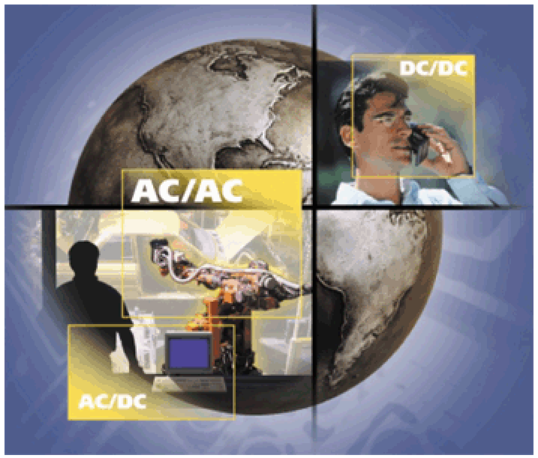
Power Supply Strategy

Fairchild offers Best Power Devices for:



AC/DC & DC/DC
Computers and Peripherals
Servers and Routers
Battery Powered Equipment
Audio and Video
Power Supplies

AC/AC & DC/AC
Robotics
Welding Equipment
Telecom
Consumer Products
Motors
UPS

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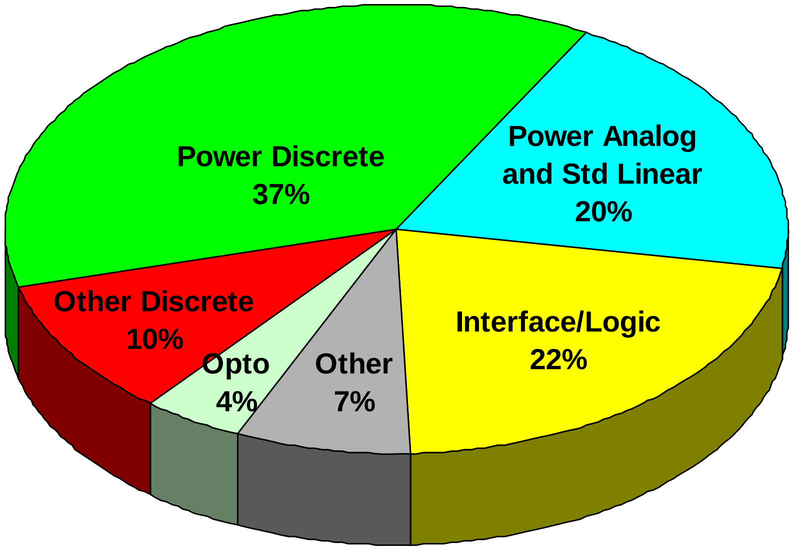
Fairchild *Multiple Market* Leader

Product Mix with the Intersil Power Products included



Power Leader

- Fairchild will sell over **$1 billion in Power solutions in 2001**
- **#2** in **$3B Power MOSFET** market
- **Top 5** in **$7B Power Discrete** market
- **Top 5** in **$5.2B Analog Power Management** Market

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Competition

		FSC	IR	SILICONIX	STMicro	NEC	HITACHI	TOSHIBA
Low Voltage	Notebook	X	X	X		X	X	X
	Desktop	X	X		X			
	HDD	X	X	X		X	X	X
	Cell Phone	X		X		X		
	Battery	X		X		X	X	X
	Automotive	X	X			X		
	VRM	X	X	X		X		X
High Voltage	SMPS	X	X		X			
	Ballast	X	X		X			X
	Monitor	X			X	X		X
	Charger	X	X		X		X	
	Motor	X	X		X			X

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Power Supply Segment
"BEST IN CLASS"

	PRODUCT	**Voltage Range**	**Power Supply Segment "BEST IN CLASS"**
DC/DC	**MOSFET**		
	Low Voltage	Up to 60V	Power Trench
	Med Voltage	60V to 200V	UltraFET Trench
	High Voltage	200V and higher	IRFPXXXA, QFET, BFET and CFET
AC/DC	**IGBT**		
	Discrete	600V, 1200V	SMPS I & II & 1200V NPT IGBT
	RECTIFIERS		
	Fast Recovery	600V, *1200V*	STEALTH

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Stealth Rectifier Selection Guide

STEALTH	
Target Market	**Applications in Switch Mode Power Supplies (SMPS), CCM PFC boost converters as boost diode, Uninterruptible Power Supplies (UPS), Motor Drives, Welding, Induction Cooking, DC/DC Output Rectification, etc.**
Customer Benefits	**Avalanche energy rated, FAST and SOFT recovery switching** **Elimination of snubber circuit possible (reduces component count and cost)**
Product Features	**Unique diode technology that combines fast recovery characteristics of Hyperfast rectifiers with “soft” recovery characteristics to achieve lower switching losses and reduced electro-magnetic interference (EMI).** Reduced diode recovery losses, reduced diode recovery current, reduced turn-on losses in IGBT, reduced stress on input capacitors, reduced EMI Typical prefixes: ISL9R, ISL9K
X-REF	
Second Source	

- **Packages include: TO-220, TO-247, TO-263, TO-262**

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MediumVoltage (60 to 200V) MOSFET Selection Guide

UltraFET Trench	
Target Market	DC/DC converters, Telecom power supplies, audio, energy management & conversion, consumer goods, motor controls, UPS, and industrial
Customer Benefits	Best gate charge and Rds(on) in the industry
Product Features	Typical prefixes HUF, FDx, NDx, FQx, IRx, RFx, etc.
X-REF	
Second Source	Wide range of Int’l Rectifier (IR) (IRF620, etc.) second source part numbers available

(MicroLeadframe/MicroFET package planned)

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High Voltage (200V to 1000V) MOSFET Selection Guide

QFET, A/B FET	
Target Market	Applications in DC-DC converters, load switching applications, and high power AC-to-DC power supplies (power factor control) where efficiency is important. Also off-Line power supplies, audio, energy management & conversion, consumer goods, motor controls, UPS, industrial, lighting (ballast), etc.
Customer Benefits	Best gate charge and Rds(on) in the industry
Product Features	Typical prefixes HUF, FQx, IRx, RFx, etc. (the "x" is the package designator)
X-REF	
Second Source	Second source to IR's MOSFETs. **IRP460A is better than Infineon's CoolMos (if 600V is not particular to customer)**

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High Voltage (600V to 1200V) IGBT Selection Guide

SMPS I & II IGBT	
Target Market	**IGBT is a MOSFET variant designed for high voltages SMPS market** Applications in Switch Mode Power Supplies (SMPS), such as PFC boost converter, DC/DC Full bridge, DC/DC Phase shifted FB-PWM-ZVS, UPS, Motor Drives, Welding, Induction Cooking, Low Vcesat IGBTs for Plasma Display Panels, etc.
Customer Benefits	**Low conduction & low switching loss where high speed switching required** Facilitates higher power density, switching speeds up to 100 kHz
Product Features	SMPS II has up to 80% less gate charge compared to MOSFETs, UIS rating, and co-pack with Stealth diode Typical Prefixes include HGT, FGXXX
X-REF	
Second Source	Industry Standard MOSFETs (SMPS II)

Packages include: TO252(DPAK), TO220, TO263 (D2PAK), TO247 etc

High Voltage Switch

SMPS IGBT

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Your "Low Cost" Switch Technology

- **SMPS IGBT Advantage**
  - **Lower conduction loss @ rated current**
  - **Reduced gate charge**
  - **Superior co-packaged diode for applications requiring a free-wheeling diode such as motor drive, UPS etc**
  - **Fastest IGBT in the world**
  - **In some applications reduced system design cost**
- **Further Improvement Required**
  - **More difficult to parallel**
  - **Turn-off speed (E_{off}) has dramatically improved, but still it is slower than most of the MOSFETs**

SMPS II----Technology

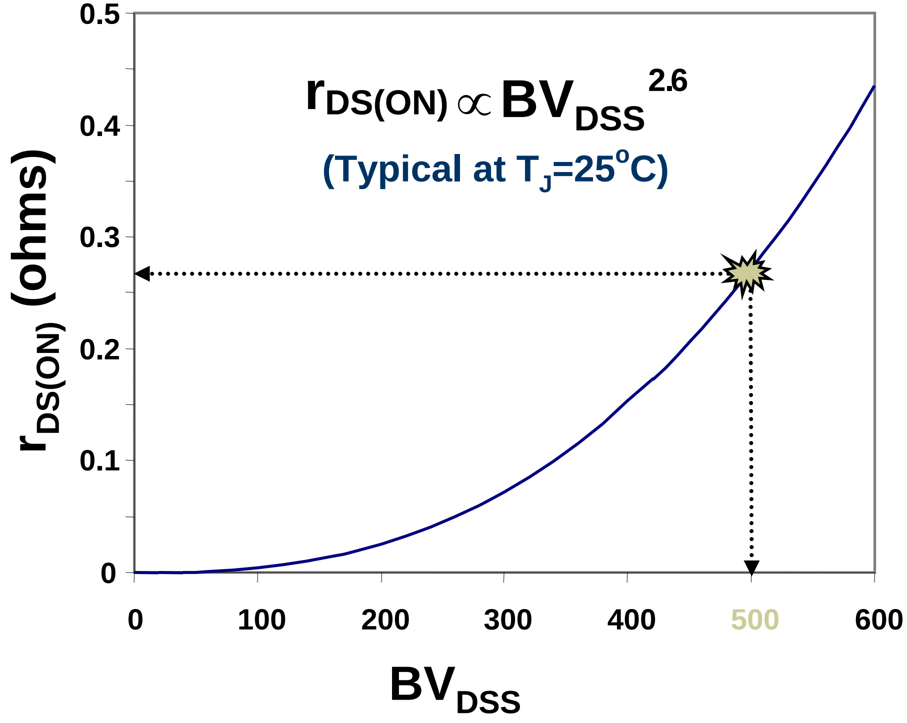
- UIS rated
- Stealth diode is used as copack diode so turn-on loss is reduced-- Applications: UPS, SMPS and DC/AC inverters
- Gate-Emitter Threshold Voltage (Vgeth) is compatible with MOSFET Vgeth
- Reduction of gate charge parameter
  80% over MOSFET & 60% over SMPS I IGBT
  Enables the designer to drive IGBT directly from control IC
- Reduced propagation delay improves phase margin in feed back loop
- Statistically conduction and turn-off loss increased by 5% over SMPS I

The IGBT Advantage

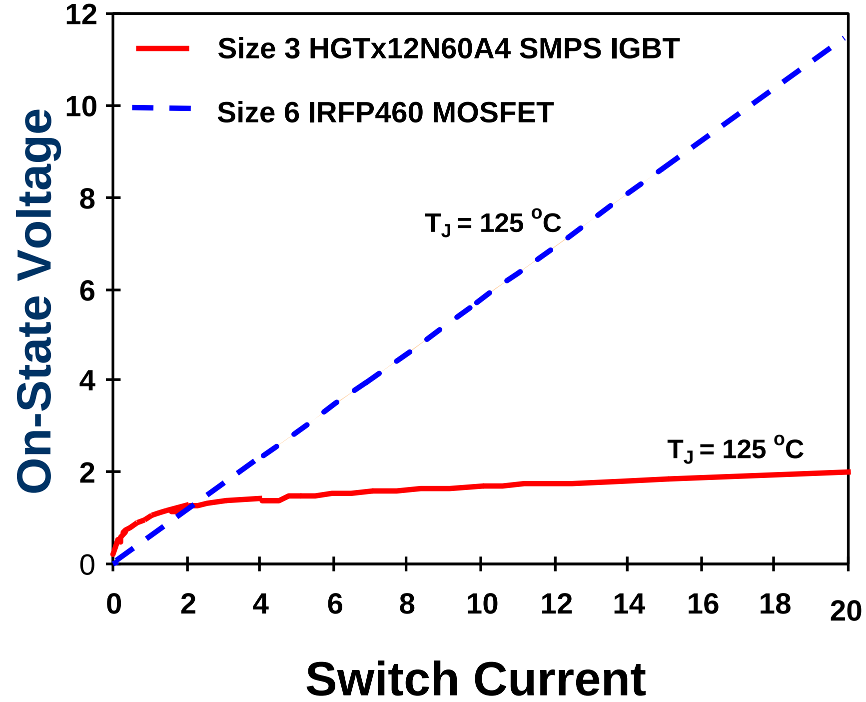
Conducting properties of the MOSFET and the IGBT

Typical $r_{DS(ON)}$ vs BV_{DSS}

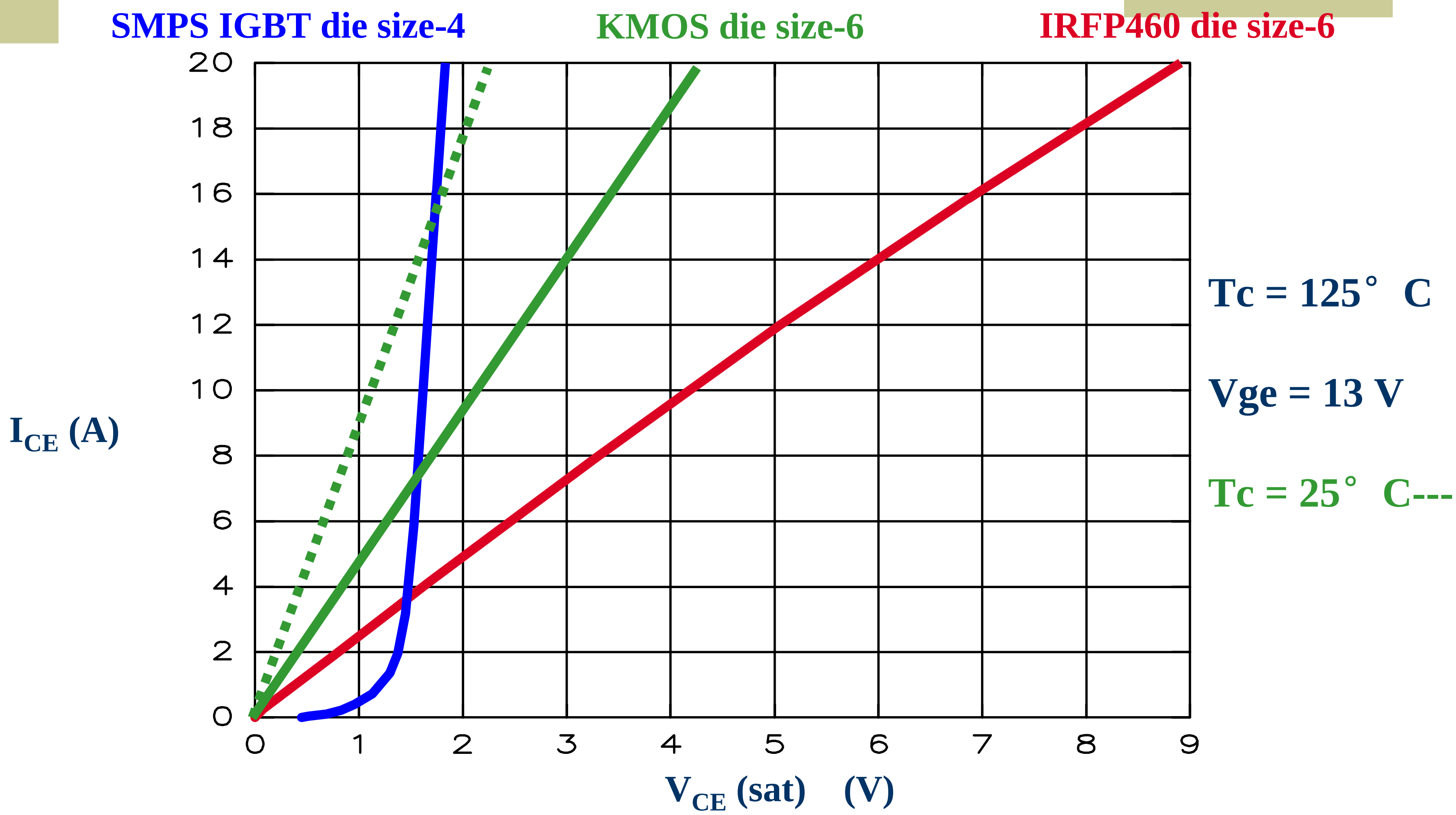
(VDMOS Structures, Size 6)



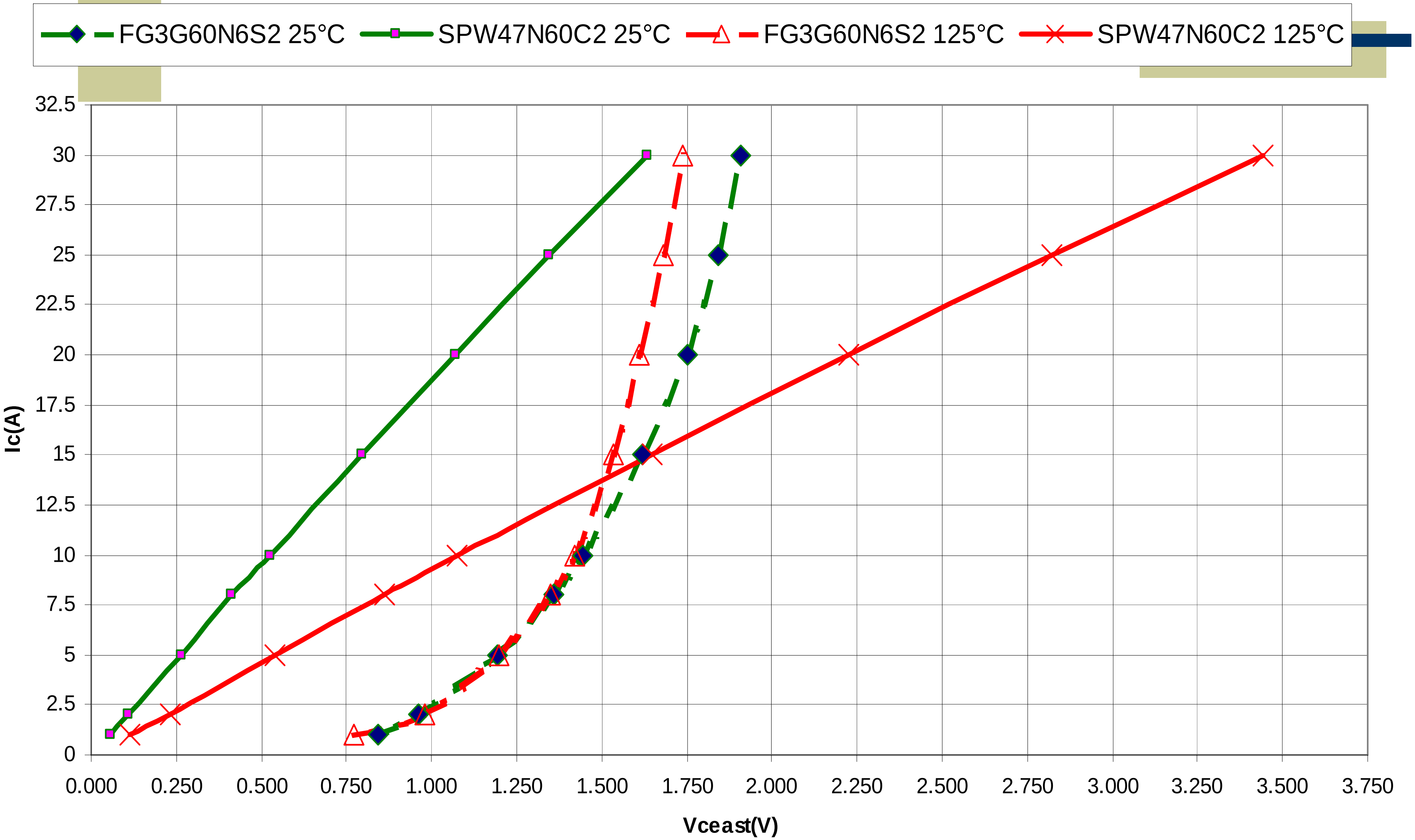
On-state Voltage



IGBT Vs Mosfet



$V_{CE(SAT)}$ Comparison



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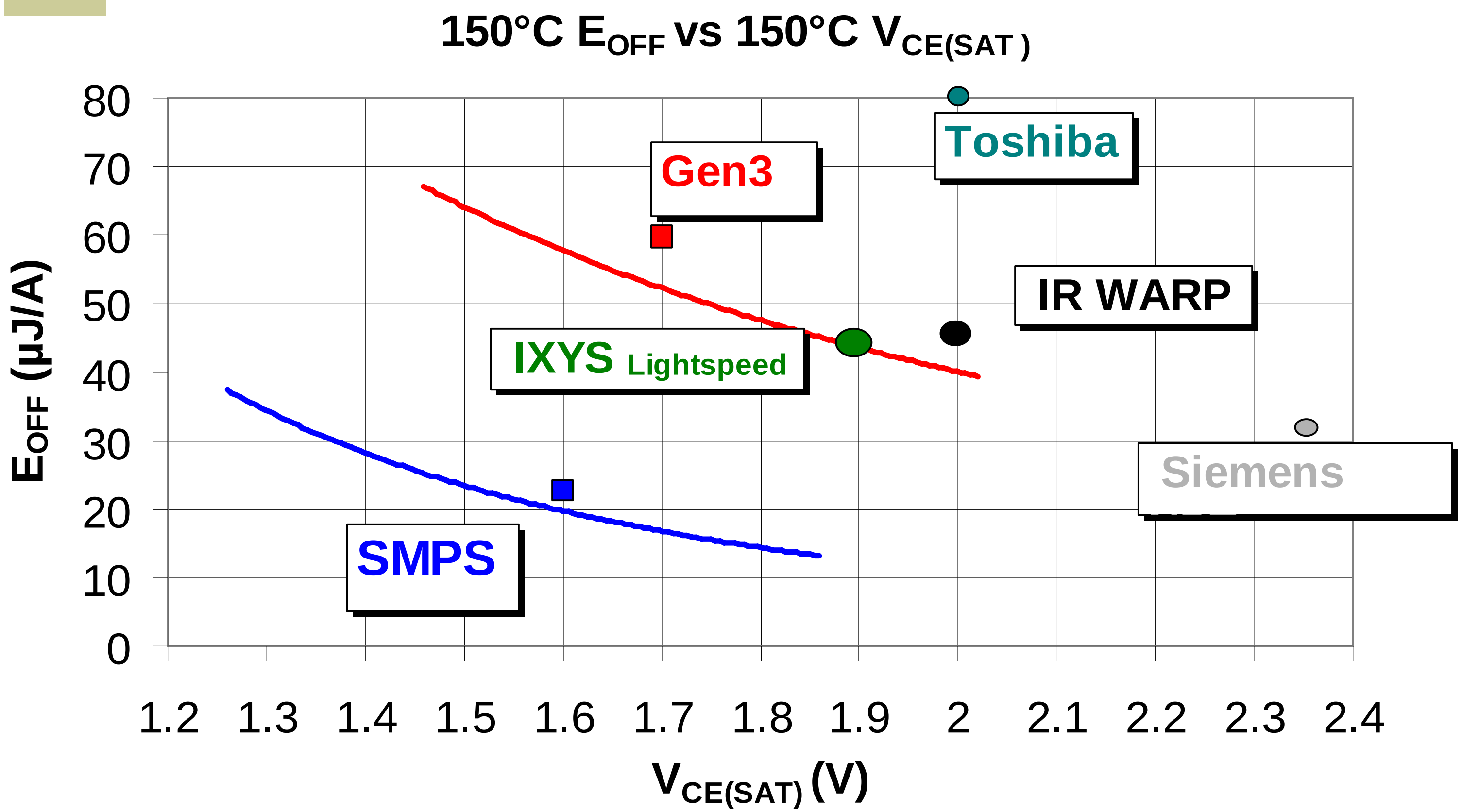
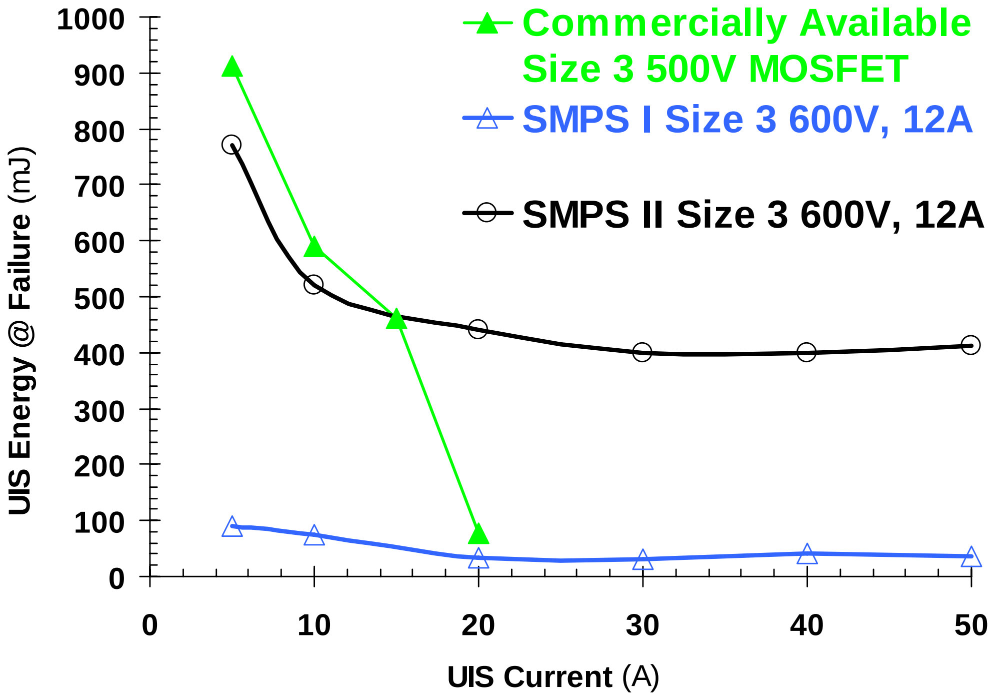
IGBT Performance Comparison



Lowest conduction loss

Measured 27° C UIS Capability

- Equivalent MOSFET die area UIS limited by pre-heating during inductive current ramp
- SMPS II IGBTs have excellent UIS performance over entire current range



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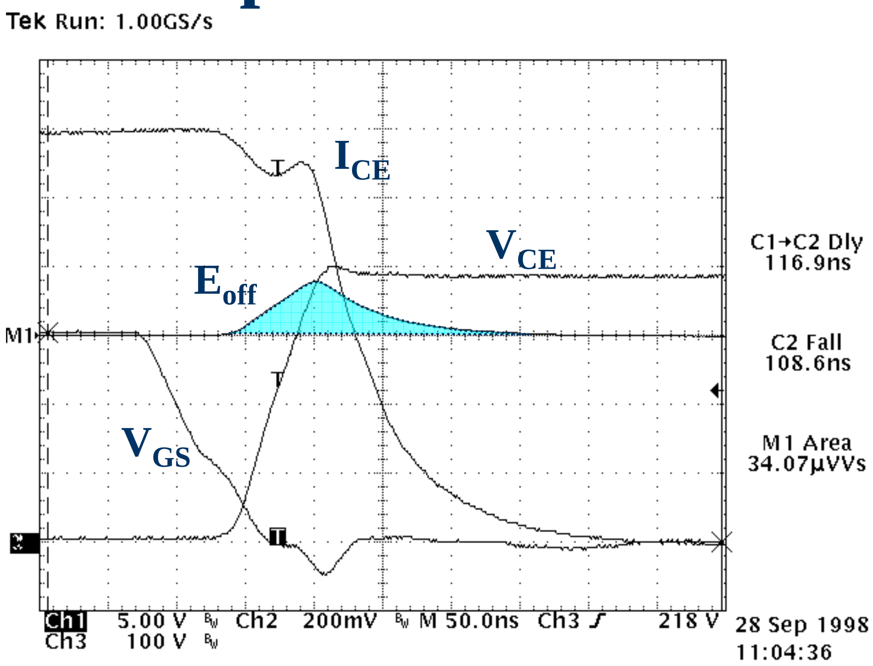
Comparison Between SMPS IGBTs And The Next Fastest IGBT Technology

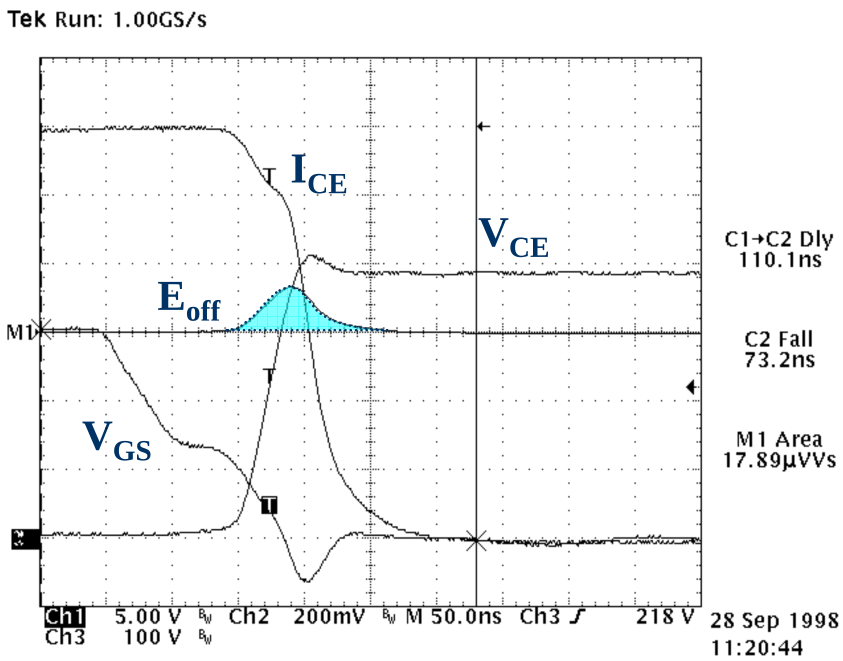
Competitive IGBT



Turn-off energy E_{off} = 341µJ

Fall time t_f = 109nsec

SMPS IGBT



Turn-off energy E_{off} = 179µJ

Fall time t_f = 73nsec

Test Conditions: V_{CE} = 390V, I_{CE} = 12A, T_J = 125°C

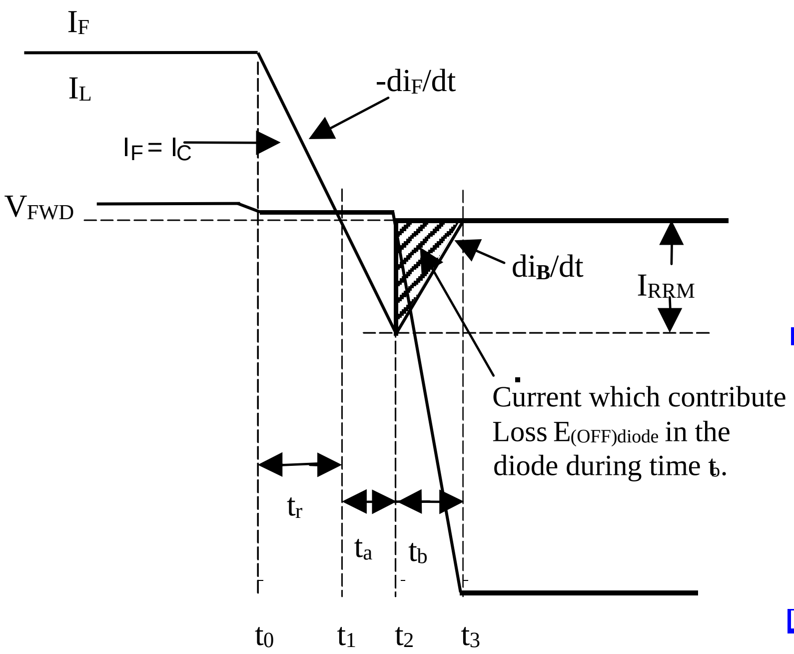
SMPS IGBT & IR Warp Comparison

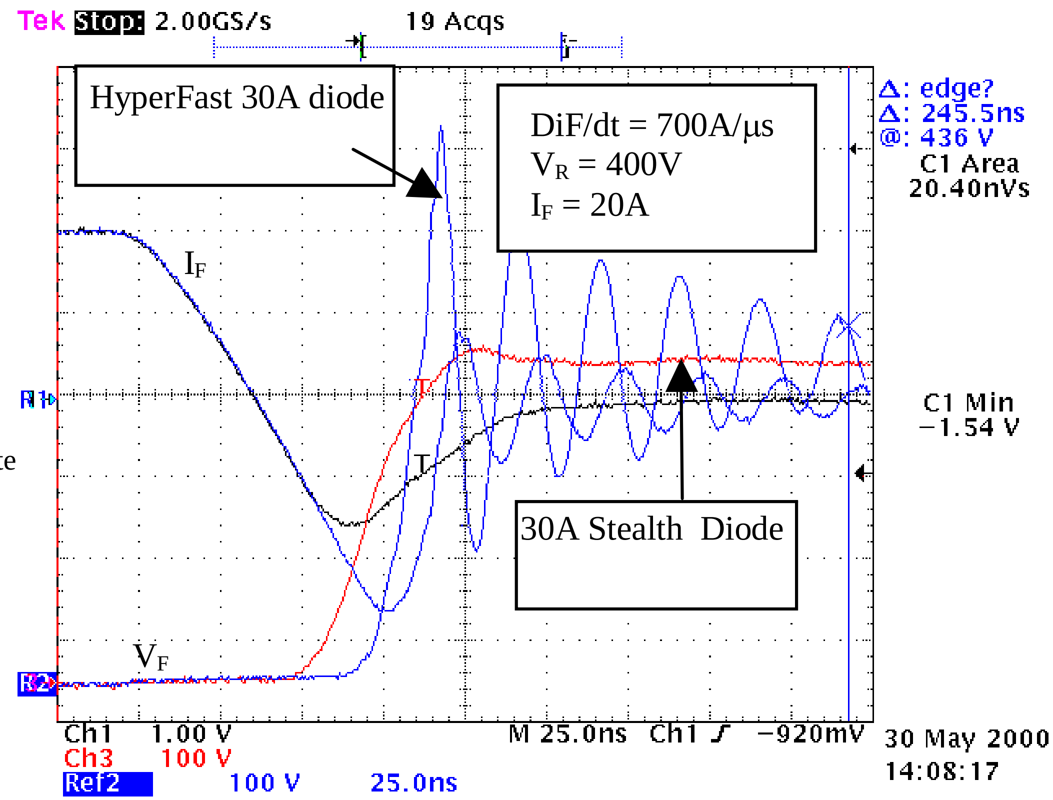
			Ic		Vge(th)		Vcesat @		Eoff @ at 400 volts			Qg(on)	Rjc
Device #	Make		@ 25°C	@ 110°C		Ic	@ 25°C	@ 125°C	Ic	@ 25°C	@ 125°C		
			Amps	Amps	Volts	Amps	Volts	Volts	Amps	µj	µj	nc	°C/W
HGTG40N60A4	FCS		75	63	5.60	40	1.700	1.500	40	380	700	350	0.20
No equvalent part	IR												
HGTG30N60A4	FCS		75	60	5.2	30	1.800	1.600	30	260	475	225	0.27
IRG4PC50W	IR		55	30	4.5	30	2.000	1.900	30	300	675	180	0.64
HGTP20N60A4	FCS		70	40	5.5	20	1.800	1.600	20	140	280	142	0.43
IRG4BC40W	IR		40	17	4.5	20	2.050	1.900	20	175	390	98	0.77
HGTG12N60A4	FCS		54	23	5.6	12	1.880	1.635	12	75	175	78	0.75
HGTG12N60A4LC	FCS		54	23	6.4	12	1.854	1.721	12	125	245	24	0.75
IRG4PC30W	IR		23	11	4.5	12	1.960	2.001	12	125	300	51	1.20
HGTP7N60A4	FCS		34	14	5.9	7	1.900	1.600	7	65	125	37	1.00
IRG4BC20W	IR		13	6	4.5	7	2.180	2.050	7	75	165	26	2.10
HGTP3N60A4	FCS		17	8	6.1	3	2.000	1.600	3	25	51	21	1.80
No equvalent part	IR												

High Voltage Diodes

Stealth

Diode Recovery Basics





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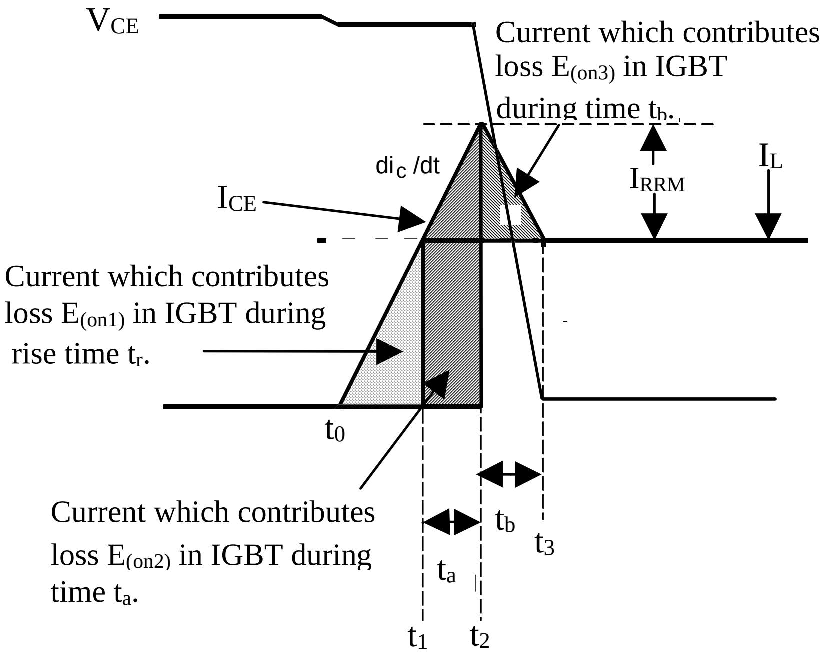
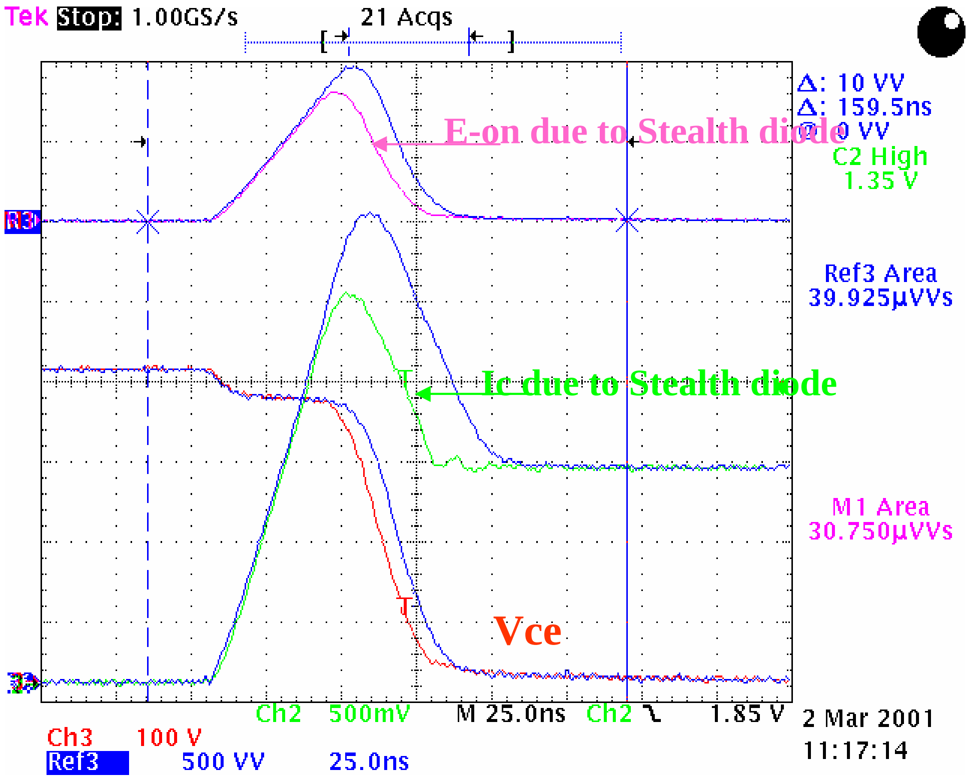
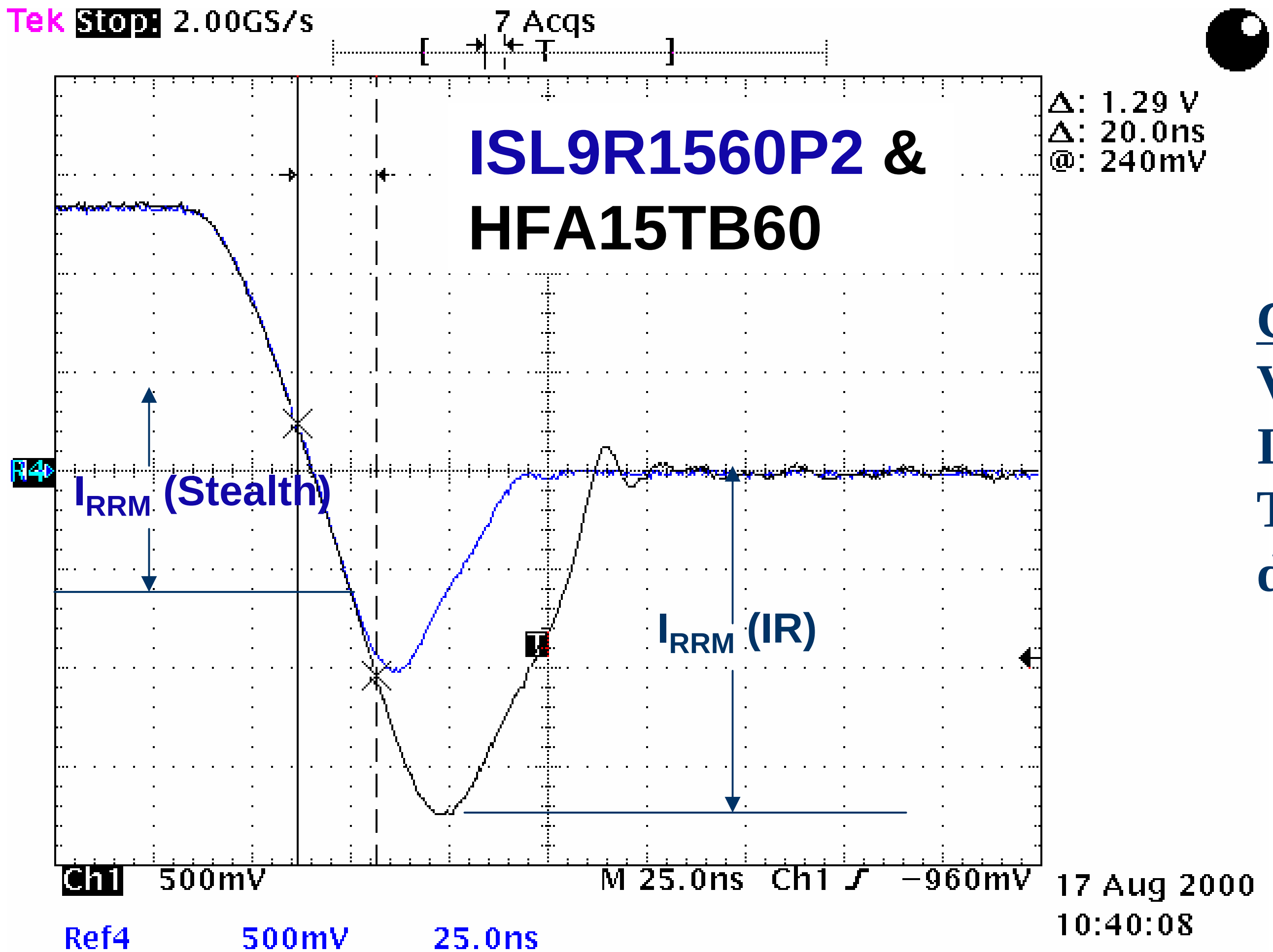
How The Diode Affects The Turn-On Loss Of The IGBT





$$\text{Eon} = \frac{V}{2}\left[I_l\left(t_R + 2\times t_A + t_B\right)\right] + \frac{V}{6}\left[I_{RRM}\left(3\times t_A + 2\times t_B\right)\right]$$

Stealth Rectifier:
15A Recovery Comparison



Conditions:

V_{CC} = 390V

I_F = 13.5A

T_J = 125° C

di/dt = 650A/µs

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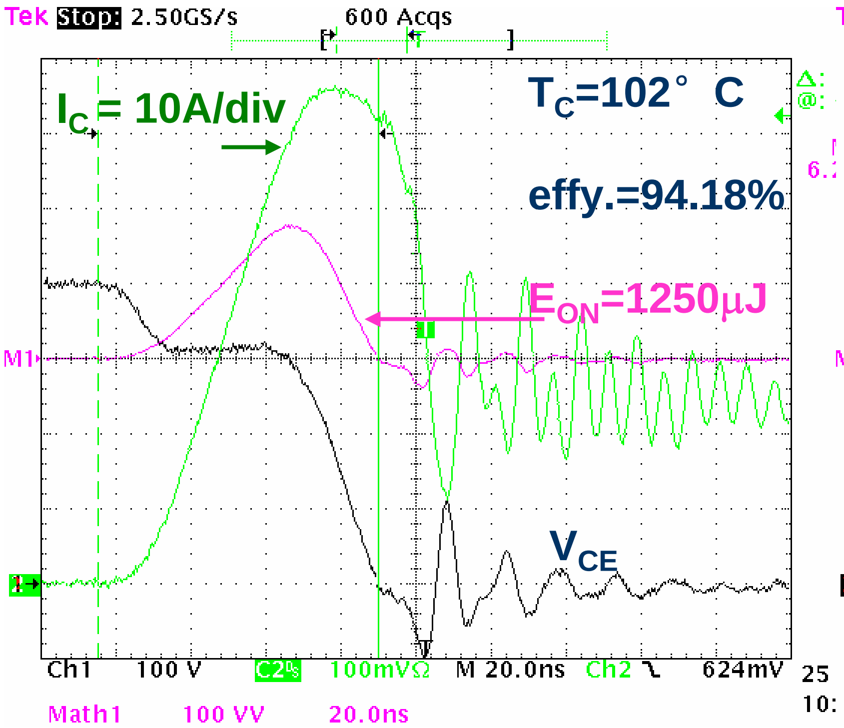
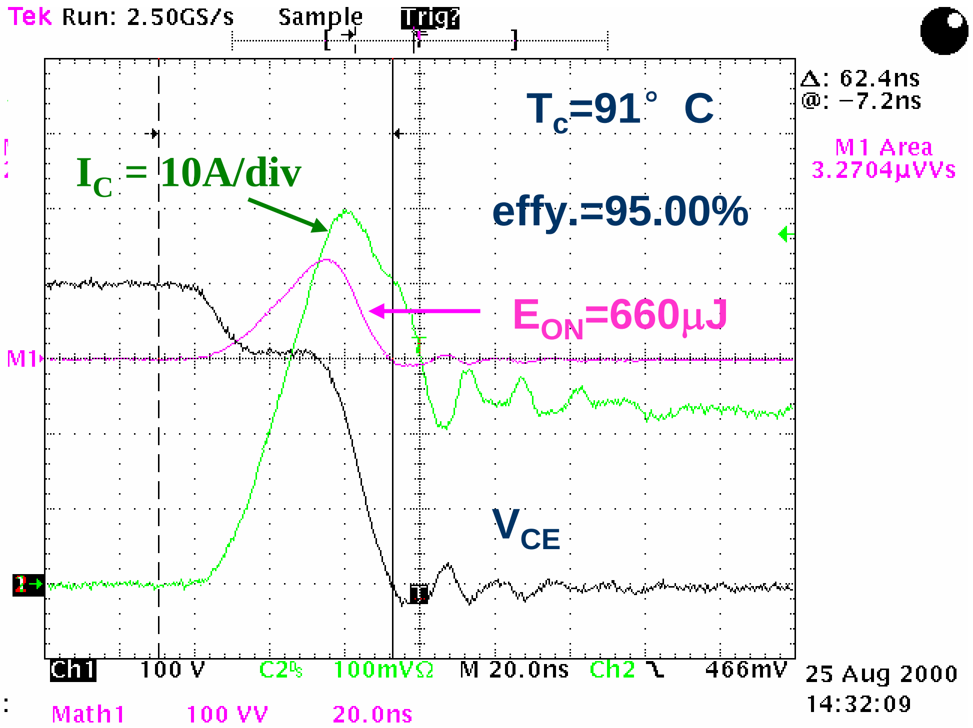
HGTG40N60A4D SMPS IGBT Turn-on loss in a 3000W PFC



Due to 25A HFA25PB60 Boost Diode



Due to 30A Stealth Boost Diode

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Stealth diode results in a CCM boost PFC

- Stealth technology solves these issues by offering reduced I_{RRM} and optimized softness (S>1)

- Case studies were done for 3KW commercial PFCs

- Standard high speed diode was replaced by Stealth Diode offering:

  0.8% improvement in efficiency
  9° C lower switch temperature
  10° C lower diode temperature

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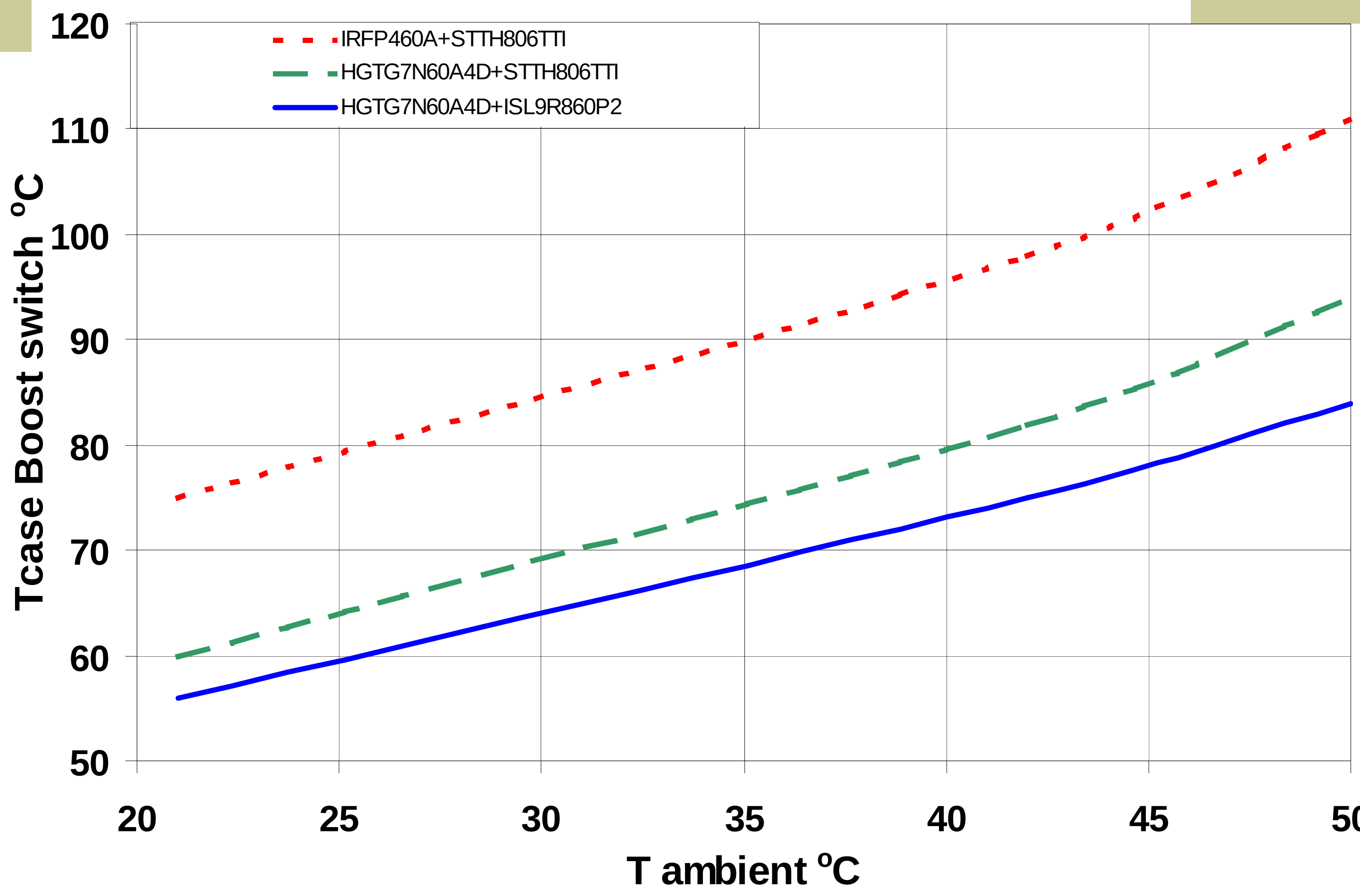
300W 100kHz Hard Switched PFC Case Study



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The Stealth Diode Advantage

- Reduces reverse recovery current
- Lower Qrr
- Reduces IGBT turn-on loss
- Reduces diode recovery loss
- As temperature goes up this diode performance becomes better compared to other diodes
- Reduces/eliminates need for diode snubber
- Reduces stress on bulk filter
- Softness S >1 (reduced EMI & ringing)
- Reduced leakage due to Pt life time control
- If switch turn-on di/dt can be increased then the efficiency can be increased without increasing diode ringing

Stealth Diode Applications

- Boost diode for CCM PFC applications
- Free wheeling diode for SMPS
- UPS applications
- Motor drives
- Output rectification (high speed)
- Induction heating
- Snubber diode

Different Boost PFC Methods

- **Discontinuous Conduction Mode**
- **Continuous Conduction Mode**

Discontinuous Conduction Mode

- Good for low power < 200Watts
  - Simple control
  - Variable switching frequency (spreads out the EMI signature)
  - Low frequency harmonics are small
  - High RMS current since switch peak current is high (increased switch conduction loss)
  - Smaller inductor
  - High ripple current stresses the filter capacitors
    - Switch considerations
      - Little to no reverse recovery since the inductor current is discontinuous
      - ZCS turn-on
    - A low V_F diode with soft recovery should be used (RUR series is the best choice)

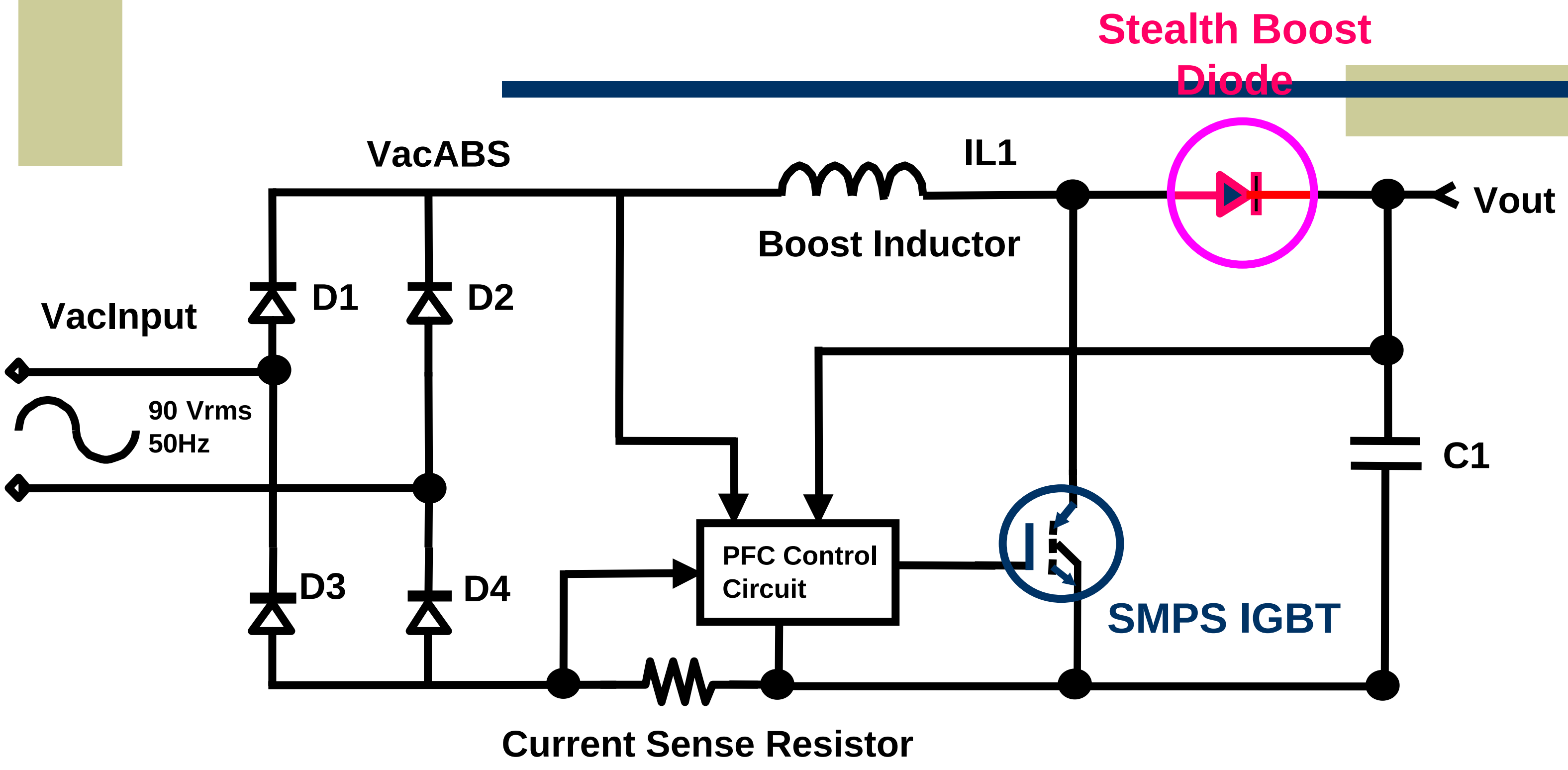
Different Boost PFC Methods

- **Discontinuous Conduction Mode**
- **Continuous Conduction Mode**

Continuous Conduction Mode

- Good for higher power > 300Watts
- Fixed switching frequency generally <100kHz
- Conversion ration 1 to infinity
- Can produce very low THD
- Typically hard turn-on and hard turn-off
  - Soft switching approach is used for high power PFC's
- Low ripple current
  - Switch considerations
    - **Better boost switch utilization**
    - Low RMS current since switch peak current is low
    - Best Boost switch tends to be a SMPS I or II IGBT
    - For hard turn-on use soft, low Qrr and fast recovery diode
    - Stealth diode is the best choice for hard turn-on

CCM Boost PFC



Impact of Diode Reverse Recovery

- High I_{RRM} & Q_{RR} increases turn-on loss of the IGBT
- High Q_B increases blocking loss of the diode
- 'Snappy' recovery causes EMI and can destroy the diode

Power Semiconductor Selection for CCM PFC hard turn-on

Power Semiconductor selection for CCM PFC hard turn-on

Boost Switch	LOW LINE = 90V	Boost Diode
HGTG3N60A4D	100W	ISL9R460P2
HGTG7N60A4D	250W	ISL9R460P2
HGTG12N60A4D	400W	ISL9R460P2
HGTG20N60A4D	600W	ISL9R860P2
HGTG30N60A4D	900W	ISL9R1560P2
HGTG40N60A4D	1200W	ISL9R1560P2

Boost Switch	LOW LINE = 180V	Boost Diode
HGTG3N60A4D	150W	ISL9R460P2
HGTG7N60A4D	400W	ISL9R460P2
HGTG12N60A4D	600W	ISL9R860P2
HGTG20N60A4D	1000W	ISL9R860P2 ISL9R1560P2
HGTG30N60A4D	1400W	ISL9R1560P2
HGTG40N60A4D	2200W	ISL9R3060G2

NOTE: This table is base line starting point only

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Power Semiconductor Selection for CCM PFC hard turn-on

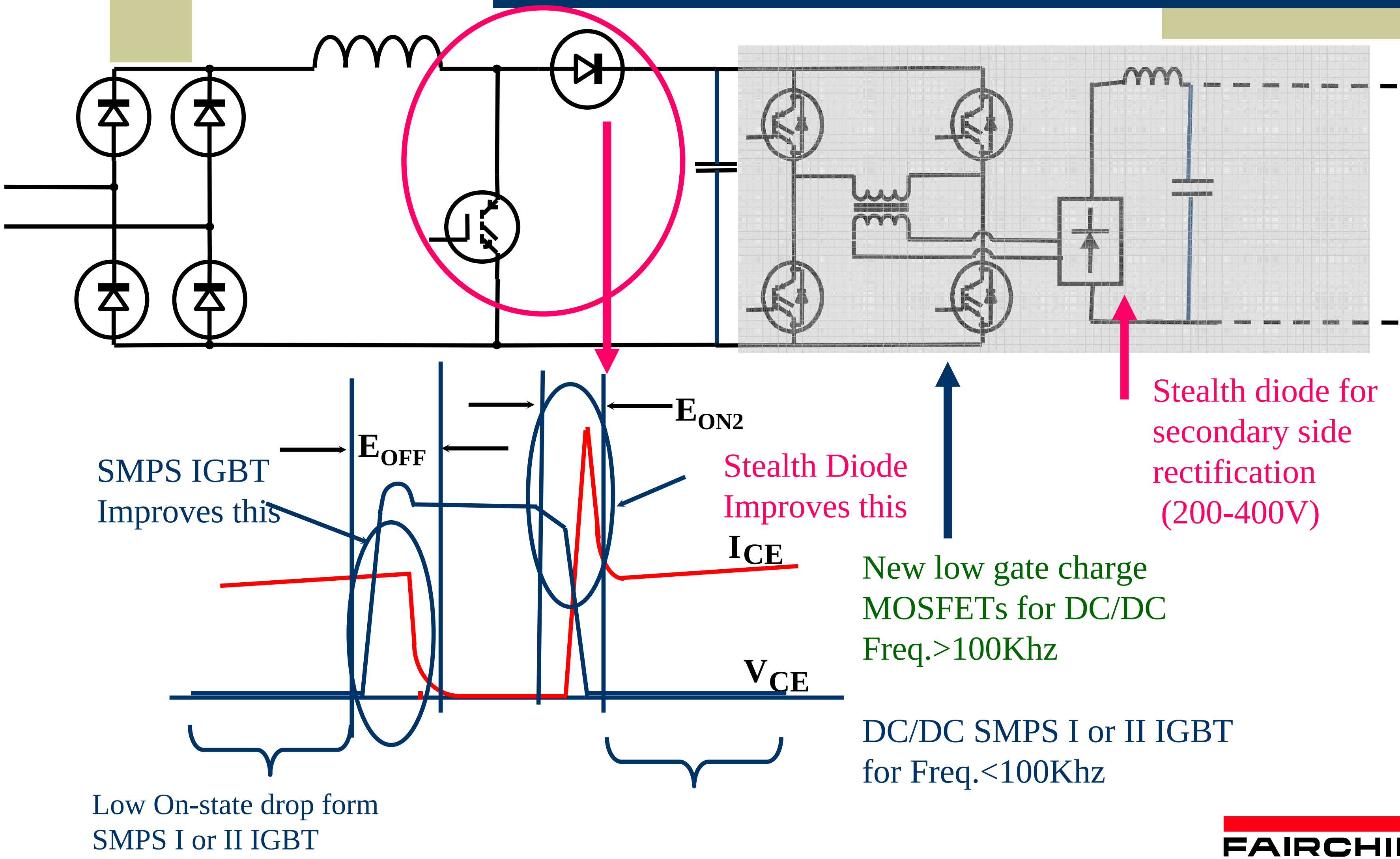
Boost Switch	LOW LINE = 90V	Boost Diode
FGH30N6S2D	100W	ISL9R460P2
FGH30N6S2D	250W	ISL9R460P2
FGH30N6S2D	400W	ISL9R460P2
FGH40N6S2D	600W	ISL9R860P2
FGH50N6S2D	900W	ISL9R1560P2
FGH60N6S2D	1200W	ISL9R1560P2

Boost Switch	LOW LINE = 180V	Boost Diode
FGH30N6S2D	150W	ISL9R460P2
FGH30N6S2D	400W	ISL9R460P2
FGH30N6S2D	600W	ISL9R860P2
FGH40N6S2D	1000W	ISL9R860P2 ISL9R1560P2
FGH50N6S2D	1400W	ISL9R1560P2
FGH60N6S2D	2200W	ISL9R3060G2

NOTE: This table is base line starting point only

See datasheet for PFC IC FSC4822 to offer complete PFC solution!

Basic Schematic Of Typical SMPS Used In Telecomm Applications



IGBT Replacement of MOSFET

- Gate drive of IGBT recommended to be 12-15V while FET has recommended 8-10V
- In the case of existing designs, the change in gate capacitance (lower for IGBT) may require change of gate resistor to re-tune gate circuit
- Stealth diode reduces EMI significantly
- The SMPS IGBT can be used to generate the same amount of output power as a much larger die size MOSFET resulting in component cost saving, board space saving, and higher efficiency.

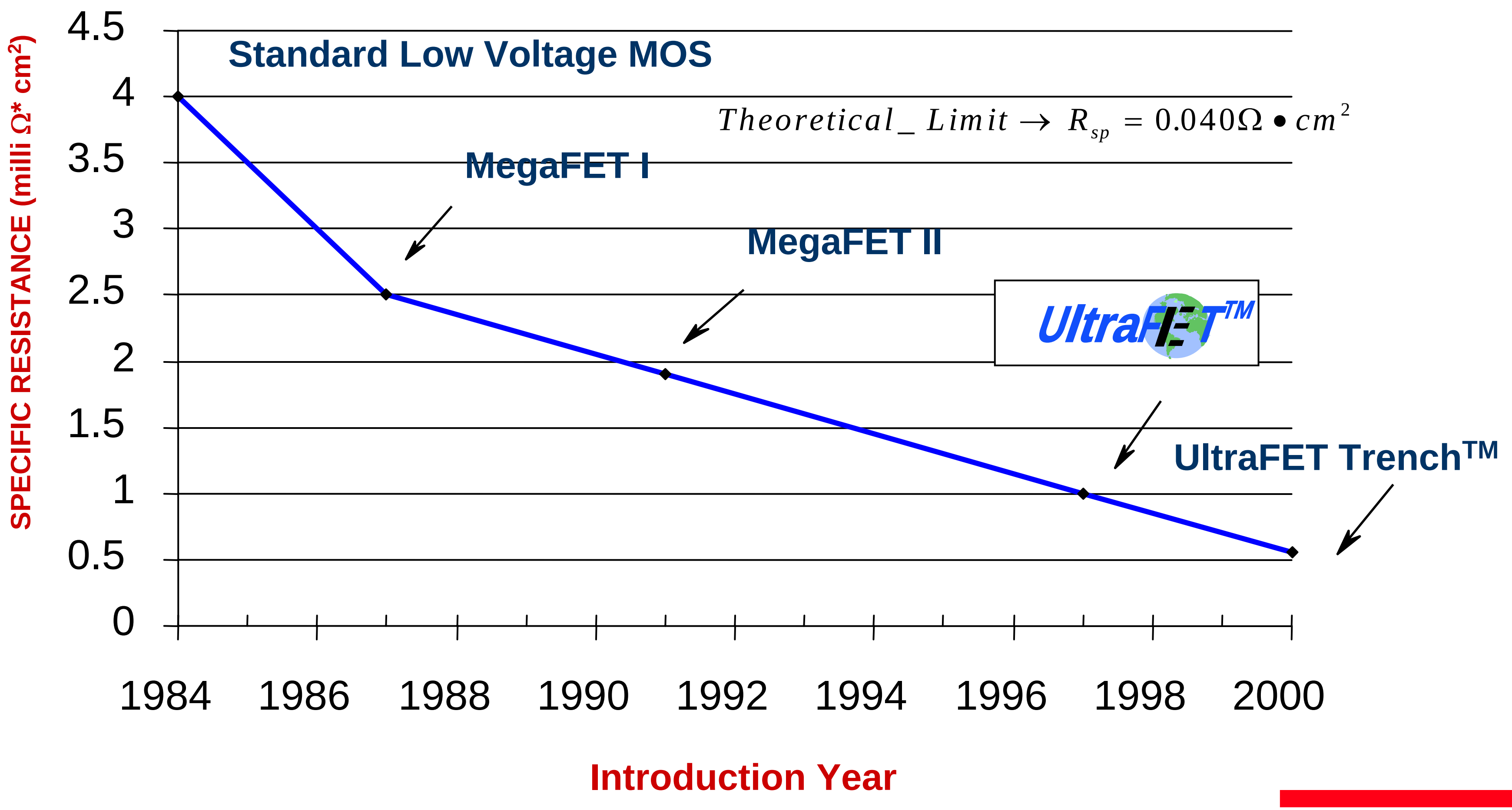
MOSFETs Comparison

			IR-MOS		INFINEON-COOLMOS		FCS MOSFETs	
Parameters	Tc	Unit	IRFP460A	IRFP37N50A	SPW20N60C2	SPW47N60C3	IRFP460A	IRFP40N50A*
Id(continuous)	25°C	A	20	37	20	47	20	40
Id(continuous)	100°C	A	12	23	13	30	12	25
Rdson	25°C	Ω	0.200	0.130	0.160	0.060	0.170	0.105
Vth	25°C	V	3	3	4.5	3	3.2	5
Rthjc		°C/W	0.45	0.28	0.6	0.3	0.5	0.22
Ciss	25°C	pF	3600	5580	3000	8800	3500	5300
Coss	25°C	pF	440	810	1700	3150	410	640
Crss	25°C	pF	39	36	50	36	25	35
Gate charge (Qg)	25°C	nc	105	180	110	tbd	60	90
Qg Measured		nc	94		125			
V Plateau		V	5.5		8.4	5.5	5	5
Turn-on delay time	25°C	ns	18	23	50			
Rise time	25°C	ns	77	98	40			
Turn-off delay time	25°C	ns	40	52	100			
Fall time	25°C	ns	43	80	20			
Turn-off loss	125°C	μJ	85		42		56	55
@ Id=10A, Vcc=400V			Rg = 15Ω		Rg = 3.6Ω		Rg = 10Ω	Rg = 3.9W
Turn-off loss	125°C	μJ			64		70	75
@ Id=10A, Vcc=400V					Rg = 10Ω		Rg = 15Ω	Rg = 3.9Ω
Package			TO-247	TO-247S	TO-247	TO-247	TO-247	TO-247

*: IRFP40N50A is not a released part

Trend in Specific Resistance

50-60 Volt Power MOS Specific Resistance



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Power Trench *Features & Benefits*

Process

20/30V PowerTrench I

- Low specific $R_{DS(ON)}$
- Very fast switching

20/30V Power Trench II

- Lowers specific on-resistance by 25%
- Smallest die size per Rds(on) available in the industry

20/30V Power Trench III

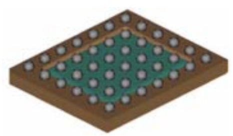
- Further reduces specific on-resistance by 25% and reduces gate charge by 25%

Packaging

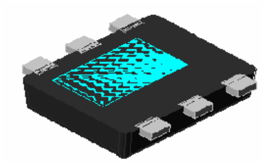
Solder-bumped low-resistance

- Wireless SO-8 – 1/2 the resistance of wire bonded SO-8
- Bottomless SO-8 – 1/3 the resistance of wire bonded SO-8
- Thermal characteristics of DPAK

BGA



Bottomless SOT-6



Bottomless SO-8

Wireless, Improved Thermal Performance

UltraFET Trench *Features & Benefits*

FEATURES

- Highest channel density
- Low specific resistance
- Tuned for Low Gate Charge
- 100 and 150V Products Available
- 60 & 75V in Development

BEST IN CLASS	
Power Trench	20V/30V
UltraFET Trench	60-200V

BENEFITS

- **Reduced package size for same on-resistance**
  - **Saves board area**
  - **Can utilize smaller, lower profile packages**
- **Lower Rds(on) for same Die Size**
  - **Dissipates less power**
  - **Each device operates cooler**
    - **→ Improves reliability**
  - **Reduces overall system temperature**
    - **→ Improves thermal management**

FAIRCHILD SEMICONDUCTOR TM

SMPS I^{TM} IGBTs

Technology	Part Number	BV (Volts)	Key Parameter: I	Unit	Package	Release Date
SMPS1 IGBT w/Diode in ISOTOP	HGT1N30N60A4D	600	>100	KHz	SOT 227	released
SMPS1 IGBT w/Diode in ISOTOP	HGT1N40N60A4D	600	>100	KHz	SOT 227	released

SMPS II^{TM} IGBTs

Technology	Part Number	BV (Volts)	Key Parameter: I	Unit	Package	Release Date
SMPS 2 IGBT/LGC/UIS Low Vth w/Stealth	FGP30N6S2D	600	>100	KHz	TO220	Q3 2001
SMPS 2 IGBT/LGC/UIS Low Vth w/Stealth	FGG30N6S2D	600	>100	KHz	TO247	Q3 2001
SMPS 2 IGBT/LGC/UIS Low Vth w/Stealth	FG1S30N6S2DS	600	>100	KHz	TO263	Q3 2001
SMPS 2 IGBT/LGC/UIS Low Vth w/Stealth	FGG40N6S2D	600	>100	KHz	TO247	Q3 2001
SMPS 2 IGBT/LGC/UIS Low Vth w/Stealth	FGG50N6S2D	600	>100	KHz	TO247	Q3 2001
SMPS 2 IGBT/LGC/UIS Low Vth w/Stealth	FG5A60N6S2D	600	>100	KHz	TO247stretch	Q3 2001
SMPS 2 IGBT/LGC/UIS Low Vth	FGP30N6S2	600	>100	KHz	TO220	Q3 2001
SMPS 2 IGBT/LGC/UIS Low Vth	FGG30N6S2	600	>100	KHz	TO247	Q3 2001
SMPS 2 IGBT/LGC/UIS Low Vth	FG1S30N6S2S	600	>100	KHz	TO263	Q3 2001
SMPS 2 IGBT/LGC/UIS Low Vth	FGP40N6S2	600	>100	KHz	TO220	Q3 2001
SMPS 2 IGBT/LGC/UIS Low Vth	FGG40N6S2	600	>100	KHz	TO247	Q3 2001
SMPS 2 IGBT/LGC/UIS Low Vth	FG1S40N6S2S	600	>100	KHz	TO263	Q3 2001
SMPS 2 IGBT/LGC/UIS Low Vth	FGG50N6S2	600	>100	KHz	TO247	Q3 2001
SMPS 2 IGBT/LGC/UIS Low Vth	FGG60N6S2	600	>100	KHz	TO247	Q3 2001

600V Stealth™

Technology	Part Number	BV (Volts)	Key Parameter: I	Unit	Package	Release Date
Stealth Rectifier	ISL9R2480G2	800	24	Amperes	TO247	Q4 2000
Stealth Rectifier	ISL9R460P2	600	4	Amperes	TO220	Released
Stealth Rectifier	ISL9K460P3	600	4 X 2	Amperes	TO220	Released
Stealth Rectifier	ISL9R860P2	600	8	Amperes	TO220	Released
Stealth Rectifier	ISL9K860P3	600	8 X 2	Amperes	TO220	Released
Stealth Rectifier	ISL9R860S2	600	8	Amperes	I2PAK	Q3 2001
Stealth Rectifier	ISL9R860S3S	600	8	Amperes	D2PAK	Q2 2001
Stealth Rectifier	ISL9R1560P2	600	15	Amperes	TO220	Released
Stealth Rectifier	ISL9K1560G3	600	15 X 2	Amperes	TO247	Released
Stealth Rectifier	ISL9R1560S2	600	15	Amperes	I2PAK	Q3 2001
Stealth Rectifier	ISL9R1560S3S	600	15	Amperes	D2PAK	Q2 2001
Stealth Rectifier	ISL9R3060P2	600	30	Amperes	TO220	Q3 2001
Stealth Rectifier	ISL9R3060G2	600	30	Amperes	TO247	Released
Stealth Rectifier	ISL9K3060G3	600	30 X 2	Amperes	TO247	Released

200V Stealth™

Technology	Part Number	BV (Volts)	Key Parameter: Vf	Unit	Package	Release Date
Stealth Rectifier	ISL9R1520P2	200	1	Volt, Vf	TO220	Q3 2001
Stealth Rectifier	ISL9R1520G2	200	1	Volt, Vf	TO247	Q3 2001
Stealth Rectifier	ISL9K1520G3	200	1	Volt, Vf	TO247	Q3 2001
Stealth Rectifier	ISL9R3020G2	200	1	Volt, Vf	TO247	Q3 2001
Stealth Rectifier	ISL9K3020G3	200	1	Volt, Vf	TO247	Q3 2001
Stealth Rectifier	ISL9R6020G2	200	1	Volt, Vf	TO247	Q3 2001
Stealth Rectifier	ISL9R6020Nx	200	1	Volt, Vf	ISOTOP	Q3 2001
Stealth Rectifier	ISL9R8020xx	200	1	Volt, Vf	TO218	Q3 2001
Stealth Rectifier	ISL9R8020Nx	200	1	Volt, Vf	ISOTOP	Q3 2001
Stealth Rectifier	ISL9R15020xx	200	1	Volt, Vf	TO218	Q3 2001

300V Stealth™

Technology	Part Number	BV (Volts)	Key Parameter: Vf	Unit	Package	Release Date
Stealth Rectifier	ISL9R1530P2	300	1	Volt, Vf	TO220	Q3 2001
Stealth Rectifier	ISL9R1530G2	300	1	Volt, Vf	TO247	Q3 2001
Stealth Rectifier	ISL9K1530G2	300	1	Volt, Vf	TO247	Q3 2001
Stealth Rectifier	ISL9R3030G2	300	1	Volt, Vf	TO247	Q3 2001
Stealth Rectifier	ISL9K3030G2	300	1	Volt, Vf	TO247	Q3 2001
Stealth Rectifier	ISL9R6030G2	300	1	Volt, Vf	TO247	Q3 2001
Stealth Rectifier	ISL9R6030Nx	300	1	Volt, Vf	ISOTOP	Q3 2001
Stealth Rectifier	ISL9R8030xx	300	1	Volt, Vf	TO218	Q3 2001
Stealth Rectifier	ISL9R8030Nx	300	1	Volt, Vf	ISOTOP	Q3 2001
Stealth Rectifier	ISL9R15030xx	300	1	Volt, Vf	TO218	Q3 2001

1200V Stealth^{TM}

Technology	Part Number	BV (Volts)	Key Parameter: I	Unit	Package	Release Date
Stealth Rectifier	ISL9R4120P2	1200	4	Amperes	TO220	Q3 2001
Stealth Rectifier	ISL9K4120P3	1200	4 X 2	Amperes	TO220	Q3 2001
Stealth Rectifier	ISL9R8120P2	1200	8	Amperes	TO220	Q3 2001
Stealth Rectifier	ISL9K8120P3	1200	8 X 2	Amperes	TO220	Q3 2001
Stealth Rectifier	ISL9R15120P2	1200	15	Amperes	TO220	Q3 2001
Stealth Rectifier	ISL9R15120G2	1200	15	Amperes	TO247	Q3 2001
Stealth Rectifier	ISL9K15120G2	1200	15 X 2	Amperes	TO247	Q3 2001
Stealth Rectifier	ISL9R30120G2	1200	30	Amperes	TO247	Q3 2001
Stealth Rectifier	ISL9K30120G2	1200	30 X 2	Amperes	TO247	Q3 2001

100V UltraFET Trench™

Technology	Part Number	BV (Volts)	Max Rds(on) @ Vgs = 10V	Typ Qg(10)	Typ Qgd	Package	Target Release	Sample Availability
100V UltraFET Trench	FDS3672	100V	22mΩ	28nC	6nC	SO8	Sep-01	Now
100V UltraFET Trench	FDM26N10	100V	26mΩ	23nC	6nC	MicroFET	Dec-01	Q4 2001
100V UltraFET Trench	FDD26N10	100V	26mΩ	23nC	6nC	TO252	Dec-01	Oct-01
100V UltraFET Trench	FDM17N10	100V	17mΩ	36nC	9nC	MicroFET	Jan-02	Q4 2001
100V UltraFET Trench	FDB17N10	100V	17mΩ	36nC	9nC	TO263	Jan-02	Q4 2001
100V UltraFET Trench	FDP17N10	100V	17mΩ	36nC	9nC	TO220	Jan-02	Q4 2001
100V UltraFET Trench	FDI17N10	100V	17mΩ	36nC	9nC	TO262	Jan-02	Q4 2001
100V UltraFET Trench	FDS3692	100V	60mΩ	9nC	2.5nC	SO8	Oct-01	PGM HOLD
100V UltraFET Trench	FDS3992	100V	60mΩ	9nC	2.5nC	SO8 Dual	Oct-01	PGM HOLD
100V UltraFET Trench	FDP08N10	100V	8mΩ	76nC	20nC	TO220	Nov-01	Now
100V UltraFET Trench	FDB08N10	100V	8mΩ	76nC	20nC	TO263	Nov-01	Now
100V UltraFET Trench	FDS3682	100V	35mΩ	17nC	4nC	SO8	Oct-01	PGM HOLD
100V UltraFET Trench	FDM35N10	100V	35mΩ	17nC	4nC	MicroFET	Oct-01	PGM HOLD
100V UltraFET Trench	FDD35N10	100V	35mΩ	17nC	4nC	TO252	Oct-01	PGM HOLD
100V UltraFET Trench	FDB35N10	100V	35mΩ	17nC	4nC	TO263	Oct-01	PGM HOLD
100V UltraFET Trench	FDP35N10	100V	35mΩ	17nC	4nC	TO220	Oct-01	PGM HOLD

150V UltraFET Trench™

Technology	Part Number	BV (Volts)	Max Rds(on) @ Vgs = 10V	Typ Qg(10)	Typ Qgd	Package	Target Release	Sample Availability
150V UltraFET Trench	FDS2572	150V	47mΩ	25nC	7nC	SO8	Sep-01	Now
150V UltraFET Trench	FDM57N15	150V	57mΩ	22nC	5nC	MicroFET	Dec-01	Nov-01
150V UltraFET Trench	FDD57N15	150V	57mΩ	22nC	5nC	TO252	Dec-01	Oct-01
150V UltraFET Trench	FDB57N15	150V	57mΩ	22nC	5nC	TO263	Dec-01	Nov-01
150V UltraFET Trench	FDP57N15	150V	57mΩ	22nC	5nC	TO220	Dec-01	Nov-01
150V UltraFET Trench	FDB36N15	150V	36mΩ	35nC	10nC	TO263	Jan-02	Oct-01
150V UltraFET Trench	FDM36N15	150V	36mΩ	35nC	10nC	MicroFET	Jan-02	Oct-01
150V UltraFET Trench	FDP36N15	150V	36mΩ	35nC	10nC	TO220	Jan-02	Oct-01
150V UltraFET Trench	FDS2582	150V	77mΩ	16nC	5nC	SO8	Oct-01	PGM HOLD
150V UltraFET Trench	FDD77N15	150V	77mΩ	16nC	5nC	TO252	Oct-01	PGM HOLD
150V UltraFET Trench	FDB77N15	150V	77mΩ	16nC	5nC	TO263	Oct-01	PGM HOLD
150V UltraFET Trench	FDP77N15	150V	77mΩ	16nC	5nC	TO220	Oct-01	PGM HOLD