57 FRQGLWLRQ KROG WLPH				V
W 68 672	6723 FRQGLWLRQ VHW XS WLPH				V
W %8)	%XV IUHH WLPH EHWZHHQ D 6723 DQG 67$57 FRQGLWLRQ				V

)RU WKH PLQLPXP +)3(5&/. IUHTXHQF\ UHTXLUHG LQ 6WDQGDUG PRGH VHH WKH , 7KH PD[LPXP 6'$ KROG WLPH VWR EH PHW RQO\ ZKHQ WKH GHYLFH GRHV QRW VW :KHQ WUDQVPLWWLQJ GDWD WKLV QXPEHU LV JXDUDQWHHG RQO\@ZKHQ , &QB&/.

6\PERO	3DUDPHWHU	&RQGLWLRQ	0LQ	7\S	0D[	8QLW
*3,2	*3,2 FXUUHQW	*3,2 LGOH FXUUHQW DEOHG		FORFN HQ		$ 0+]
356	356 FXUUHQW	356 LGOH FXUUHQW				$ 0+]
'0$	'0$ FXUUHQW	&ORFN HQDEOH				$ 0+]

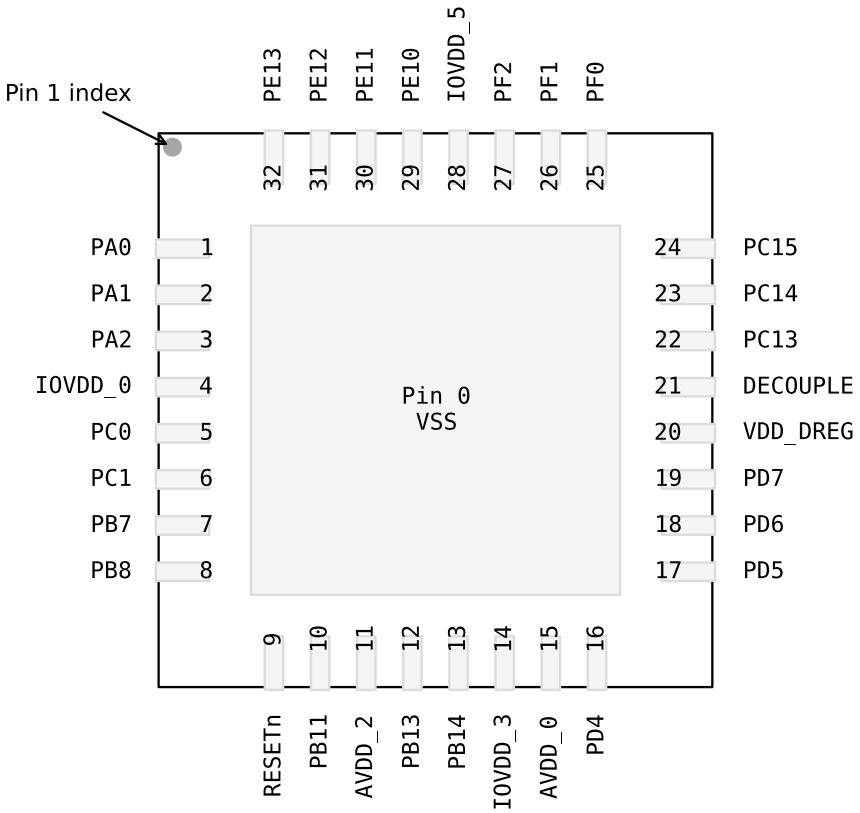
3LQRXW DQG 3DFNDJH

1RWH
3OHDVH UHIHU WR WKH DSSOLFDWLRQ QRWH $1 ()0 +D
JXLGHOLQHV RQ GHVLJQLQJ 3ULQWHG &LUFXLW %RDUGV 3

3LQRXW

7KH ()0 +* SLQRXW LV VKRZQ LQ)LJXUH S DQG 7DEOH
DUG GHQRWHG E\ IROORZHG E\ WKH ORFDWLRQ QXPEHU 0XOWLS
$OWHUQDWH ORFDWLRQV FDQ EH FRQILJXUHG LQ WKH /2&$7,21 E
LQ TXHVWLRQ

)LJXUH ()0 +* 3LQRXW WRS YLHZ QRW WR VFDOH

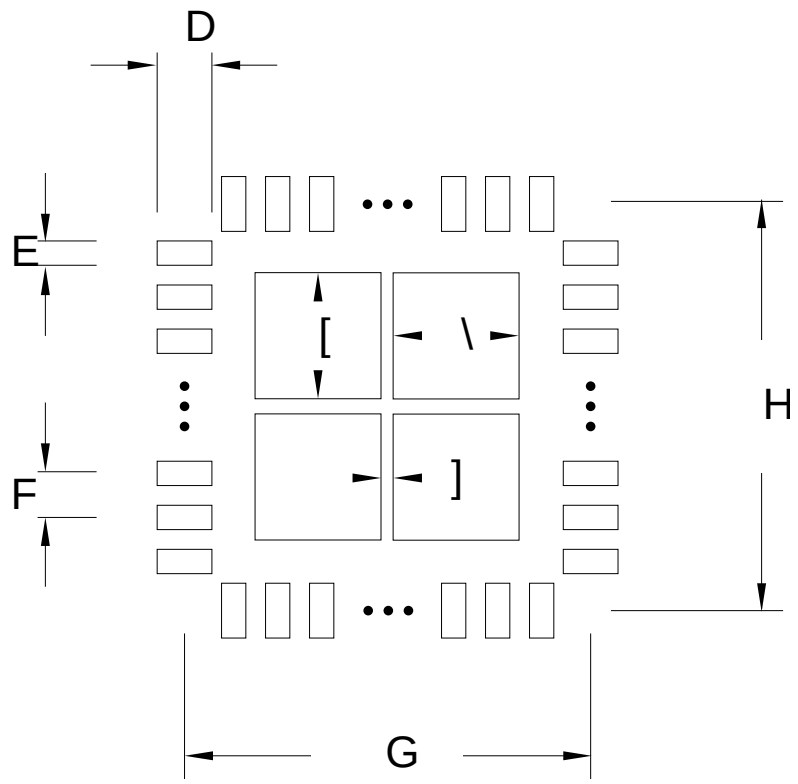


7DEOH 'HYLFH 3LQRXW

4)1 3LQ DQG 1DPH			3LQ $OWHUQDWH)XQFWLRQDOLW\ 'HVFU		
3LQ	3LQ 1DPH	$QDORJ	7LPHUV	&RPPXQLFDWLRQV	2WKHU
	966	*URXQG			
	3$		7,0 B&& 7,0 B&& 3&17 B6 ,1	86 B5; /(8 B5; , & B6'$	356B&+ 356B&+ *3,2B(0 :8
	3$		7,0 B&&	, & B6&/	&08B&/.

4)1 3LQ DQG 1DPH		3LQ $OWHUQDWH)XQFWLRQDOLW\ 'HVFU			
3LQ	3LQ 1DPH	$QDORJ	7LPHUV	&RPPXQLFDWL	2WKHU
			7,0 B&&		356B&+
	3$		7,0 B&&		&08B&/.
	,29''B	'LJLWDO ,2 SRZHU VXSSO\			
	3&	$&03 B&+	7,0 B&& 3&17 B6 ,1	86 B7; 86 B7; 86 B&6 , & B6'$	356B&+
	3&	$&03 B&+	7,0 B&& 3&17 B6 ,1	86 B5; 86 B7; 86 B5; , & B6&/	356B&+
	3%	/);7$/B3	7,0 B&&	86 B7; 86 B&/.	
	3%	/);7$/B1	7,0 B&&	86 B5; 86 B&6	
	5(6(7Q	5HVHW LQSXW DFWLYH ORZ 7R DSSO\ DQ H[WHUQDO UHVHW VRXUFH WR WKLV SLQ LW LV UHTXLUHG WR RQO\ HQVXUH WKDW UHVHW LV UHOHDVHG			
	3%	,'$& B287	7,0 B&& 3&17 B6 ,1	86 B&/.	&08B&/. $&03 B2
	$9''B	$QDORJ SRZHU VXSSO\			
	3%	+);7$/B3		86 B&/. /(8 B7;	
	3%	+);7$/B1		86 B&6 /(8 B5;	
	,29''B	'LJLWDO ,2 SRZHU VXSSO\			
	$9''B	$QDORJ SRZHU VXSSO\			
	3'	$'& B&+		/(8 B7;	
	3'	$'& B&+		/(8 B5;	
	3'	$'& B&+	7,0 B&& 3&17 B6 ,1	86 B5; , & B6'$	$&03 B2
	3'	$'& B&+	7,0 B&& 3&17 B6 ,1	86 B7; , & B6&/	&08B&/.
	9''B'5(*	3RZHU VXSSO\ IRU RQ FKLS YROWDJH UHJXODWRU			
	'(&283/(	'HFRXSOH RXWSXW IRU RQ FKLS YROWDJH UHJXODWRU			
	3&		7,0 B&'7, 7,0 B&& 7,0 B&& 3&17 B6 ,1		
	3&		7,0 B&'7, 7,0 B&& 3&17 B6 ,1	86 B&6 86 B&6 /(8 B7;	356B&+
	3&		7,0 B&'7, 7,0 B&&	86 B&/. 86 B&/. /(8 B5;	356B&+
	3)		7,0 B&&	86 B&/. /(8 B7; , & B6'$	'%*B6:&/. %227B7;
	3)		7,0 B&&	86 B&6 /(8 B5; , & B6&/	'%*B6:',2 *3,2B(0 :8 %227B5;
	3)		7,0 B&& 7,0 B&&	86 B7; /(8 B7;	&08B&/. 356B&+ *3,2B(0 :8

)LJXUH 4)1 3&% 6WHQFLO 'HVLJQ



7DEOH 4)1 3&% 6WHQFLO 'HVLJQ 'LPHQVLRQV 'LPHQVLRQV L

6\PERO	'LP PP
D	
E	
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H	
[	
\	
]	

7KH GUDZLQJV DUH QRW WR VFDOH
$OO GLPHQVLRQV DUH LQ PLOOLPHWHUV
$OO GUDZLQJV DUH VXEMHFW WR FKDQJH ZLWKRXW QRWLFH
7KH 3&% /DQG 3DWWHUQ GUDZLQJ LV LQ FRPSOLDQFH ZLWK ,3&
6WHQFLO WKLFNQHVV PP
)RU GHWDLOHG SLQ SRVLWLRQLQJ VHH)LJXUH S

6ROGHULQJ ,QIRUPDWLRQ

7KH ODWHVW ,3& -('(& - 67' UHFRPPHQGDWLRQV IRU 3E)UHH U

3ODEM PDQ\ DQG DV VPDOO DV SRVVLEOH YLDV XQGHUQHDWK HD
SDG

5HYLVLRQ

’HFHPEHU WK

3UHOLPLQDU\ 5HOHDVH