



**ELECTROSTATIC SENSITIVE DEVICE**  
OBSERVE HANDLING PRECAUTIONS

MITSUBISHI RF POWER MOS FET

# RD05MMP1

RoHS Compliance, Silicon MOSFET Power Transistor, 941MHz, 5.5W

## DESCRIPTION

RD05MMP1 is a MOS FET type transistor specifically designed for UHF RF power amplifiers applications.

## FEATURES

- High power gain:  
Pout>5.5W, Gp>8.9dB@Vdd=7.2V,f=941MHz
- High Efficiency: 43%min. (941MHz)
- No gate protection diode

## APPLICATION

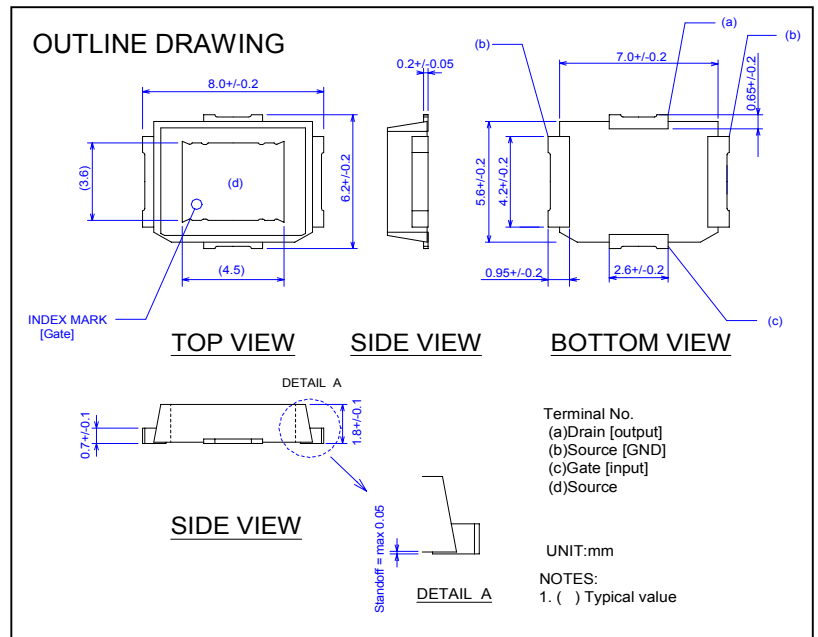
For output stage of high power amplifiers in 941MHz band mobile radio sets.

## RoHS COMPLIANT

RD05MMP1 is a RoHS compliant product.

RoHS compliance is indicating by the letter "G" after the Lot Marking. This product includes the lead in high melting temperature type solders. However, it applicable to the following exceptions of RoHS Directions.

- 1.Lead in high melting temperature type solders (i.e. tin-lead older alloys containing more than85% lead.)



## ABSOLUTE MAXIMUM RATINGS

(Tc=25°C UNLESS OTHERWISE NOTED)

SYMBOL	PARAMETER	CONDITIONS	RATINGS	UNIT
VDSS	Drain to source voltage	Vgs=0V	40	V
VGSS	Gate to source voltage	Vds=0V	-5 to +10	V
Pch	Channel dissipation	Tc=25°C	73	W
Pin	Input Power	Zg=Zl=50Ω	1.4	W
ID	Drain Current	-	3	A
Tch	Junction Temperature	-	150	°C
Tstg	Storage temperature	-	-40 to +125	°C
Rth j-c	Thermal resistance	Junction to case	1.7	°C/W

Note: Above parameters are guaranteed independently.

## ELECTRICAL CHARACTERISTICS (Tc=25°C, UNLESS OTHERWISE NOTED)

SYMBOL	PARAMETER	CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX.	
IDSS	Zero gate voltage drain current	VDS=17V, VGS=0V	-	-	10	uA
IGSS	Gate to source leak current	VGS=10V, VDS=0V	-	-	1	uA
VTH	Gate threshold Voltage	VDS=12V, IDS=1mA	0.5	-	2.5	V
Pout	Output power	f=941MHz, VDD=7.2V	5.5	6	-	W
ηD	Drain efficiency	Pin=0.7W, Idq=1.0A	43	-	-	%
VSWRT	Load VSWR tolerance	VDD=9.5V, Po=5.5W(Pin Control) f=941MHz, Idq=1.0A, Zg=50Ω Load VSWR=20:1(All Phase)	No destroy			-

Note : Above parameters , ratings , limits and conditions are subject to change.



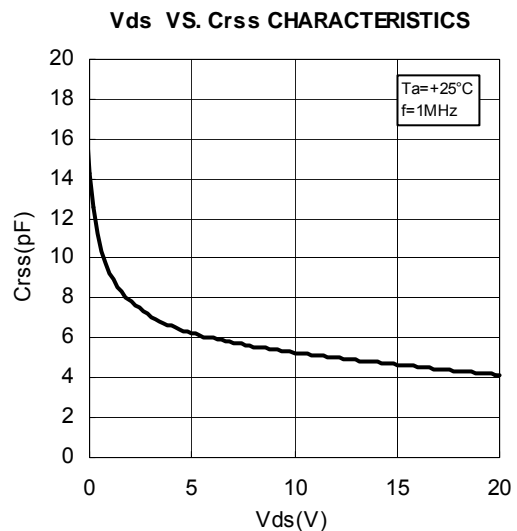
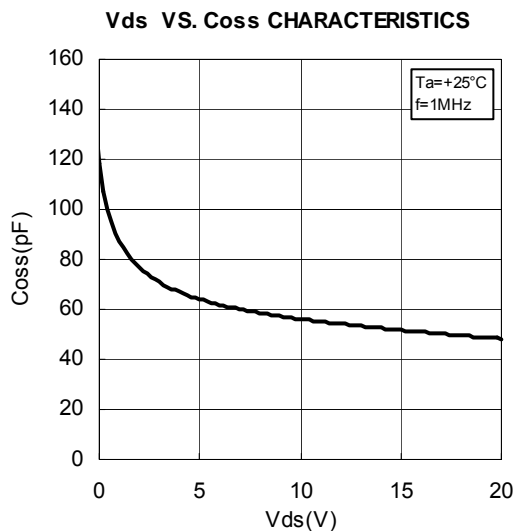
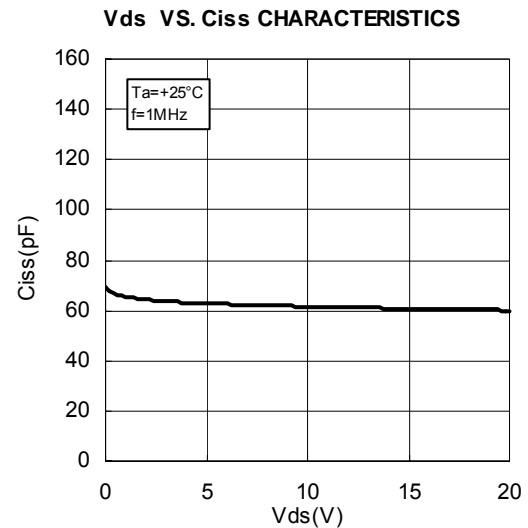
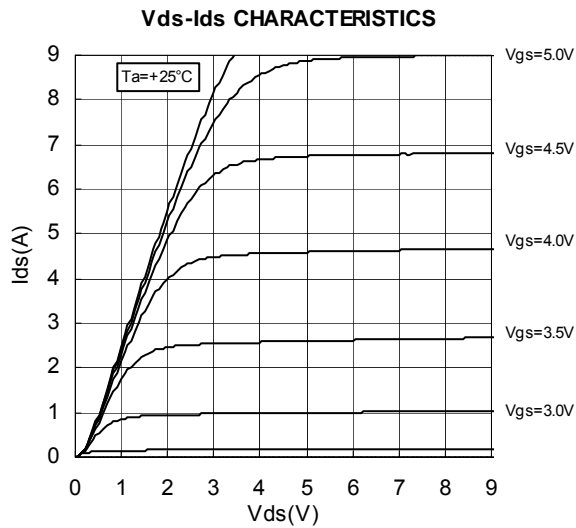
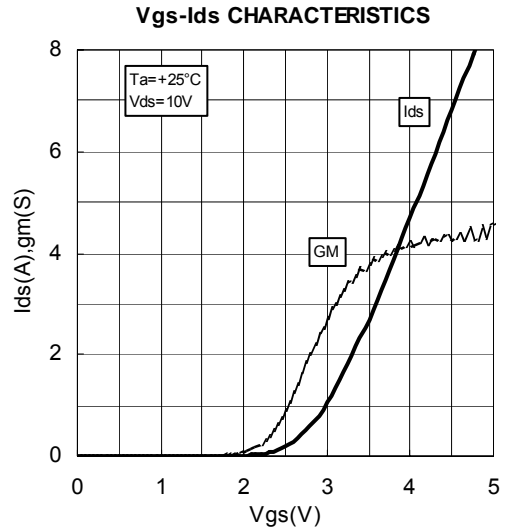
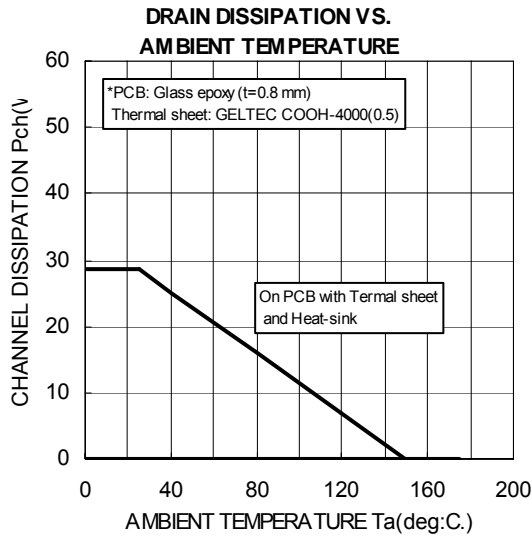
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**TYPICAL CHARACTERISTICS**





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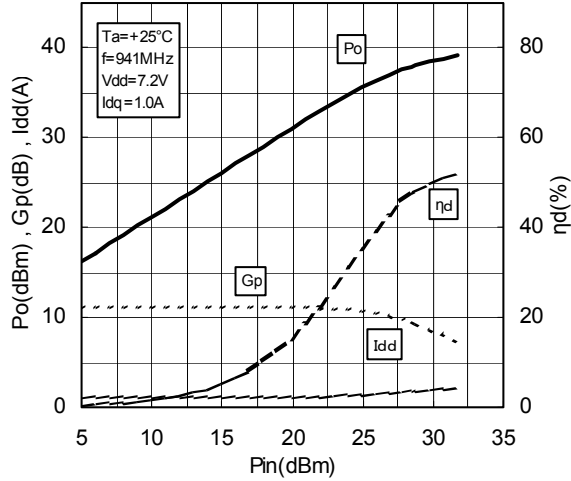
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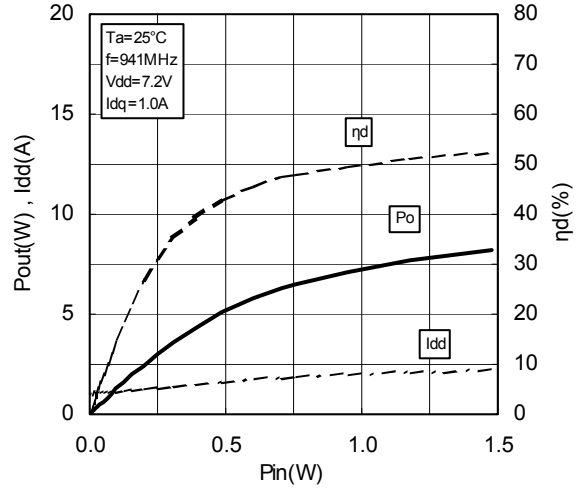
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## TYPICAL CHARACTERISTICS

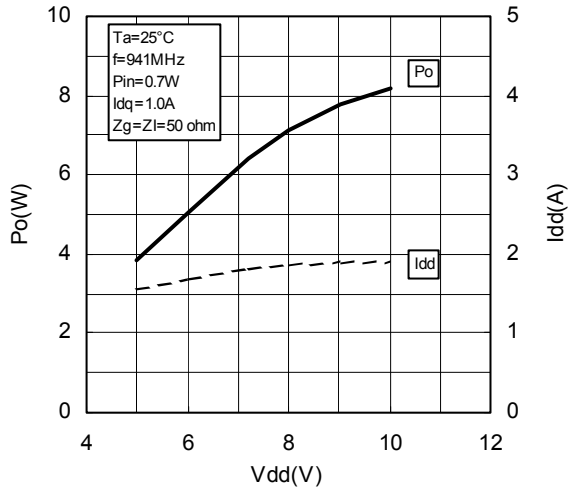
Pin-Po CHARACTERISTICS @f=941MHz



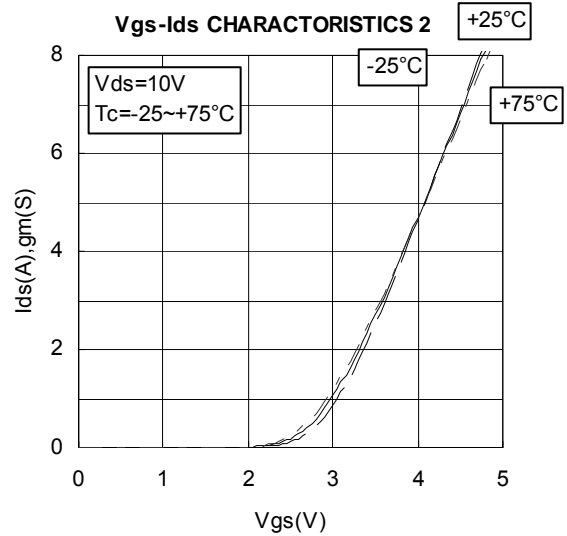
Pin-Po CHARACTERISTICS @f=941MHz

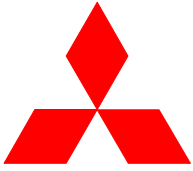


Vdd-Po CHARACTERISTICS @f=941MHz



Vgs-Ids CHARACTERISTICS 2





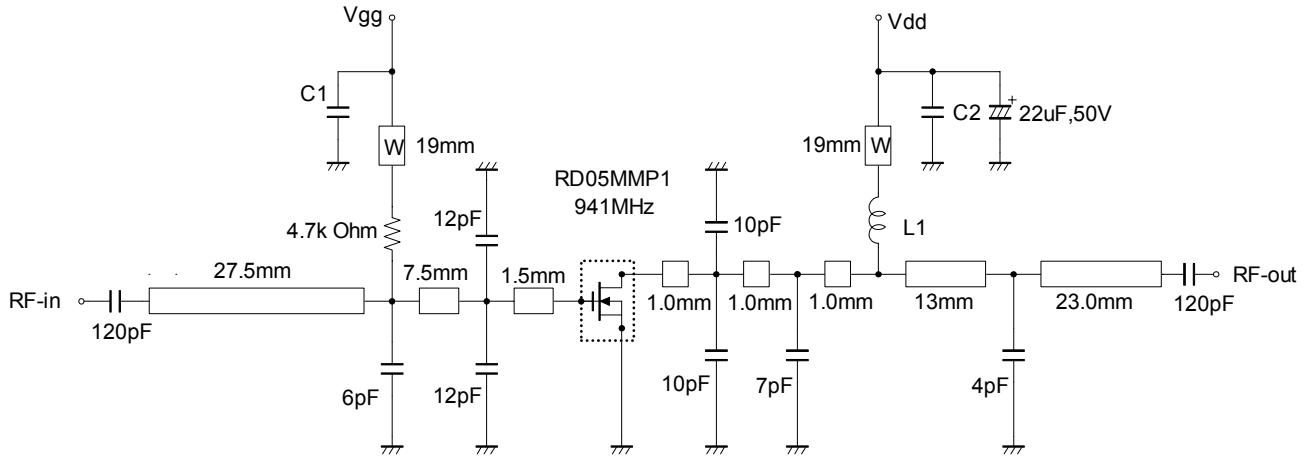
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## TEST CIRCUIT (f=941MHz)



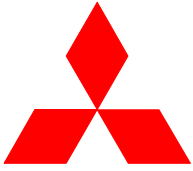
Note: Board material= glass-Epoxy Substrate

L1: 24.4nH, Enameled wire 5Turns, D: 0.23mm, 1.37mm (outside diameter)

Micro strip line width= 1.3mm/50OHM,  $\epsilon_r=4.8$ ,  $t=0.8$ mm

C1, C2: 100pF, 1000pF in parallel

W: Line width= 1.0mm



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RD05MMP1 S-PARAMETER DATA (@Vdd=7.2V, Id=500mA)

Freq. [MHz]	S11		S21		S12		S22	
	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
100	0.841	-169.5	7.706	82.9	0.020	-3.4	0.806	-171.5
125	0.845	-171.5	6.148	78.7	0.020	-5.0	0.817	-172.9
150	0.846	-172.4	5.024	75.0	0.019	-6.5	0.810	-174.2
175	0.848	-173.3	4.240	72.0	0.018	-6.6	0.817	-174.7
200	0.848	-173.7	3.669	69.4	0.017	-7.1	0.822	-175.0
225	0.852	-174.5	3.227	66.5	0.017	-8.5	0.835	-175.1
250	0.858	-174.9	2.856	63.6	0.017	-8.9	0.841	-175.3
275	0.861	-175.2	2.543	60.8	0.016	-8.7	0.838	-175.8
300	0.866	-175.3	2.279	58.6	0.015	-8.2	0.840	-176.2
325	0.872	-175.5	2.068	56.5	0.014	-3.2	0.849	-176.4
350	0.877	-175.5	1.886	54.1	0.013	-4.3	0.858	-176.8
375	0.878	-176.2	1.735	51.5	0.013	-3.6	0.868	-177.0
400	0.880	-176.6	1.584	49.3	0.012	-0.8	0.869	-177.4
425	0.886	-177.1	1.456	47.4	0.011	2.0	0.868	-177.5
450	0.891	-177.2	1.343	45.9	0.011	7.3	0.874	-177.8
475	0.897	-177.2	1.249	44.1	0.011	10.5	0.880	-178.2
500	0.900	-177.3	1.164	42.2	0.010	16.6	0.886	-178.7
525	0.904	-177.6	1.086	40.3	0.010	19.9	0.893	-179.1
550	0.905	-178.1	1.010	38.7	0.010	25.6	0.893	-179.0
575	0.907	-178.6	0.945	37.2	0.010	30.6	0.897	-179.4
600	0.913	-178.9	0.889	35.8	0.011	35.9	0.901	-179.9
625	0.918	-178.9	0.833	34.6	0.011	40.4	0.908	179.6
650	0.920	-178.9	0.786	33.2	0.011	46.3	0.911	179.2
675	0.920	-179.1	0.741	31.9	0.012	49.2	0.909	179.0
700	0.925	-179.5	0.698	30.6	0.012	51.0	0.915	178.6
725	0.925	179.8	0.660	29.4	0.013	57.5	0.916	178.4
750	0.927	179.5	0.625	28.3	0.013	58.5	0.917	177.9
775	0.931	179.2	0.595	27.1	0.014	60.4	0.921	177.4
800	0.929	179.3	0.565	26.3	0.015	62.2	0.925	177.0
825	0.936	179.2	0.537	25.4	0.016	67.1	0.924	176.7
850	0.936	179.0	0.513	24.6	0.017	67.9	0.923	176.6
875	0.935	178.5	0.488	23.6	0.019	68.4	0.921	176.3
900	0.935	178.1	0.469	22.6	0.020	67.0	0.922	175.5
925	0.933	177.9	0.446	21.7	0.023	64.2	0.919	175.0
950	0.938	177.8	0.426	20.3	0.024	52.9	0.906	175.4
975	0.943	177.8	0.404	20.3	0.019	51.8	0.920	176.6
1000	0.943	177.5	0.388	19.9	0.019	61.8	0.933	176.0



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RD05MMP1 S-PARAMETER DATA (@V<sub>dd</sub>=7.2V, I<sub>d</sub>=900mA)

Freq. [MHz]	S11		S21		S12		S22	
	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
100	0.878	-174.2	7.474	85.7	0.014	4.3	0.869	-176.3
125	0.884	-175.6	6.046	81.9	0.014	2.9	0.865	-176.9
150	0.880	-176.9	4.919	78.9	0.014	3.3	0.865	-177.5
175	0.877	-177.4	4.153	77.5	0.013	4.7	0.872	-177.9
200	0.879	-177.7	3.636	76.1	0.013	8.8	0.873	-178.3
225	0.888	-178.2	3.246	73.8	0.013	4.2	0.875	-178.5
250	0.888	-178.7	2.912	71.1	0.013	7.9	0.874	-178.6
275	0.884	-179.1	2.598	69.0	0.012	9.1	0.869	-178.8
300	0.884	-179.2	2.351	67.4	0.012	11.5	0.872	-178.9
325	0.891	-179.6	2.152	66.0	0.012	13.3	0.882	-179.2
350	0.893	-179.7	1.995	64.1	0.012	18.1	0.884	-179.4
375	0.897	179.8	1.849	62.2	0.011	16.1	0.886	-179.5
400	0.897	179.7	1.708	60.0	0.012	20.8	0.883	-179.3
425	0.896	179.6	1.580	58.5	0.012	25.7	0.883	-179.6
450	0.902	179.3	1.475	57.1	0.012	26.7	0.886	-179.7
475	0.903	178.9	1.388	55.6	0.012	30.8	0.892	180.0
500	0.906	178.7	1.308	53.7	0.012	33.2	0.893	179.9
525	0.905	178.5	1.222	52.1	0.012	35.6	0.894	179.8
550	0.906	178.4	1.152	50.6	0.012	38.7	0.896	179.7
575	0.910	178.2	1.086	49.4	0.012	42.5	0.898	179.6
600	0.914	177.9	1.030	48.2	0.012	45.7	0.902	179.2
625	0.915	177.5	0.978	46.6	0.013	46.2	0.906	179.1
650	0.916	177.3	0.928	45.1	0.013	52.5	0.906	179.0
675	0.917	177.3	0.877	43.8	0.014	53.1	0.906	179.1
700	0.919	177.2	0.832	43.0	0.015	55.3	0.905	178.8
725	0.921	176.9	0.798	41.7	0.015	56.8	0.908	178.5
750	0.925	176.6	0.759	40.5	0.015	59.3	0.911	178.1
775	0.924	176.5	0.725	39.2	0.016	59.2	0.916	177.9
800	0.926	176.3	0.694	38.3	0.016	62.2	0.916	178.0
825	0.927	176.1	0.661	37.2	0.017	63.6	0.921	178.1
850	0.929	175.8	0.634	36.5	0.018	64.2	0.918	177.9
875	0.929	175.6	0.611	35.5	0.019	65.1	0.917	177.4
900	0.931	175.5	0.585	34.3	0.019	66.8	0.921	177.0
925	0.930	175.2	0.562	33.4	0.020	66.6	0.923	176.8
950	0.928	175.2	0.539	32.6	0.021	65.2	0.928	176.9
975	0.932	174.8	0.518	31.9	0.022	67.9	0.930	177.3
1000	0.937	174.8	0.496	31.1	0.022	68.8	0.926	177.0



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**Keep safety first in your circuit designs!**

Mitsubishi Electric Corporation puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage. Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of non-flammable material or (iii) prevention against any malfunction or mishap.

**Warning!**

Do not use the device at the exceeded the maximum rating condition. In case of plastic molded devices, the exceeded maximum rating condition may cause blowout, smoldering or catch fire of the molding resin due to extreme short current flow between the drain and the source of the device. These results causes in fire or injury.