

1.Features(N-Ch)

- $V_{DS(V)}=30V$
- $I_D=6.8A(V_{GS}=10V)$
- $R_{DS(ON)}<27m\Omega(V_{GS}=10V)$

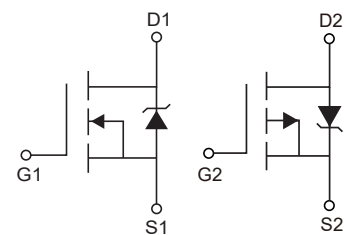
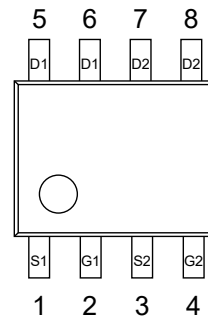
1.Features(P-Ch)

- $V_{DS(V)}=-30V$
- $I_D=-4.6A(V_{GS}=-10V)$
- $R_{DS(ON)}<64m\Omega(V_{GS}=-10V)$

2.Pinning information

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

SOP-8



3.Absolute Maximum Ratings

Parameter		Symbol	N-Channel	P-Channel	Units
Drain-Source Voltage		V_{DS}	± 20	± 20	V
Continuous Drain Current ($V_{GS}=10V$)	$T_A=25^{\circ}C$	I_D	6.8	-4.6	A
	$T_A=70^{\circ}C$		5.4	-3.7	A
Pulsed Drain Current ①		I_{DM}	34	-23	A
Power Dissipation	$T_A=25^{\circ}C$	P_D	2	2	W
Power Dissipation	$T_A=70^{\circ}C$		1.3	1.3	W
Linear Derating Factor			0.016	0.016	W/ $^{\circ}C$
Storage Temperature Range		T_J, T_{STG}	-55 to 150	-55 to 150	$^{\circ}C$

4.Thermal resistance rating

Parameter	Symbol	Typ	Max	Units
Junction-to-Drain Lead ④	$R_{\theta JL}$		20	$^{\circ}C/W$
Junction-to-Ambient ③	$R_{\theta JA}$		62.5	$^{\circ}C/W$



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

Parameter	Symbol		Conditions	Min	Typ	Max	Units
Drain-to-Source Breakdown Voltage	BV_{DSS}	N-Ch	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	30			V
		P-Ch	$I_D=-250\mu\text{A}$, $V_{GS}=0\text{V}$	-30			V
Breakdown Voltage Temp Coefficient	$\frac{\Delta BV_{DSS}}{\Delta T_J}$	N-Ch	$I_D=1\text{mA}$, Reference to 25°C		0.03		$\text{V}/^{\circ}\text{C}$
		P-Ch	$I_D=-1\text{mA}$, Reference to 25°C		0.02		$\text{V}/^{\circ}\text{C}$
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	N-Ch	$V_{GS}=10\text{V}$, $I_D=6.8\text{A}$ ②		22	27	$\text{m}\Omega$
		P-Ch	$V_{GS}=4.5\text{V}$, $I_D=5.4\text{A}$ ②		33	40	$\text{m}\Omega$
		N-Ch	$V_{GS}=-10\text{V}$, $I_D=-4.6\text{A}$ ②		51	64	$\text{m}\Omega$
		P-Ch	$V_{GS}=-4.5\text{V}$, $I_D=-3.7\text{A}$ ②		82	103	$\text{m}\Omega$
Gate Threshold Voltage	$V_{GS(th)}$	N-Ch	$V_{DS}=V_{GS}$, $I_D=10\mu\text{A}$	1.3	1.8	2.3	V
		P-Ch	$V_{DS}=V_{GS}$, $I_D=-10\mu\text{A}$	-1.3	-1.8	-2.3	V
Drain-to-Source Leakage Current	I_{DSS}	N-Ch	$V_{DS}=24\text{V}$, $V_{GS}=0\text{V}$			1	μA
		P-Ch	$V_{DS}=-24\text{V}$, $V_{GS}=0\text{V}$			-1	μA
		N-Ch	$V_{DS}=24\text{V}$, $V_{GS}=0\text{V}$, $T_J=125^{\circ}\text{C}$			150	μA
		P-Ch	$V_{DS}=-24\text{V}$, $V_{GS}=0\text{V}$, $T_J=125^{\circ}\text{C}$			-150	μA
Gate-to-Source Forward Leakage	I_{GSS}	N-Ch	$V_{GS}=20\text{V}$			100	nA
		P-Ch	$V_{GS}=-20\text{V}$			-100	nA
Gate-to-Source Reverse Leakage		N-Ch	$V_{GS}=-20\text{V}$			-100	nA
		P-Ch	$V_{GS}=20\text{V}$			100	nA
Forward Transconductance	g_{fs}	N-Ch	$V_{DS}=15\text{V}$, $I_D=5.4\text{A}$	8.2			S
		P-Ch	$V_{DS}=-15\text{V}$, $I_D=-3.7\text{A}$	4.1			S
Total Gate Charge	Q_g	N-Ch	$I_D=6.8\text{A}$, $V_{DS}=15\text{V}$, $V_{GS}=10\text{V}$		6.8	14	nC
		P-Ch			8.1	16	nC
Gate-to-Source Charge	Q_{gs}	N-Ch			1.4		nC
		P-Ch			1.3		nC
Gate-to-Drain ("Miller") Charge	Q_{gd}	N-Ch			0.98		nC
		P-Ch			2.1		nC



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-30V P-Channel MOSFET

Gate Resistance	R_G	N-Ch			2.2	4.4	Ω
		P-Ch			9.4	19	Ω
Turn-On Delay Time	$t_{D(on)}$	N-Ch	N-Ch: ② $V_{DD}=15A, V_{GS}=4.5V$ $I_D=1A, R_G=6.2\Omega$ P-Ch: ② $V_{DD}=-15A, V_{GS}=-4.5V$ $I_D=-1A, R_G=6.8\Omega$		5.1		ns
		P-Ch			8		ns
Rise Time	t_r	N-P			4.8		ns
		N-P			14		ns
Turn-Off Delay Time	$t_{D(off)}$	N-Ch			4.9		ns
		P-Ch			17		ns
Fall Time	t_f	N-Ch			3.9		ns
		P-Ch			15		ns
Input Capacitance	C_{iss}	N-Ch	N-Ch: $V_{GS}=0V, V_{DS}=15V, f=1MHz$ P-Ch: $V_{GS}=0V, V_{DS}=-15V, f=1MHz$		398		pF
		P-Ch			383		pF
Output Capacitance	C_{oss}	N-Ch			82		pF
		P-Ch			104		pF
Reverse Transfer Capacitance	C_{rss}	N-Ch			36		pF
		P-Ch			64		pF
Continuous Source Current (Body Diode)	I_S	N-Ch				2	A
		P-Ch				-2	A
Pulsed Source Current (Body Diode) ①	I_{SM}	N-Ch				34	A
		P-Ch				-23	A
Diode Forward Voltage	V_{SD}	N-Ch	$T_J=25^\circ C, I_S=2A, V_{GS}=0V$ ②			1.2	V
		P-Ch	$T_J=25^\circ C, I_S=-2A, V_{GS}=0V$ ②			-1.2	V
Reverse Recovery Time	t_{rr}	N-Ch	N-Ch: $T_J=25^\circ C, I_F=2A$		8.4	13	ns
		P-Ch	$V_{DD}=15V, di/dt=102/\mu s$ ②		11	17	ns
Reverse Recovery Charge	Q_{rr}	N-Ch	P-Ch: $T_J=25^\circ C, I_F=-2A$		2.3	3.5	nC
		P-Ch	$V_{DD}=-15V, di/dt=102/\mu s$ ②		4.8	7.2	nC

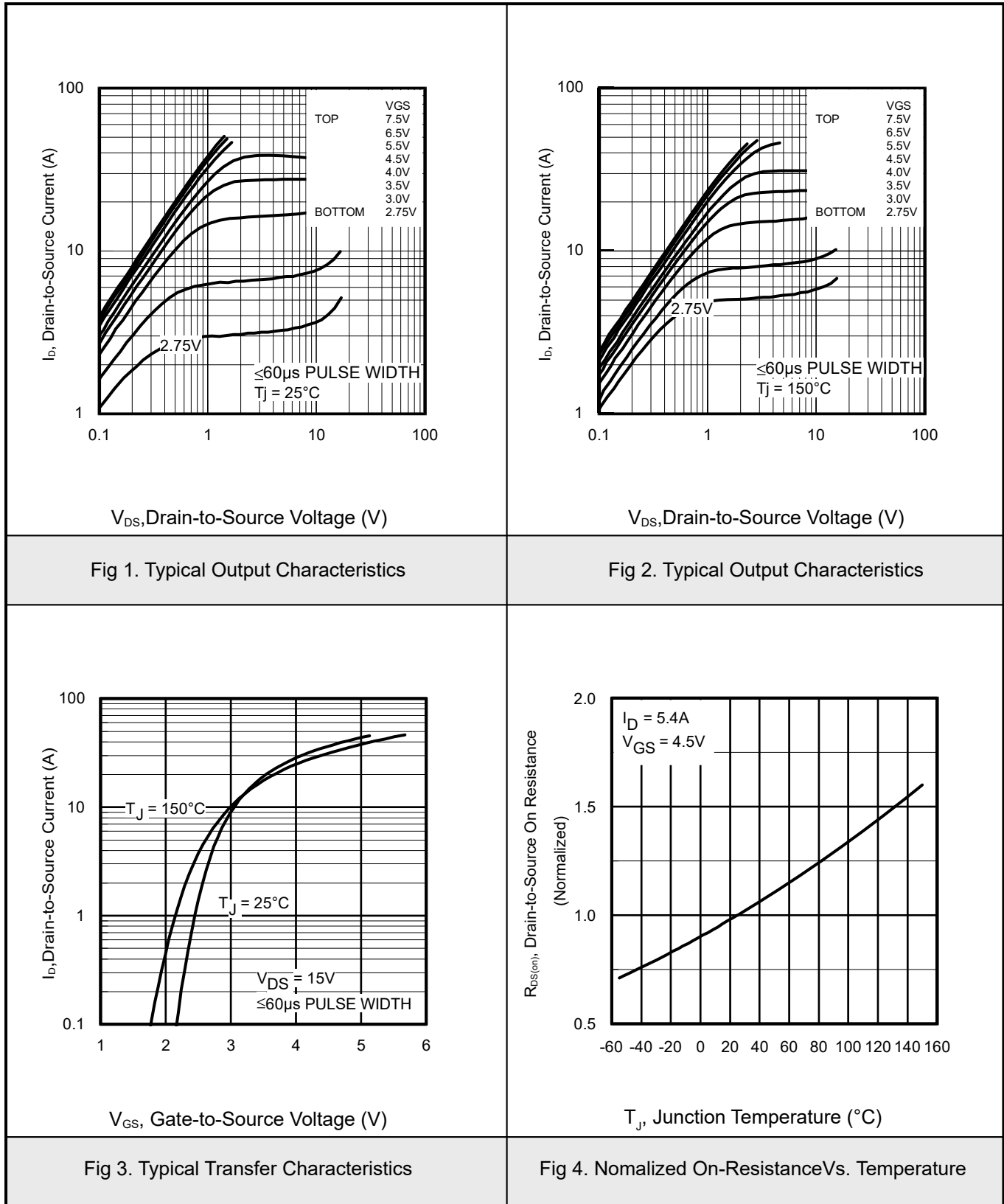
Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 16)
- ② Pulse width $\leq 400\mu s$; duty cycle $\leq 2\%$.
- ③ Surface mounted on 1 in square Cu board
- ④ R_θ is measured at T_J approximately $90^\circ C$.



30V N-Channel MOSFET
-30V P-Channel MOSFET

6.1 Typical Characteristics (N-Channel)





30V N-Channel MOSFET
-30V P-Channel MOSFET

6.2 Typical Characteristics (N-Channel)

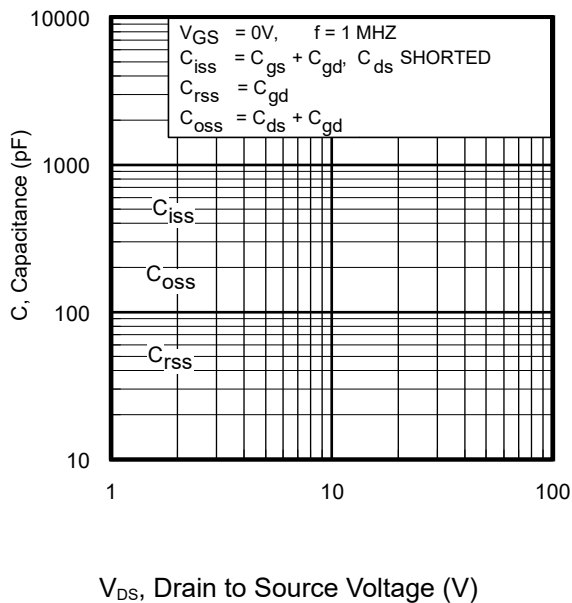


Fig 5. Capacitance vs V_{DS}

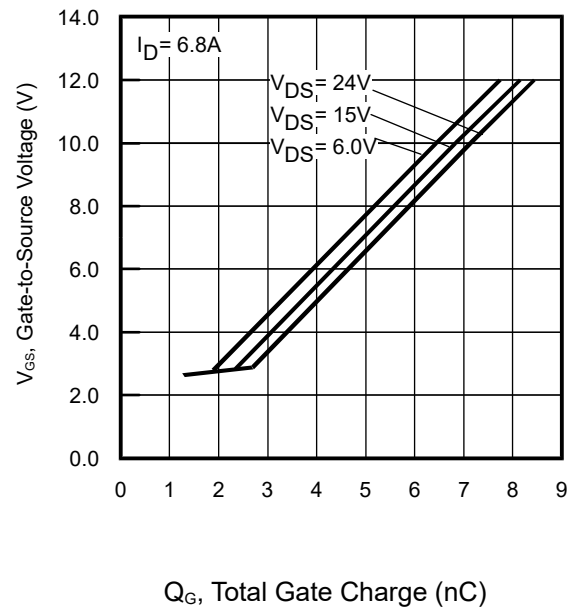


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

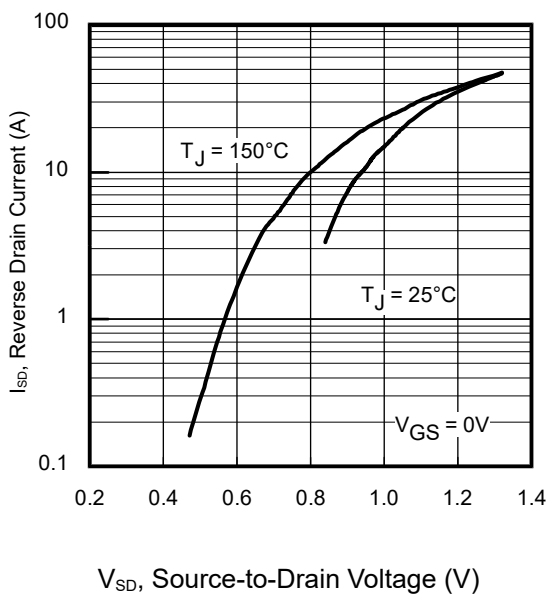


Fig 7. Typical Source-Drain Diode Forward Voltage

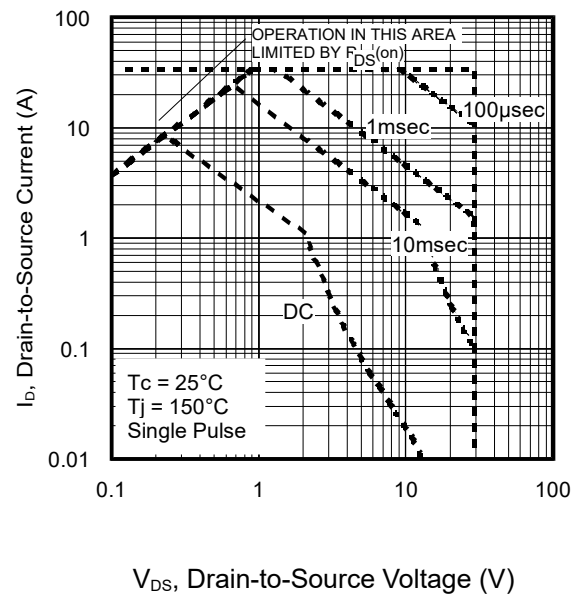
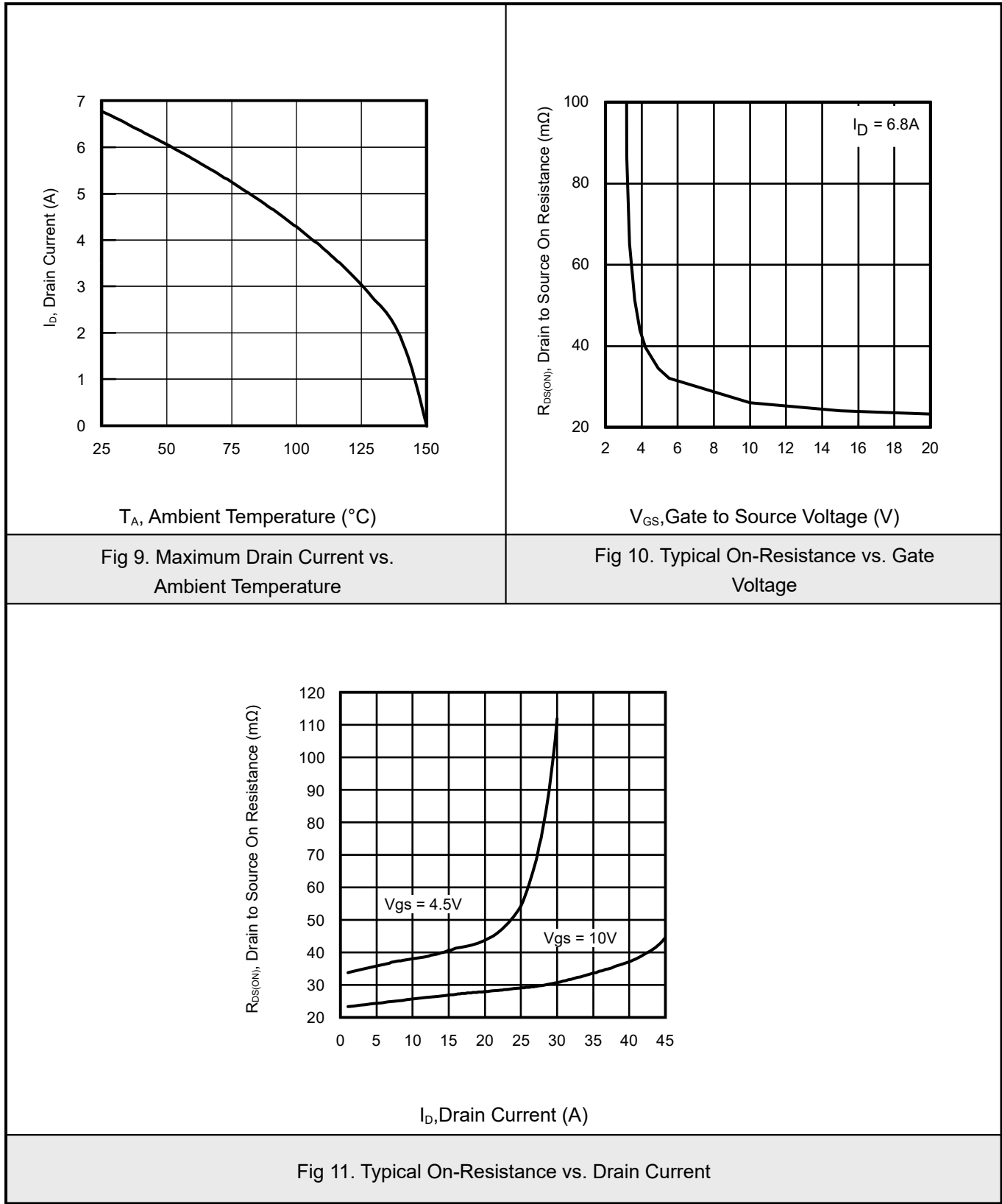


Fig 8. Maximum Safe Operating Area



30V N-Channel MOSFET
-30V P-Channel MOSFET

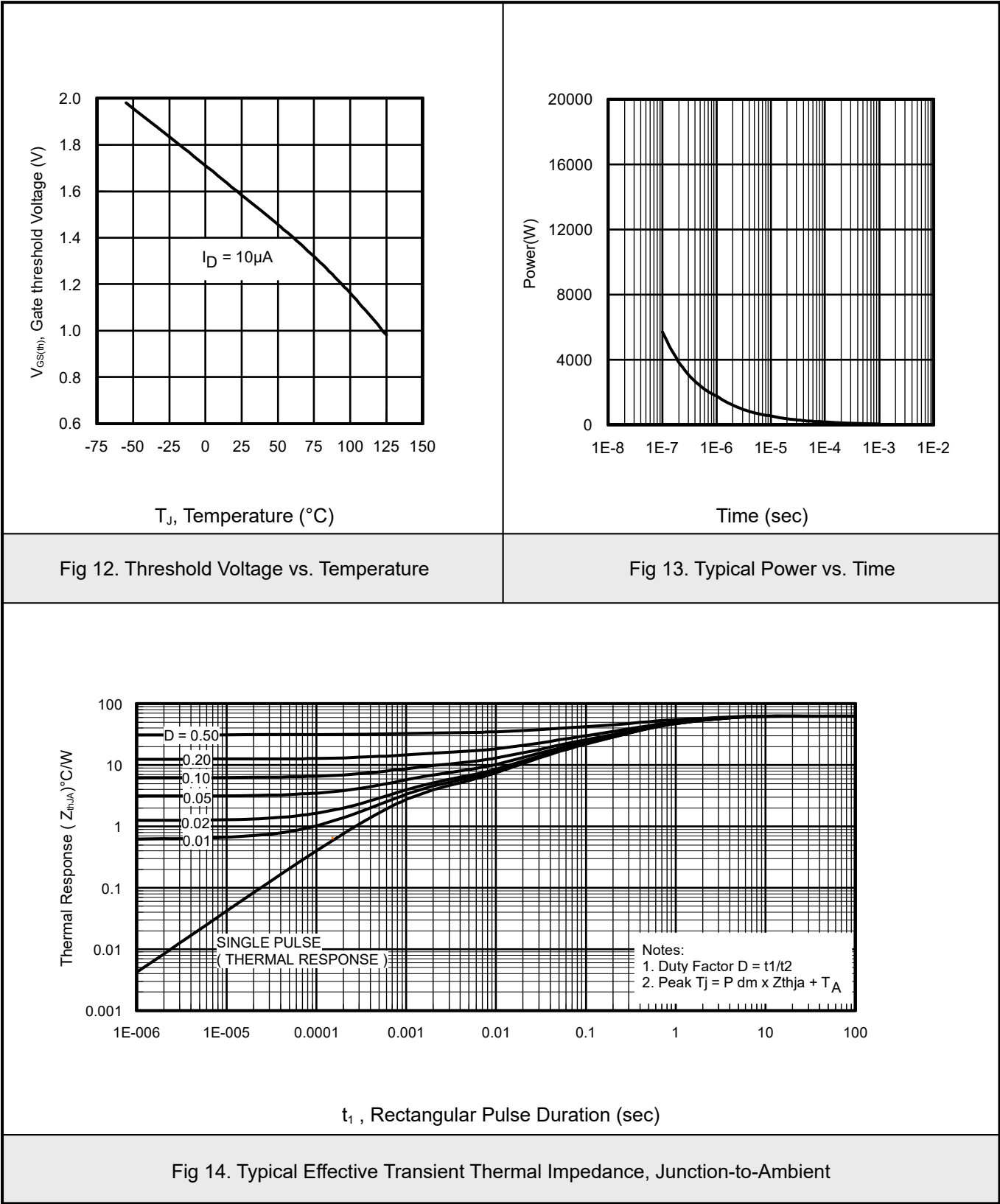
6.3Typical Characterisitics (N-Channel)





30V N-Channel MOSFET
-30V P-Channel MOSFET

6.4Typical Characterisitics (N-Channel)





30V N-Channel MOSFET
-30V P-Channel MOSFET

6.5 Typical Characteristics (N-Channel)

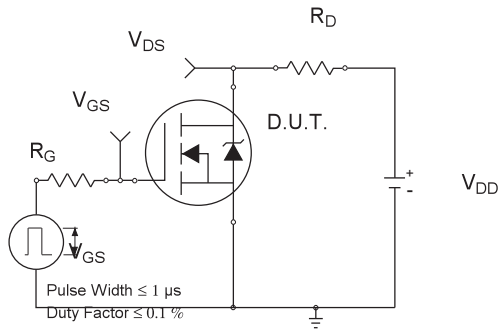


Fig 15a. Switching Time Test Circuit

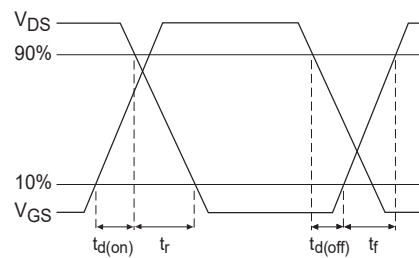


Fig 15b. Switching Time Waveforms

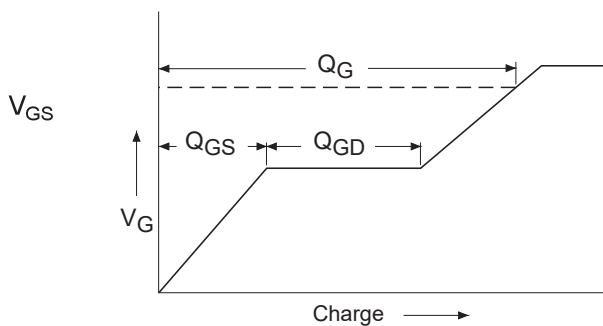


Fig 16a. Basic Gate Charge Waveform

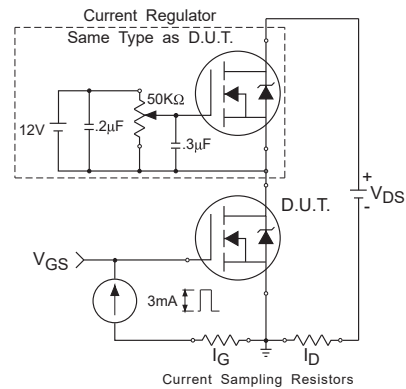
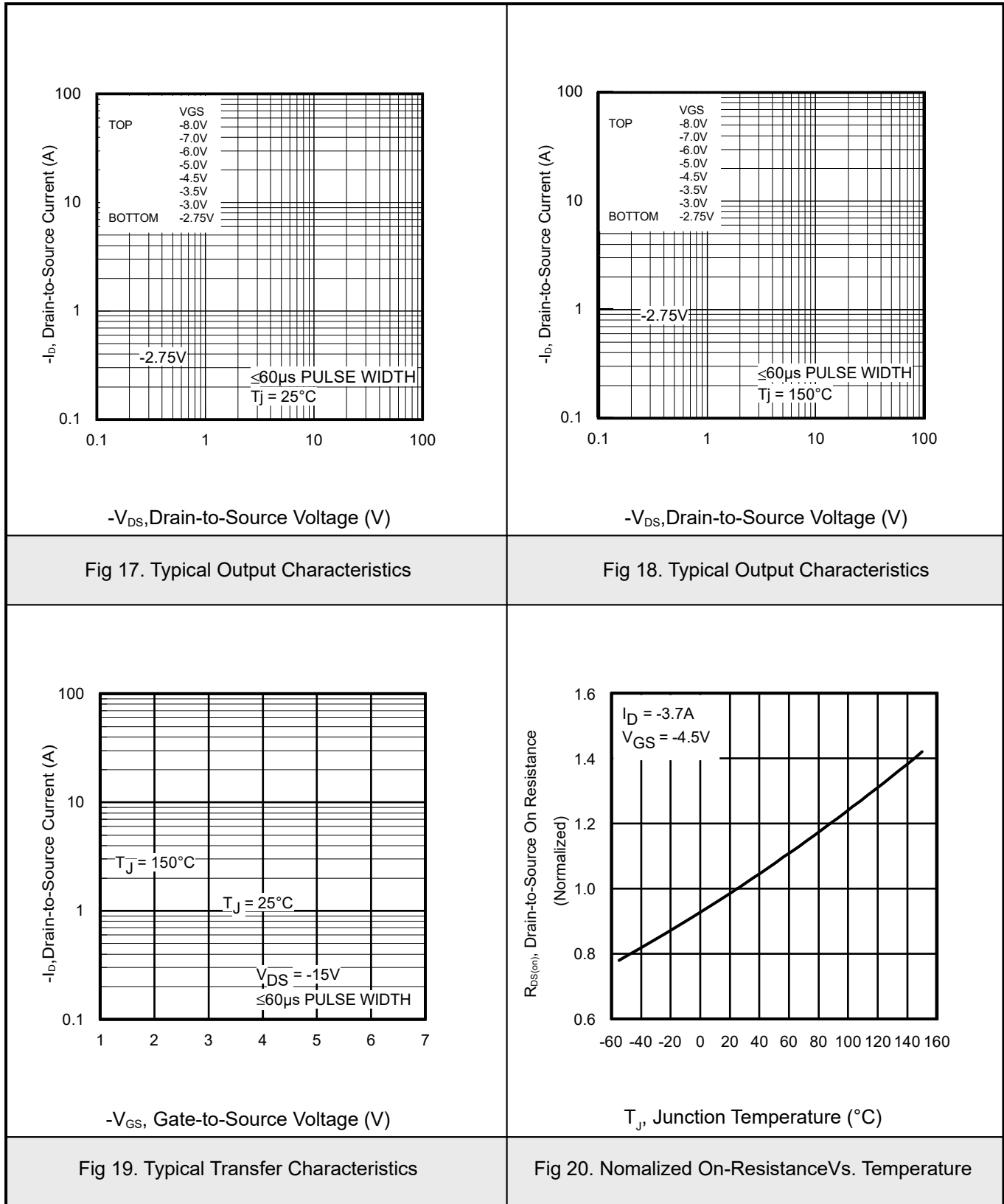


Fig 16b. Gate Charge Test Circuit



30V N-Channel MOSFET
-30V P-Channel MOSFET

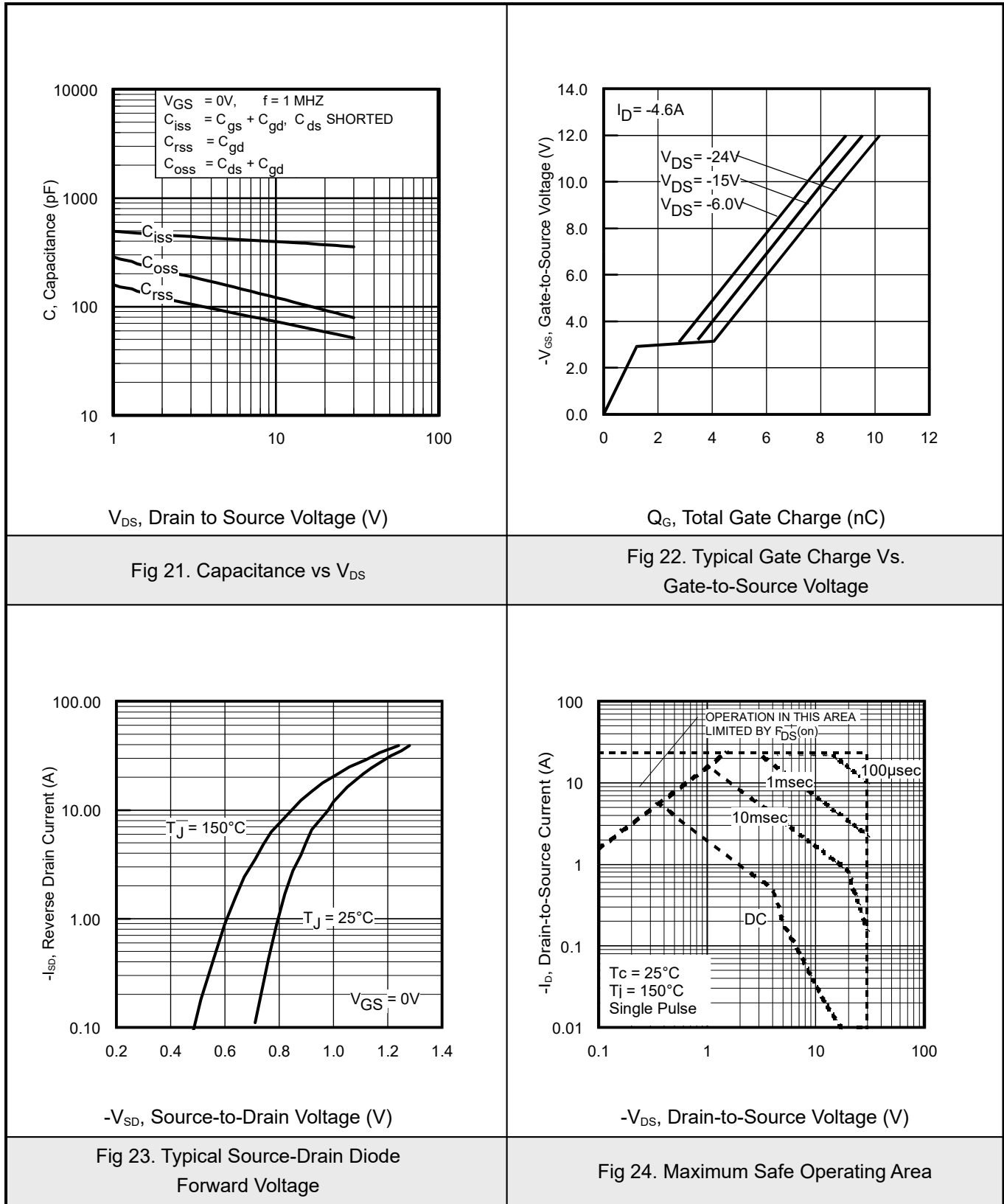
6.6Typical Characterisitics (P-Channel)





30V N-Channel MOSFET
-30V P-Channel MOSFET

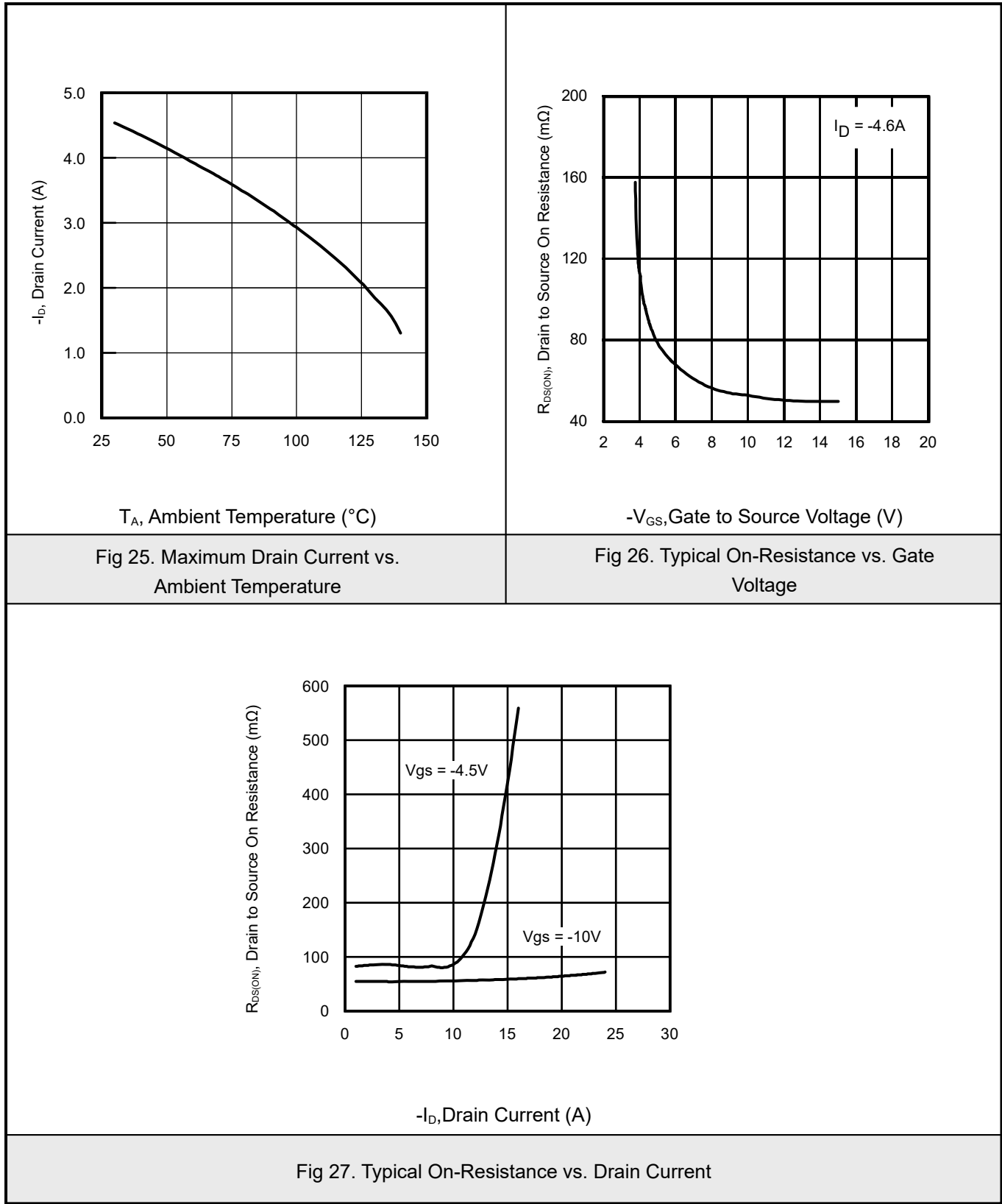
6.7Typical Characterisitics (P-Channel)





30V N-Channel MOSFET
-30V P-Channel MOSFET

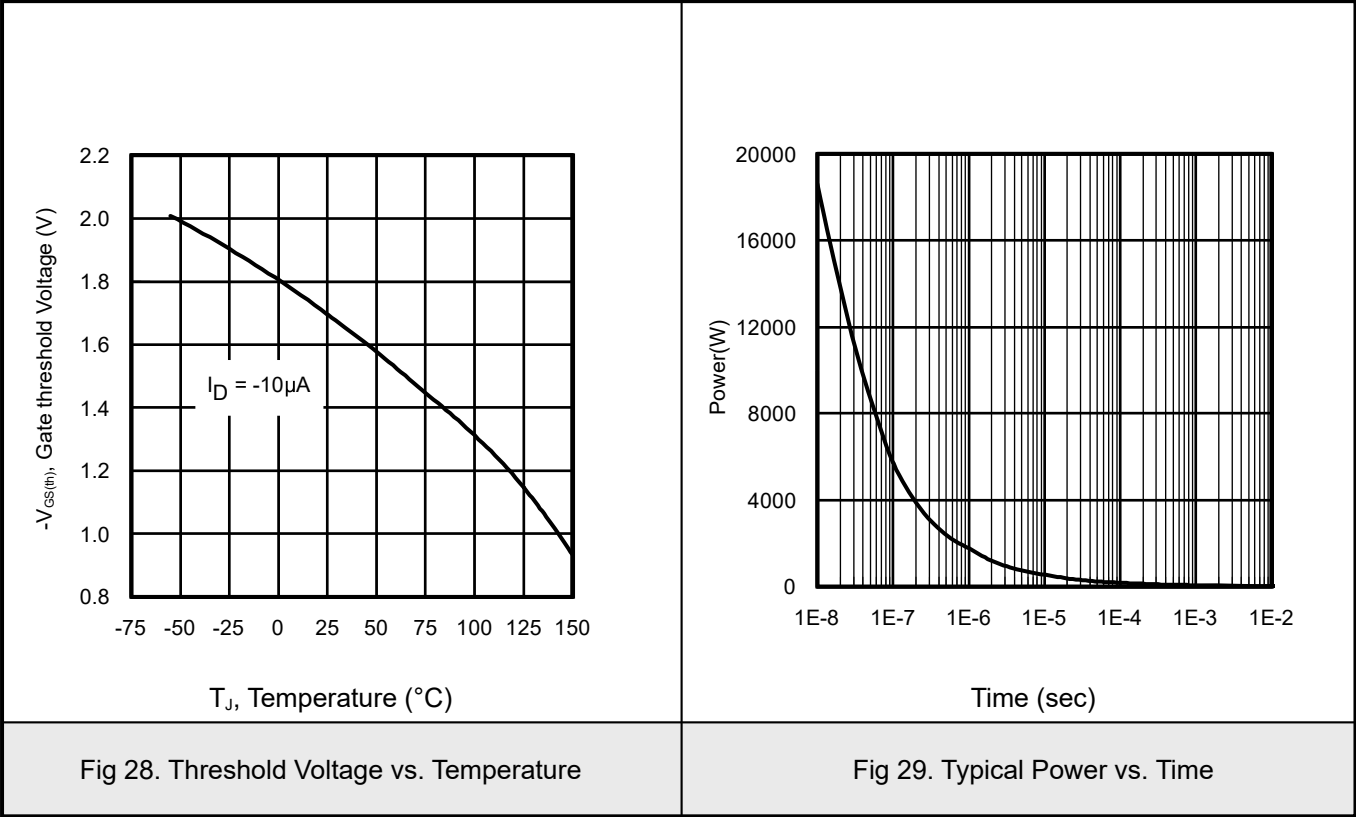
6.8Typical Characterisitics (P-Channel)





30V N-Channel MOSFET
-30V P-Channel MOSFET

6.9Typical Characterisitics (P-Channel)





30V N-Channel MOSFET
-30V P-Channel MOSFET

6.10 Typical Characteristics (P-Channel)

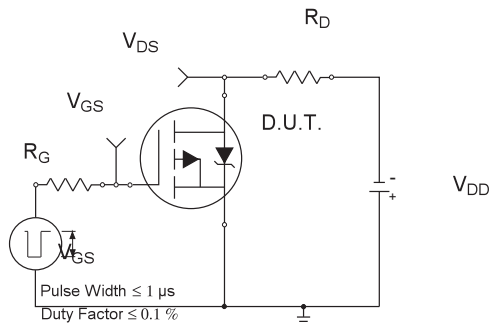


Fig 30a. Switching Time Test Circuit

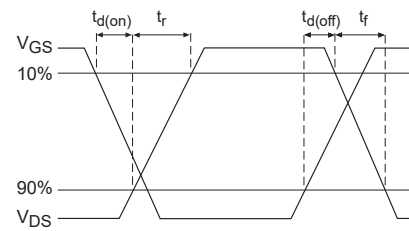


Fig 30b. Switching Time Waveforms

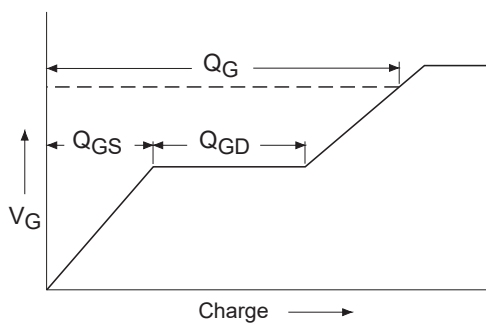


Fig 31a. Basic Gate Charge Waveform

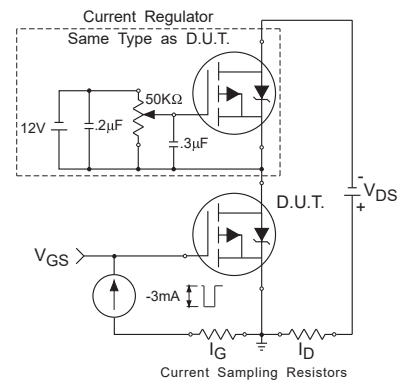
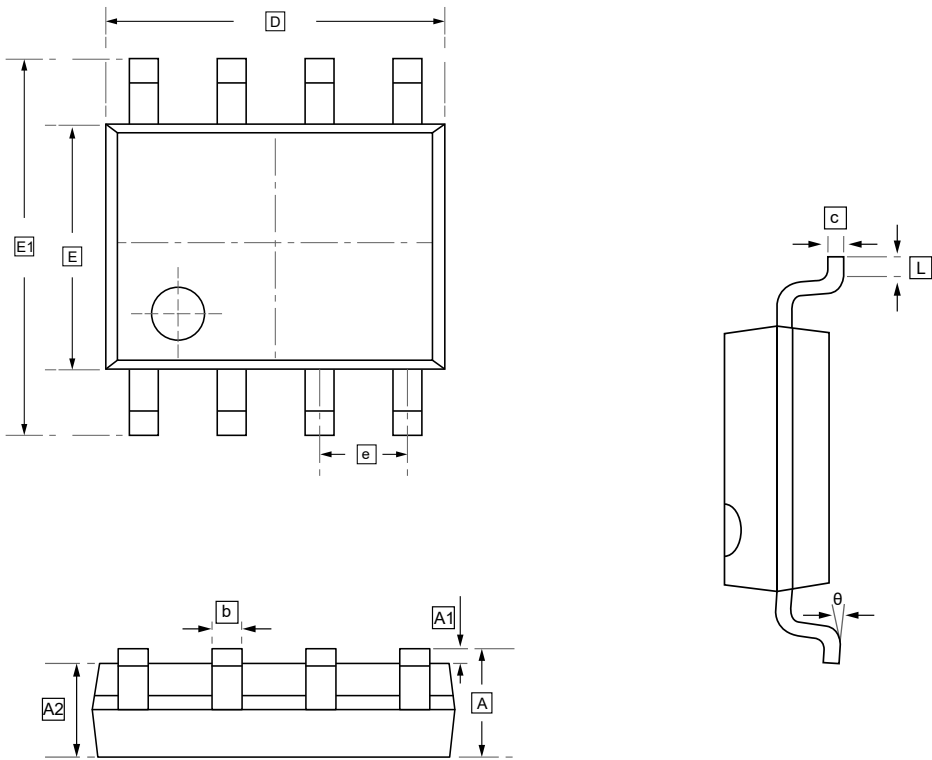


Fig 31b. Gate Charge Test Circuit



8.SOP-8 Package Outline Dimensions



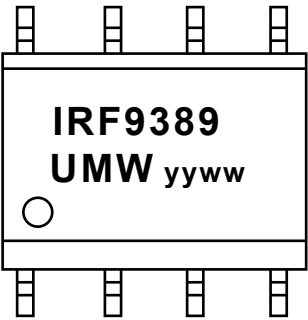
DIMENSIONS (mm are the original dimensions)

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°



30V N-Channel MOSFET
-30V P-Channel MOSFET

9.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW IRF9389TR	SOP-8	3000	Tape and reel



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