

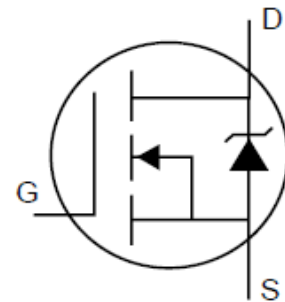
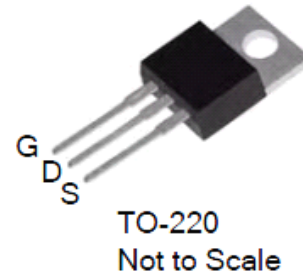
**DESCRIPTION**

The 8850 uses advanced trench technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge. It can be used in a wide variety of applications.

$V_{DSS}$	$R_{DS(ON)}$	$I_D$
88V	14m $\Omega$	50A

**GENERAL FEATURES**

- $V_{DS} = 88V, I_D = 50A$   
 $R_{DS(ON)} < 16m\Omega @ V_{GS} = 10V$  (Typ: 14m $\Omega$ )
- High density cell design for ultra low  $R_{dson}$ .
- Fully characterized avalanche voltage and current.
- Special designed for Convertors and power controls .
- Good stability and uniformity with high EAS .
- Excellent package for good heat dissipation .
- Special process technology for high ESD capability .



**Applications**

- Power switching application.
- Hard switched and high frequency circuits.
- Uninterruptible power supply.

**Ordering Information**

PART NUMBER	PACKAGE	BRAND
8850	TO-220	OGFD

**Absolute Maximum Ratings (TC=25°C, unless otherwise noted)**

Symbol	Parameter	8850	Units
V <sub>DSS</sub>	Drain-to-Source Voltage	80	V
I <sub>D</sub>	Continuous Drain Current	50	A
I <sub>D</sub> (100°C)	Drain Current-Continuous(TC=100°C)	35.4	
I <sub>DM</sub>	Pulsed Drain Current@VG=10V	85	
P <sub>D</sub>	Power Dissipation	110	W
	Derating Factor above 25°C	0.73	W/°C
V <sub>GS</sub>	Gate-to-Source Voltage	± 20	V
E <sub>AS</sub>	Single Pulse Avalanche Energy	450	mJ
T <sub>J</sub> and T <sub>STG</sub>	Operating Junction and Storage Temperature Range	-55 to 175	°C

**Thermal Resistance**

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
R <sub>θJC</sub>	Junction-to-Case	--	--	1.36	°C/W	Water cooled heatsink, PD adjusted for a peak junction temperature of +175°C.
R <sub>θJA</sub>	Junction-to-Ambient	--	--	--		1 cubic foot chamber, free air.

**OFF Characteristics T<sub>J</sub>=25°C unless otherwise specified**

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
B <sub>V</sub> DSS	Drain-to-Source Breakdown Voltage	80	88	--	V	V <sub>GS</sub> =0, I <sub>D</sub> =250uA
I <sub>GSS</sub>	Gate-to-Source Forward Leakage	--	--	±100	nA	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	--	--	1	uA	V <sub>DS</sub> =80V, V <sub>GS</sub> =0V

**ON Characteristics T<sub>J</sub>=25°C unless otherwise specified**

Symbol	Parameter	Min.	Typ.	Max	Units	Test Conditions
R <sub>DS(ON)</sub>	Static Drain-to-Source On-Resistance	--	14	16	mΩ	V <sub>GS</sub> =10V, I <sub>D</sub> =20A
V <sub>GS(TH)</sub>	Gate Threshold Voltage, Figure 12.	2	3	4	V	V <sub>DS</sub> =10V, I <sub>D</sub> =250uA
G <sub>fs</sub>	Forward Transconductance	28	---	--	S	V <sub>DS</sub> =10V, I <sub>D</sub> =20A

**Dynamic Characteristics Essentially independent of operating temperature**

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
C <sub>iss</sub>	Input Capacitance	--	2350	--	pF	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1.0MHZ
C <sub>oss</sub>	Output Capacitance	--	337	--		
C <sub>rss</sub>	Reverse Transfer Capacitance	--	165	--		
Q <sub>g</sub>	Total Gate Charge	--	34	--	nC	V <sub>DS</sub> =40V, V <sub>GS</sub> =10V, I <sub>D</sub> =20A
Q <sub>gs</sub>	Gate-to-Source Charge	--	13	--		
Q <sub>gd</sub>	Gate-to-Drain ("Miller") Charge	--	11	--		

**Resistive Switching Characteristics Essentially independent of operating temperature**

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
T <sub>d(ON)</sub>	Turn-on Delay Time		12		ns	V <sub>DD</sub> =40V, I <sub>D</sub> =2A, R <sub>L</sub> =2Ω V <sub>GS</sub> =10V, R <sub>G</sub> =3Ω
T <sub>rise</sub>	Rise Time		9			
T <sub>d(OFF)</sub>	Turn-Off Delay Time		20			
T <sub>fall</sub>	Fall Time		18			

**Drain-Source Diode Characteristics**

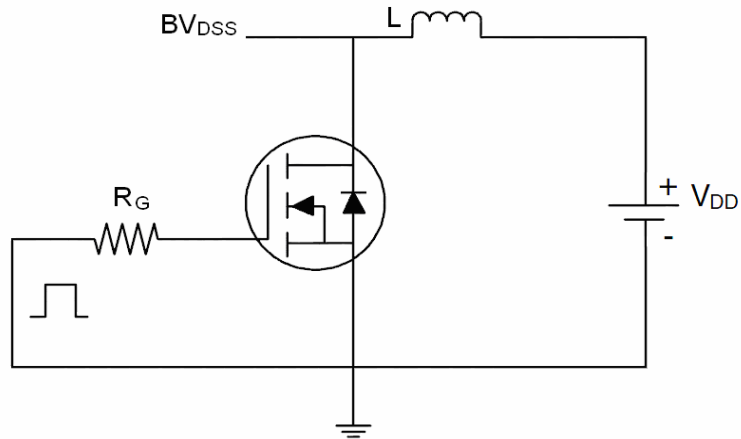
Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =20A	--	--	1.2	V
Diode Forward Current	I <sub>S</sub>	--	--	--	50	A
Reverse Recovery Time	t <sub>rr</sub>	T <sub>J</sub> =25°C, I <sub>F</sub> =20A Di/dt = 100 A/μs	--	21	--	nS
Reverse Recovery Charge	Q <sub>rr</sub>		--	65	--	nC
Forward Turn-On Time	t <sub>on</sub>	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

**Notes:**

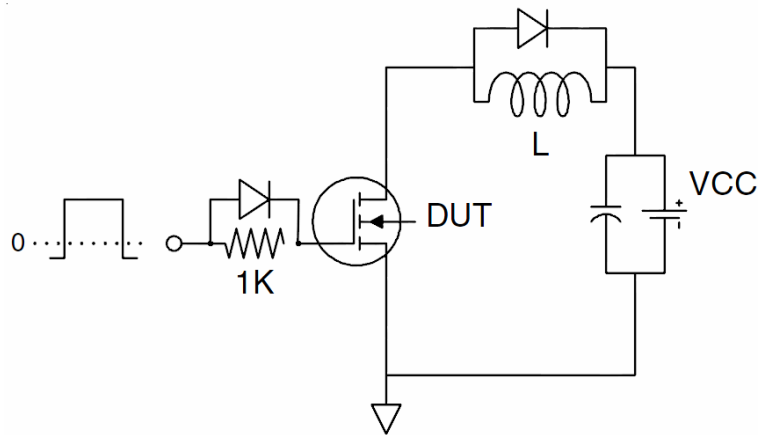
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production.
5. EAS condition: T<sub>J</sub>=25°C, V<sub>DD</sub>=40V, V<sub>G</sub>=10V, L=0.5mH, R<sub>G</sub>=25Ω

**Test Circuit**

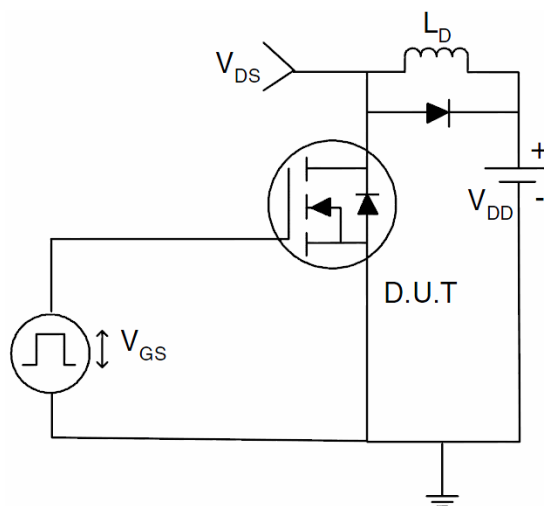
**1) E<sub>AS</sub> test Circuits**



**2) Gate charge test Circuit**



**3) Switch Time Test Circuit**



Typical Electrical and Thermal Characteristics (Curves)

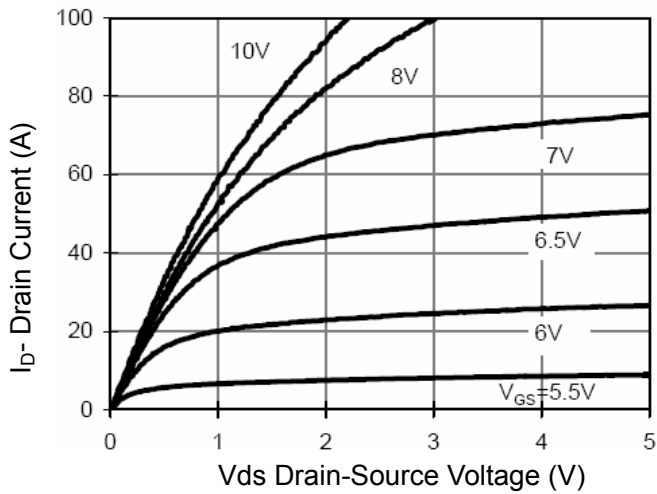


Figure 1 Output Characteristics

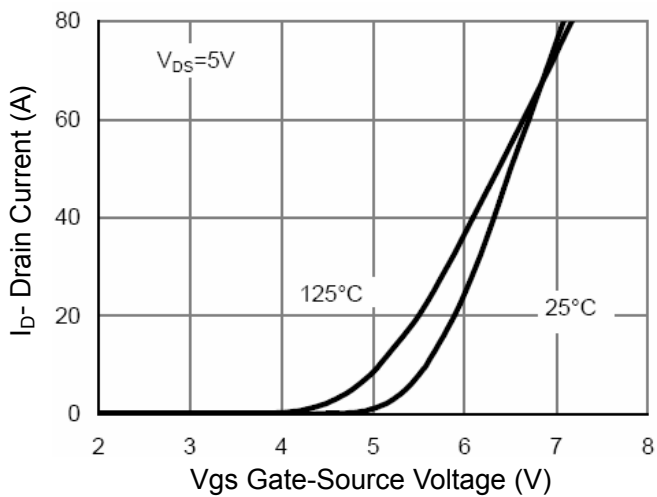


Figure 2 Transfer Characteristics

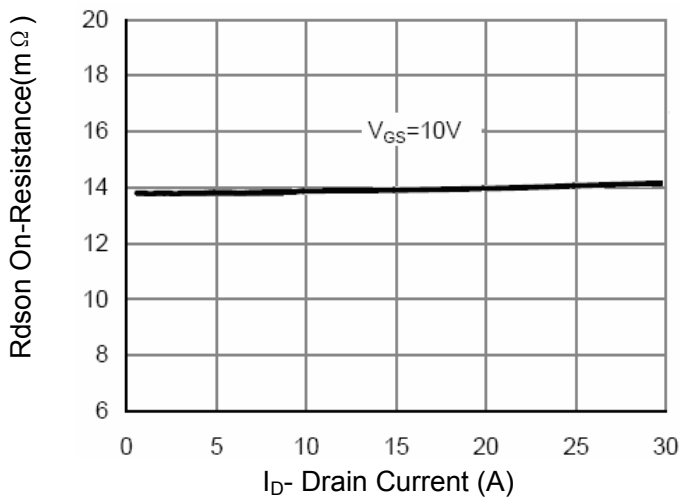


Figure 3 Rdson- Drain Current

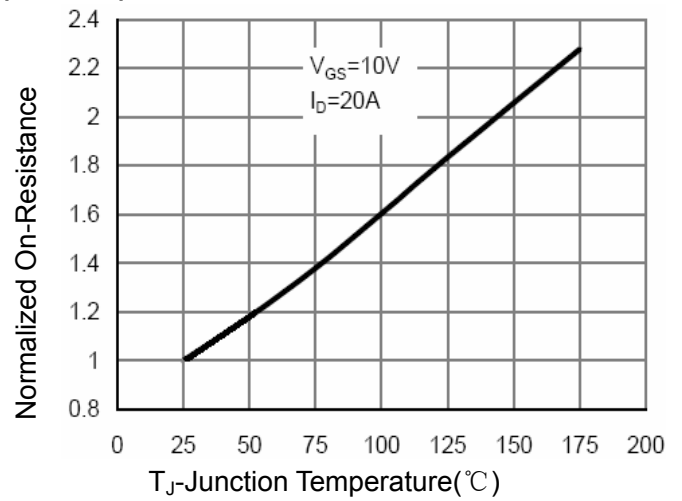


Figure 4 Rdson-Junction Temperature

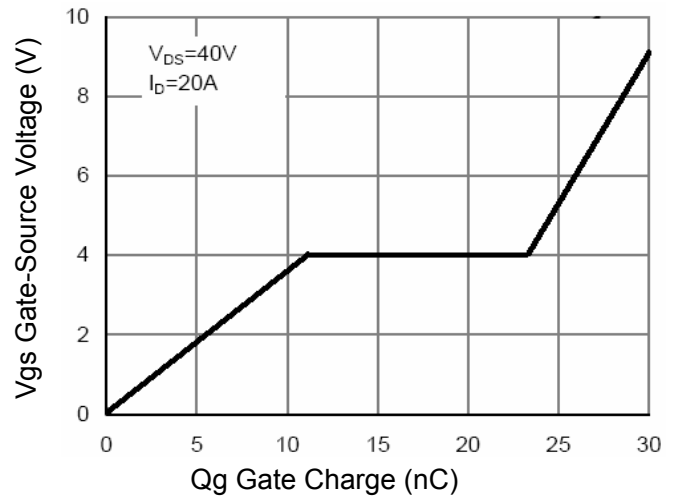


Figure 5 Gate Charge

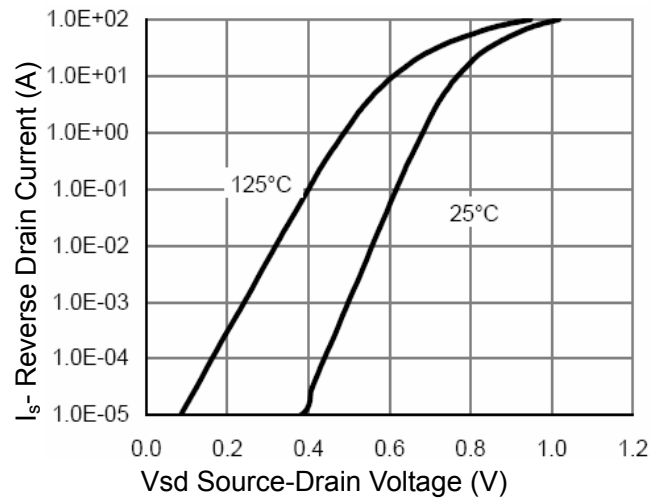


Figure 6 Source- Drain Diode Forward

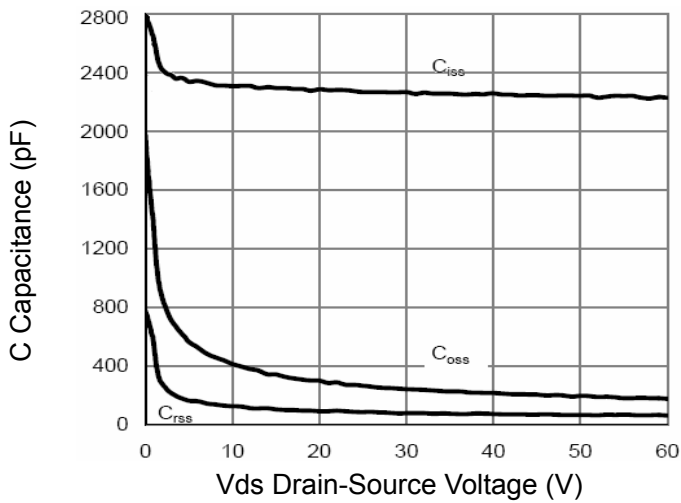


Figure 7 Capacitance vs Vds

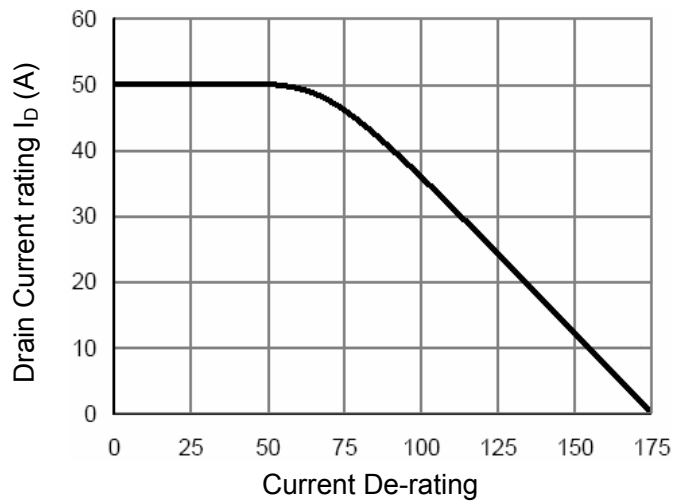


Figure 9 Drain Current vs Junction Temperature

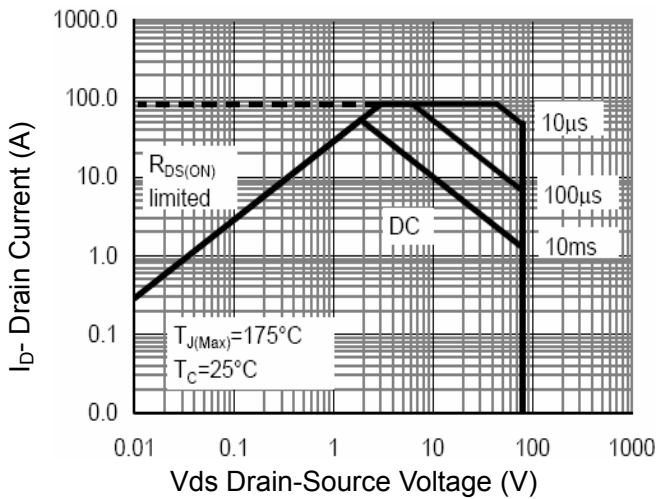


Figure 8 Safe Operation Area

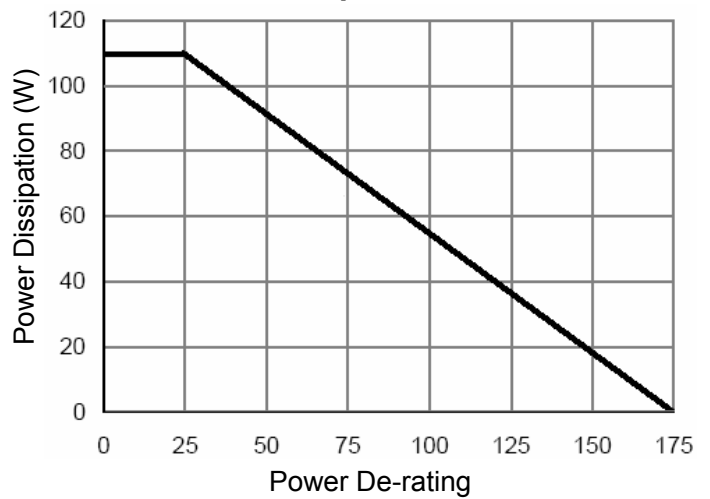


Figure 10 Power vs Junction Temperature

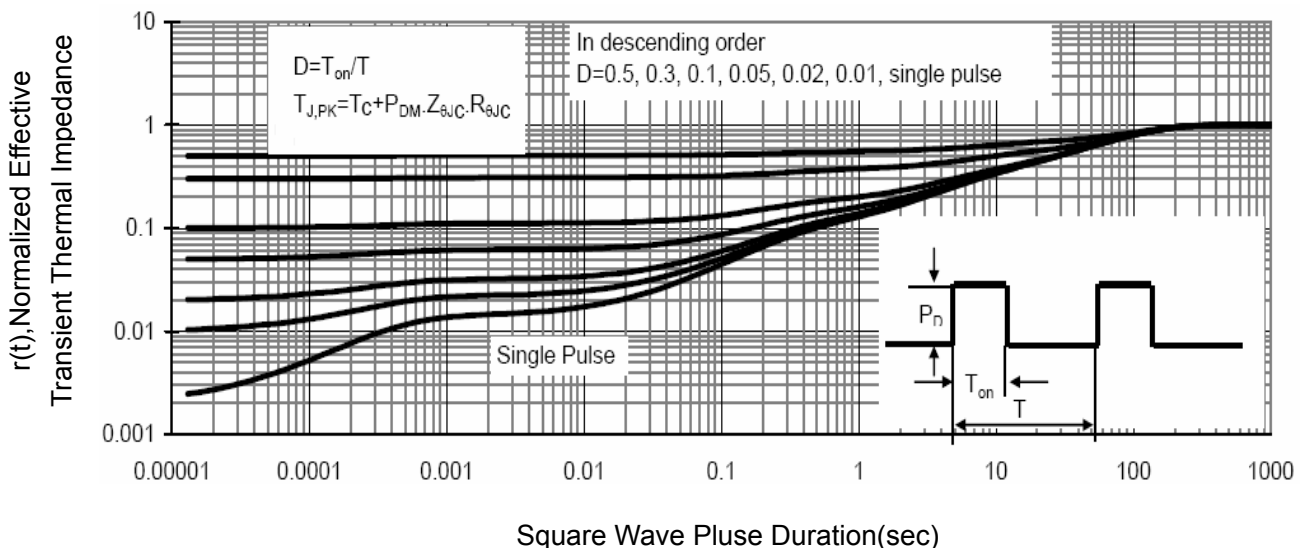


Figure 11 Normalized Maximum Transient Thermal Impedance

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