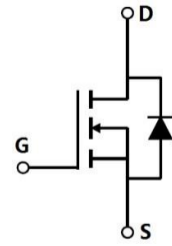


80V N-SGT Enhancement Mode MOSFET

**General Description**

IRF1407PBF-ML use advanced SGTMOSTM technology to provide low RDS(ON), low gate charge, fast switching. This device is specially designed to get better ruggedness and suitable to use in

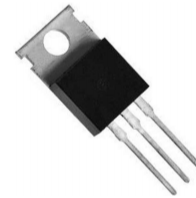


**Features**

- Low RDS(on) & FOM
- Extremely low switching loss
- Excellent stability and uniformity of Invertors

**Applications**

- Consumer electronic power supply Motor control
- Synchronous-rectification Isolated DC
- Synchronous-rectification applications



**Absolute Maximum Ratings** at T<sub>j</sub>=25°C unless otherwise noted

Parameter	Symbol	Value	Unit
Drain source voltage	VDS	80	V
Gate source voltage	VGS	±20	V
Continuous drain current <sup>1)</sup>	ID	130	A
Pulsed drain current <sup>2)</sup>	ID, pulse	390	A
Power dissipation <sup>3)</sup>	P <sub>d</sub>	192	W
Single pulsed avalanche energy <sup>5)</sup>	EAS	400	mJ
Operation and storage temperature	Tstg, Tj	-55 to 150	°C
Thermal resistance, junction-case	RθJC	0.65	°C/W
Thermal resistance, junction-ambient <sup>4)</sup>	RθJA	62.5	°C/W

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Electrical Characteristics at  $T_j=25\text{ }^\circ\text{C}$  unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Drain-source breakdown voltage	$BV_{DSS}$	80			V	$V_{GS}=0\text{ V}$ , $I_D=250\text{ }\mu\text{A}$
Gate threshold voltage	$V_{GS(th)}$	2.0		4.0	V	$V_{DS}=V_{GS}$ , $I_D=250\text{ }\mu\text{A}$
Drain-source on-state resistance	$R_{DS(on)}$		3.8	4.5	m $\Omega$	$V_{GS}=10\text{ V}$ , $I_D=20\text{ A}$
Gate-source leakage current	$I_{GSS}$			100	nA	$V_{GS}=20\text{ V}$
				-100		$V_{GS}=-20\text{ V}$
Drain-source leakage current	$I_{DSS}$			1	$\mu\text{A}$	$V_{DS}=80\text{ V}$ , $V_{GS}=0\text{ V}$
Input capacitance	$C_{iss}$		8681		pF	$V_{GS}=0\text{ V}$ , $V_{DS}=50\text{ V}$ ,
Output capacitance	$C_{oss}$		6484		pF	$f=1\text{ MHz}$
Reverse transfer capacitance	$C_{rss}$		8.55		pF	
Turn-on delay time	$t_{d(on)}$		28.2		ns	$V_{GS}=10\text{ V}$ , $V_{DS}=50$
Rise time	$t_r$		7.5		ns	V,
Turn-off delay time	$t_{d(off)}$		81.9		ns	$R_G=2.2\text{ }\Omega$ ,
Fall time	$t_f$		20.1		ns	$I_D=22\text{ A}$
Total gate charge	$Q_g$		101.6		nC	$I_D=22\text{ A}$ ,
Gate-source charge	$Q_{gs}$		20.6		nC	$V_{DS}=50\text{ V}$ ,
Gate-drain charge	$Q_{gd}$		28.7		nC	$V_{GS}=10\text{ V}$
Gate plateau voltage	$V_{plateau}$		4.2		V	
Diode forward current	$I_S$			130	A	$V_{GS}<V_{th}$
Pulsed source current	$I_{SP}$			390		
Diode forward voltage	$V_{SD}$			1.3	V	$I_S=20\text{ A}$ , $V_{GS}=0\text{ V}$
Reverse recovery time	$t_{rr}$		82.1		ns	$I_S=10\text{ A}$ , $di/dt=100$
Reverse recovery charge	$Q_{rr}$		248.4		nC	A/ $\mu\text{s}$
Peak reverse recovery current	$I_{rrm}$		4.9		A	

Note

- 1) Calculated continuous current based on maximum allowable junction temperature.
- 2) Repetitive rating; pulse width limited by max. junction temperature.
- 3)  $P_d$  is based on max. junction temperature, using junction-case thermal resistance.
- 4) The value of  $R_{\theta JA}$  is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with  $T_a=25\text{ }^\circ\text{C}$ .
- 5)  $V_{DD}=50\text{ V}$ ,  $R_G=25\text{ }\Omega$ ,  $L=0.5\text{ mH}$ , starting  $T_j=25\text{ }^\circ\text{C}$ .

Electrical Characteristics Diagrams

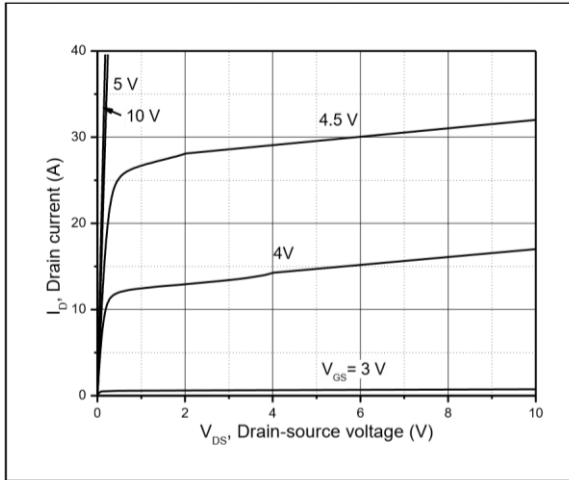


Figure 1, Typ. output characteristics

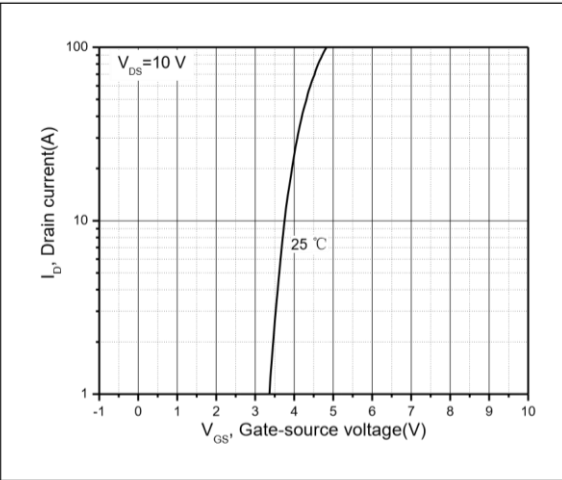


Figure 2, Typ. transfer characteristics

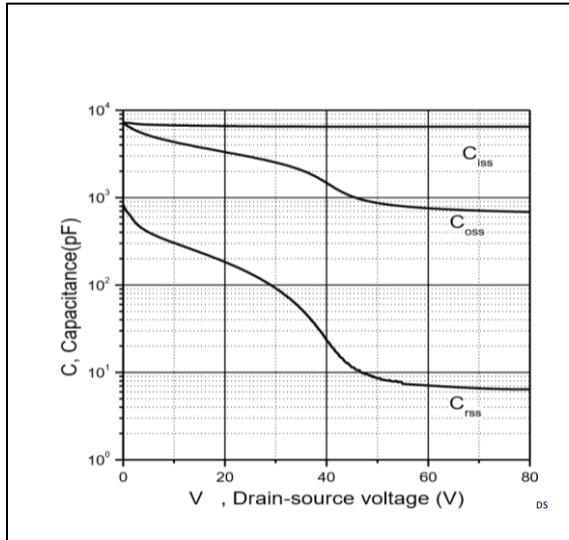


Figure 3, Typ. capacitances

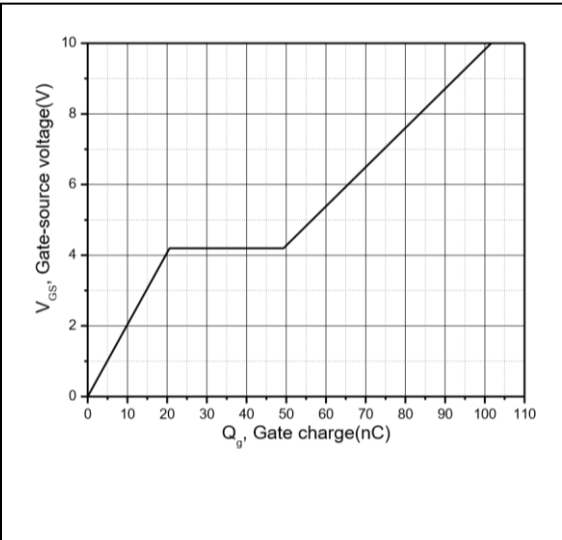


Figure 4, Typ. gate charge

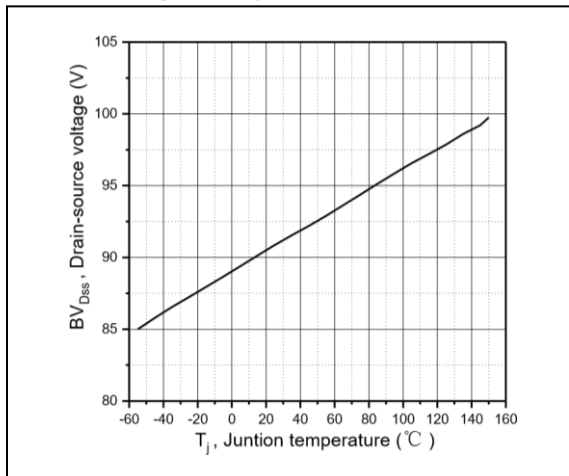


Figure 5, Drain-source breakdown voltage

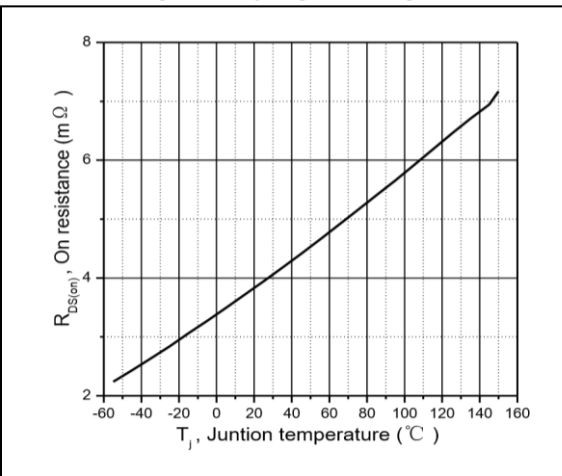


Figure 6, Drain-source on-state resistance

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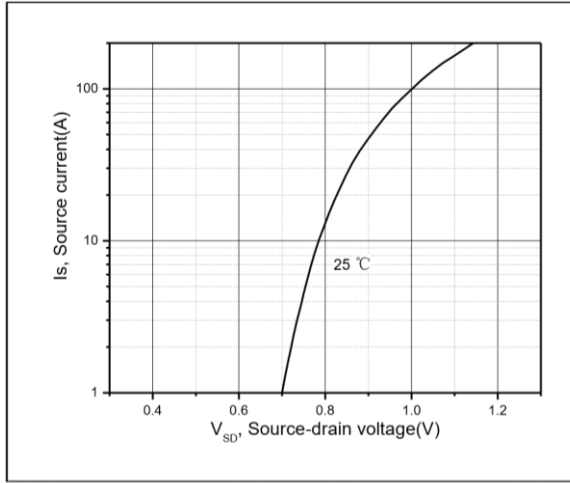


Figure 7, Forward characteristic of body diode

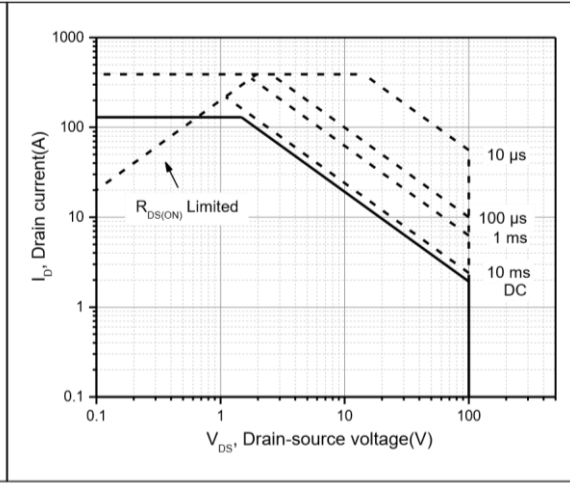


Figure 8, Safe operation area  $T_c=25\text{ °C}$

Test circuits and waveforms

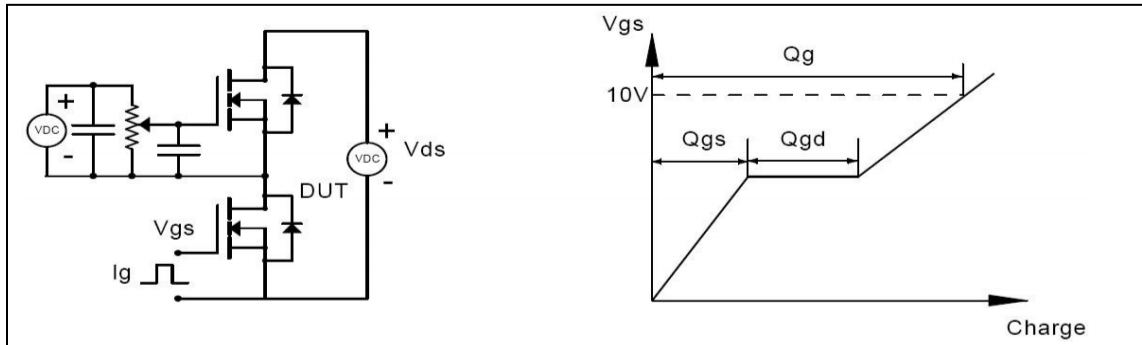


Figure 1, Gate charge test circuit & waveform

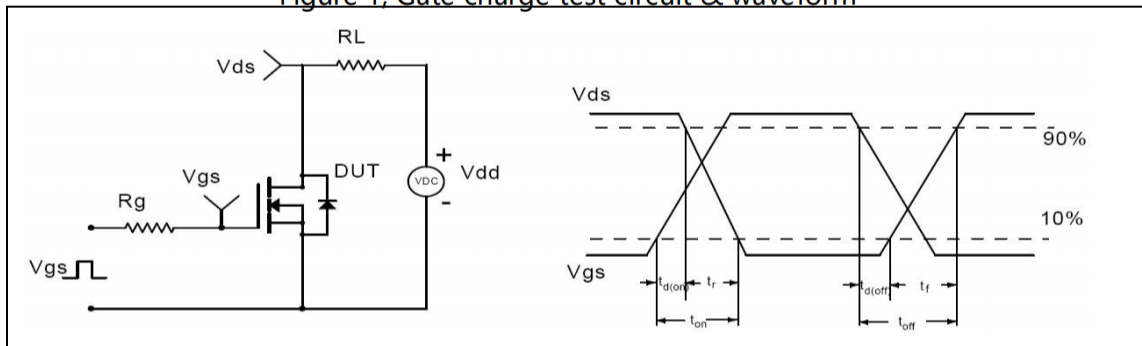


Figure 2, Switching time test circuit & waveforms

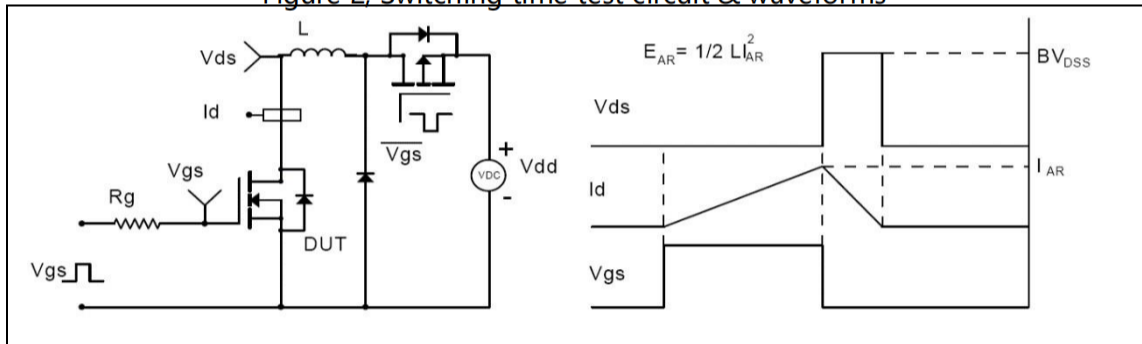


Figure 3, Unclamped inductive switching (UIS) test circuit & waveforms

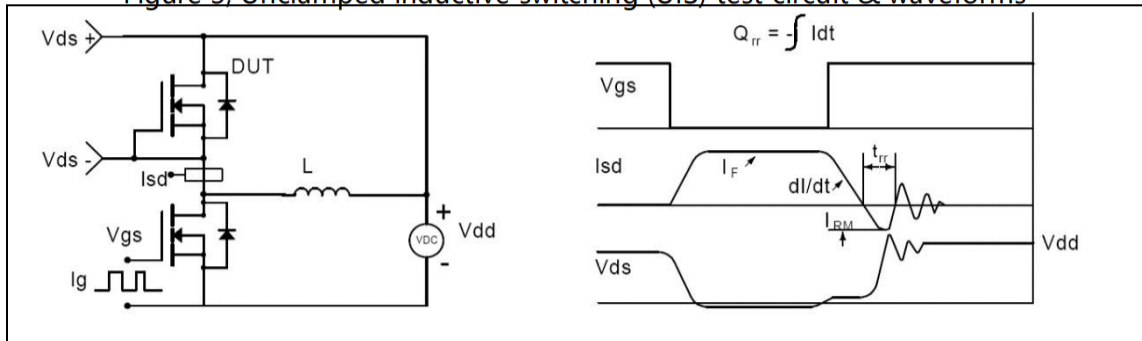
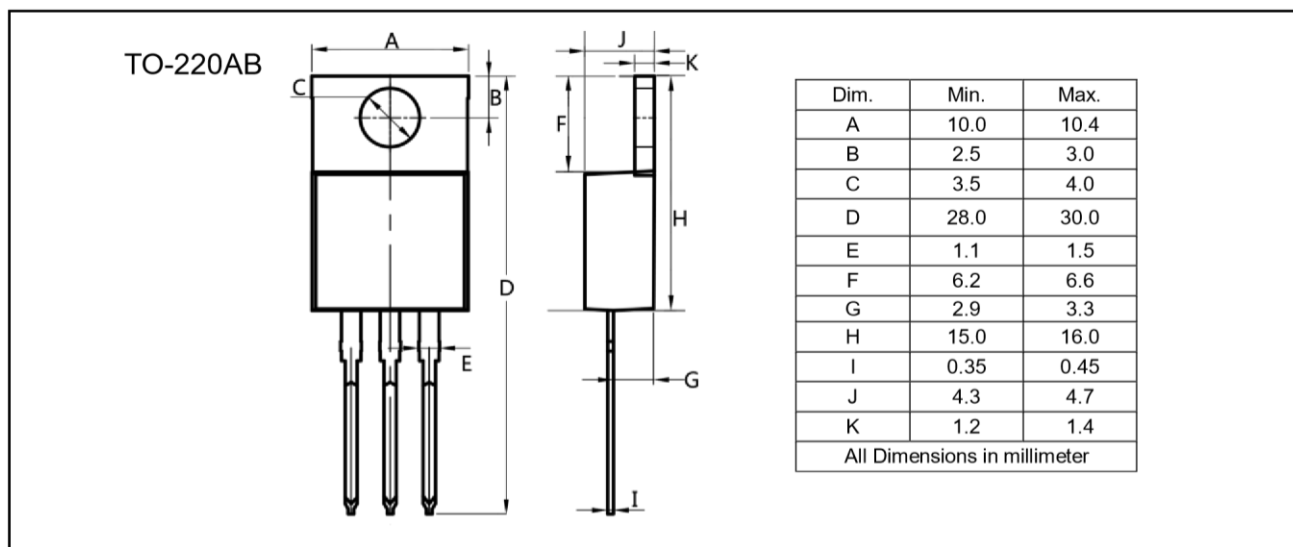


Figure 4, Diode reverse recovery test circuit & waveforms

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