

XP152A12COMR P-Channel 20-V(D-S) MOSFET

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
-20V	$0.300\Omega @ -4.5V$	-0.4A
	$0.500\Omega @ -2.5V$	

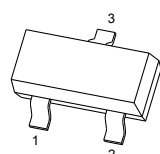
General FEATURE

- TrenchFET Power MOSFET
- Lead free product is acquired
- Surface mount package

APPLICATION

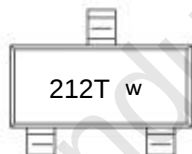
- Load Switch for Portable Devices
- DC/DC Converter

SOT-23



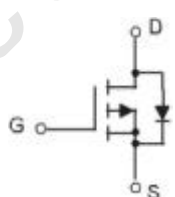
1.GATE
2.SOURCE
3.DRAIN

MARKING



*w: week code

Equivalent Circuit



Maximum ratings ($T_a=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	± 12	
Continuous Drain Current	I_D	-0.4	A
Pulsed Drain Current	I_{DM}	-6.0	
Continuous Source-Drain Diode Current	I_S	-1.30	
Maximum Power Dissipation	P_D	0.5	W
Thermal Resistance from Junction to Ambient($t \leq 5s$)	$R_{\theta JA}$	250	$^{\circ}\text{C/W}$
Junction Temperature	T_J	150	$^{\circ}\text{C}$
Storage Temperature	T_{stg}	-55 ~ +150	

MOSFET ELECTRICAL CHARACTERISTICS

T_a =25 °C unless otherwise specified

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Static						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-20			V
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-0.5	-0.7	-1	
Gate-source leakage	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 10V$			± 100	nA
Zero gate voltage drain current	I_{DSS}	$V_{DS} = -20V, V_{GS} = 0V$			-1	μA
Drain-source on-state resistance ^a	$R_{DS(on)}$	$V_{GS} = -4.5V, I_D = -0.4A$		0.280	0.300	Ω
		$V_{GS} = -2.5V, I_D = -0.4A$		0.460	0.500	
Forward transconductance ^a	g_{fs}	$V_{DS} = -5V, I_D = -0.4A$	4.0	6.5		S
Dynamic ^b						
Input capacitance	C_{iss}	$V_{DS} = -10V, V_{GS} = 0V, f = 1MHz$		285		pF
Output capacitance	C_{oss}			58		
Reverse transfer capacitance	C_{rss}			32		
Total gate charge	Q_g	$V_{DS} = -10V, V_{GS} = -4.5V, I_D = -0.4A$		5.5	10	nC
		$V_{DS} = -10V, V_{GS} = -2.5V, I_D = -0.4A$		2.9	6	
Gate-source charge	Q_{gs}			0.45		
Gate-drain charge	Q_{gd}			0.75		
Gate resistance	R_g	$f = 1MHz$		6.0		Ω
Turn-on delay time	$t_{d(on)}$	$V_{DD} = -10V,$ $R_L = 5\Omega, I_D = -0.4A,$ $V_{GEN} = -4.5V, R_g = 3\Omega$		9.8	20	ns
Rise time	t_r			4.9	60	
Turn-off delay time	$t_{d(off)}$			20.5	50	
Fall time	t_f			7.0	20	
Drain-source body diode characteristics						
Continuous source-drain diode current	I_S	$T_C = 25^\circ C$			-1.3	A
Pulse diode forward current ^a	I_{SM}				-10	
Body diode voltage	V_{SD}	$I_S = -0.4A$		-0.8	-1.2	V

Notes :

a. Pulse Test : Pulse Width < 300μs, Duty Cycle ≤ 2%.

b. Guaranteed by design not subjected to production testing.

Typical Electrical and Thermal Characteristics

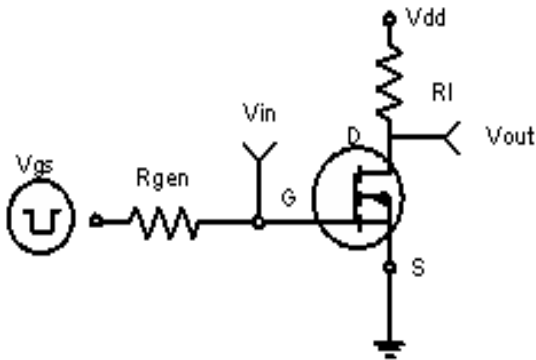


Figure 1: Switching Test Circuit

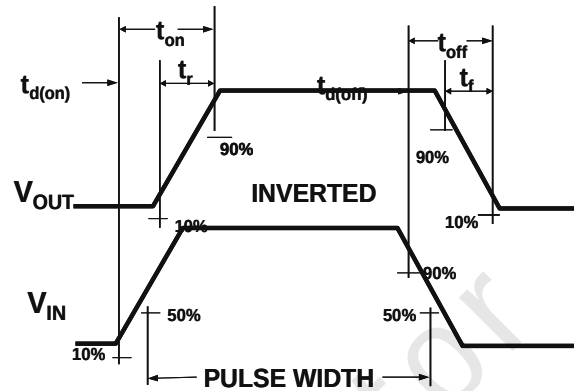
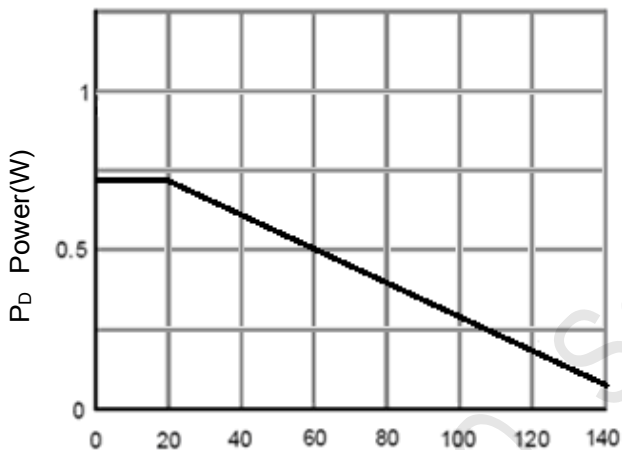
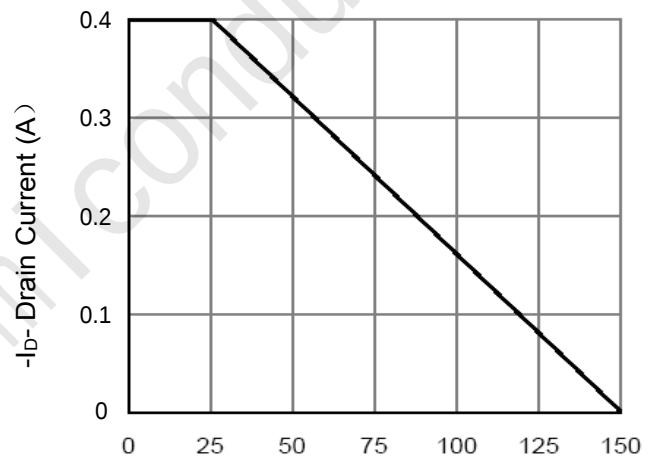


Figure 2: Switching Waveforms



T_J-Junction Temperature(°C)
Figure 3 Power Dissipation



T_J-Junction Temperature(°C)
Figure 4 Drain Current

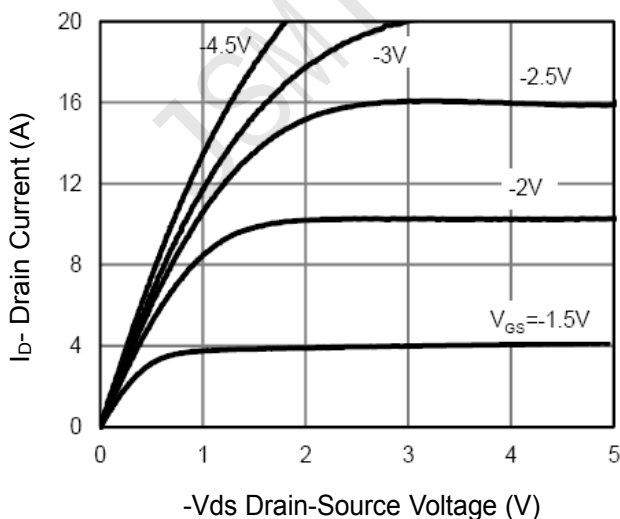


Figure 5 Output Characteristics

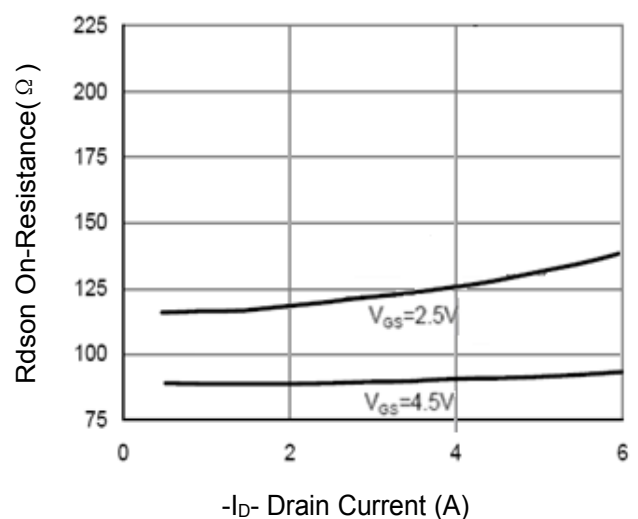


Figure 6 Drain-Source On-Resistance

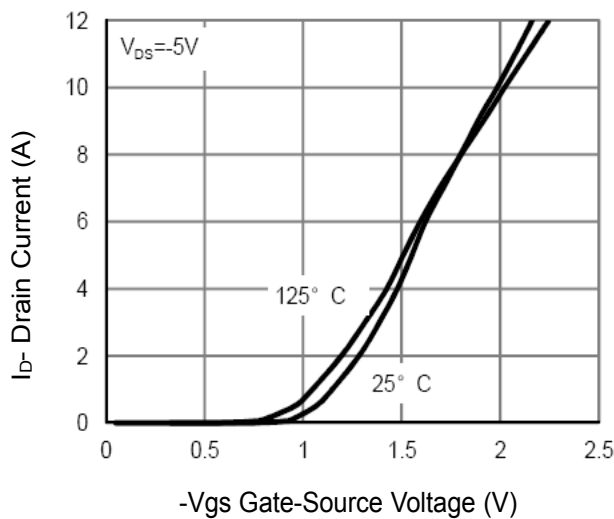


Figure 7 Transfer Characteristics

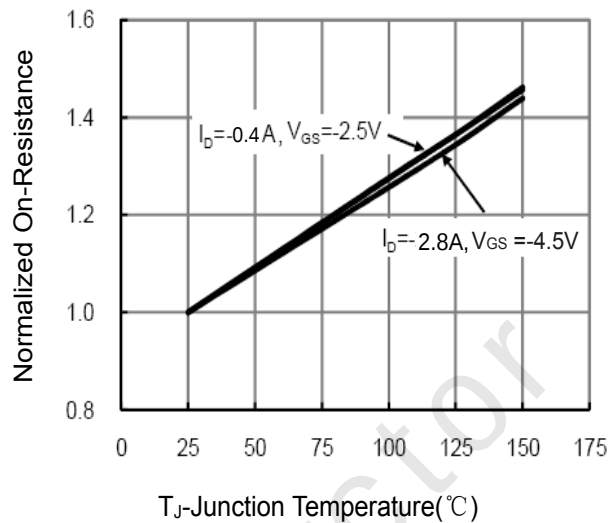


Figure 8 Drain-Source On-Resistance

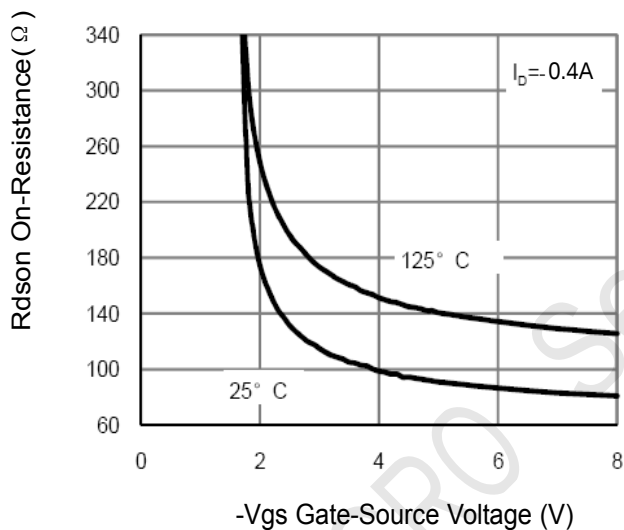


Figure 9 Rdson vs Vgs

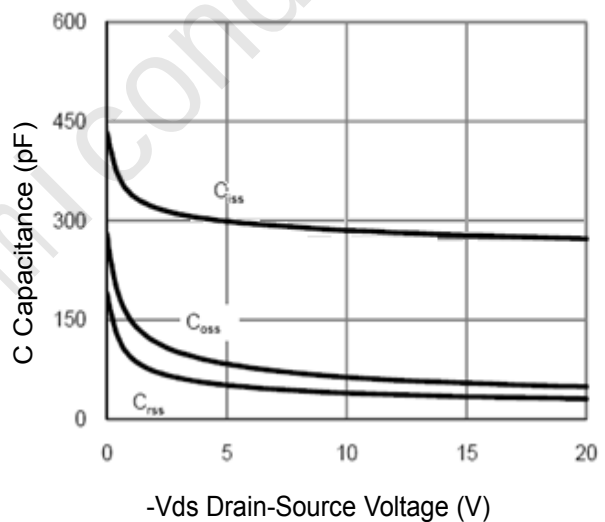


Figure 10 Capacitance vs Vds

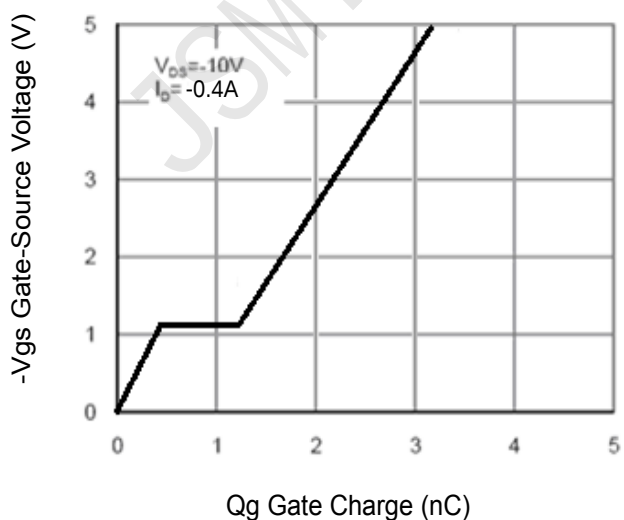


Figure 11 Gate Charge

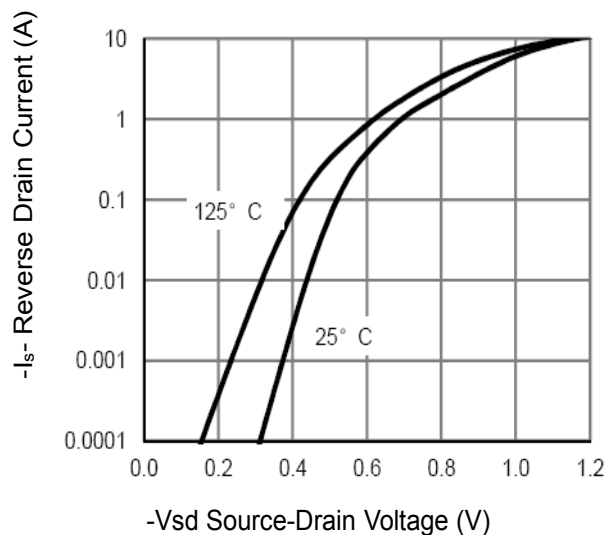


Figure 12 Source- Drain Diode Forward

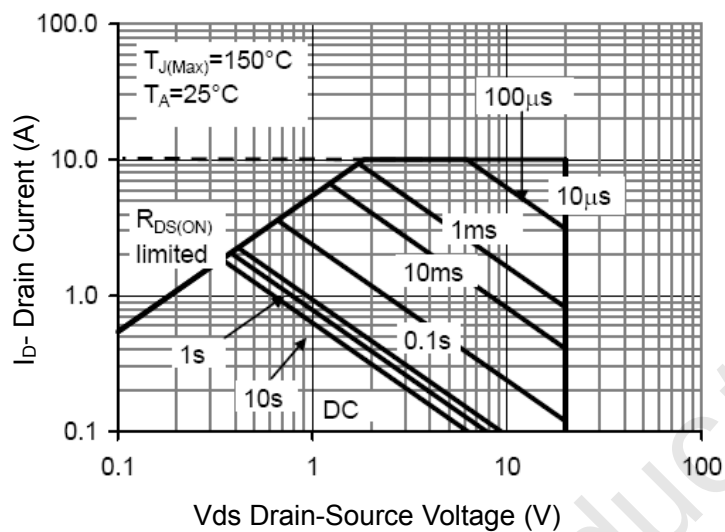


Figure 13 Safe Operation Area

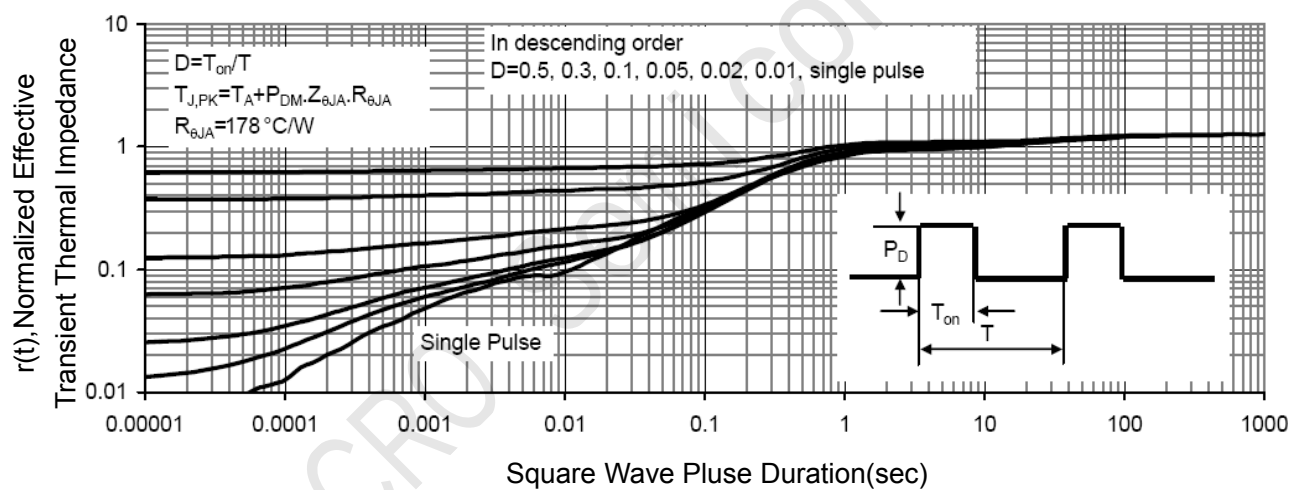
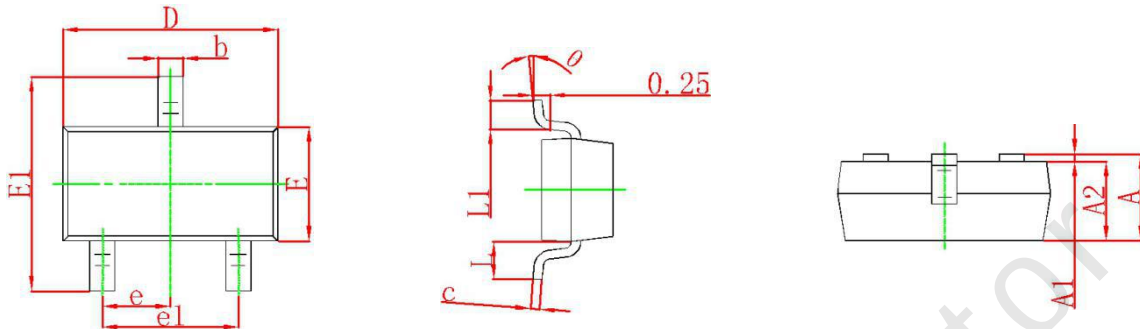


Figure 14 Normalized Maximum Transient Thermal Impedance

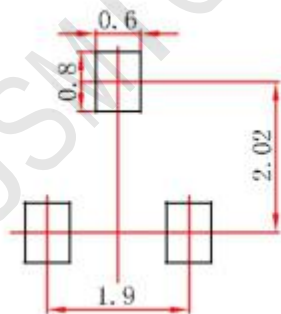
SOT-23 Plastic-Encapsulate MOSFETS

SOT-23 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

SOT-23 Suggested Pad Layout



Note:

1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.