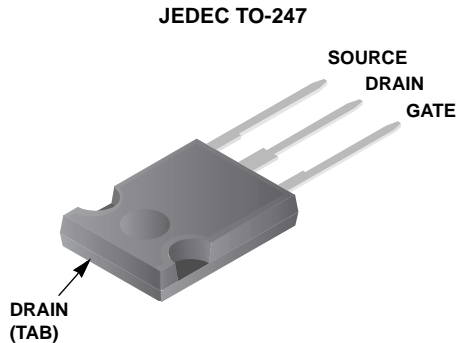


**75A, 150V, 0.016 Ohm, N-Channel,  
UltraFET® Power MOSFET**

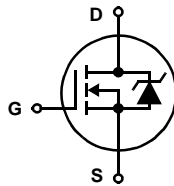
**Packaging**



**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

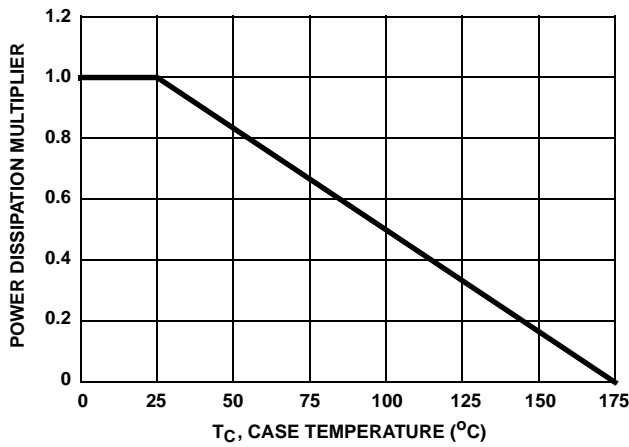


FIGURE 1. NORMALIZED POWER DISSIPATION vs CASE TEMPERATURE

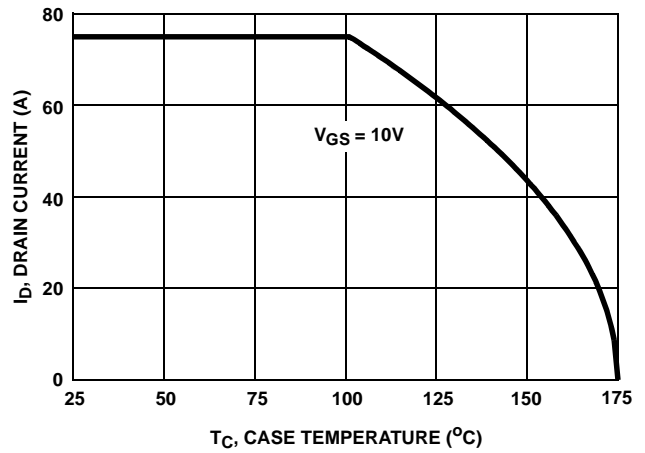


FIGURE 2. MAXIMUM CONTINUOUS DRAIN CURRENT vs CASE TEMPERATURE

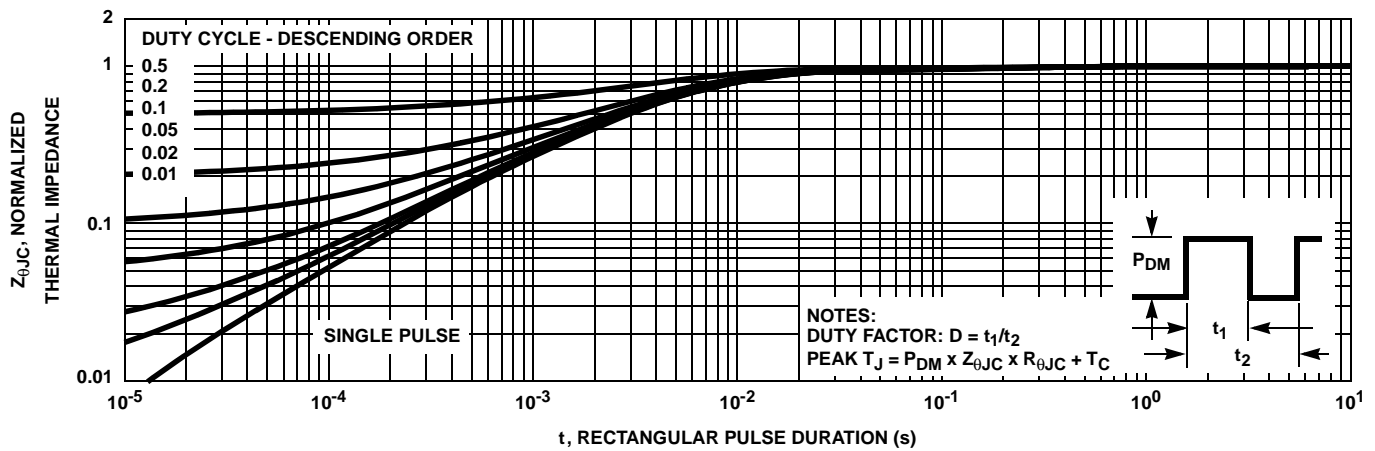


FIGURE 3. NORMALIZED MAXIMUM TRANSIENT THERMAL IMPEDANCE

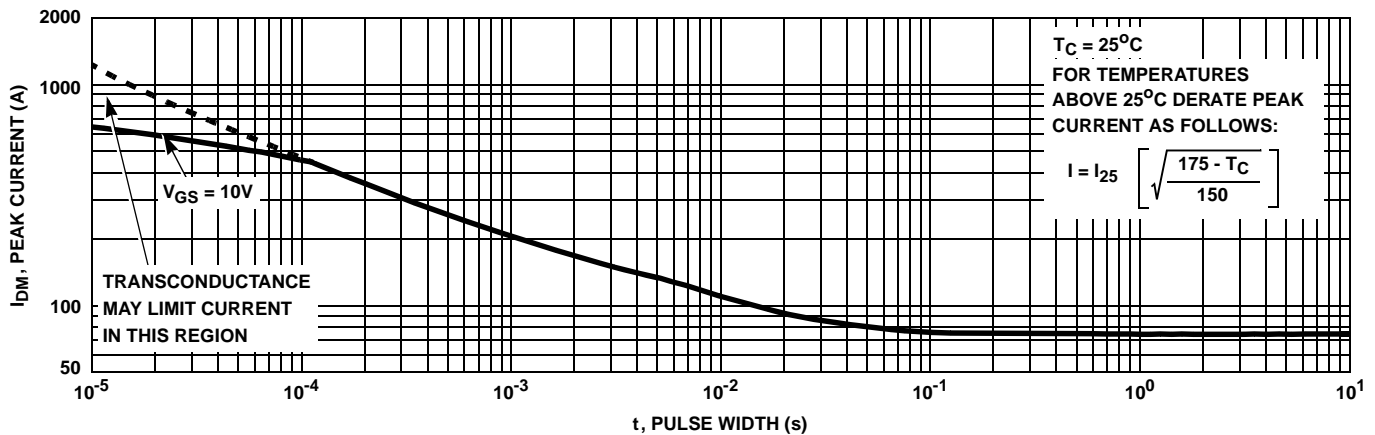


FIGURE 4. PEAK CURRENT CAPABILITY

Typical Performance Curves (Continued)

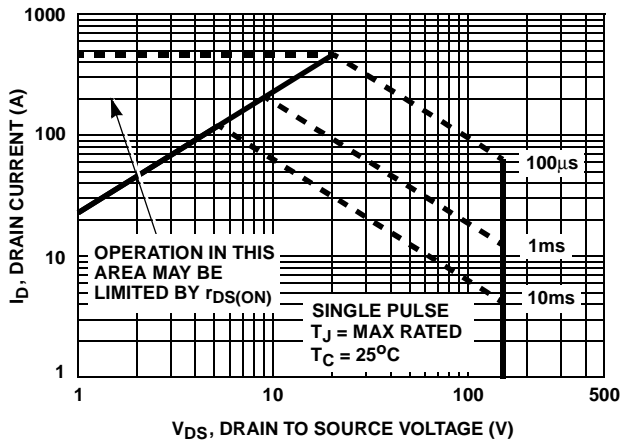
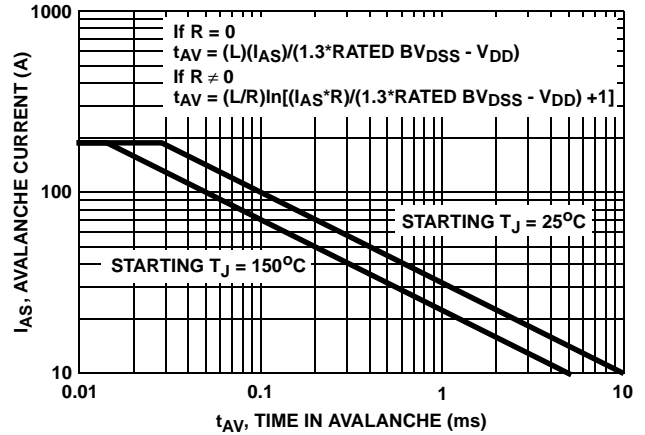


FIGURE 5. FORWARD BIAS SAFE OPERATING AREA



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

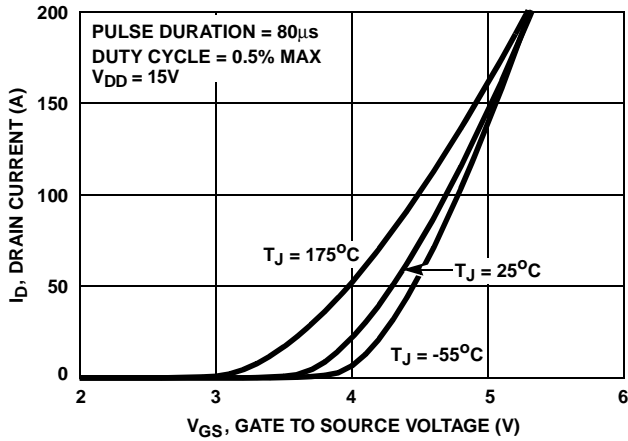


FIGURE 7. TRANSFER CHARACTERISTICS

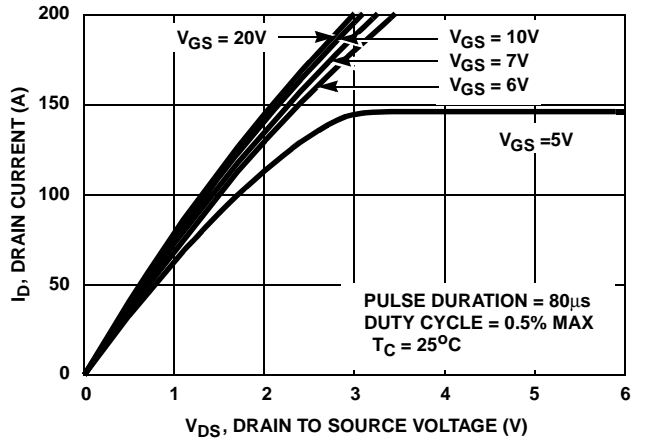


FIGURE 8. SATURATION CHARACTERISTICS

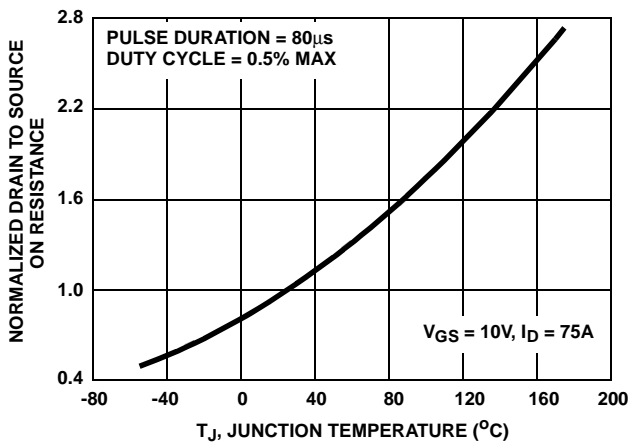


FIGURE 9. NORMALIZED DRAIN TO SOURCE ON RESISTANCE vs JUNCTION TEMPERATURE

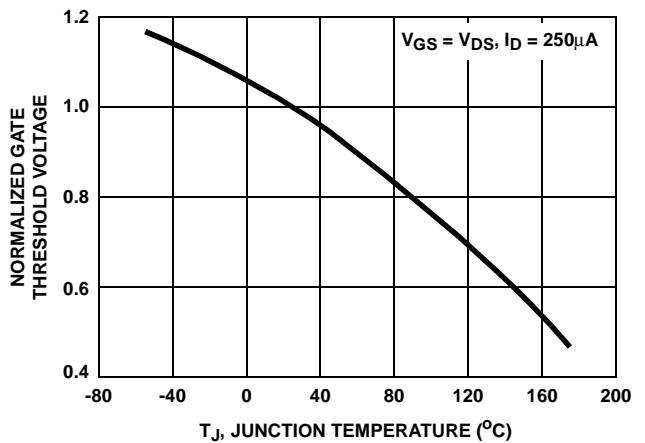


FIGURE 10. NORMALIZED GATE THRESHOLD VOLTAGE vs JUNCTION TEMPERATURE

Typical Performance Curves (Continued)

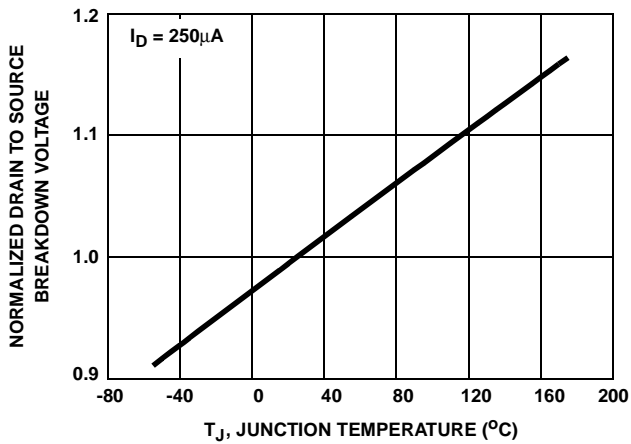


FIGURE 11. NORMALIZED DRAIN TO SOURCE BREAKDOWN VOLTAGE vs JUNCTION TEMPERATURE

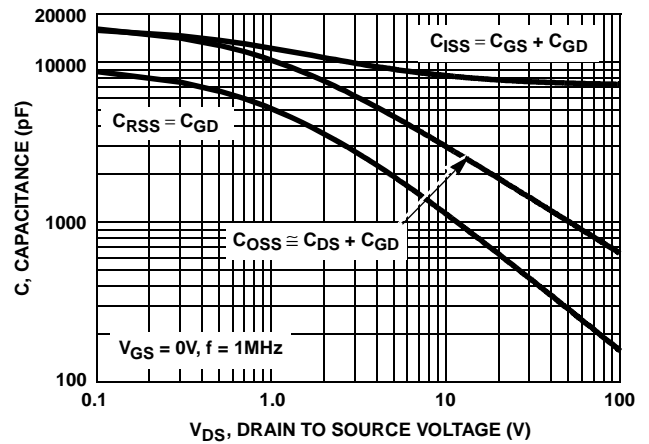
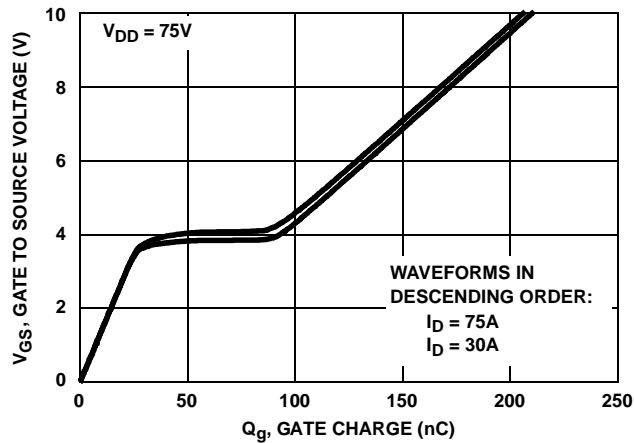


FIGURE 12. CAPACITANCE vs DRAIN TO SOURCE VOLTAGE



NOTE: Refer to Fairchild Application Notes AN7254 and AN7260.

FIGURE 13. GATE CHARGE WAVEFORMS FOR CONSTANT GATE CURRENT

Test Circuits and Waveforms

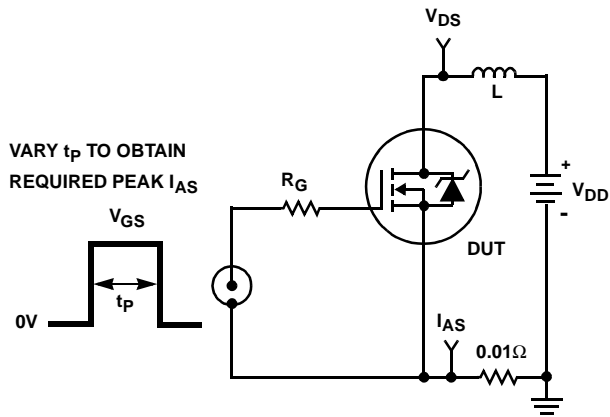


FIGURE 14. UNCLAMPED ENERGY TEST CIRCUIT

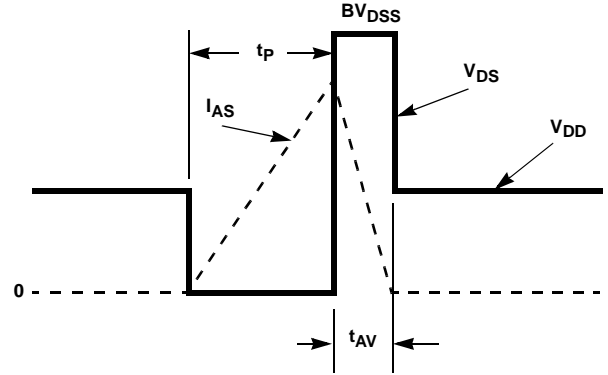


FIGURE 15. UNCLAMPED ENERGY WAVEFORMS

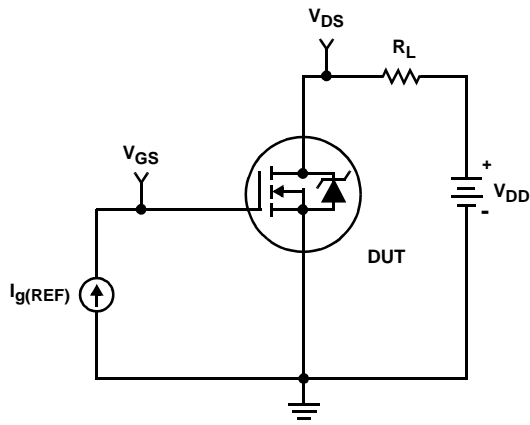


FIGURE 16. GATE CHARGE TEST CIRCUIT

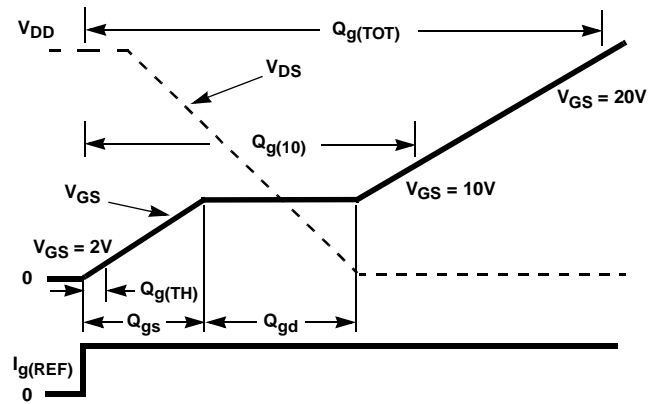


FIGURE 17. GATE CHARGE WAVEFORMS

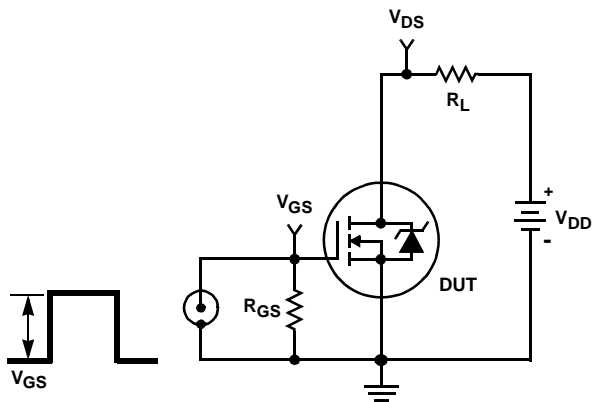


FIGURE 18. SWITCHING TIME TEST CIRCUIT

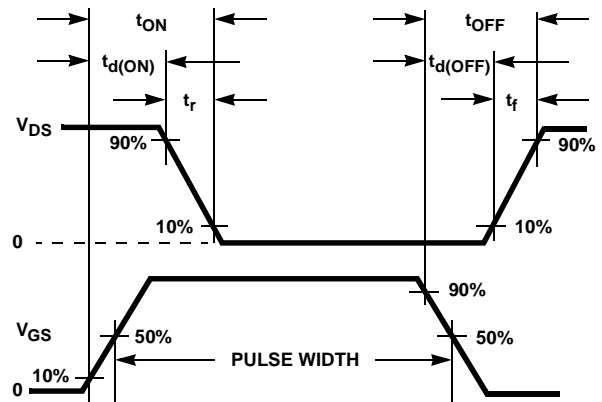


FIGURE 19. SWITCHING TIME WAVEFORM



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| 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®                                                                            |
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| 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™                                                                                 |
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