

Features

- Low on resistance
- Low gate charge
- Fast switching
- High avalanche current
- Low reverse transfer capacitances

Application

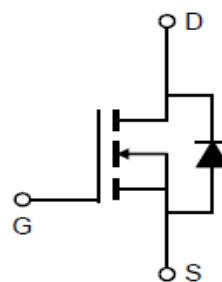
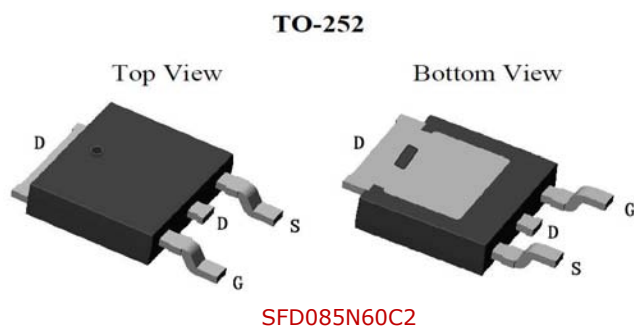
- Brushed and BLDC Motor drive systems
- Battery Management
- DC/DC and AC/DC Converter
- UPS

Product Summary

V_{DS}	60V
$R_{DS(on)}$ typ.	7mΩ
I_D	80A

100% DVDS Tested

100% Avalanche Tested



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
SFD085N60C2	085N60C2	TO-252	Reel&Tape	330×16.7mm	16mm	2500pcs

Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Drain - Source Voltage		V_{DS}	60	V
Gate - Source Voltage		V_{GS}	±20	V
Continuous Drain Current	$T_C = 25^{\circ}\text{C}$	I_D	80	A
	$T_C = 100^{\circ}\text{C}$		58	
Pulsed Drain Current($T_C=25^{\circ}\text{C}$, t_p limited by T_{Jmax})		$I_{D,Pulse}$	320	A
Single Pulsed Avalanche Energy($L=0.5\text{mH}$, $V_{DD}=50\text{V}$, $R_G=10\Omega$, $T_J=25^{\circ}\text{C}$)		E_{AS}	389	mJ
Power Dissipation	$T_C = 25^{\circ}\text{C}$	P_{tot}	107	W
Junction Temperature		T_J	-55 ~ 175	$^{\circ}\text{C}$
Storage Temperature		T_{STG}	-55 ~ 175	$^{\circ}\text{C}$

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance , junction – case	R_{thJC}	1.4	°C/W
Thermal resistance , junction – ambient(min. footprint)	R_{thJA}	62	°C/W

Electrical Characteristics ($T_J = 25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
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Static Characteristics

Drain - Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	60	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 60V, V_{GS} = 0V$ $T_C = 25^{\circ}\text{C}$ $T_C = 100^{\circ}\text{C}$	- - -	- - -	1 100	μA
Gate - Body Leakage Current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	3	4	V
Drain-source On-resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$	-	7.0	8.5	mΩ

Dynamic Characteristics

Input Capacitance	C_{iss}	$V_{DS} = 30V, V_{GS} = 0V, f = 1\text{MHz}$	-	4852	-	pF
Output Capacitance	C_{oss}		-	226	-	
Reverse Transfer Capacitance	C_{rss}		-	168	-	
Gate Resistance	R_g	$V_{DS} = 0V, V_{GS} = 0V, f = 1\text{MHz}$	-	5.5	-	Ω

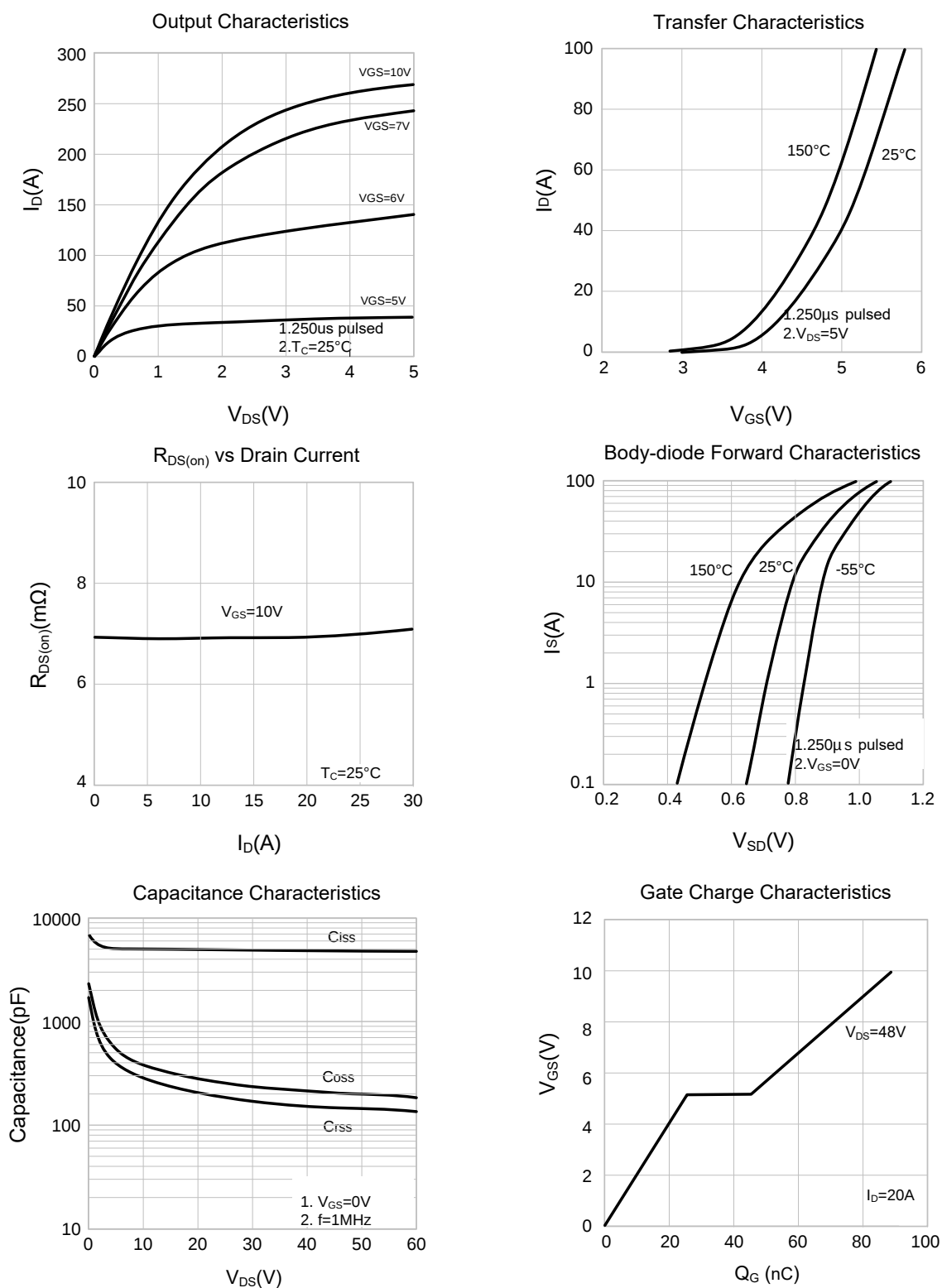
Switching Characteristics

Total Gate Charge	Q_g	$V_{DS} = 48V, V_{GS} = 10V, I_D = 20A$	-	89	-	nC
Gate-source Charge	Q_{gs}		-	26	-	
Gate-drain Charge	Q_{gd}		-	20	-	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 30V, V_{GS} = 10V, I_D = 20A,$ $R_G = 3\Omega$	-	15	-	ns
Turn-on Rise Time	t_r		-	44	-	
Turn-off Delay Ttime	$t_{d(off)}$		-	93	-	
Turn-off Fall Time	t_f		-	25	-	

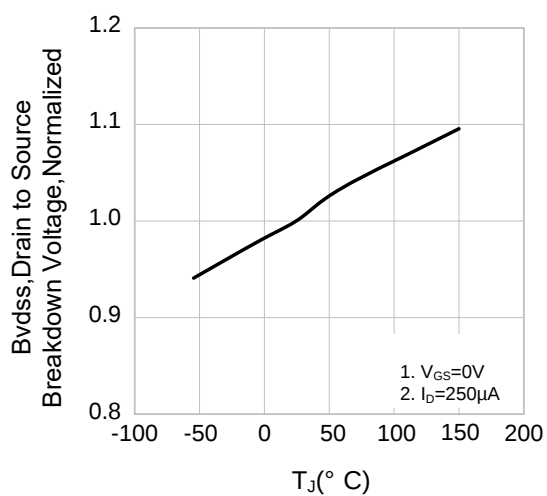
Body Diode Characteristic

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Diode continous forward current	I_S	-	-	-	80	A
Diode pulse current	$I_{S,pulse}$	Pulsed, $t_p \leq 10\mu s$	-	-	240	A
Body Diode Forward Voltage	V_{SD}	$V_{GS} = 0V, I_{SD} = 20A$	-	-	1.4	V
Body Diode Reverse Recovery Time	T_{rr}	$I_F = 20A, di/dt = 100A/\mu s$	-	29	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}	$I_F = 20A, di/dt = 100A/\mu s$	-	39	-	nC

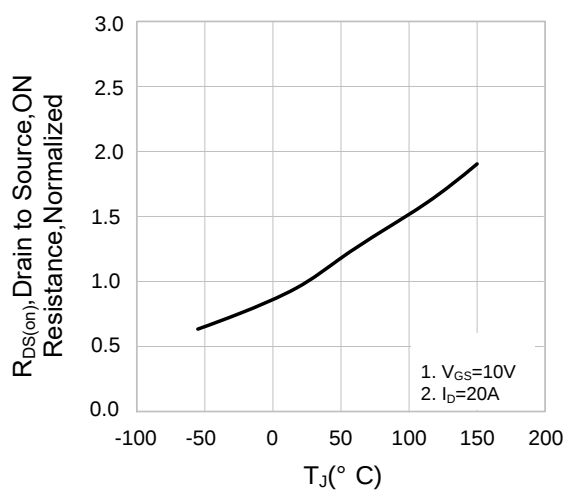
Typical Performance Characteristics



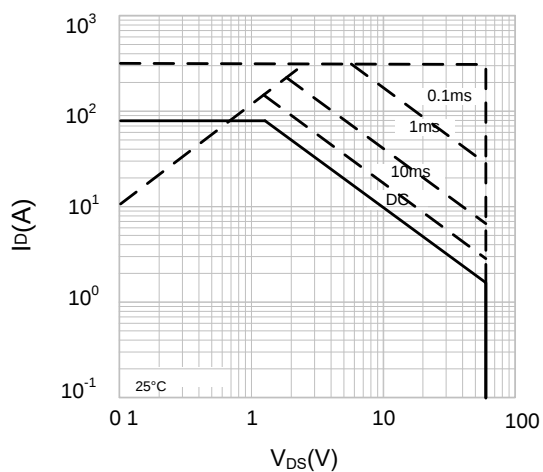
Typical Breakdown Voltage vs
Junction Temperature



$R_{DS(on)}$ vs. Temperature

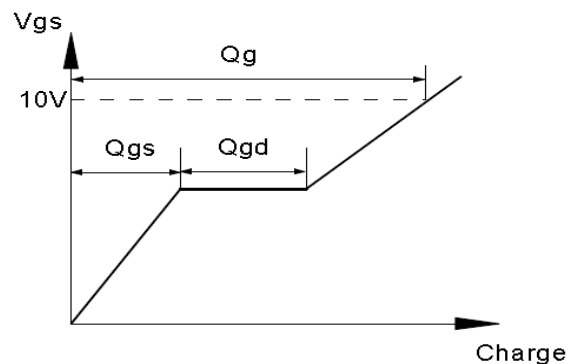
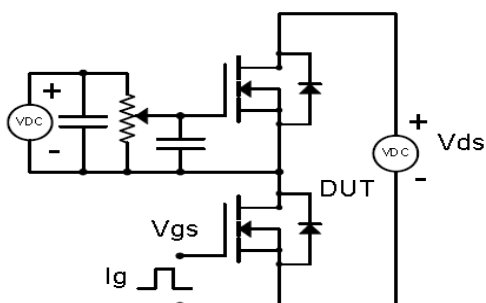


Safe Operating Area

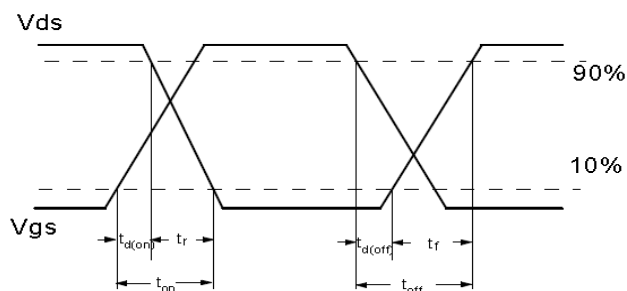
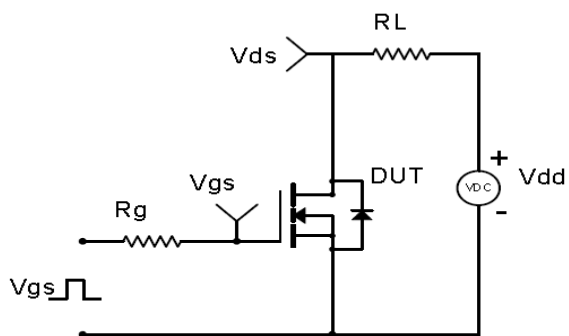


Test Circuit & Waveform

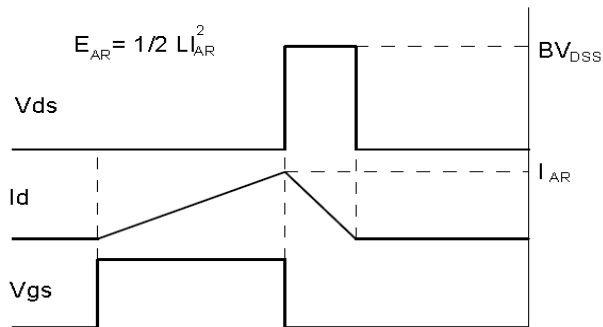
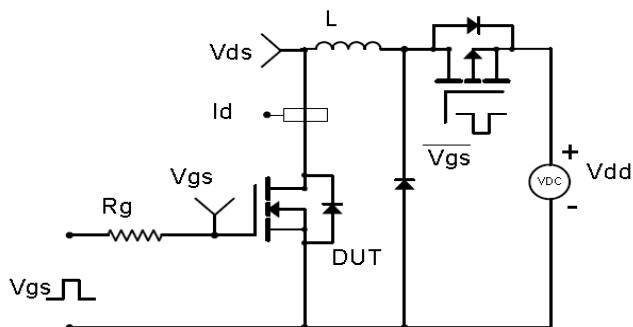
Gate Charge Test Circuit & Waveform



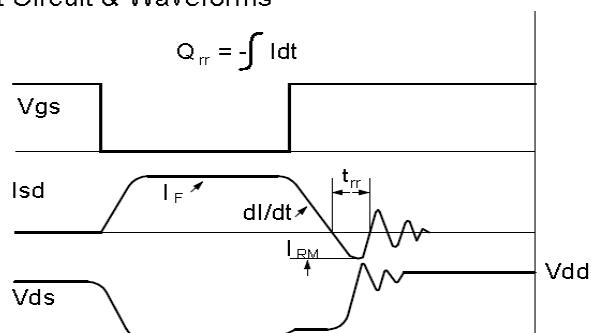
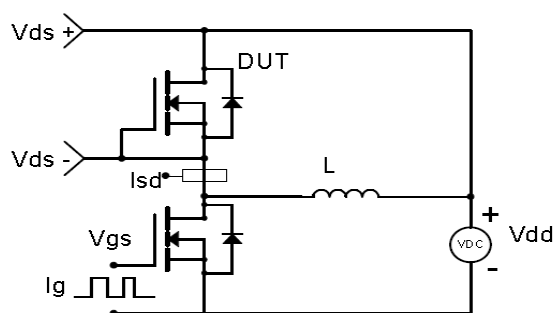
Resistive Switching Test Circuit & Waveforms

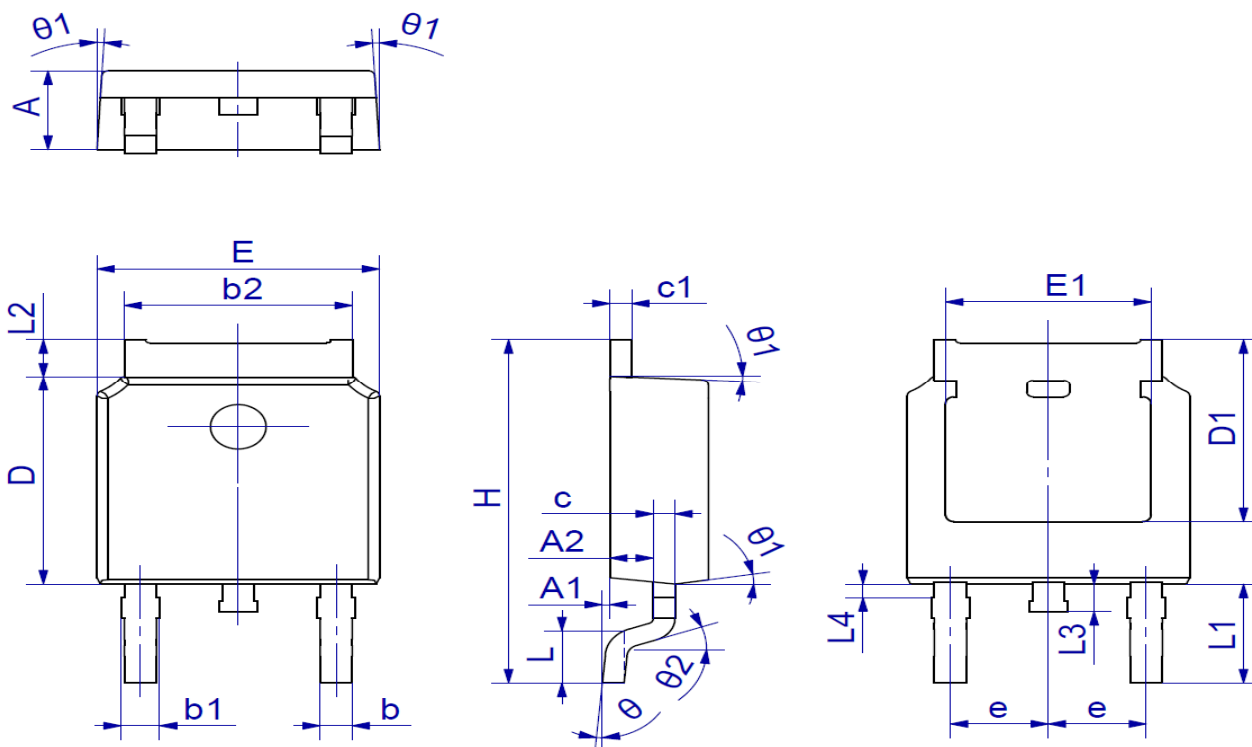


Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: TO-252


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.10	2.50	0.083	0.098
A1	0	0.15	0.000	0.006
A2	0.76	1.36	0.030	0.054
b	0.61	0.85	0.024	0.033
b1	0.71	0.91	0.028	0.036
b2	5.04	5.64	0.198	0.222
c	0.508 TYP.		0.02 TYP.	
c1	0.508 TYP.		0.02 TYP.	
D	5.8	6.3	0.228	0.248
D1	5	5.6	0.197	0.220
E	6.3	6.9	0.248	0.272
E1	4.55	5.15	0.179	0.203
e	2.286 TYP.		0.09 TYP.	
H	9.65	10.4	0.380	0.409
L	1.4	1.7	0.055	0.067
L1	2.90 REF.		0.114 REF.	
L2	0.75	1.35	0.030	0.053
L3	0.6	1.2	0.024	0.047
θ	0°	10°	0°	10°
θ1	5°	9°	5°	9°
θ2	25° REF.		25° REF.	

Revision History

Revision	Date	Major Changes
1.0	2023-12-23	Release of formal version

Disclaimer

Unless otherwise specified in the datasheet, the product is designed and qualified as a standard commercial product and is not intended for use in applications that require extraordinary levels of quality and reliability, such as automotive, aviation/aerospace and life-support devices or systems.

Any and all semiconductor products have certain probability to fail or malfunction, which may result in personal injury, death or property damage. Customer are solely responsible for providing adequate safe measures when design their systems.

Scilicon Electric reserves the right to improve product design, function and reliability without notice.