

1.Description

The SOP-8 has been modified through a customized eadframe "or enhanced thermal characteristics and multiple-die capability making it ideal in a variety of power applications.

2.2Features(N-Ch)

- $V_{DS(V)}=25V$
- $I_D=3.5A$
- $R_{DS(ON)}<100m\Omega(V_{GS}=10V)$
- $R_{DS(ON)}<160m\Omega(V_{GS}=4.5V)$

2.1Features

- Advanced Process Technology Ultra
- Low On-Resistance Surface Mount
- Dynamic dv/dt Rating
- Fast Switching Lead-Free

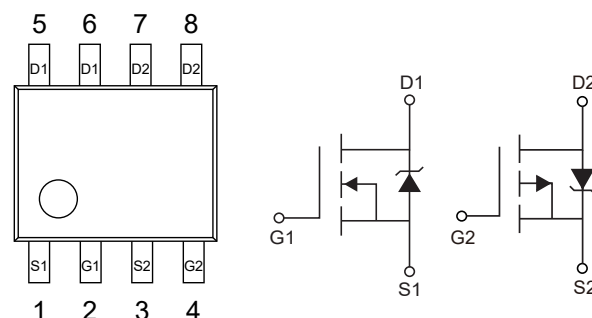
2.3Features(P-Ch)

- $V_{DS(V)}=-25V$
- $I_D=-2.3A$
- $R_{DS(ON)}<250m\Omega(V_{GS}=-10V)$
- $R_{DS(ON)}<400m\Omega(V_{GS}=-4.5V)$

3.Pinning information

Pin	Symbol	Description
2,4	G1,G2	GATE
1,3	S1,S2	SOURCE
5,6,7,8	D1,D2	DRAIN

SOP-8



4.Absolute Maximum Ratings

Parameter		Symbol	N-Channel	P-Channel	Units
Continuous Drain Current, $V_{GS}=10V$	$T_A=25^{\circ}C$	I_D	3.5	-2.3	A
Continuous Drain Current, $V_{GS}=10V$	$T_A=70^{\circ}C$		2.8	-1.8	A
Pulsed Drain Current ①		I_{DM}	14	-10	A
Power Dissipation	$T_C=25^{\circ}C$	P_D	2		W
Linear Derating Factor			0.016		W/ $^{\circ}C$
Gate-to-Source Voltage		V_{GS}	± 20		V
Peak Diode Recovery dv/dt ②		dv/dt	3	-3	V/ns
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150		$^{\circ}C$



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5.Thermal Characteristics

Parameter	Symbol	Max.	Units
Maximum Junction-to-Ambient ④	R _{θJA}	62.5	°C/W



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

Parameter	Symbol		Conditions	Min	Typ	Max	Units
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	N-Ch	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	25			V
		P-Ch	$I_D=-250\mu\text{A}$, $V_{GS}=0\text{V}$	-25			V
Breakdown Voltage Temp Coefficient	$\frac{\Delta V_{(BR)DSS}}{\Delta T_J}$	N-Ch	$I_D=1\text{mA}$, Reference to 25°C		0.03		V/ $^\circ\text{C}$
		P-Ch	$I_D=-1\text{mA}$, Reference to 25°C		-0.015		V/ $^\circ\text{C}$
Static Drain-to-Source On-Resistance	$R_{DS(on)}$	N-Ch	$V_{GS}=10\text{V}$, $I_D=1\text{A}$ ③		83	100	m Ω
		N-Ch	$V_{GS}=4.5\text{V}$, $I_D=0.5\text{A}$ ③		140	160	m Ω
		P-Ch	$V_{GS}=-10\text{V}$, $I_D=-1\text{A}$ ③		160	250	m Ω
		P-Ch	$V_{GS}=-4.5\text{V}$, $I_D=-0.5\text{A}$ ③		300	400	m Ω
Gate Threshold Voltage	$V_{GS(th)}$	N-Ch	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	1		3	V
		P-Ch	$V_{DS}=V_{GS}$, $I_D=-250\mu\text{A}$	-1		-3	V
Forward Transconductance	g_{fs}	N-Ch	$V_{DS}=15\text{V}$, $I_D=3.5\text{A}$ ③		4.3		S
		P-Ch	$V_{DS}=-15\text{V}$, $I_D=-3.5\text{A}$ ③		3.1		S
Drain-to-Source Leakage Current	I_{DSS}	N-Ch	$V_{DS}=20\text{V}$, $V_{GS}=0\text{V}$			2	μA
			$V_{DS}=-20\text{V}$, $V_{GS}=0\text{V}$			-2	μA
		P-Ch	$V_{DS}=20\text{V}$, $V_{GS}=0\text{V}$, $T_J=55^\circ\text{C}$			25	μA
			$V_{DS}=-20\text{V}$, $V_{GS}=0\text{V}$, $T_J=55^\circ\text{C}$			-25	μA
Gate-to-Source Forward Leakage	I_{GSS}	N-P	$V_{GS}=\pm 20\text{V}$			± 100	nA
Total Gate Charge	Q_g	N-Ch	N-Ch: ③		9.4	27	nC
		P-Ch			10	25	nC
Gate-to-Source Charge	Q_{gs}	N-Ch	$I_D=2.3\text{A}$, $V_{DS}=12.5\text{V}$, $V_{GS}=10\text{V}$			1.7	nC
		P-Ch	P-Ch:		1.9		nC
Gate-to-Drain ("Miller") Charge	Q_{gd}	N-Ch	$I_D=-2.3\text{A}$, $V_{DS}=-12.5\text{V}$, $V_{GS}=-10\text{V}$			3.1	nC
		P-Ch				2.8	nC
Turn-On Delay Time	$t_{D(on)}$	N-Ch	N-Ch: ③		7	20	ns
		P-Ch			12	40	ns
Rise Time	t_r	N-Ch	$V_{DD}=25\text{A}$, $I_D=1\text{A}$		9	20	ns
		P-Ch	$R_G=6\Omega$, $R_D=25\Omega$		13	40	ns



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Turn-Off Delay Time	$t_{D(off)}$	N-Ch	P-Ch: ③ $V_{DD}=-25A, I_D=-1A$ $R_G=6\Omega, R_D=25\Omega$		45	90	ns
		P-Ch			45	90	ns
Fall Time	t_f	N-Ch			25	50	ns
		P-Ch			37	50	ns
Internal Drain Inductance	L_S	N-P	Between lead ,6mm (0.25in)from package and center of die contact		4		nH
Internal Source Inductance	L_D	N-P			6		nH
Input Capacitance	C_{iss}	N-Ch	N-Ch: $V_{GS}=0V, V_{DS}=15V, f=1MHz$ P-Ch: $V_{GS}=0V, V_{DS}=-15V, f=1MHz$		330		pF
		P-Ch			290		pF
Output Capacitance	C_{oss}	N-Ch			250		pF
		P-Ch			210		pF
Reverse Transfer Capacitance	C_{rss}	N-Ch			61		pF
		P-Ch			67		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				14	A
		P-Ch				-9.2	A
Diode Forward Voltage	V_{SD}	N-Ch	$T_J=25^\circ C, I_S=1.3A, V_{GS}=0V$ ③			1.2	V
		P-Ch	$T_J=25^\circ C, I_S=-1.3A, V_{GS}=0V$ ③			-1.2	V
Reverse Recovery Time	t_{rr}	N-Ch	N-Ch: $T_J=25^\circ C$ $I_F=1.3A, dI_F/dt=100A/\mu s$ P-Ch: $T_J=25^\circ C$ $I_F=-1.3A, dI_F/dt=100A/\mu s$ ③		36	54	ns
		P-Ch			69	100	ns
Reverse Recovery Charge	Q_{rr}	N-Ch			41	75	nC
		P-Ch			90	180	nC
Forward Turn-On Time	t_{on}	N-P	Intrinsic turn-on time is negligible (turn-on is dominated by L_S+L_D)				

Notes:

① Repetitive rating; pulse width limited by max. junction temperature.

② N-Channel $I_{SD} \leq 3.5A, di/dt \leq 90A/\mu s, V_{DD} \leq V_{(BR)DSS}, T_J \leq 150^\circ C$.

P-Channel $I_{SD} \leq -2.3A, di/dt \leq 90A/\mu s, V_{DD} \leq V_{(BR)DSS}, T_J \leq 150^\circ C$.

③ Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.

④ Surface mounted on FR-4 board, $t \leq 10sec$.



25V N-Channel MOSFET
-25V P-Channel MOSFET

7.1 Typical Characteristics (N-Channel)

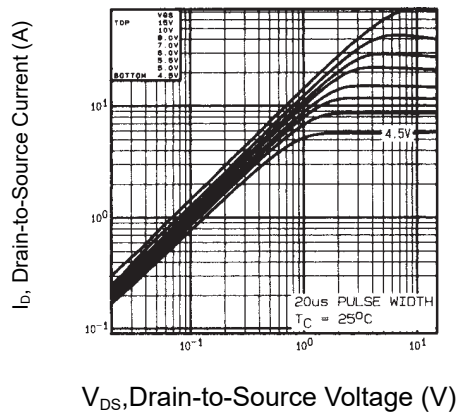


Figure 1: Typical Output Characteristics

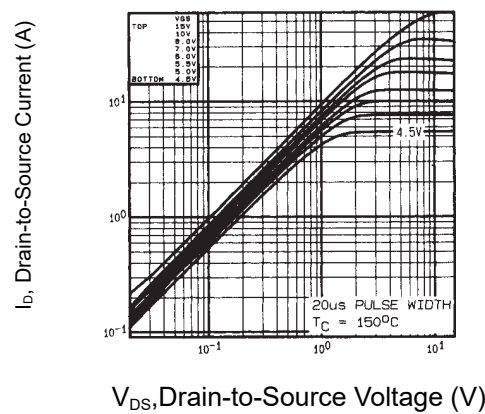


Figure 2: Typical Output Characteristics

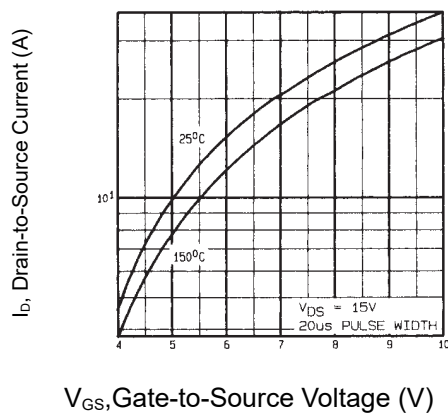


Figure 3: Typical Output Characteristics

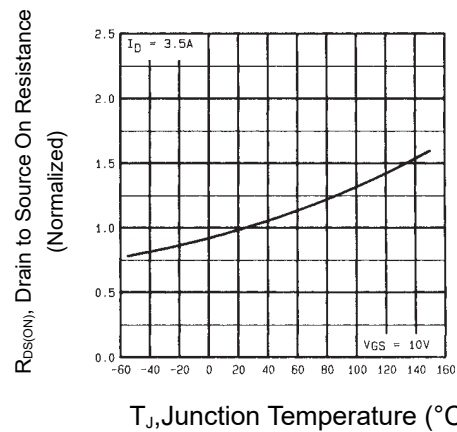


Figure 4: Normalized On-Resistance Vs. Temperature

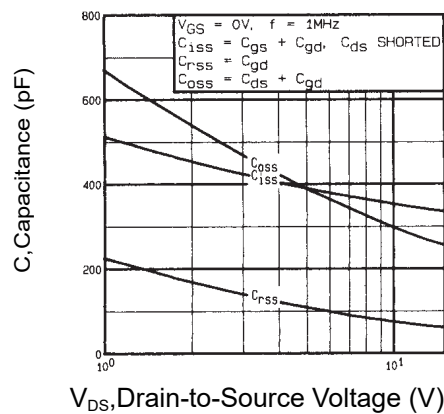


Figure 5: Typical Capacitance vs. Drain-to-Source Voltage

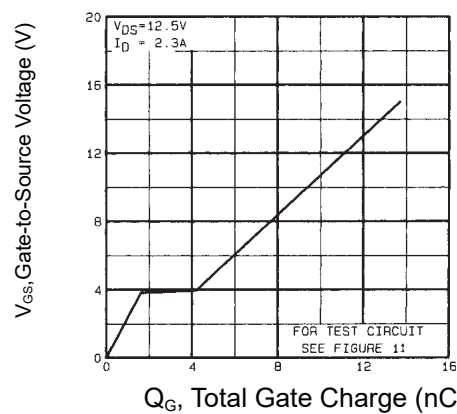
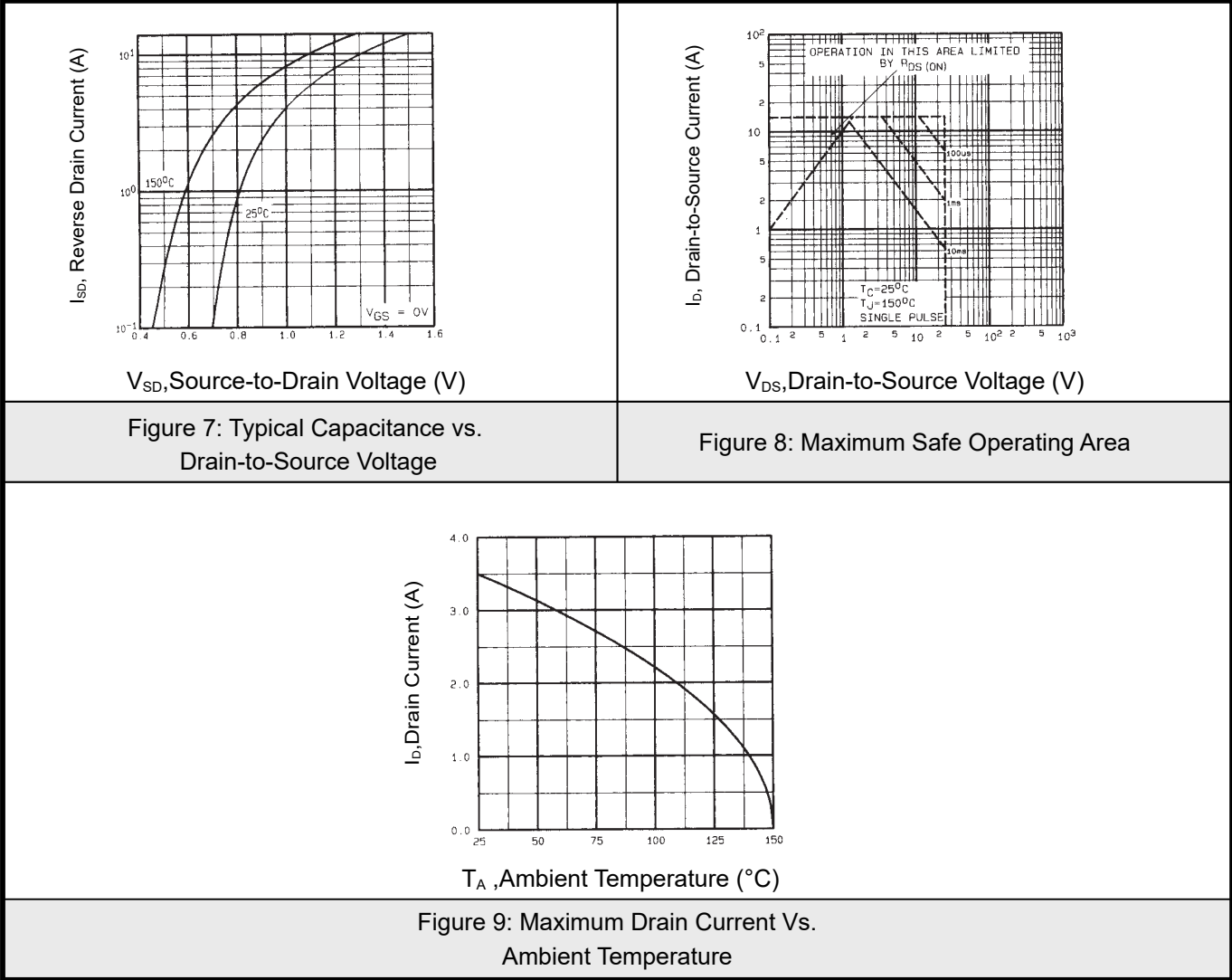


Figure 6: Typical Gate Charge Vs. Gate-to-Source Voltage



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7.2Typical Characterisitics (N-Channel)





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7.3 Typical Characteristics (N-Channel)

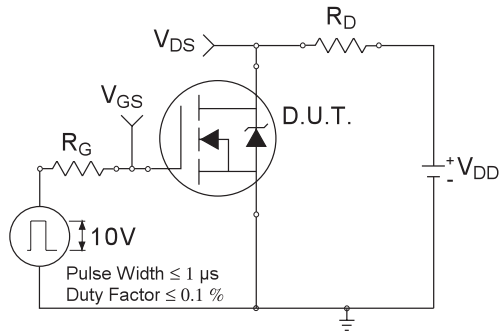


Figure 10a: Switching Time Test Circuit

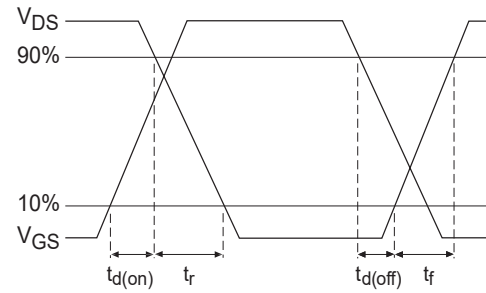


Figure 10b: Switching Time Waveforms

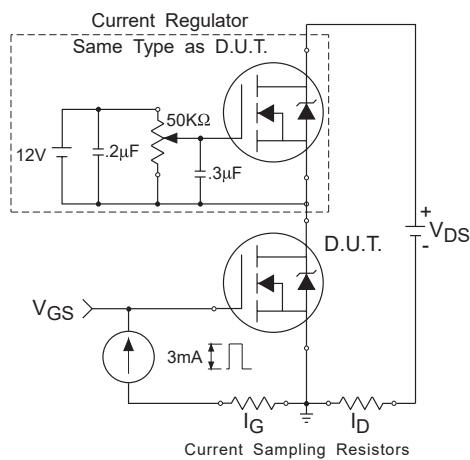


Figure 11a: Gate Charge Test Circuit

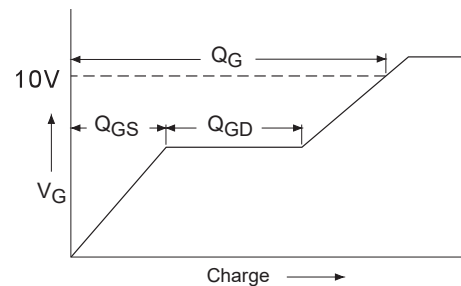


Figure 11b: Basic Gate Charge Waveform



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7.4 Typical Characteristics (P-Channel)

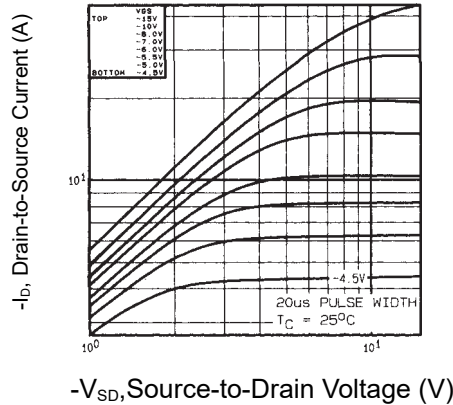


Figure 12: Typical Output Characteristics

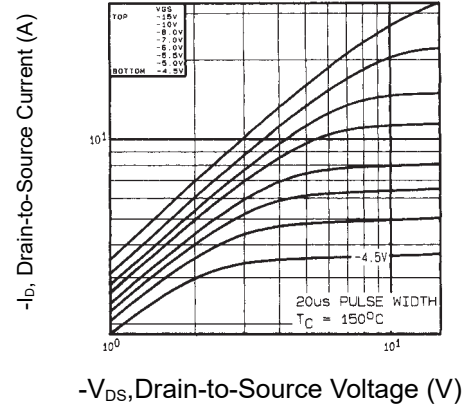


Figure 13: Typical Output Characteristics

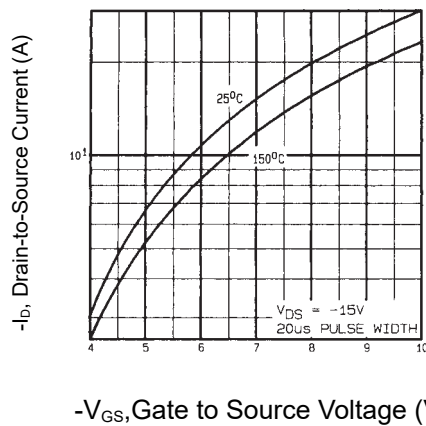


Figure 14: Typical Transfer Characteristics

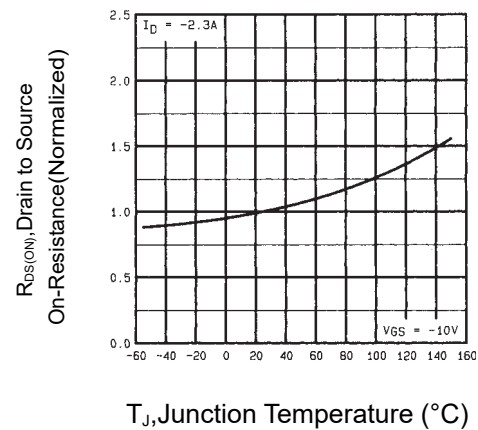


Figure 15: Normalized On-Resistance Vs. Temperature

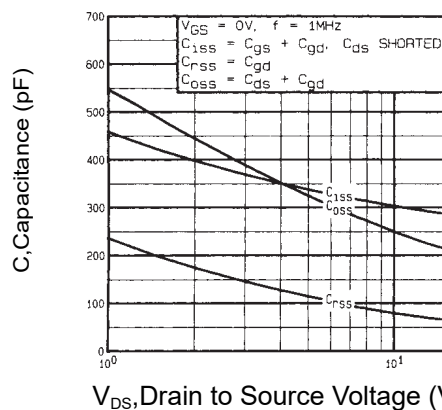


Figure 16: Typical Capacitance Vs. Drain-to-Source Voltage

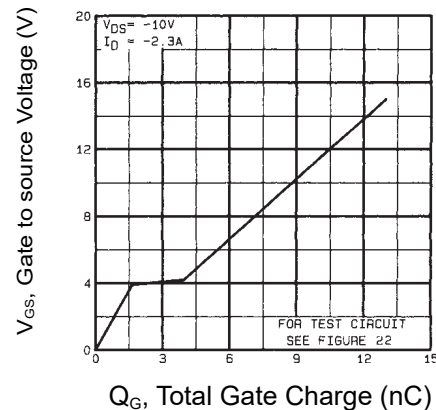
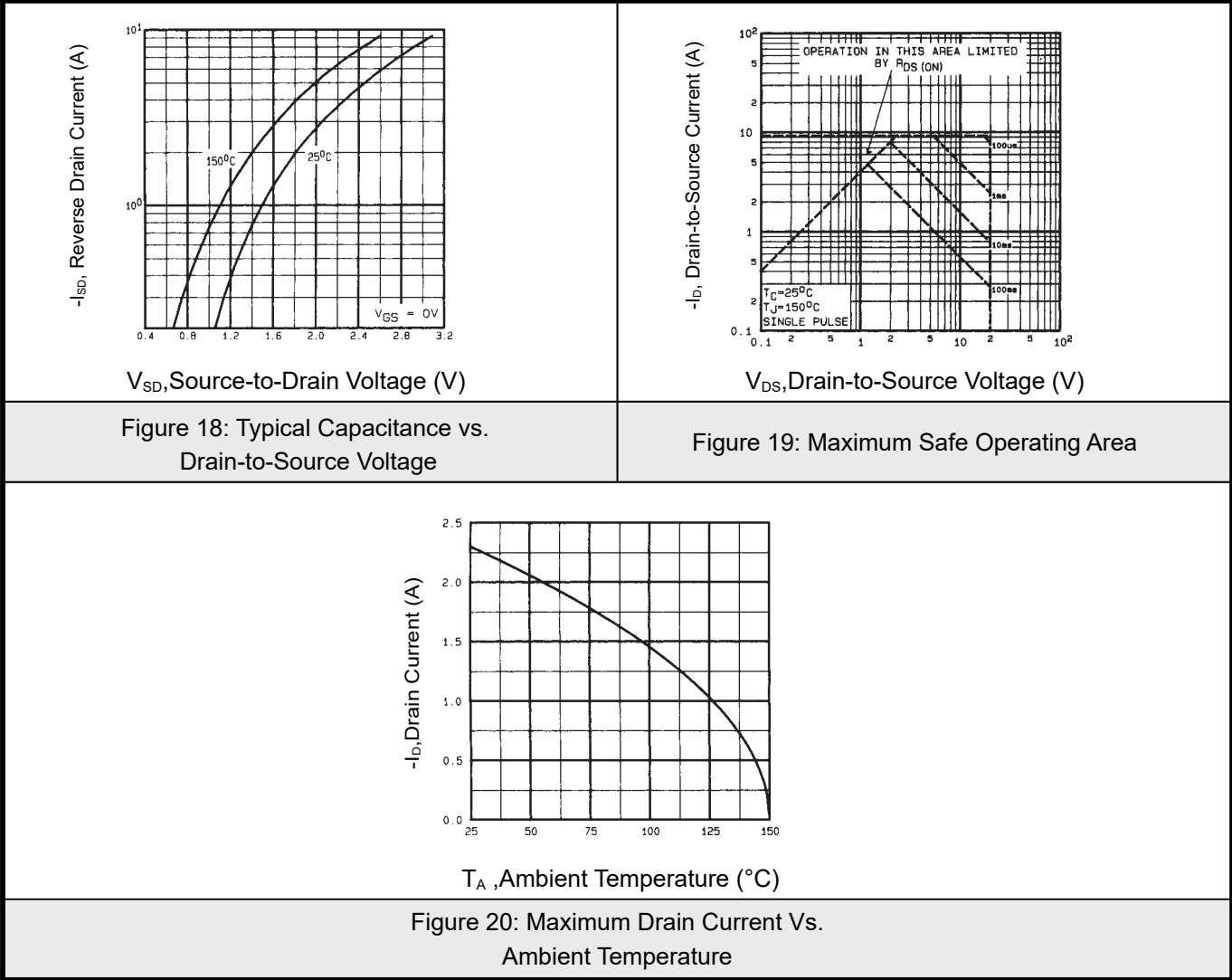


Figure 17: Typical Gate Charge Vs. Gate-to-Source Voltage



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-25V P-Channel MOSFET

7.5Typical Characterisitics (P-Channel)





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-25V P-Channel MOSFET

7.6 Typical Characteristics (P-Channel)

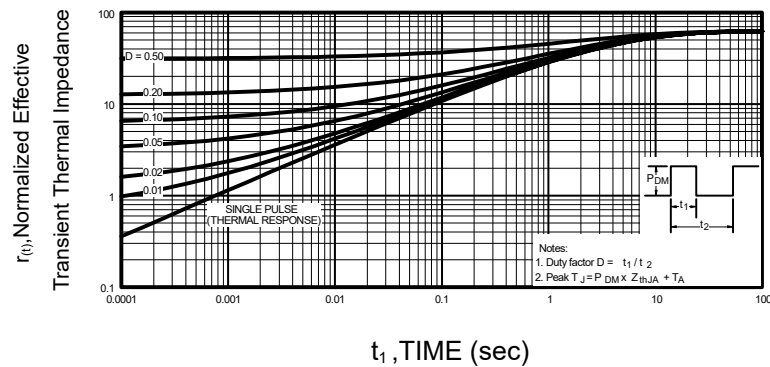


Figure 21: Transient Thermal Response Curve

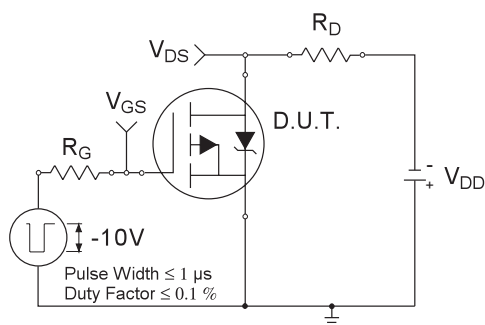


Figure 22a: Switching Time Test Circuit

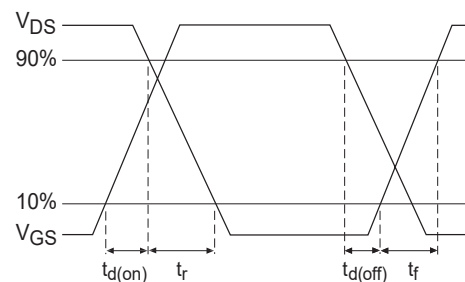


Figure 22b: Switching Time Waveforms

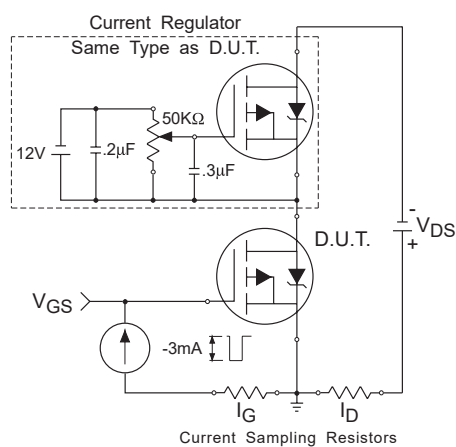


Figure 23a: Gate Charge Test Circuit

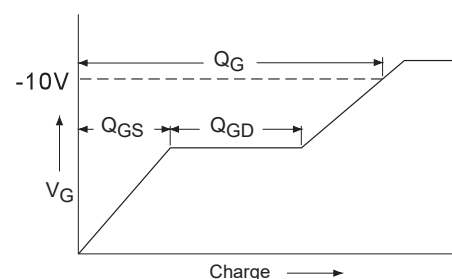
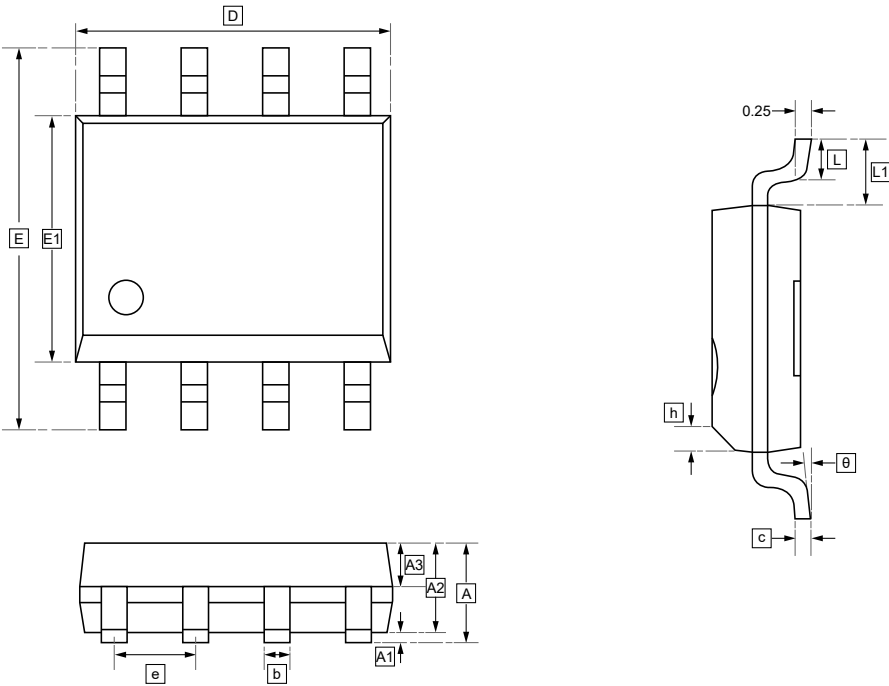


Figure 23b: Basic Gate Charge Waveform



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8.SOP-8 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

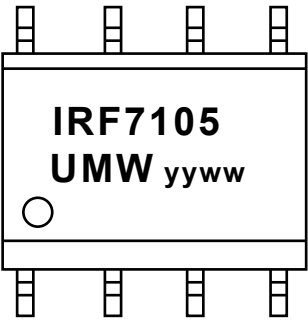
Symbol	A	A1	A2	A3	b	c	D	E	E1	e	h	L
Min	-	0.05	1.30	0.60	0.39	0.20	4.80	5.80	3.80	1.24	0.30	0.50
Max	1.75	0.20	1.50	0.70	0.47	0.24	5.00	6.20	4.00	1.30	0.50	0.80

Symbol	L1	θ
Min	1.00	0°
Max	1.10	8°



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9.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW IRF7105TR	SOP-8	3000	Tape and reel



10.Disclaimer

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