

EPC7030G – Rad Hard Power GaN Transistor Target Datasheet

Summary:

Rad Hard e-GaN® 300 V, 50 A, 35 mΩ max Surface Mount (FSMD-G)

Absolute Maximum Rating (T _J = 25°C unless otherwise noted)			
Symbol	Parameter-Conditions	Value	Units
V _{DS}	Drain-to-Source Voltage (Note 1)	300	V
	Drain-to-Source Voltage (up to 10,000 5ms pulses at 150°C)	360	
I _D	Continuous Drain Current at V _{GS} = 5 V	50	A
I _{DM}	Pulsed (25°C, T _{PULSE} = 300 μs)	200	
V _{GS}	Gate-to-Source Voltage (Note 2)	+6 / -4	V
T _J , T _{STG}	Operating and Storage Junction Temperature Range	-55 to 150	°C
T _{SOL}	Package Mounting Surface Temperature	260	
ESD	ESD Class	1A -2A	

Static Characteristics (T _J = 25°C unless otherwise noted)						
PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
BV _{DSS}	Drain-to-Source Voltage	V _{GS} = 0 V, I _D = 1.0 mA	300			V
I _{DSS}	Drain Source Leakage	V _{DS} = 300 V, V _{GS} = 0 V		10	500	μA
		V _{DS} = 300 V, V _{GS} = 0 V, T _J = 125°C		25	1000	
I _{GSS}	Gate-to-Source Forward Leakage	V _{GS} = 6 V		0.5	1.6	mA
	Gate-to-Source Forward Leakage [#]	V _{GS} = 6 V, T _J = 125°C		1	3.0	
	Gate-to-Source Reverse Leakage	V _{GS} = -4 V			0.500	
V _{GS(TH)}	Gate-to-Source Threshold Voltage	V _{DS} = V _{GS} , I _D = 18 mA	0.8	1.4	2.5	V
ΔV _{GS(TH)}	Gate-to-Source Threshold Voltage Temperature Coefficient			-2.0		mV/°C
R _{DS(on)}	Drain-Source On Resistance (Note 4)	V _{GS} = 5 V, I _D = 50 A		28	32	mΩ
V _{SD}	Source-Drain Forward Voltage (Note 5)	I _S = 0.5 A, V _{GS} = 0 V		2.0		V

All measurements were done with substrate shorted to source.

Defined by design. Not subject to production test.

Dynamic Characteristics (T _J = 25°C, f = 1 MHz unless otherwise noted)						
PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
C _{ISS}	Input Capacitance	V _{DS} = 300 V, V _{GS} = 0 V		1155		pF
C _{RSS}	Reverse Transfer Capacitance			10		
C _{OSS}	Output Capacitance			235		
Q _G	Total Gate Charge	V _{DS} = 150 V, V _{GS} = 5 V, I _D = 50 A		15		nC
Q _{GS}	Gate-to-Source Charge			4		
Q _{GD}	Gate-to-Drain Charge			4		
Q _{RR}	Source-Drain Recovery Charge			0		

All measurements were done with substrate shorted to source.

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RADIATION CHARACTERISTICS

EPC Space eGaN® HEMTs are tested according to MIL-STD-750 Method 1019 for total ionizing dose validation. Every manufacturing lot is tested for total ionizing dose of Gamma radiation with an in-situ bias for (i) $V_{GS} = 5\text{ V}$, (ii) $V_{DS} = V_{GS} = 0\text{ V}$ and (iii) $V_{DS} = 80\% B_{VDSS}$.

Electrical Characteristics up to 1000 krad ($T_J = 25^\circ\text{C}$ unless otherwise noted. Typical (TYP) values are for reference only.)

Parameter	Symbol	Test Conditions	MIN	TYP	MAX	Units
Min Drain to Source Voltage	V_{DSMin}	$V_{GS} = 0\text{ V}$, $I_D = 1.0\text{ mA}$	300			V
Gate to Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 18\text{ mA}$	0.8	1.4	2.5	V
Drain to Source Leakage	I_{DSS}	$V_{DS} = 240\text{ V}$, $V_{GS} = 0\text{ V}$			500	μA
Gate to Source Forward Leakage	I_{GSSF}	$V_{GS} = 5\text{ V}$			1600	μA
Gate to Source Reverse Leakage	I_{GSSR}	$V_{GS} = -4\text{ V}$			500	μA
Drain to Source Resistance (Note 4)	$R_{DS(on)}$	$I_D = 50\text{ A}$, $V_{GS} = 5\text{ V}$			32	$\text{m}\Omega$

TYPICAL SINGLE EVENT EFFECT SAFE OPERATING AREA

Test	Environment			VDS Voltage (V)		
	Ion	LET MeV/mg/cm ²	Range μm	Energy MeV	$V_{GS} = 0\text{ V}$	$V_{GS} = -4\text{ V}$
See SOA	Xe	50	131	1653	300	300
	Au	83.7	130	2482	270	270

