UNIKC Semiconductor

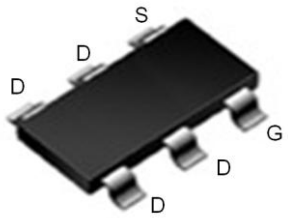
RoHS Compliant

P5102FM6

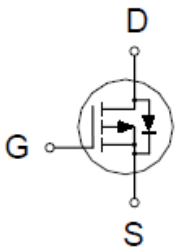
P-Channel Enhancement Mode MOSFET

PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
-20V	51mΩ @V_{GS} = -4.5V	-4.2A



SOT-23-6



ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C Unless Otherwise Noted)

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNITS
Drain-Source Voltage		V_{DS}	-20	V
Gate-Source Voltage		V_{GS}	±8	
Continuous Drain Current	T_A = 25 °C	I_D	-4.2	A
	T_A = 70 °C		-3.3	
Pulsed Drain Current[1]		I_{DM}	-21	
Avalanche Current		I_{AS}	-21	
Avalanche Energy	L=0.1mH	E_{AS}	22	mJ
Power Dissipation	T_A = 25 °C	P_D	1.4	W
	T_A = 70 °C		0.9	
Junction & Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Ambient	$R_{\theta JA}$		85	°C / W

[1]Limited by maximum junction temperature.

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ELECTRICAL CHARACTERISTICS (T_J = 25 °C, Unless Otherwise Noted)

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = -250μA	-20			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250μA	-0.45	-0.6	-0.9	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±8V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -16V, V_{GS} = 0V			-1	μA
		V_{DS} = -10V, V_{GS} = 0V , T_J = 70 °C			-10	
On-State Drain Current[1]	$I_{D(ON)}$	V_{DS} = -5V, V_{GS} = -4.5V	-21			A
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = -1.8V, I_D = -2A		60	71	mΩ
		V_{GS} = -2.5V, I_D = -4A		48	61	
		V_{GS} = -4.5V, I_D = -4A		40	51	
Forward Transconductance[1]	g_{fs}	V_{DS} = -5V, I_D = -4A		17		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = -10V, f = 1MHz		1200		pF
Output Capacitance	C_{oss}			187		
Reverse Transfer Capacitance	C_{rss}			119		
Gate Resistance	R_g	V_{GS} = 0V, V_{DS} = 0V, f = 1MHz		8.2		Ω
Total Gate Charge[2]	Q_g	V_{DS} = 0.5$V_{(BR)DSS}$, V_{GS} = -4.5V, I_D = -4A		16.7		nC
Gate-Source Charge[2]	Q_{gs}			1.8		
Gate-Drain Charge[2]	Q_{gd}			5.2		
Turn-On Delay Time[2]	$t_{d(on)}$	V_{DS} = -10V, I_D ≅ -4A, V_{GS} = -4.5V, R_{GEN} = 3.3Ω		20		nS
Rise Time[2]	t_r			36		
Turn-Off Delay Time[2]	$t_{d(off)}$			46		
Fall Time[2]	t_f			62		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICE (T_J = 25 ˚C)						
Continuous Current	I_S				-1	A
Forward Voltage[1]	V_{SD}	I_F = -4A, V_{GS} = 0V			-1.3	V
Reverse Recovery Time	t_{rr}	I_F = -4A, dI_F/dt = 100A / μS		30		nS
Reverse Recovery Change	Q_{rr}			14		nC

[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

[2]Independent of operating temperature.

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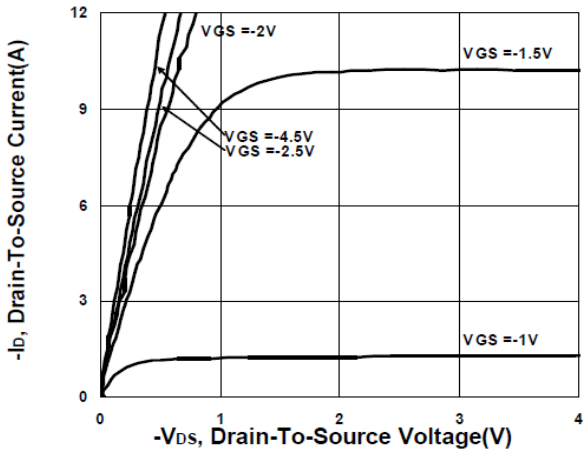
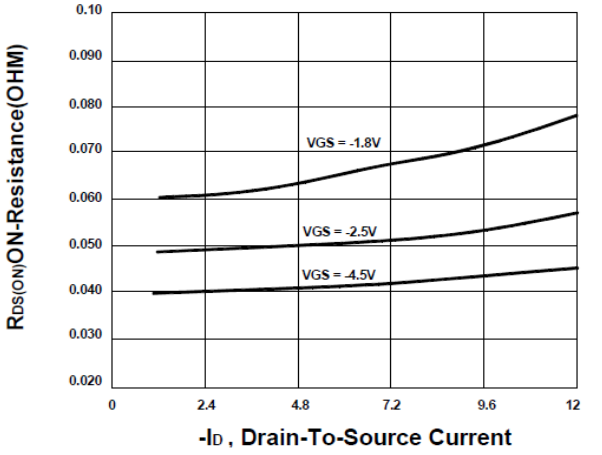
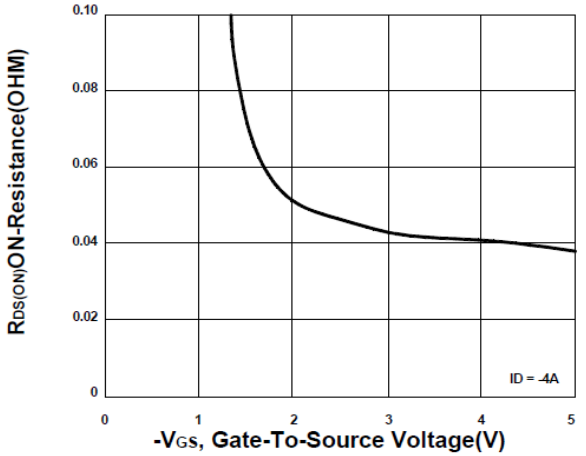
Output Characteristics



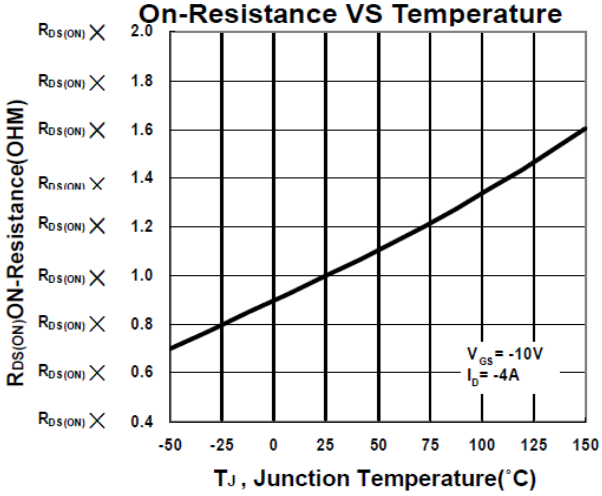
On-Resistance VS Drain Current



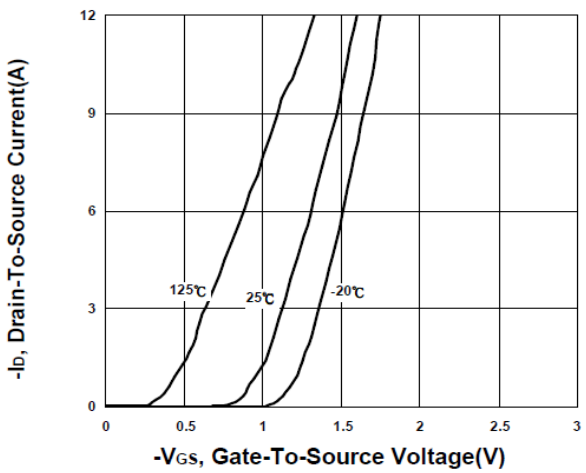
On-Resistance VS Gate-To-Source



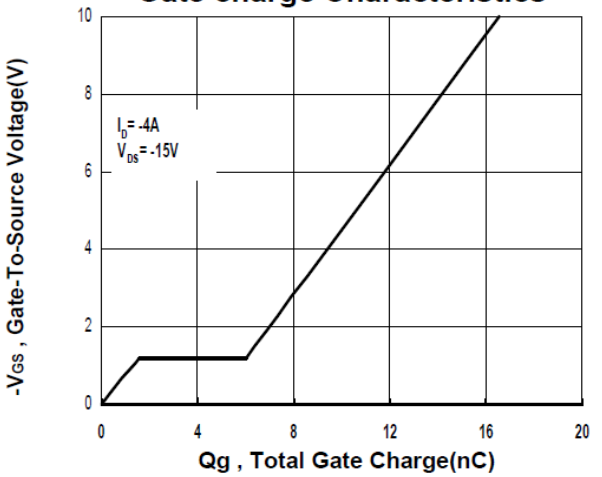
On-Resistance VS Temperature



Transfer Characteristics



Gate charge Characteristics



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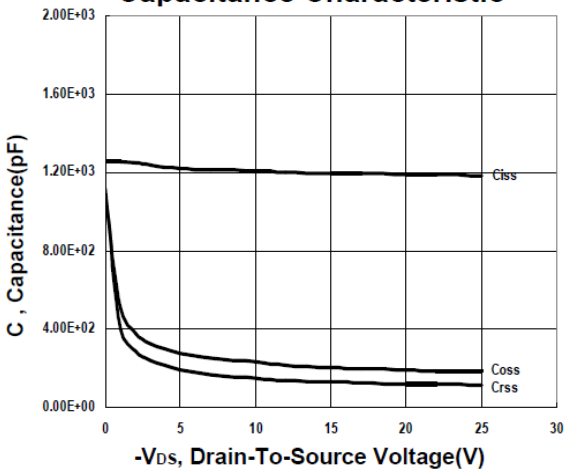
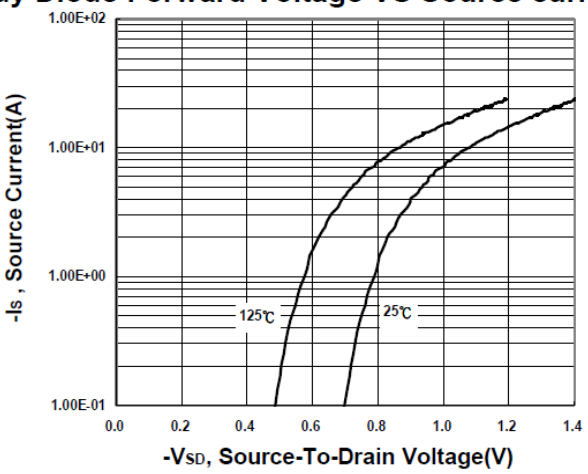
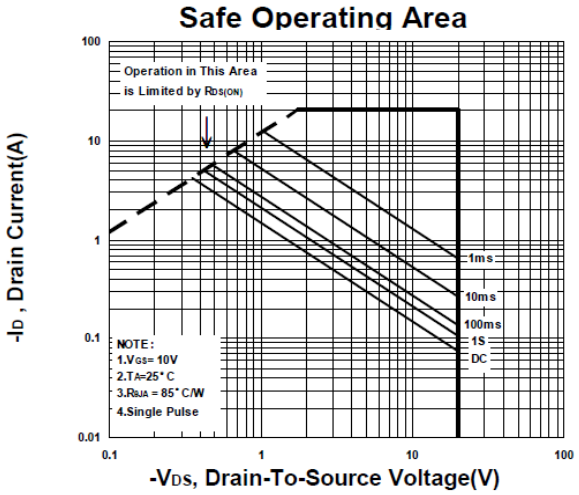
Capacitance Characteristic



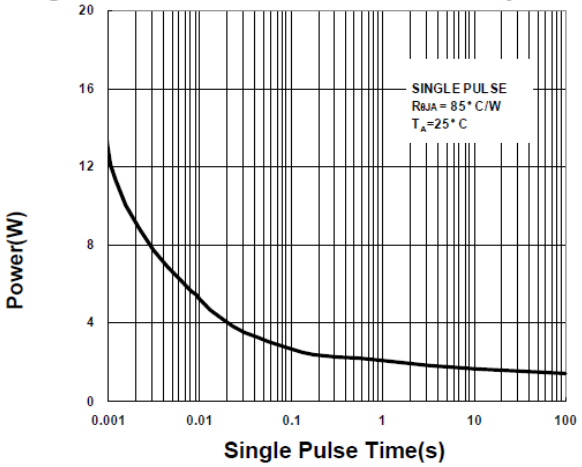
Body Diode Forward Voltage VS Source current



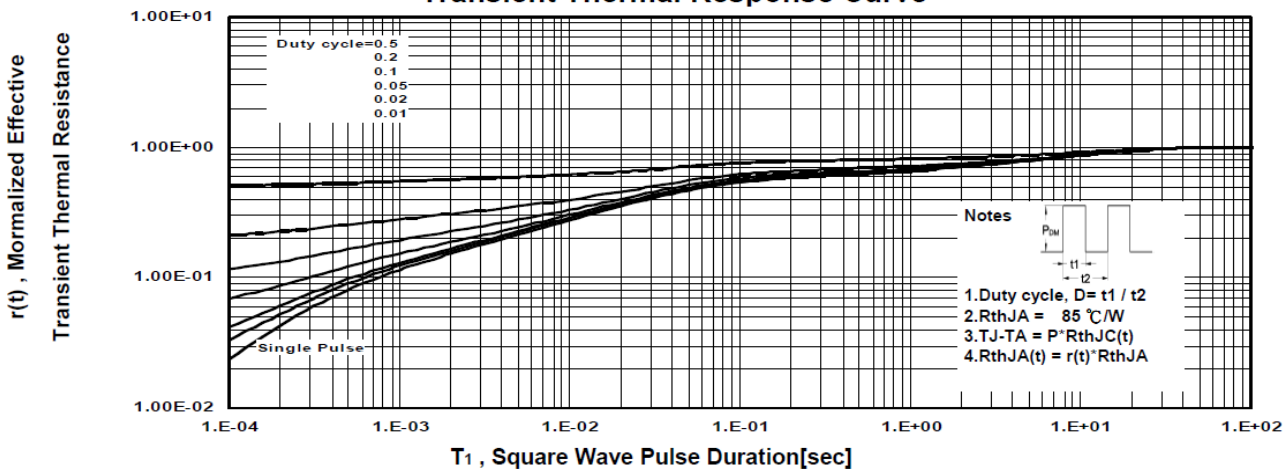
Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve



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Package Dimension

SOT-23-6 MECHANICAL DATA

Dimension	mm			Dimension	mm		
	Min.	Typ.	Max.		Min.	Typ.	Max.
A	0.9	1.07	1.15	H	2.6	2.8	3.0
B	0.3	0.4	0.5	I	0		0.1
C	0.1	0.15	0.25				
D	2.8	2.9	3.1				
E	1.4	1.6	1.7				
F	1.8		2.0				
G	0.3	0.45	0.6