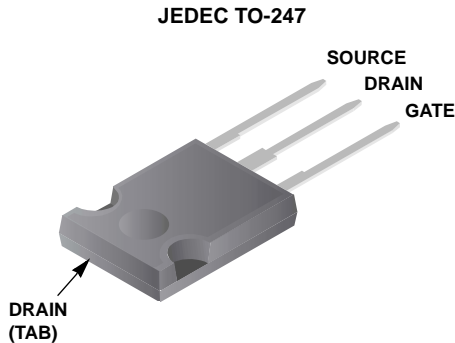


**75A, 150V, 0.016 Ohm, N-Channel,  
UltraFET® Power MOSFET**

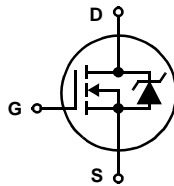
**Packaging**



**Features**

- Ultra Low On-Resistance  
-  $r_{DS(ON)} = 0.016\Omega$ ,  $V_{GS} = 10V$
- Peak Current vs Pulse Width Curve
- UIS Rating Curve
- Qualified to AEC Q101
- RoHS Compliant

**Symbol**



**Ordering Information**

PART NUMBER	PACKAGE	BRAND
HUFA75852G3_F085	TO-247	75852G

**Absolute Maximum Ratings**  $T_C = 25^\circ C$ , Unless Otherwise Specified

	HUFA75852G3_F085	UNITS
Drain to Source Voltage (Note 1) . . . . .	$V_{DSS}$	150 V
Drain to Gate Voltage ( $R_{GS} = 20k\Omega$ ) (Note 1) . . . . .	$V_{DGR}$	150 V
Gate to Source Voltage . . . . .	$V_{GS}$	$\pm 20$ V
Drain Current		
Continuous ( $T_C = 25^\circ C$ , $V_{GS} = 10V$ ) (Figure 2) . . . . .	$I_D$	75 A
Continuous ( $T_C = 100^\circ C$ , $V_{GS} = 10V$ ) (Figure 2) . . . . .	$I_D$	75 A
Pulsed Drain Current . . . . .	$I_{DM}$	Figure 4
Pulsed Avalanche Rating . . . . .	UIS	Figures 6, 14, 15
Power Dissipation . . . . .	$P_D$	500 W
Derate Above $25^\circ C$ . . . . .		3.33 W/ $^\circ C$
Operating and Storage Temperature . . . . .	$T_J, T_{STG}$	-55 to 175 $^\circ C$
Maximum Temperature for Soldering		
Leads at 0.063in (1.6mm) from Case for 10s . . . . .	$T_L$	300 $^\circ C$
Package Body for 10s, See Techbrief TB334 . . . . .	$T_{pkg}$	260 $^\circ C$

NOTE:

1.  $T_J = 25^\circ C$  to  $150^\circ C$ .

**CAUTION:** Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

This product has been designed to meet the extreme test conditions and environment demanded by the automotive industry. For a copy of the requirements, see AEC Q101 at: <http://www.aecouncil.com/>

Reliability data can be found at: <http://www.fairchildsemi.com/products/discrete/reliability/index.html>.

All Fairchild semiconductor products are manufactured, assembled and tested under ISO9000 and QS9000 quality systems certification.

## HUFA75852G3\_F085

### Electrical Specifications $T_C = 25^\circ\text{C}$ , Unless Otherwise Specified

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS	
<b>OFF STATE SPECIFICATIONS</b>							
Drain to Source Breakdown Voltage	$BV_{DSS}$	$I_D = 250\mu\text{A}$ , $V_{GS} = 0\text{V}$ (Figure 11)	150	-	-	V	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 140\text{V}$ , $V_{GS} = 0\text{V}$	-	-	1	$\mu\text{A}$	
		$V_{DS} = 135\text{V}$ , $V_{GS} = 0\text{V}$ , $T_C = 150^\circ\text{C}$	-	-	250	$\mu\text{A}$	
Gate to Source Leakage Current	$I_{GSS}$	$V_{GS} = \pm 20\text{V}$	-	-	$\pm 100$	nA	
<b>ON STATE SPECIFICATIONS</b>							
Gate to Source Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}$ , $I_D = 250\mu\text{A}$ (Figure 10)	2	-	4	V	
Drain to Source On Resistance	$r_{DS(ON)}$	$I_D = 75\text{A}$ , $V_{GS} = 10\text{V}$ (Figure 9)	-	0.013	0.016	$\Omega$	
<b>THERMAL SPECIFICATIONS</b>							
Thermal Resistance Junction to Case	$R_{\theta JC}$	TO-247	-	-	0.30	$^\circ\text{C/W}$	
Thermal Resistance Junction to Ambient	$R_{\theta JA}$		-	-	30	$^\circ\text{C/W}$	
<b>SWITCHING SPECIFICATIONS (<math>V_{GS} = 10\text{V}</math>)</b>							
Turn-On Time	$t_{ON}$	$V_{DD} = 75\text{V}$ , $I_D = 75\text{A}$ $V_{GS} = 10\text{V}$ , $R_{GS} = 2.0\Omega$ (Figures 18, 19)	-	-	260	ns	
Turn-On Delay Time	$t_{d(ON)}$		-	22	-	ns	
Rise Time	$t_r$		-	151	-	ns	
Turn-Off Delay Time	$t_{d(OFF)}$		-	82	-	ns	
Fall Time	$t_f$		-	107	-	ns	
Turn-Off Time	$t_{OFF}$		-	-	285	ns	
<b>GATE CHARGE SPECIFICATIONS</b>							
Total Gate Charge	$Q_{g(TOT)}$	$V_{GS} = 0\text{V}$ to $20\text{V}$	$V_{DD} = 75\text{V}$ , $I_D = 75\text{A}$ , $I_{g(REF)} = 1.0\text{mA}$ (Figures 13, 16, 17)	-	400	480	nC
Gate Charge at 10V	$Q_{g(10)}$	$V_{GS} = 0\text{V}$ to $10\text{V}$		-	215	260	nC
Threshold Gate Charge	$Q_{g(TH)}$	$V_{GS} = 0\text{V}$ to $2\text{V}$		-	15	17.5	nC
Gate to Source Gate Charge	$Q_{gs}$			-	25	-	nC
Gate to Drain "Miller" Charge	$Q_{gd}$			-	66	-	nC
<b>CAPACITANCE SPECIFICATIONS</b>							
Input Capacitance	$C_{ISS}$	$V_{DS} = 25\text{V}$ , $V_{GS} = 0\text{V}$ , $f = 1\text{MHz}$ (Figure 12)	-	7690	-	pF	
Output Capacitance	$C_{OSS}$		-	1650	-	pF	
Reverse Transfer Capacitance	$C_{RSS}$		-	535	-	pF	

### Source to Drain Diode Specifications

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Source to Drain Diode Voltage	$V_{SD}$	$I_{SD} = 75\text{A}$	-	-	1.25	V
		$I_{SD} = 35\text{A}$	-	-	1.00	V
Reverse Recovery Time	$t_{rr}$	$I_{SD} = 75\text{A}$ , $dI_{SD}/dt = 100\text{A}/\mu\text{s}$	-	-	260	ns
Reverse Recovered Charge	$Q_{RR}$	$I_{SD} = 75\text{A}$ , $dI_{SD}/dt = 100\text{A}/\mu\text{s}$	-	-	1830	nC

Typical Performance Curves

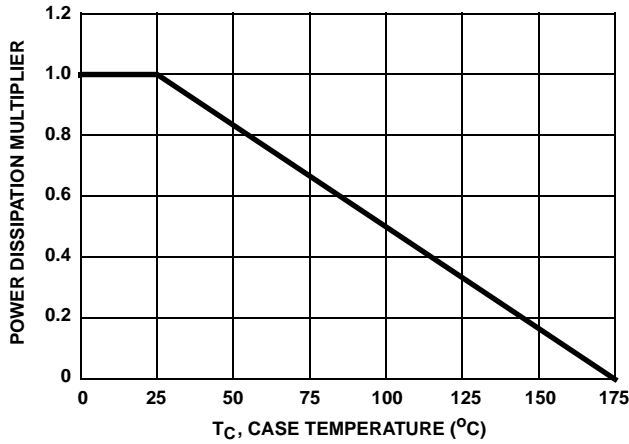


FIGURE 1. NORMALIZED POWER DISSIPATION vs CASE TEMPERATURE

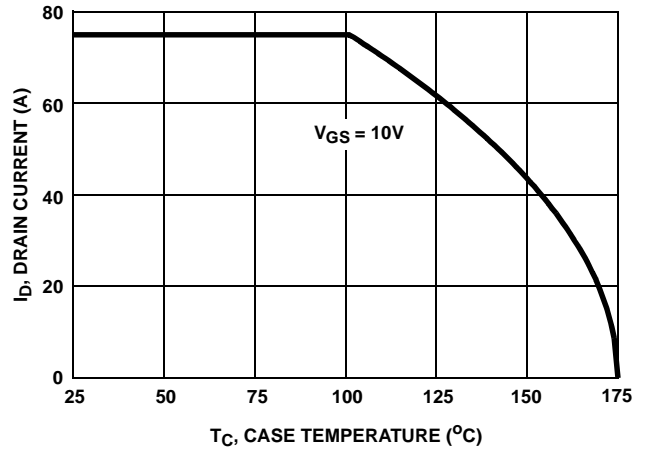


FIGURE 2. MAXIMUM CONTINUOUS DRAIN CURRENT vs CASE TEMPERATURE

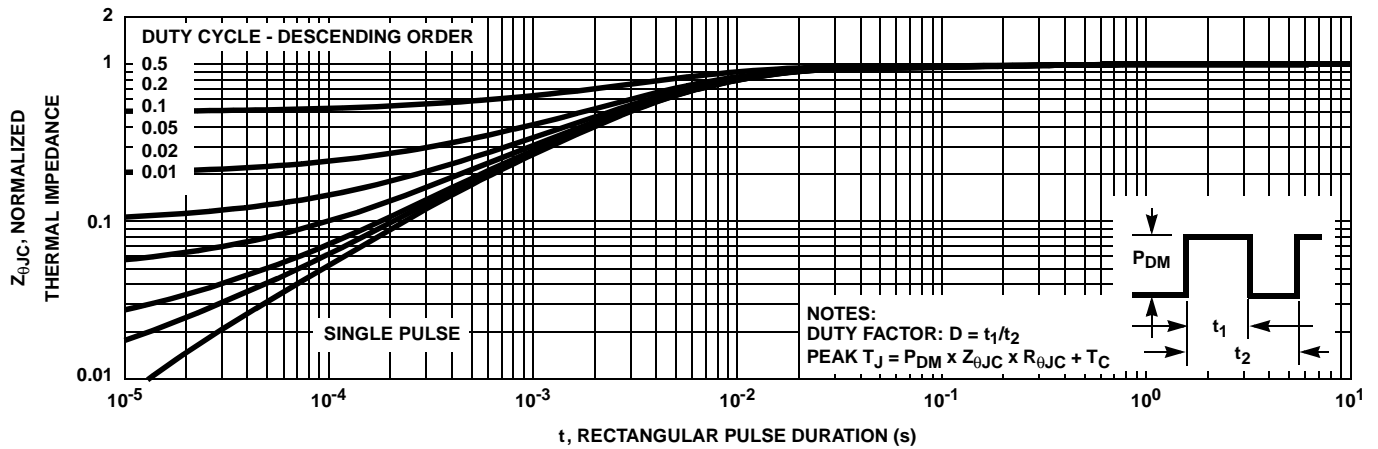


FIGURE 3. NORMALIZED MAXIMUM TRANSIENT THERMAL IMPEDANCE

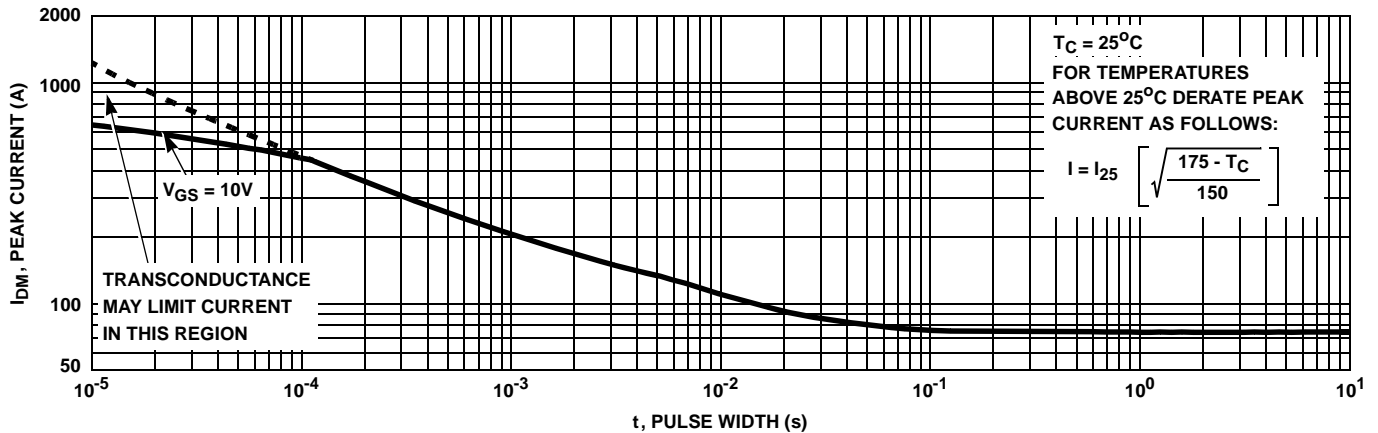


FIGURE 4. PEAK CURRENT CAPABILITY

Typical Performance Curves (Continued)

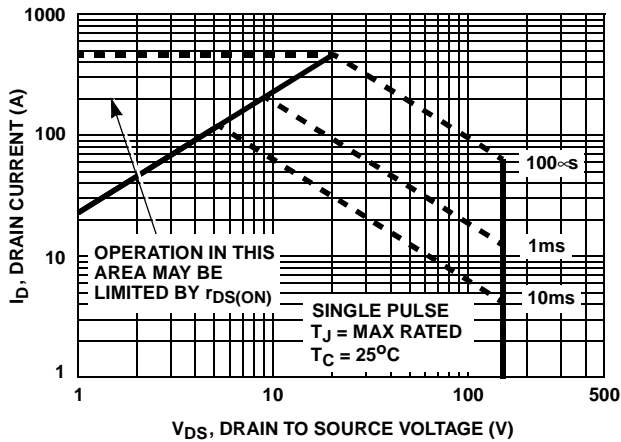
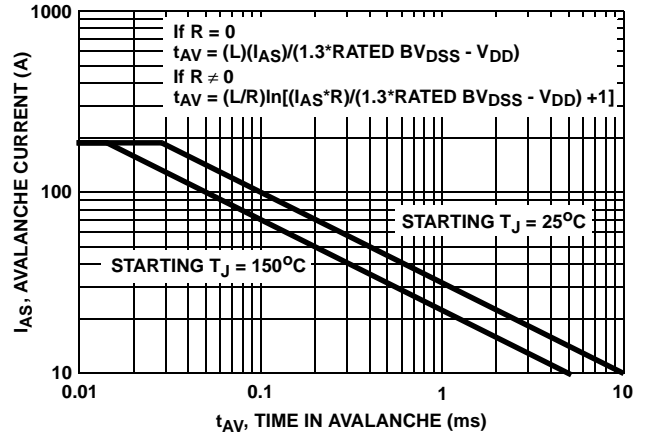


FIGURE 5. FORWARD BIAS SAFE OPERATING AREA



NOTE: Refer to Fairchild Application Notes AN9321 and AN9322.  
FIGURE 6. UNCLAMPED INDUCTIVE SWITCHING CAPABILITY

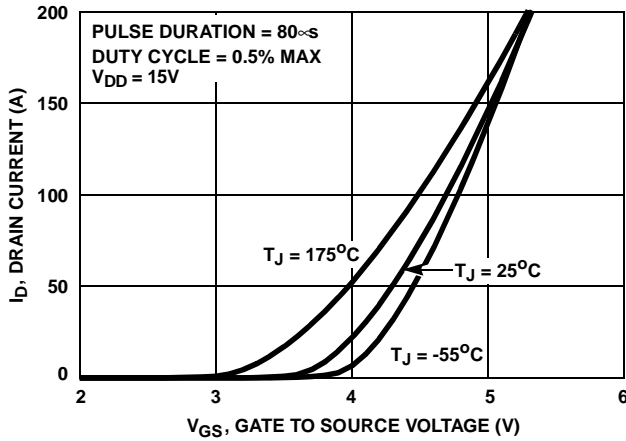


FIGURE 7. TRANSFER CHARACTERISTICS

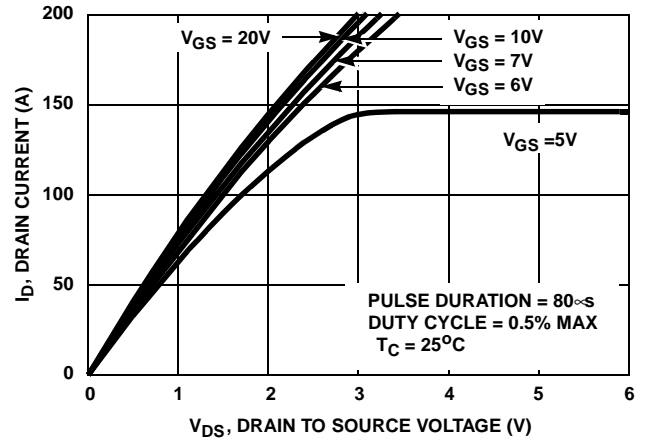


FIGURE 8. SATURATION CHARACTERISTICS

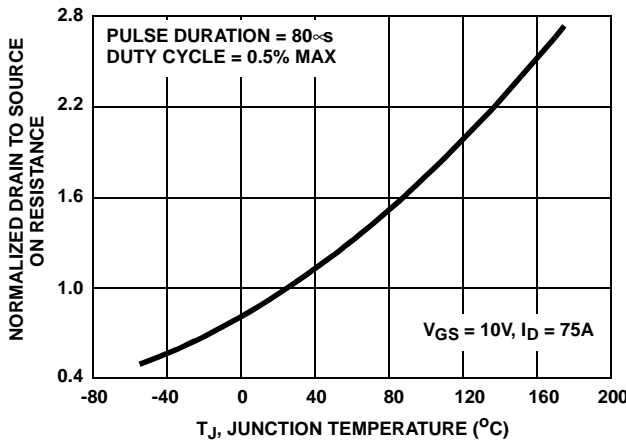


FIGURE 9. NORMALIZED DRAIN TO SOURCE ON RESISTANCE vs JUNCTION TEMPERATURE

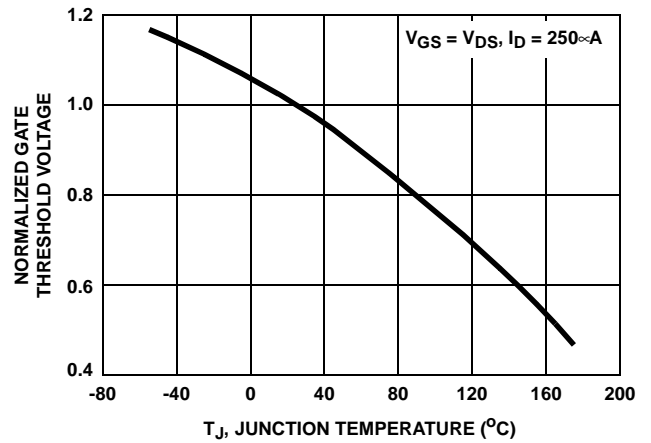


FIGURE 10. NORMALIZED GATE THRESHOLD VOLTAGE vs JUNCTION TEMPERATURE

Typical Performance Curves (Continued)

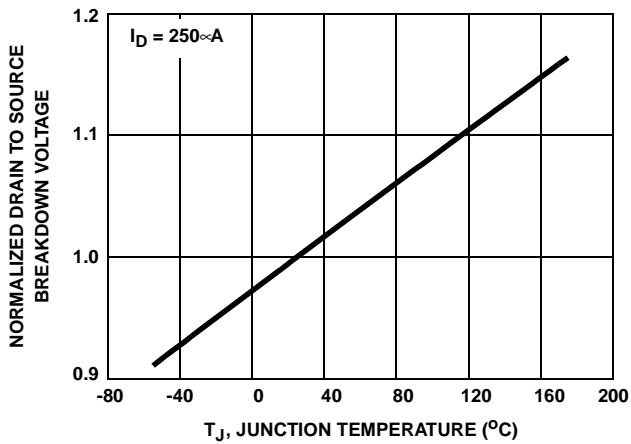


FIGURE 11. NORMALIZED DRAIN TO SOURCE BREAKDOWN VOLTAGE vs JUNCTION TEMPERATURE

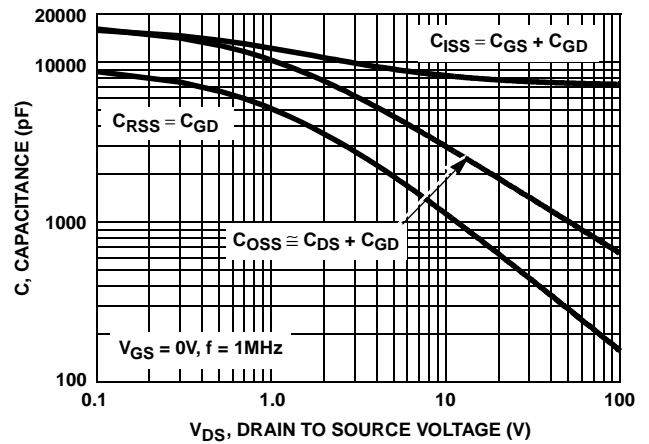
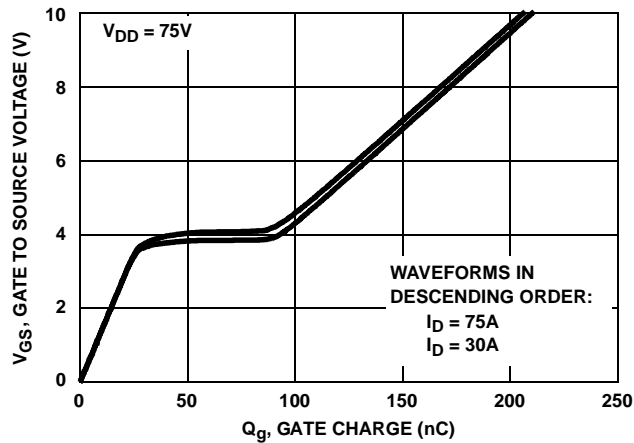


FIGURE 12. CAPACITANCE vs DRAIN TO SOURCE VOLTAGE



NOTE: Refer to Fairchild Application Notes AN7254 and AN7260.

FIGURE 13. GATE CHARGE WAVEFORMS FOR CONSTANT GATE CURRENT

Test Circuits and Waveforms

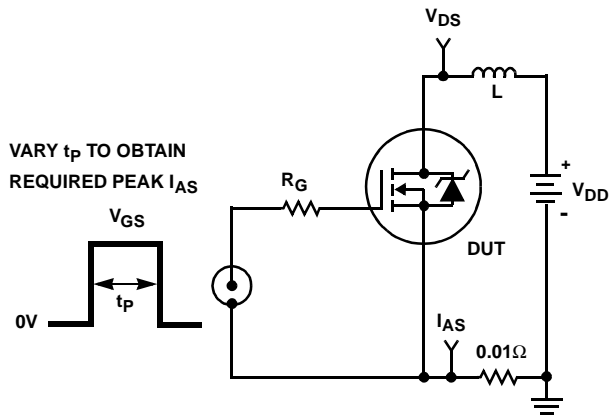


FIGURE 14. UNCLAMPED ENERGY TEST CIRCUIT

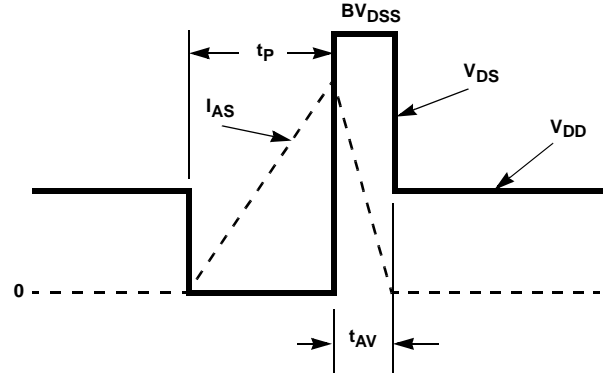


FIGURE 15. UNCLAMPED ENERGY WAVEFORMS

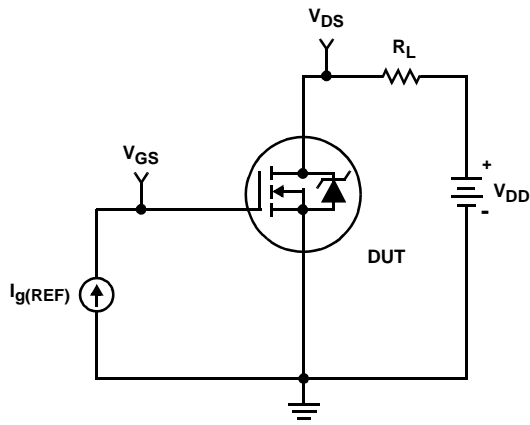


FIGURE 16. GATE CHARGE TEST CIRCUIT

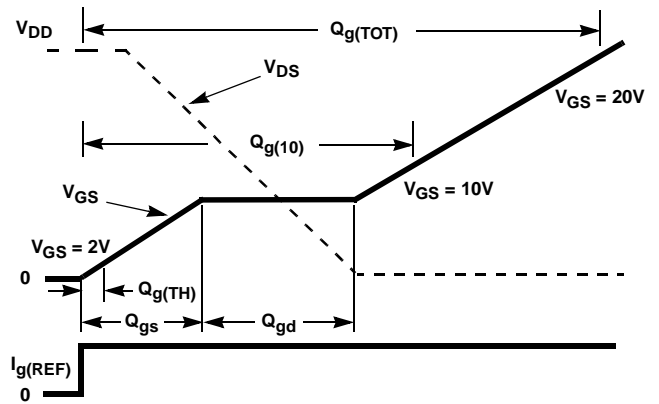


FIGURE 17. GATE CHARGE WAVEFORMS

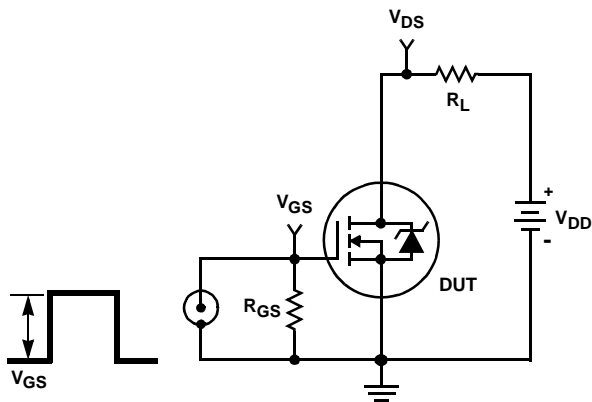


FIGURE 18. SWITCHING TIME TEST CIRCUIT

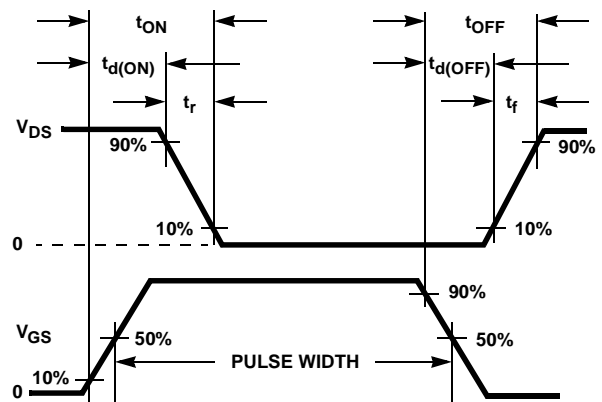







FIGURE 19. SWITCHING TIME WAVEFORM



**TRADEMARKS**

The following includes registered and unregistered trademarks and service marks, owned by Fairchild Semiconductor and/or its global subsidiaries, and is not intended to be an exhaustive list of all such trademarks.

- |   |   |   |   |
|---|---|---|---|
| 2Cool™  | FPS™  |  | The Power Franchise®  |
| AccuPower™  | F-PFST™   | PowerTrench®  | the power®  |
| Auto-SPM™   | FRFET®  | PowerXS™  | franchise™  |
| AX-CAP™*  | Global Power Resource <sup>SM</sup>             | Programmable Active Droop™  | TinyBoost™  |
| BitSiC®   | GreenBridge™                                    | QFET®   | TinyBuck™   |
| Build it Now™   | Green FPS™                                      | QS™   | TinyCalc™   |
| CorePLUS™   | Green FPS™ e-Series™                            | Quiet Series™   | TinyLogic®  |
| CorePOWER™  | Gmax™   | RapidConfigure™   | TINYOPTO™   |
| CROSSVOLT™  | GTO™  |  | TinyPower™  |
| CTL™  | IntelliMAX™                                     | Saving our world, 1mW/W/kW at a time™   | TinyPWM™  |
| Current Transfer Logic™   | ISOPLANAR™                                      | SignalWise™   | TinyWire™   |
| DEUXPEED®   | Marking Small Speakers Sound Louder and Better™ | SmartMax™   | TranSiC®  |
| Dual Cool™  | MegaBuck™                                       | SMART START™  | TriFault Detect™  |
| EcoSPARK®   | MICROCOUPLER™                                   | Solutions for Your Success™   | TRUECURRENT®*   |
| EfficientMax™   | MicroFET™                                       | SPM®  | µSerDes™  |
| ESBC™   | MicroPak™                                       | STEALTH™  |  |
|  | MicroPak2™                                      | SuperFET®   | UHC®  |
| Fairchild®  | MillerDrive™                                    | SuperSOT™-3   | Ultra FRFET™  |
| Fairchild Semiconductor®  | MotionMax™                                      | SuperSOT™-6   | UniFET™   |
| FACT Quiet Series™  | Motion-SPM™                                     | SuperSOT™-8   | VCX™  |
| FACT®   | mWSaver™  | SupreMOS®   | VisualMax™  |
| FAST®   | OptoHiT™  | SyncFET™  | VoltagePlus™  |
| FastvCore™  | OPTOLOGIC®                                      | Sync-Lock™  | XS™   |
| FETBench™   | OPTOPLANAR®                                     |  |   |
| FlashWriter® *  |   |   |   |

\*Trademarks of System General Corporation, used under license by Fairchild Semiconductor.

**DISCLAIMER**

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION, OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS. THESE SPECIFICATIONS DO NOT EXPAND THE TERMS OF FAIRCHILD'S WORLDWIDE TERMS AND CONDITIONS, SPECIFICALLY THE WARRANTY THEREIN, WHICH COVERS THESE PRODUCTS.

**LIFE SUPPORT POLICY**

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION.

As used here in:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
2. A critical component in any component of a life support, device, or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

**ANTI-COUNTERFEITING POLICY**

Fairchild Semiconductor Corporation's Anti-Counterfeiting Policy. Fairchild's Anti-Counterfeiting Policy is also stated on our external website, [www.Fairchildsemi.com](http://www.Fairchildsemi.com), under Sales Support. Counterfeiting of semiconductor parts is a growing problem in the industry. All manufactures of semiconductor products are experiencing counterfeiting of their parts. Customers who inadvertently purchase counterfeit parts experience many problems such as loss of brand reputation, substandard performance, failed application, and increased cost of production and manufacturing delays. Fairchild is taking strong measures to protect ourselves and our customers from the proliferation of counterfeit parts. Fairchild strongly encourages customers to purchase Fairchild parts either directly from Fairchild or from Authorized Fairchild Distributors who are listed by country on our web page cited above. Products customers buy either from Fairchild directly or from Authorized Fairchild Distributors are genuine parts, have full traceability, meet Fairchild's quality standards for handling and storage and provide access to Fairchild's full range of up-to-date technical and product information. Fairchild and our Authorized Distributors will stand behind all warranties and will appropriately address and warranty issues that may arise. Fairchild will not provide any warranty coverage or other assistance for parts bought from Unauthorized Sources. Fairchild is committed to combat this global problem and encourage our customers to do their part in stopping this practice by buying direct or from authorized distributors.

**PRODUCT STATUS DEFINITIONS**

**Definition of Terms**

Datasheet Identification	Product Status	Definition
Advance Information	Formative / In Design	Datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.
Obsolete	Not In Production	Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.