

1.Features

- $V_{DS(V)}=30V$
- $I_D=13A(V_{GS}=10V)$
- $R_{DS(ON)}<9.1m\Omega(V_{GS}=10V)$
- $R_{DS(ON)}<12.5m\Omega(V_{GS}=4.5V)$

3.Benefits

- Very Low $R_{DS(ON)}$ at 4.5V V_{GS}
- Low Gate Charge

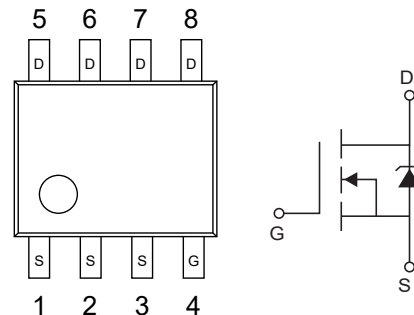
2.Applications

- High Frequency Point-of-Load Synchronous Buck Converter for Applications in Networking & Computing Systems.
- Lead-Free

4.Pinning information

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

SOP-8



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

Parameter		Symbol	Rating	Units
Drain- Source Voltage		V_{DS}	30	V
Gate-to-Source Voltage		V_{GS}	± 20	A
Continuous Drain Current, $V_{GS}=10V$	$T_A=25^{\circ}C$	I_D	13.6	A
Continuous Drain Current, $V_{GS}=10V$	$T_A=70^{\circ}C$		11	A
Pulsed Drain Current ①		I_{DM}	100	W
Maximum Power Dissipation ④	$T_A=25^{\circ}C$	P_D	2.5	W
Maximum Power Dissipation ④	$T_A=70^{\circ}C$		1.6	W/ $^{\circ}C$
Linear Derating Factor			0.02	V
Storage Temperature Range		T_J, T_{STG}	-55 to 150	$^{\circ}C$



6.Thermal resist ance rating

Parameter	Symbol	Typ	Max	Units
Junction-to-Drain Lead ⑤	$R_{\theta JL}$		20	°C/W
Junction-to-Ambient ④ ⑤	$R_{\theta JA}$		50	°C/W



7. Electrical Characteristics $T_J=25^{\circ}\text{C}$

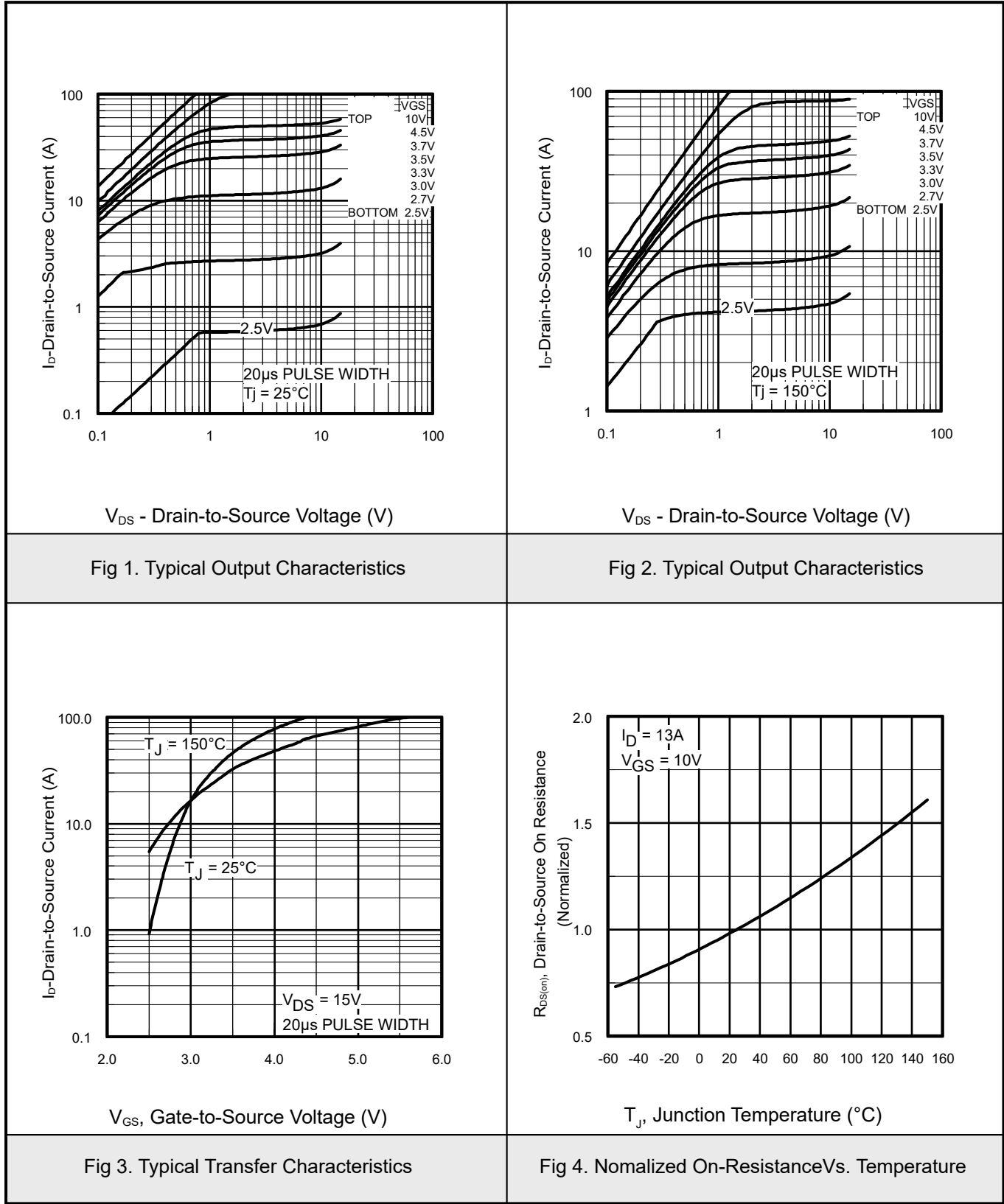
Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	30			V
Breakdown Voltage Temp. Coefficient	$\Delta BV_{DSS}/\Delta T_J$	$I_D=1\text{mA}$, Reference to 25°C		0.025		$\text{V}/^{\circ}\text{C}$
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=13\text{A}$ ③		7	9.1	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}$, $I_D=10\text{A}$ ③		9.5	12.5	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	1			V
Gate Threshold Voltage Coefficient	$\Delta V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$		-4.9		$\text{mV}/^{\circ}\text{C}$
Drain-to-Source Leakage Current	I_{DSS}	$V_{DS}=24\text{V}$, $V_{GS}=0\text{V}$			1	μA
		$V_{DS}=24\text{V}$, $V_{GS}=0\text{V}$, $T_J=125^{\circ}\text{C}$			150	μA
Gate-to-Source Forward Leakage	I_{GSS}	$V_{GS}=20\text{V}$			100	nA
Gate-to-Source Reverse Leakage		$V_{GS}=-20\text{V}$			-100	nA
Forward Transconductance	g_{FS}	$V_{DS}=15\text{V}$, $I_D=10\text{A}$	22			S
Total Gate Charge	Q_g	$V_{DS}=15\text{V}$ $V_{GS}=4.5\text{V}$ $I_D=10\text{A}$ See Fig. 16		9.3	14	nC
Pre-Vth Gate-to-Source Charge	Q_{gs1}			2.5		nC
Post-Vth Gate-to-Source Charge	Q_{gs2}			0.8		nC
Gate-to-Drain Charge	Q_{gd}			2.9		nC
Gate Charge Overdrive	Q_{godr}			3.1		nC
Switch Charge ($Q_{gs2} + Q_{gd}$)	Q_{sw}			3.7		nC
Output Charge	Q_{oss}	$V_{GS}=0\text{V}$, $V_{DS}=10\text{V}$		6.1		nC
Turn-On Delay Time	$t_{D(on)}$	$V_{DD}=15\text{V}$		6.3		ns
Rise Time	t_r	$V_{GS}=4.5\text{V}$ ③		2.7		ns
Turn-Off Delay Time	$t_{D(off)}$	$I_D=10\text{A}$		9.7		ns
Fall Time	t_f	Clamped Inductive Load		7.3		ns
Input Capacitance	C_{iss}	$V_{GS}=0\text{V}$		1010		pF
Output Capacitance	C_{oss}	$V_{DS}=15\text{V}$		360		pF
Reverse Transfer Capacitance	C_{rss}	$f=1.0\text{MHz}$		110		pF



Avalanche Characteristics						
Single Pulse Avalanche Energy ② ⑥	E _{AS}				44	mJ
Avalanche Current ①	I _{AR}				10	A
Diode Characteristics						
Continuous Source Current	I _S	MOSFET symbol showing the integral reverse p-n junction diode.			3.1	A
(Body Diode)						A
Pulsed Source Current	I _{SM}				100	
(Body Diode) ①						
Diode Forward Voltage	V _{SD}	T _J =25°C,I _S =10A,V _{GS} =0V ③			1	V
Reverse Recovery Time	t _{rr}	T _J =25°C,I _F =10A, V _{DD} =20V dI/dt=100A/μs ③		28	42	ns
Reverse Recovery Charge	Q _{rr}			23	35	nC

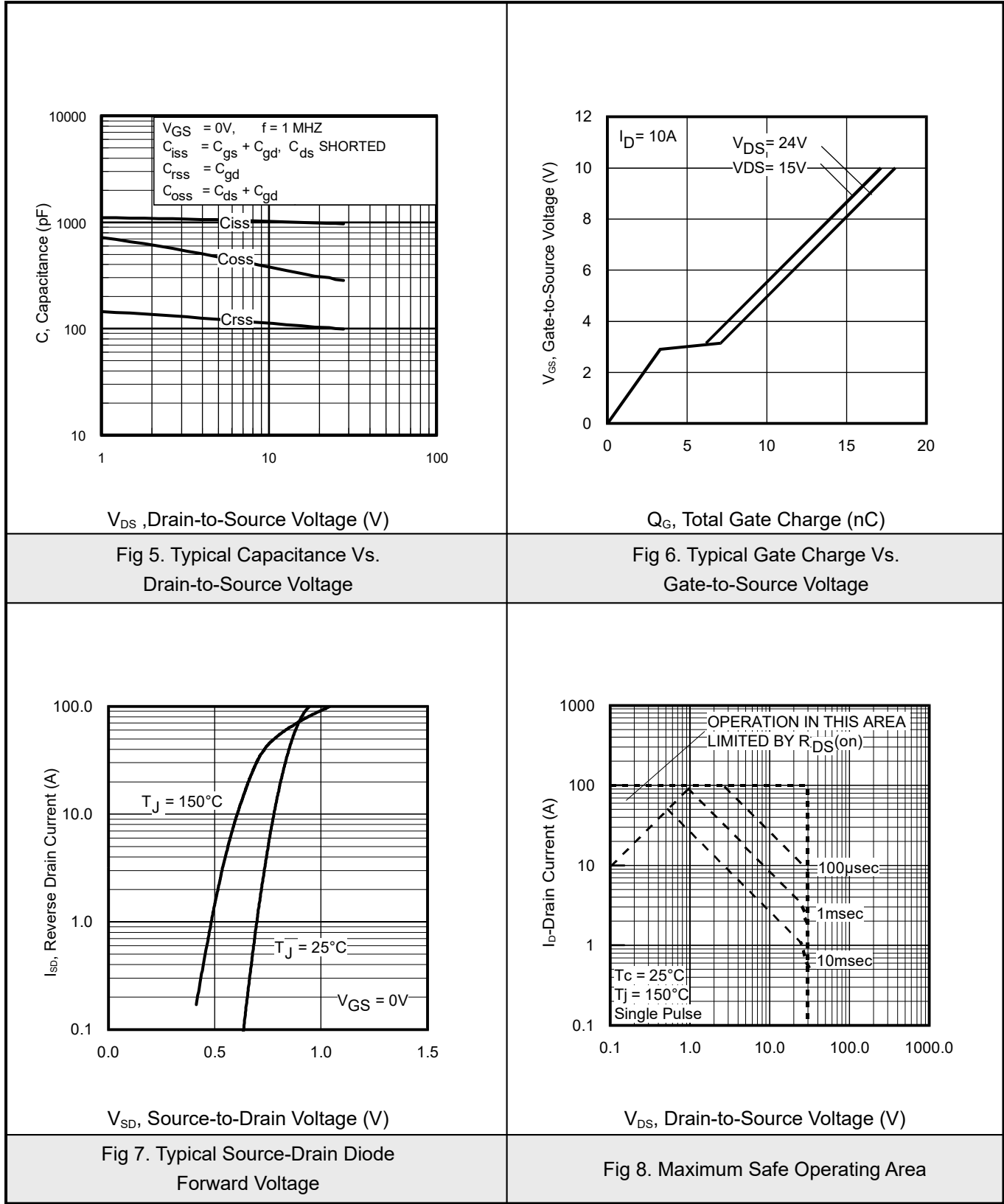


8.1Typical Characteristics



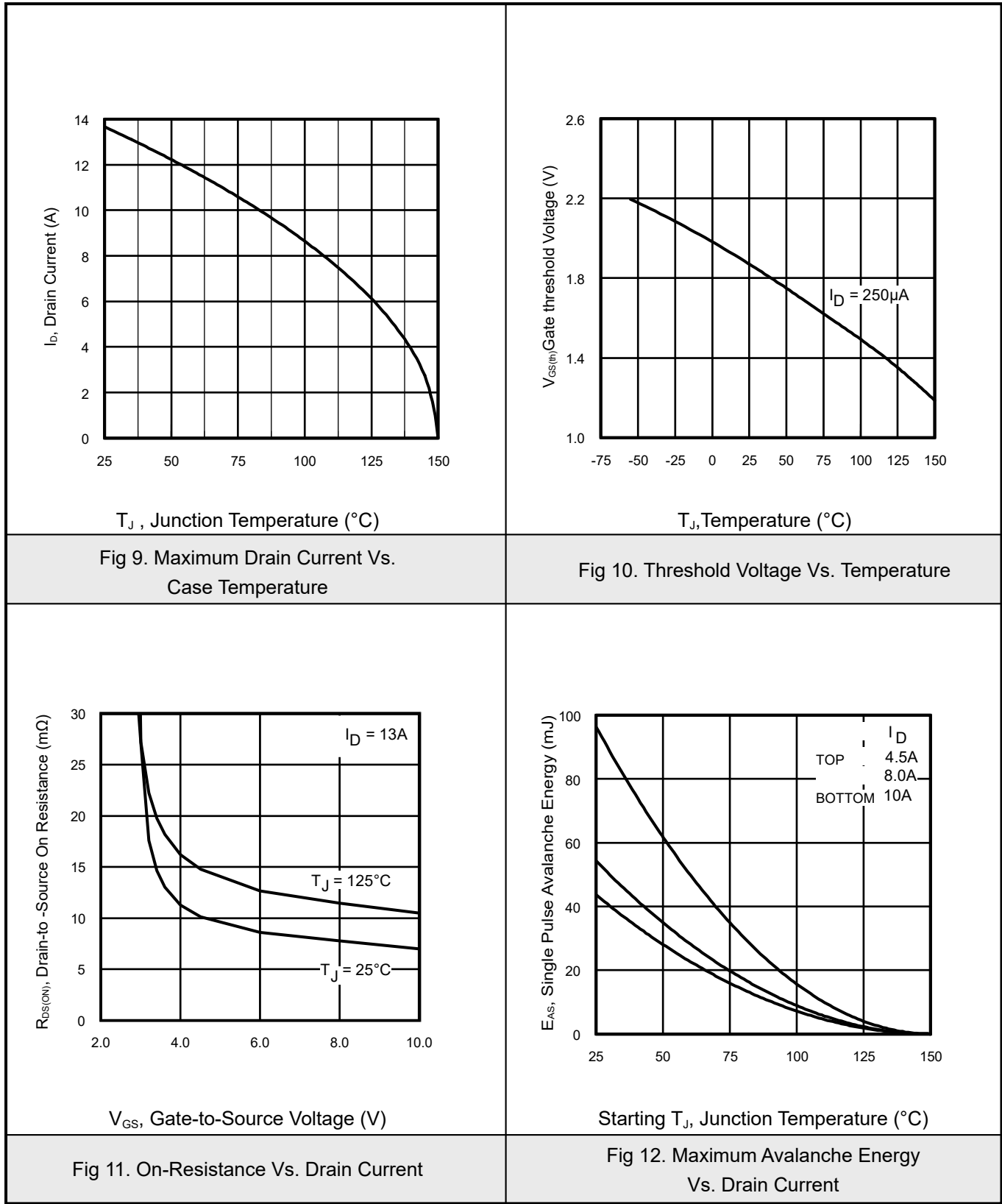


8.2Typical Characterisitics





8.3Typical Characterisitics





8.4 Typical Characteristics

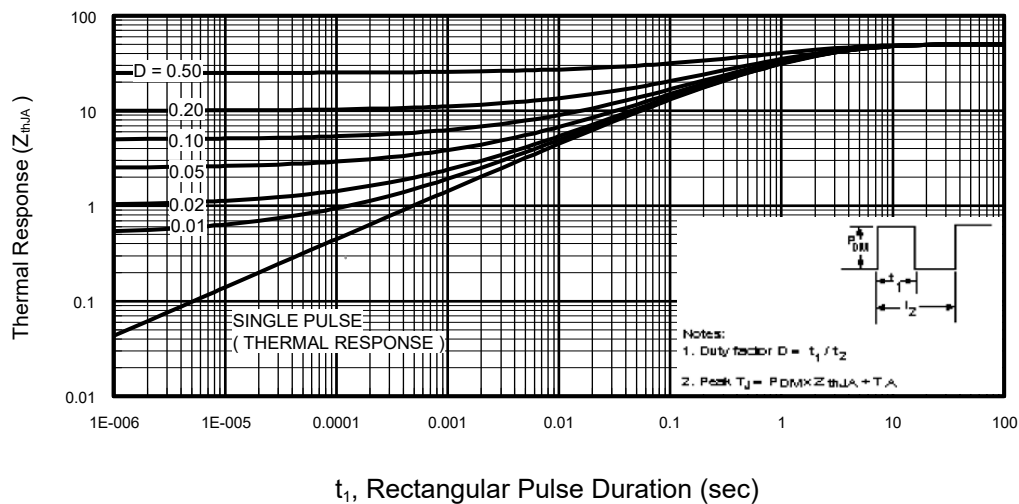


Fig 13. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



8.5 Typical Characteristics

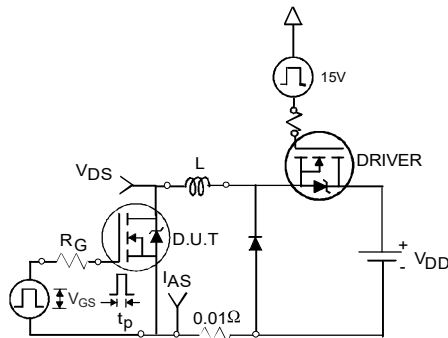


Fig 14a. Unclamped Inductive Test Circuit

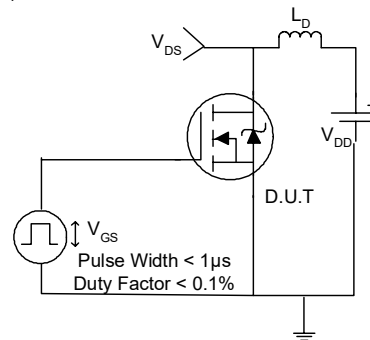


Fig 14b. Switching Time Test Circuit

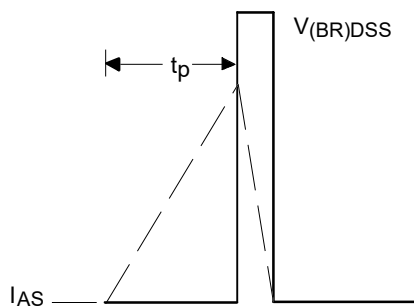


Fig 15a. Unclamped Inductive Waveforms

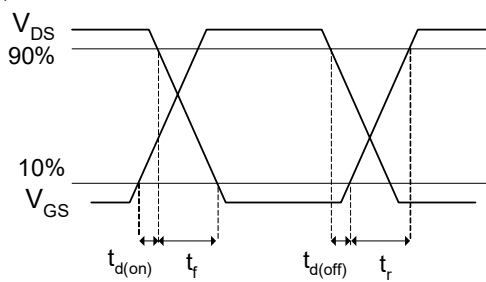


Fig 15b. Switching Time Waveforms

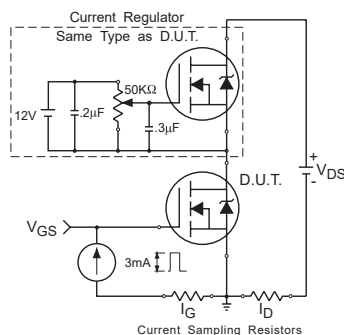


Fig 16a. Gate Charge Test Circuit

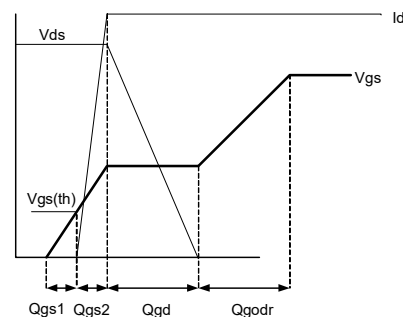
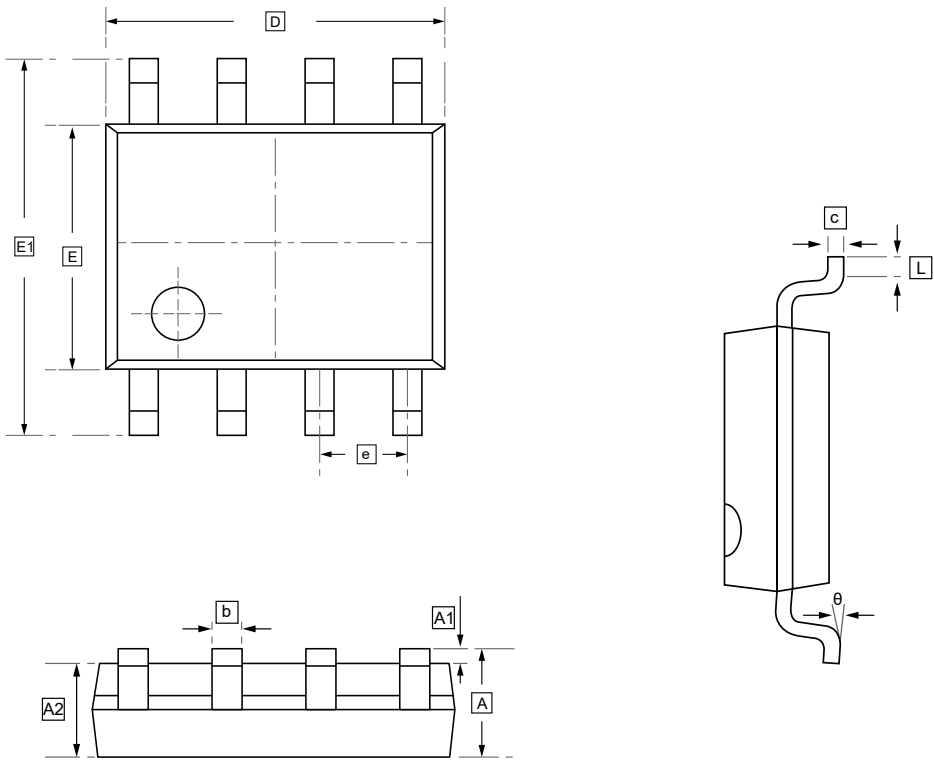


Fig 16b. Gate Charge Waveform



9.SOP-8 Package Outline Dimensions

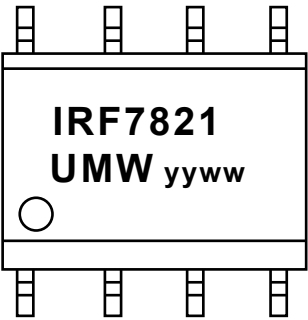


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	c	D	E	E1	e	L	θ
Min	1.350	0.000	1.350	0.330	0.170	4.700	3.800	5.800	1.270	0.400	0°
Max	1.750	0.100	1.550	0.510	0.250	5.100	4.000	6.200	BSC	1.270	8°



10.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW IRF7821TR	SOP-8	3000	Tape and reel



11.Disclaimer

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