

1.Description

The SOT23-6 package with its customized lead frame produces a power MOSFET with $R_{DS(ON)}$ 60% less than a similar size SOT-23. This package is ideal for applications where printed circuit board space is at a premium.

3.Applications

- Ultra Low On-Resistance
- P-Channel MOSFET
- Surface Mount
- Available in Tape & Reel

2.Features

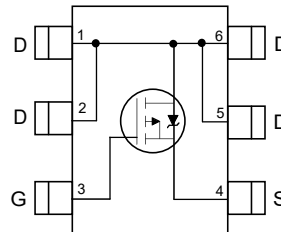
- $V_{DS(V)} = -40V$
- $I_D = -3.4A (V_{GS} = -10V)$
- $R_{DS(ON)} \leq 112m\Omega (V_{GS} = -10V)$
- $R_{DS(ON)} \leq 190m\Omega (V_{GS} = -4.5V)$

- Low Gate Charge
- Lead-Free
- Halogen-Free

4.Pinning information

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

SOT23-6



5.Absolute Maximum Ratings $T_J = 25^\circ C$ unless otherwise noted

Parameter		Symbol	Rating	Units
Drain- Source Voltage		V_{DS}	-40	V
Continuous Drain Current, $V_{GS} = -10V$	$T_A = 25^\circ C$	I_D	-3.4	A
Continuous Drain Current, $V_{GS} = -10V$	$T_A = 70^\circ C$		-2.7	A
Pulsed Drain Current ①		I_{DM}	-27	A
Maximum Power Dissipation ③	$T_A = 25^\circ C$	P_D	2	W
Maximum Power Dissipation ③	$T_A = 70^\circ C$		1.3	W



Linear Derating Factor		16	mW/°C
Gate-to-Source Voltage	V _{GS}	±20	
Storage Temperature Range	T _J , T _{STG}	-55 to 150	°C

6.Thermal resistance rating

Parameter	Symbol	Typ	Max	Units
Junction-to-Ambient ③	R _{θJA}		62.5	°C/W



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

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=-250\mu\text{A}$, $V_{GS}=0\text{V}$	-40			V
Breakdown Voltage Temp. Coefficient	$\Delta V_{(BR)DSS}/\Delta T_J$	$I_D=-1\text{mA}$, Reference to 25°C		-0.03		V/ $^{\circ}\text{C}$
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=-10\text{V}$, $I_D=-3.4\text{A}$			112	m Ω
		$V_{GS}=-4.5\text{V}$, $I_D=-2.7\text{A}$			190	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=-250\mu\text{A}$	-1		-3	V
Forward Transconductance	g_{FS}	$V_{GS}=-10\text{V}$, $I_D=-3.4\text{A}$	4			S
Drain-to-Source Leakage Current	I_{DSS}	$V_{DS}=-32\text{V}$, $V_{GS}=0\text{V}$			-10	μA
		$V_{DS}=-32\text{V}$, $V_{GS}=0\text{V}$, $T_J=150^{\circ}\text{C}$			-25	
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	
Total Gate Charge	Q_g	$I_D=-3.4\text{A}$		25	37	nC
Gate-to-Source Charge	Q_{gs}	$V_{DS}=-20\text{V}$		4.5	6.8	
Gate-to-Drain ("Miller") Charge	Q_{gd}	$V_{GS}=-10\text{V}$		3.5	5.3	
Turn-On Delay Time	$t_{D(on)}$	$V_{DD}=-20\text{V}$ ②		43		ns
Rise Time	t_r	$I_D=-1\text{A}$		550		
Turn-Off Delay Time	$t_{D(off)}$	$R_G=6\Omega$		88		
Fall Time	t_f	$V_{GS}=-10\text{V}$		50		
Input Capacitance	C_{iss}	$V_{GS}=0\text{V}$		1110		pF
Output Capacitance	C_{oss}	$V_{DS}=-25\text{V}$		93		
Reverse Transfer Capacitance	C_{rss}	$f=100\text{KHz}$		73		



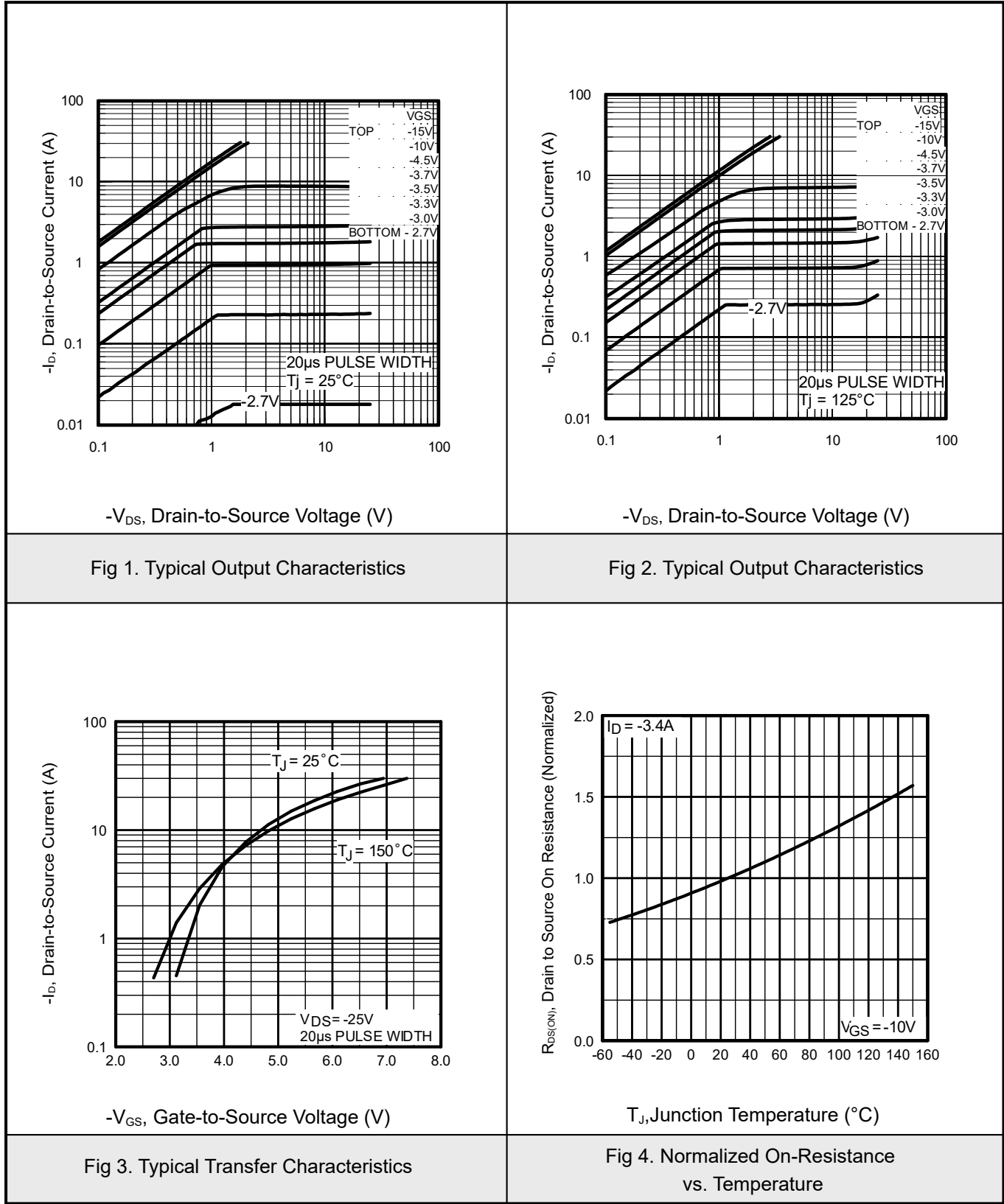
Source-Drain Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.			-2	A
Pulsed Source Current (Body Diode) ①	I_{SM}				-27	
Diode Forward Voltage	V_{SD}	$T_J=25^{\circ}\text{C}, I_S=2\text{A}, V_{GS}=0\text{V}$ ②			-1.2	V
Reverse Recovery Time	t_{rr}	$T_J=25^{\circ}\text{C}, I_F=-2\text{A}$ $dI/dt=100\text{A}/\mu\text{s}$ ②		27	40	ns
Reverse Recovery Charge	Q_{rr}			34	50	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 Surface mounted on 1 in square Cu board.

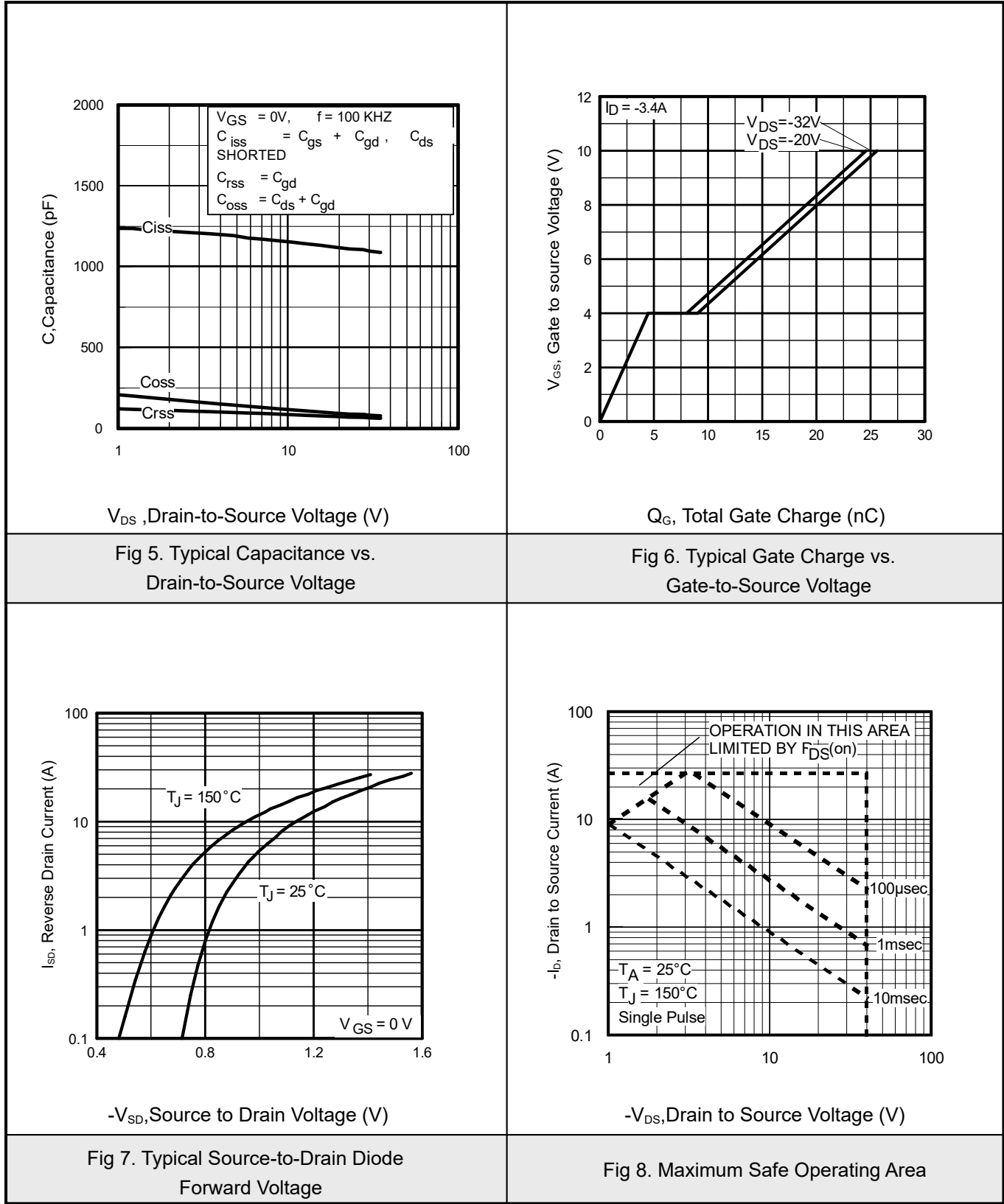


8.1Typical Characterisitics



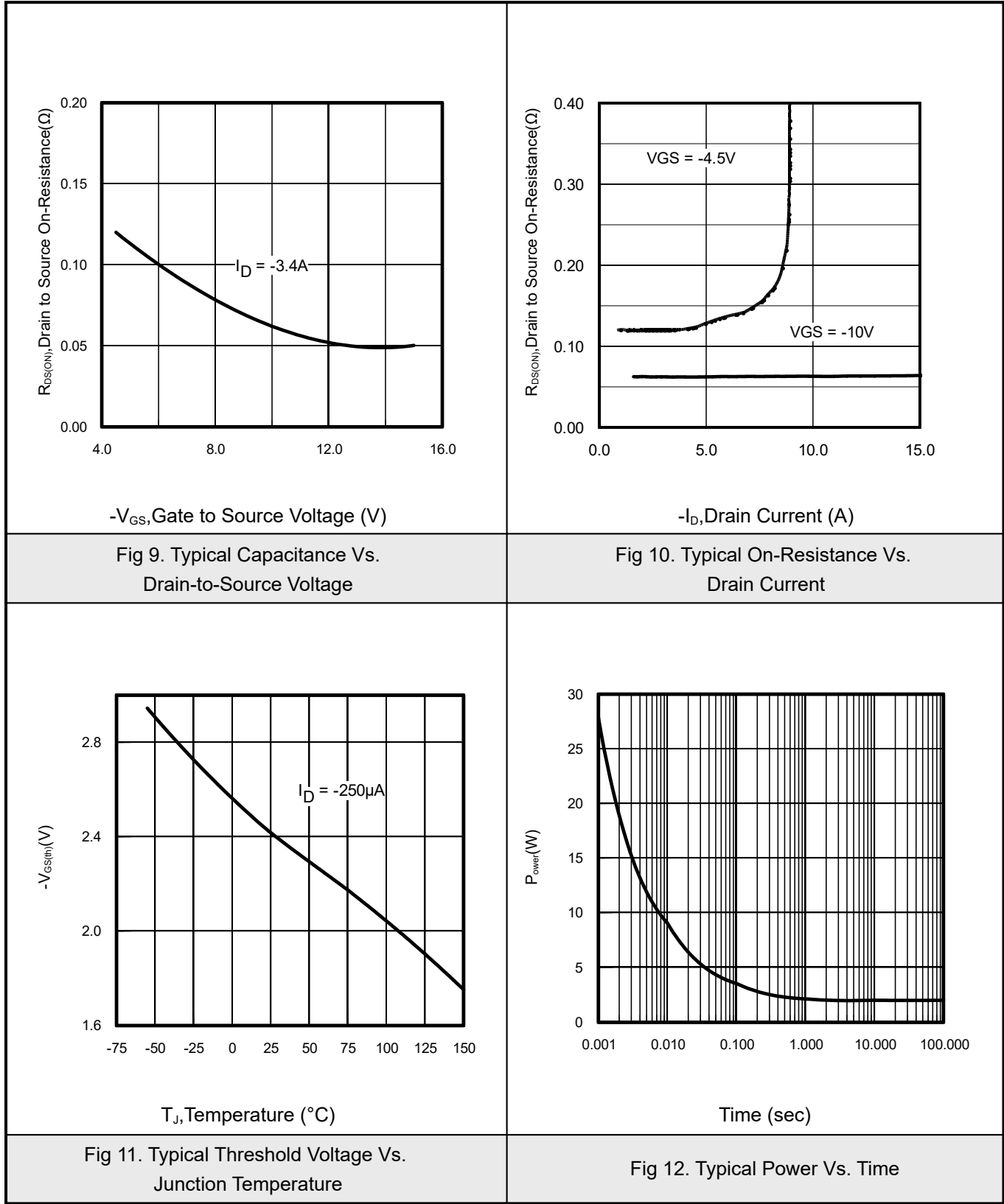


8.2Typical Characteristics





8.3Typical Characterisitics





8.4 Typical Characteristics

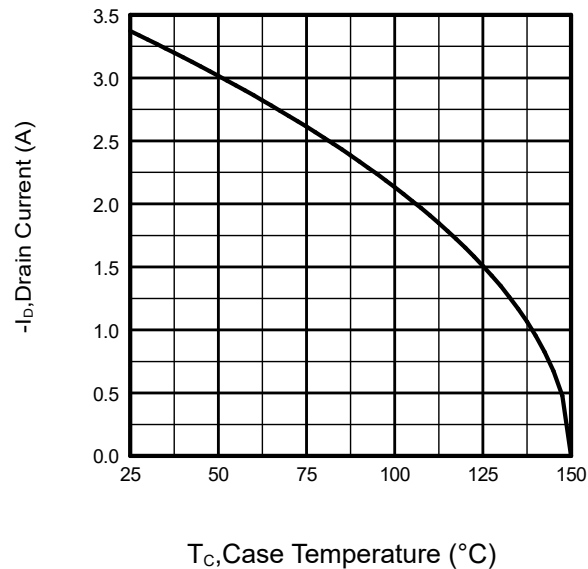


Fig 13. Maximum Drain Current vs. Case Temperature

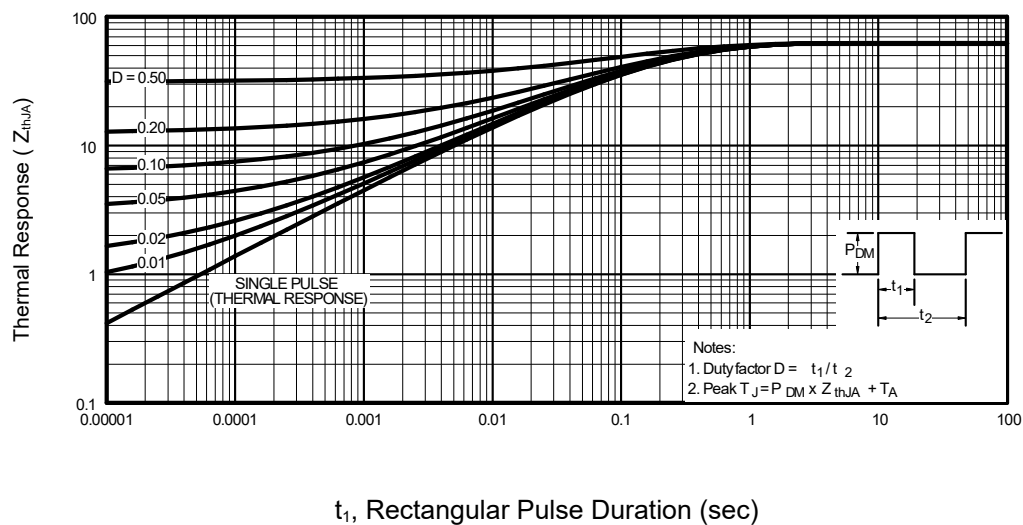


Fig 14. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



8.5 Typical Characteristics

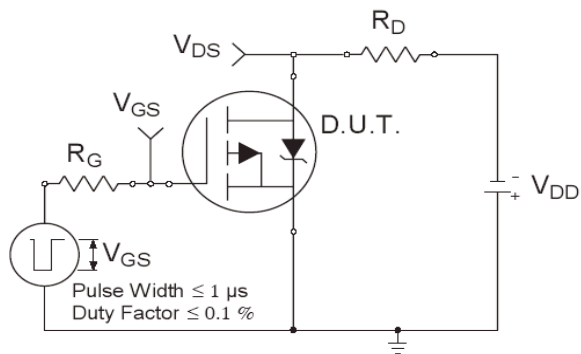


Fig 15a. Switching Time Test Circuit

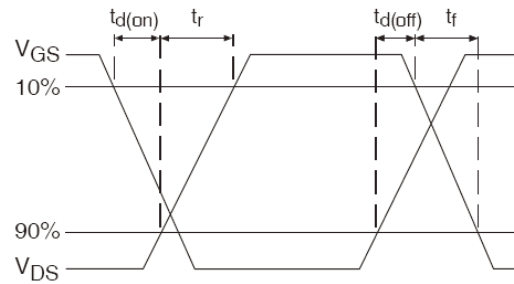


Fig 15b. Switching Time Waveforms

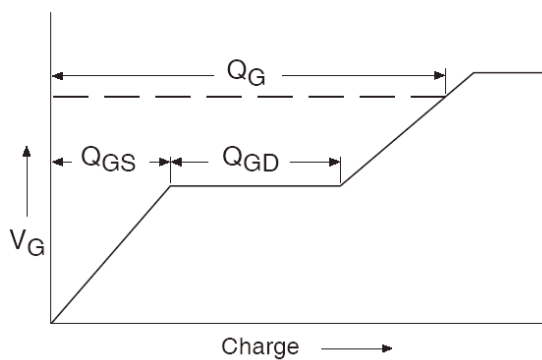


Fig 16a. Basic Gate Charge Waveform

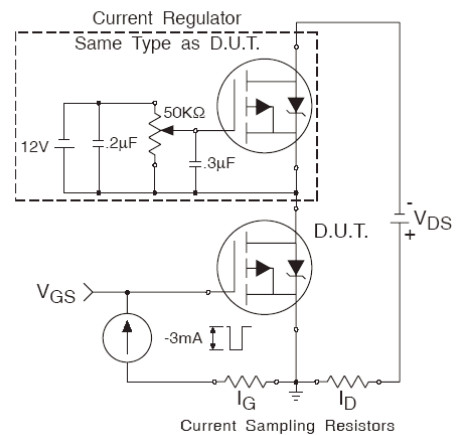
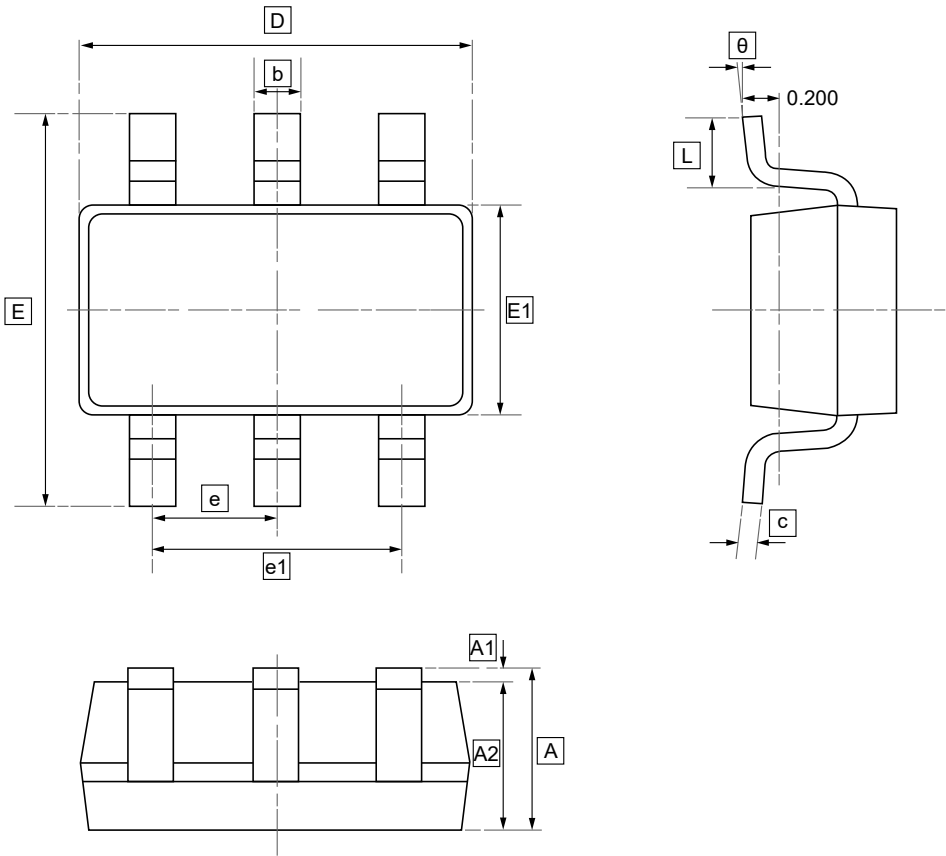


Fig 16b. Gate Charge Test Circuit



9.SOT23-6 Package Outline Dimensions

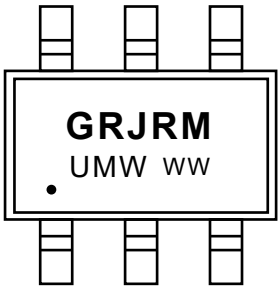


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	c	D	E1	E	e	e1	L	θ
Min	1.050	0.000	1.050	0.300	0.100	2.820	1.500	2.650	0.950	1.800	0.300	0°
Max	1.250	0.100	1.150	0.500	0.200	3.020	1.700	2.950	BSC	2.000	0.600	8°



10.Ordering information



ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW IRF5803TR	SOT23-6	3000	Tape and reel



11.Disclaimer

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