

1.Description

The IRF7809AV has been optimized for all parameters that are critical in synchronous buck converters including $R_{DS(ON)}$, gate charge and Cdv/dt -induced turn-on immunity.

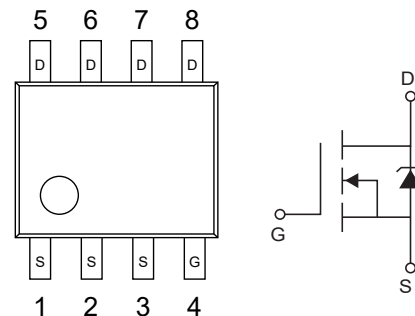
2.Features

- $V_{DS(V)}=30V$
- $I_D=15A$
- $R_{DS(ON)}<7m\Omega(V_{GS}=4.5V)$

3.Pinning information

Pin	Symbol	Description
1,2,3	S	SOURCE
4	G	GATE
5,6,7,8	D	DRAIN

SOP-8



4.Absolute Maximum Ratings $T_A=25^{\circ}C$ unless otherwise noted

Parameter		Symbol	Rating	Units
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	± 12	
Continuous Drain Current, $V_{GS} \geq 4.5V$	$T_A=25^{\circ}C$	I_D	15	A
	$T_L=90^{\circ}C$		14.6	
Pulsed Drain Current ①		I_{DM}	100	
Power Dissipation ④	$T_A=25^{\circ}C$	P_D	2.5	W
	$T_L=90^{\circ}C$		3	W
Junction & Storage Temperature Range		T_J, T_{STG}	-55 to 150	$^{\circ}C$
Continuous Source Current (Body Diode)		I_S	2.5	A
Pulsed Source Current ①		I_{SM}	50	A



5.Thermal resistance rating

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ③	$R_{\theta JA}$		50	°C/W
Maximum Junction-to-Lead	$R_{\theta JL}$		20	°C/W



6. Electrical Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu A$, $V_{GS}=0V$	30			V
Static Drain-Source on Resistance	$R_{DS(ON)}$	$V_{GS}=4.5V$, $I_D=15A$ ②		7	9	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=250\mu A$	1	1.2	1.4	V
Drain Source Leakage Current	I_{DSS}	$V_{DS}=24V$, $V_{GS}=0V$			30	μA
		$V_{DS}=24V$, $V_{GS}=0V$, $T_J=100^\circ C$			150	μA
Gate-Source Leakage Current*	I_{GSS}	$V_{GS}=\pm 12V$			±100	nA
Total Gate Chg Cont FET	Q_g	$V_{GS}=5V$, $I_D=15A$, $V_{DS}=20V$		41	62	nC
Total Gate Chg Sync FET	Q_g	$V_{GS}=5V$, $V_{DS}<100mV$		36	54	nC
Pre-Vth Gate-Source Charge	Q_{gs1}	$V_{DS}=20V$, $I_D=15A$		7		nC
Pre-Vth Gate-Source Charge	Q_{gs2}			2.3		nC
Gate to Drain Charge	Q_{gd}	$I_D=15A$, $V_{DS}=16V$		12		nC
Switch Chg($Q_{gs2} + Q_{gd}$)	Q_{sw}			14	21	nC
Output Charge*	Q_{oss}	$V_{DS}=16V$, $V_{GS}=0V$		30	45	nC
Gate Resistance	R_G			1.5	3	Ω
Turn-on Delay Time	$t_{D(on)}$	$V_{DD}=16V$, $I_D=15A$, $V_{GS}=5V$ Clamped Inductive Load		14		ns
Rise Time	t_r			36		ns
Turn-Off Delay Time	$t_{D(off)}$			96		ns
Fall Time	t_f			10		ns
Input Capacitance	C_{iss}	$V_{GS}=0V$, $V_{DS}=16V$		3780		pF
Output Capacitance	C_{oss}			1060		pF
Reverse Transfer Capacitance	C_{rss}				130	pF
Diode Forward Voltage*	V_{SD}	$I_S=15A$ ②, $V_{GS}=0V$			1.3	V
Reverse Recovery Charge ④	Q_{rr}	$di/dt \sim 700A/\mu s$ $V_{DS}=16V$, $V_{GS}=0V$, $I_S=15A$		120		nC
Reverse Recovery Charge (with Parallel Schottky) ④	$Q_{rr(s)}$	$di/dt \sim 700A/\mu s$ (with 10BQ040) $V_{DS}=16V$, $V_{GS}=0V$, $I_S=15A$		150		nC

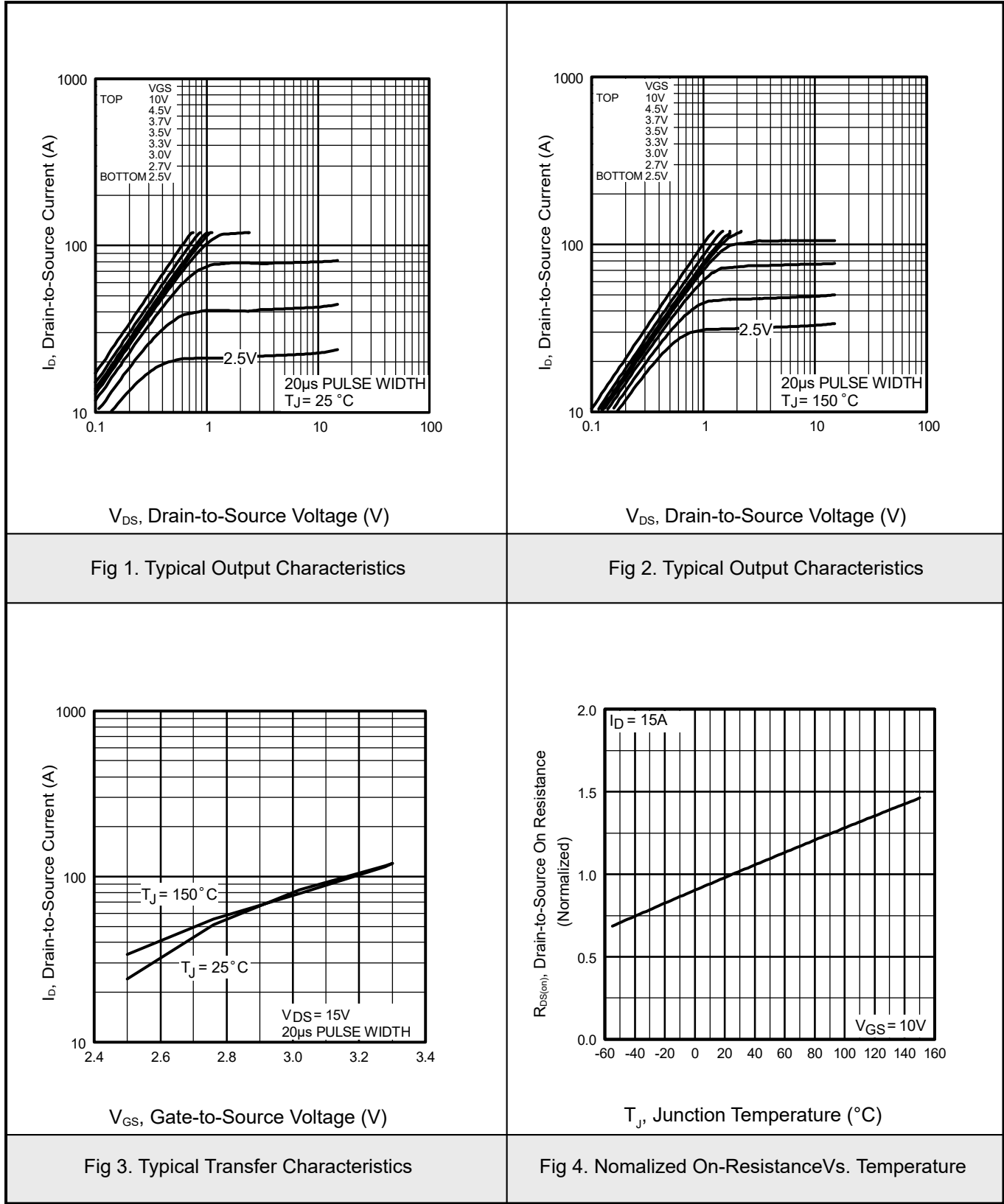


Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Pulse width $\leq 400\mu\text{s}$; duty cycle $\leq 2\%$.
- ③ When mounted on 1 inch square copper board, $t < 10$ sec.
- ④ Typ= measured- Q_{OSS} .
- ⑤ Typical values measured at $V_{\text{GS}} = 4.5\text{V}$, $I_{\text{F}} = 15\text{A}$.

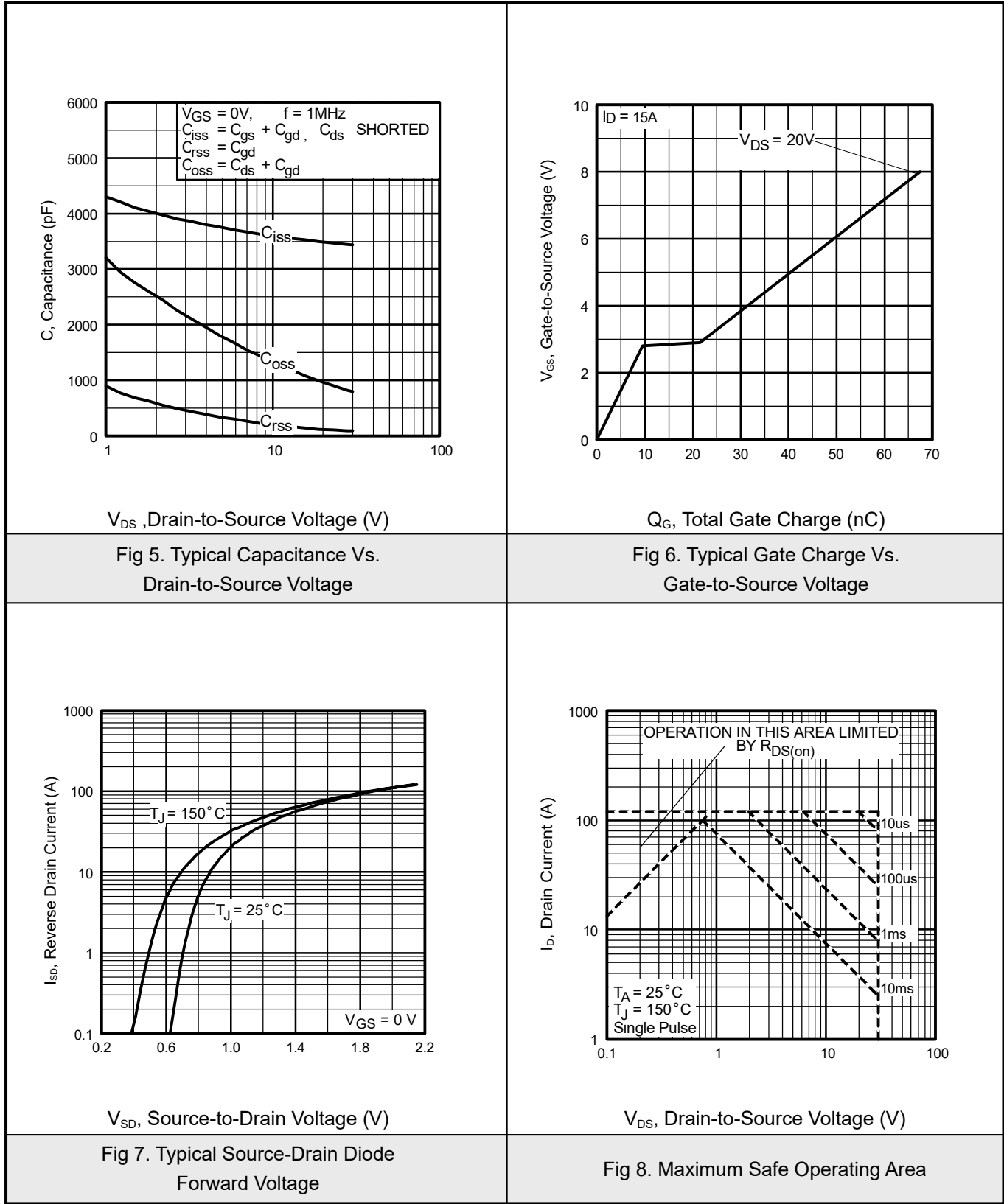


7.1Typical Characteristics



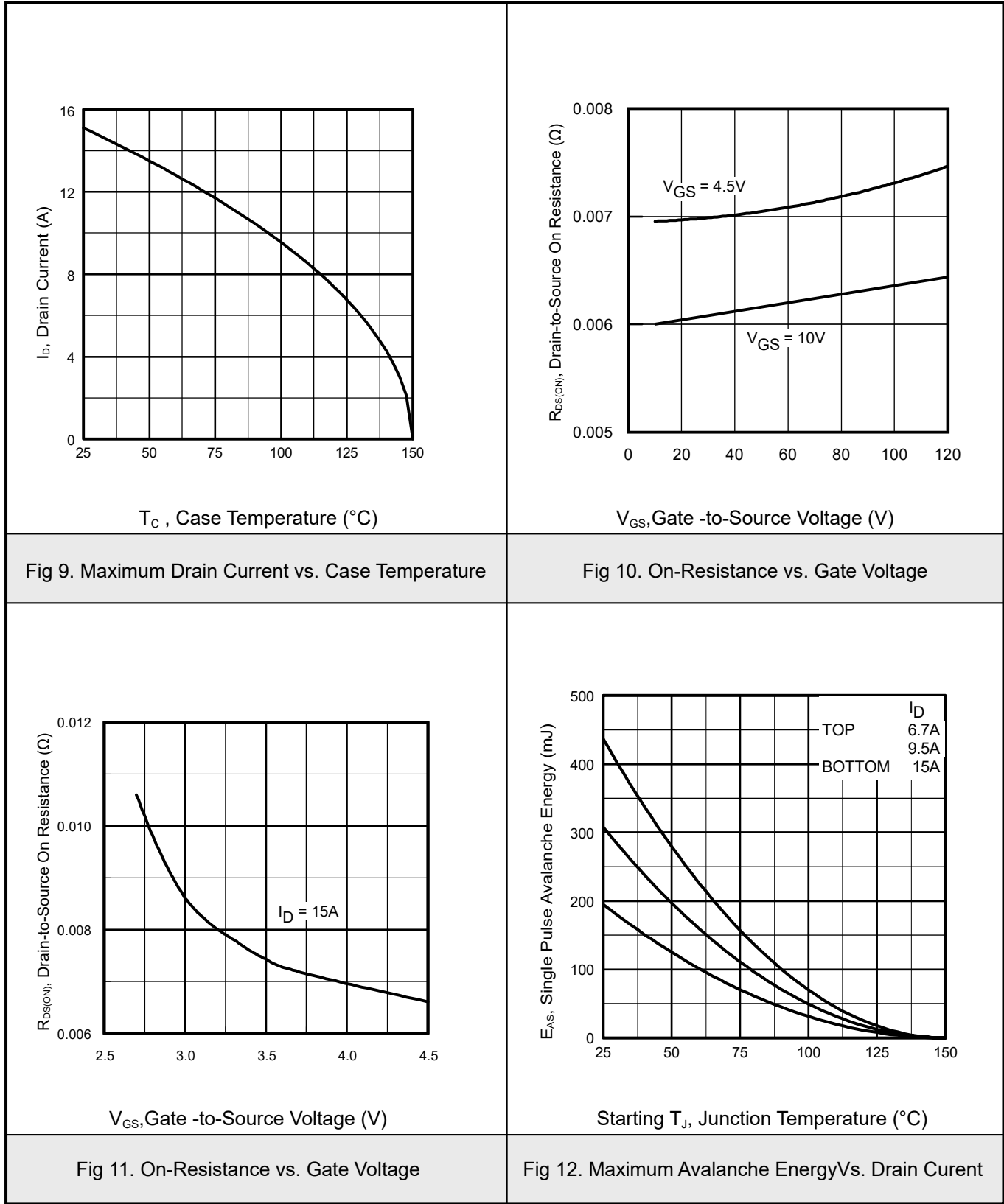


7.2Typical Characterisitics



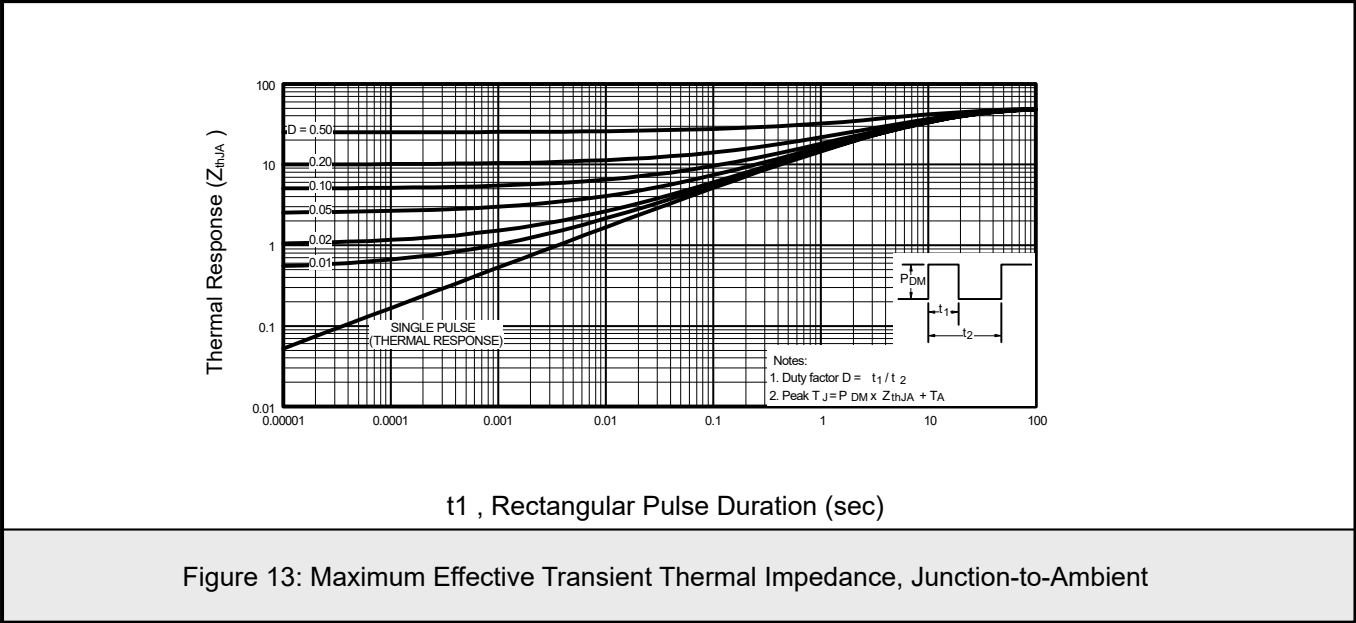


7.3Typical Characterisitics





7.4Typical Characterisitics





7.5 Typical Characteristics

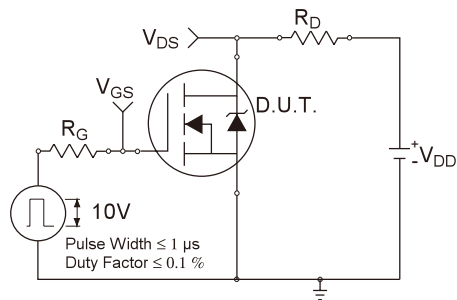


Fig 14a. Switching Time Test Circuit

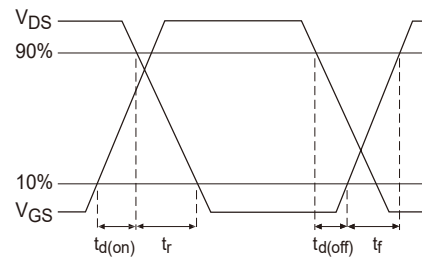


Fig 14b. Switching Time Waveforms

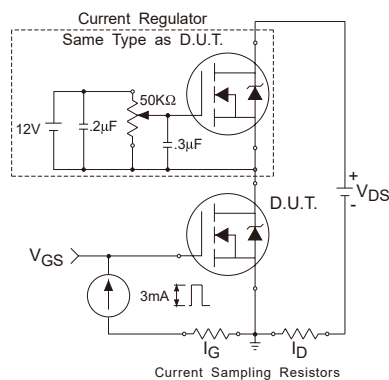


Fig 15a&b. Basic Gate Charge Test Circuit and Waveform

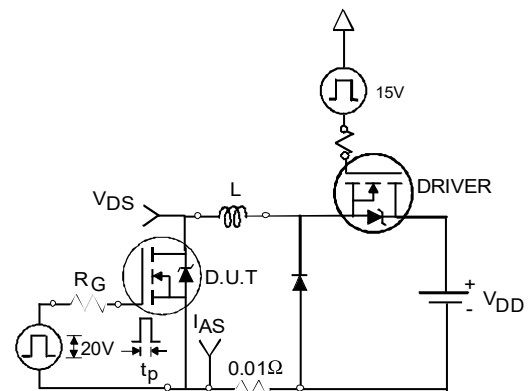
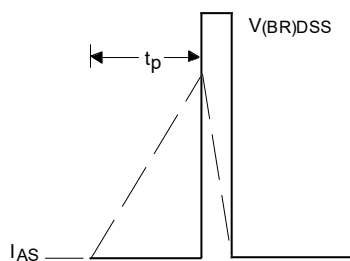
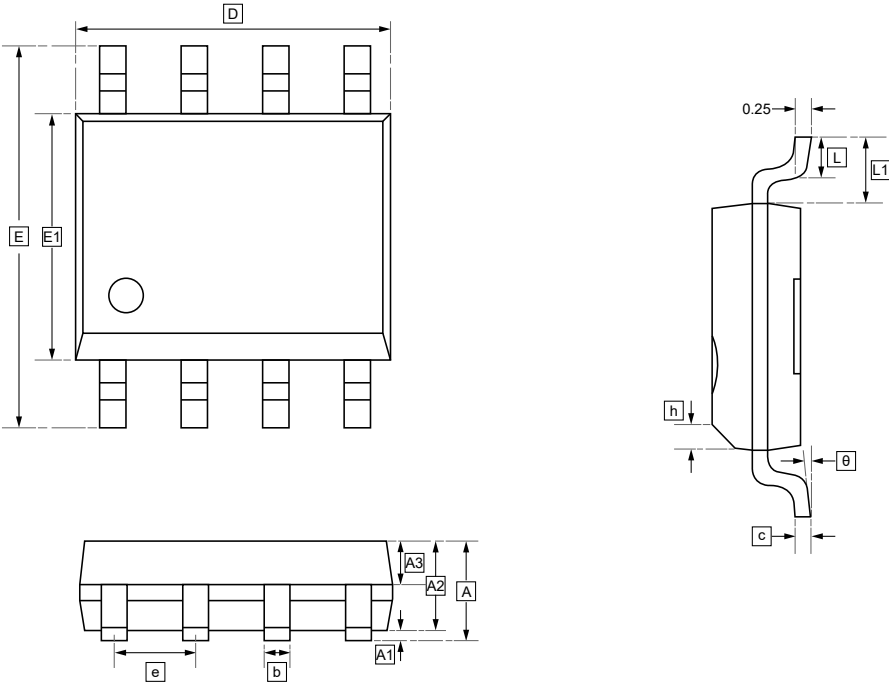


Fig 16a&b. Unclamped Inductive Test circuit and Waveforms



8.SOP-8 Package Outline Dimensions



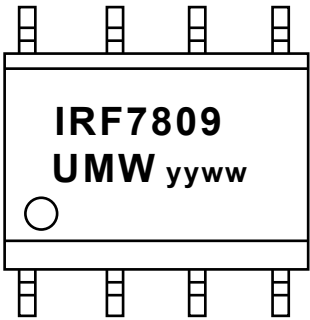
DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	A3	b	c	D	E	E1	e	h	L
Min	-	0.05	1.30	0.60	0.39	0.20	4.80	5.80	3.80	1.24	0.30	0.50
Max	1.75	0.20	1.50	0.70	0.47	0.24	5.00	6.20	4.00	1.30	0.50	0.80

Symbol	L1	θ
Min	1.00	0°
Max	1.10	8°



9.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW IRF7809AVTR	SOP-8	3000	Tape and reel



10.Disclaimer

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