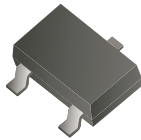


NACMS02P04T-HF

P-Channel
RoHS Device
Halogen Free



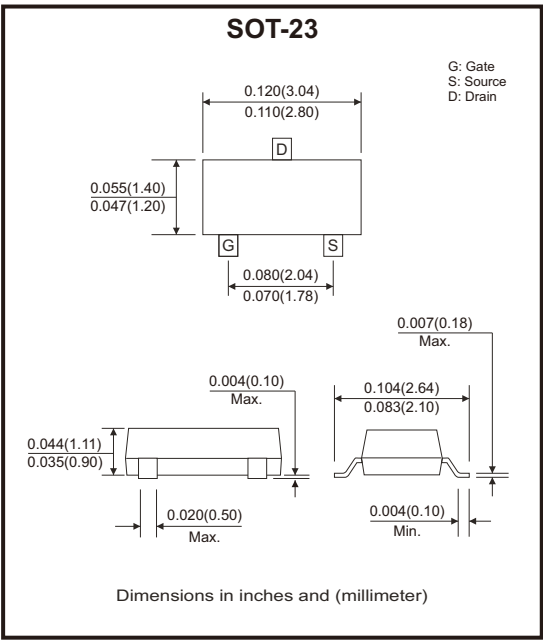
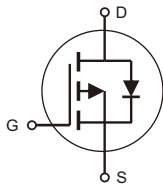
Features

- Fast switching.
- Green device available.
- $R_{DS(ON)} \leq 68m\Omega @ V_{GS} = -10V$.
- AEC-Q101 Qualified.

Mechanical data

- Case: SOT-23, molded plastic.
- Terminals: Solderable per MIL-STD-750, method 2026.
- Mounting position: Any.

Circuit Diagram



Maximum Ratings (at $T_C = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	-40	V
Gate-source voltage	V_{GS}	± 20	V
Drain current-continuous @ $T_A = 25^\circ\text{C}$	I_D	-2.9	A
Drain current-pulsed (Note 1)	I_{DM}	-11.6	A
Power dissipation @ $T_A = 25^\circ\text{C}$	P_D	1	W
Thermal resistance junction to ambient	$R_{\theta JA}$	125	$^\circ\text{C/W}$
Operating junction temperature range	T_J	-50 to +150	$^\circ\text{C}$
Storage temperature range	T_{STG}	-50 to +150	$^\circ\text{C}$

Electrical Characteristics (at $T_J=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Off Characteristics						
Drain-source breakdown voltage	BV _{DSS}	V _{GS} = 0V, I _D = -250μA	-40			V
Drain-source leakage current	I _{DSS}	V _{DS} = -40V, V _{GS} = 0V, T _J = 25°C			-1	μA
Gate-source leakage current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V			±100	nA
On Characteristics						
Static drain-source on-resistance	R _{DS(on)}	V _{GS} = -10V, I _D = -2A			68	mΩ
		V _{GS} = -4.5V, I _D = -1A			100	
Gate threshold voltage	V _{GS(th)}	V _{GS} = V _{DS} , I _D = -250μA	-1		-2.5	V
Dynamic and Switching Characteristics						
Total gate charge (Note 2, 3)	Q _g	V _{DS} = -32V, V _{GS} = -10V, I _D = -2A		6.4		nC
Gate-source charge (Note 2, 3)	Q _{gs}			0.5		
Gate-drain charge (Note 2, 3)	Q _{gd}			2.7		
Turn-on delay time (Note 2, 3)	t _{d(on)}	V _{DD} = -20V, V _{GS} = -10V, R _G = 6Ω, I _D = -1A		12		nS
Rise time (Note 2, 3)	t _r			9		
Turn-off delay time (Note 2, 3)	t _{d(off)}			45		
Fall time (Note 2, 3)	t _f			5		
Input capacitance	C _{iss}	V _{DS} = -25V, V _{GS} = 0V, f = 1MHz		600		pF
Output capacitance	C _{oss}			60		
Reverse transfer capacitance	C _{rss}			43		
Drain-Source Diode Characteristics and Ratings						
Continuous source current	I _S	V _G = V _D = 0V, Force current			-2.9	A
Pulsed source current	I _{SM}				-5.8	A
Diode forward voltage (Note 2)	V _{SD}	V _{GS} = 0V, I _S = -1A, T _J = 25°C			-1	V

- Notes: 1. Pulse width limited by maximum junction temperature.
 2. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
 3. Essentially independent of operating temperature.

Typical Rating and Characteristic Curves (NACMS02P04T-HF)

Fig.1 - Continuous Drain Current vs. T_J

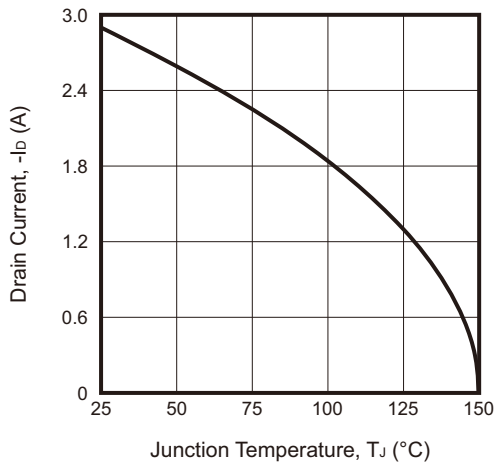


Fig.2 - Normalized $R_{DS(ON)}$ vs. T_J

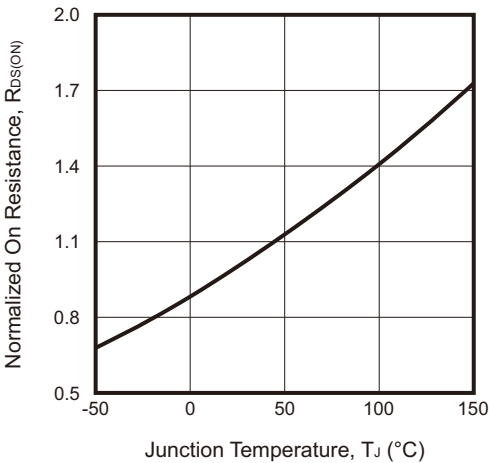


Fig.3 - Normalized $V_{GS(th)}$ vs. T_J

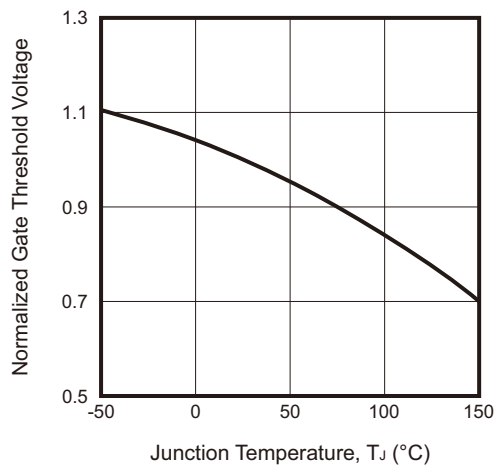


Fig.4 - Gate Charge Characteristics

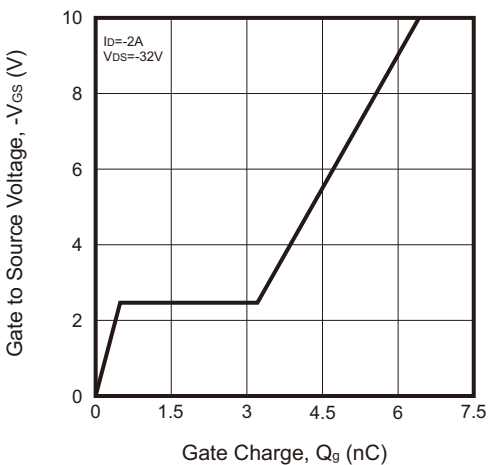
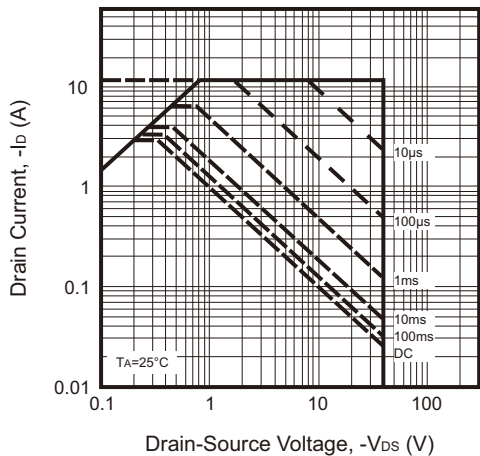
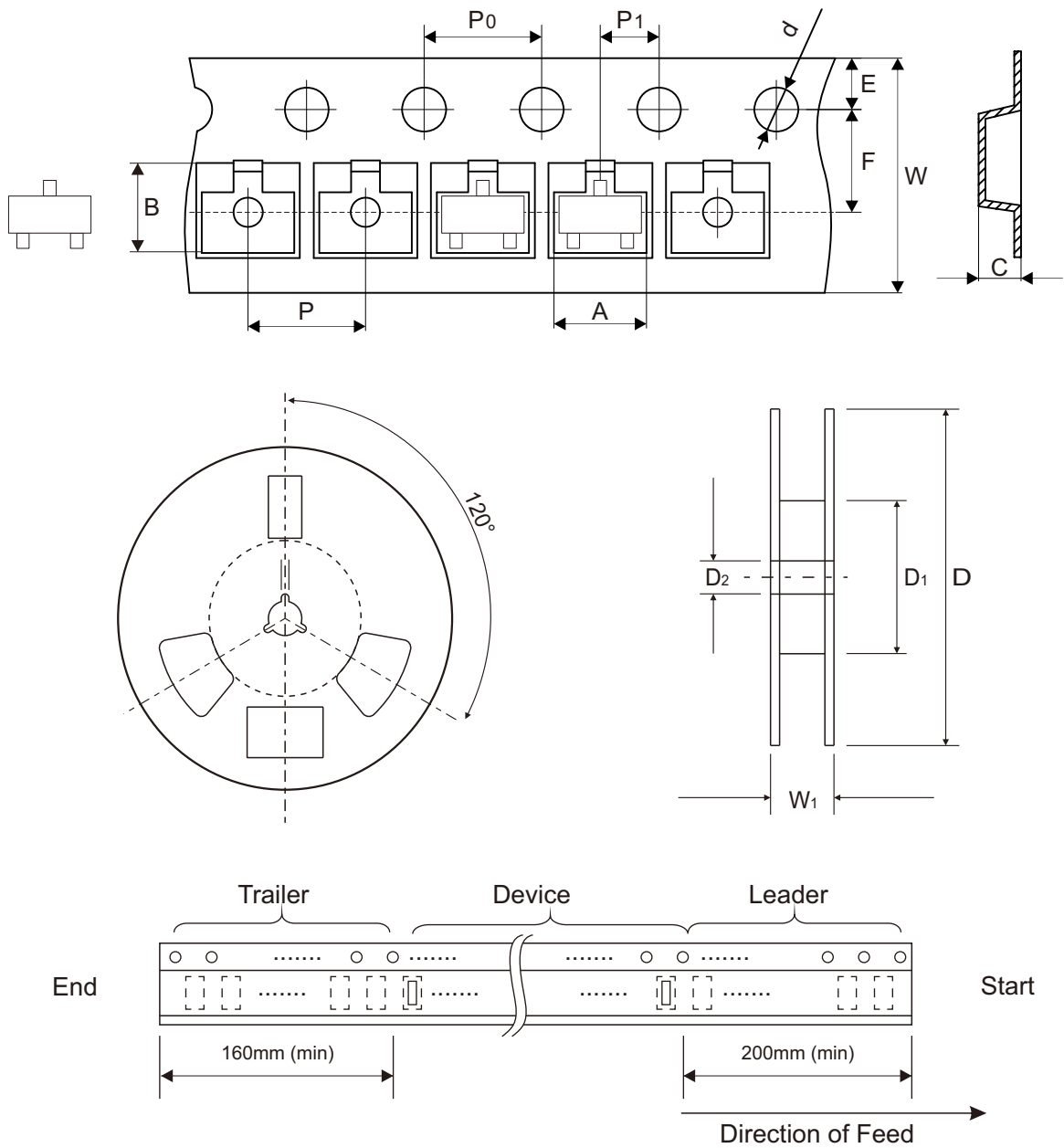


Fig.5 - Maximum Safe Operating Area



Reel Taping Specification

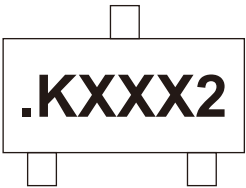


SOT-23	SYMBOL	A	B	C	d	D	D1	D2
	(mm)	3.15 ± 0.20	2.80 ± 0.20	1.30 ± 0.20	1.50 ± 0.10	178.00 ± 2.00	50.00 Min	13.20 ± 0.50
	(inch)	0.124 ± 0.008	0.110 ± 0.008	0.051 ± 0.008	0.059 ± 0.004	7.008 ± 0.079	1.969 Min	0.520 ± 0.020

SOT-23	SYMBOL	E	F	P	P0	P1	W	W1
	(mm)	1.75 ± 0.10	3.50 ± 0.10	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.10	8.00 ± 0.30	9.50 ± 1.50
	(inch)	0.069 ± 0.004	0.138 ± 0.004	0.157 ± 0.004	0.157 ± 0.004	0.079 ± 0.004	0.315 ± 0.012	0.374 ± 0.059

Marking Code

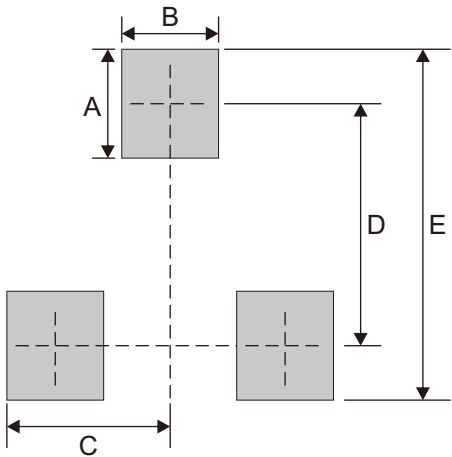
Part Number	Marking Code
NACMS02P04T-HF	.K



XXX2 = Control code

Suggested P.C.B. PAD Layout

SIZE	SOT-23	
	(mm)	(inch)
A	0.90	0.035
B	0.80	0.031
C	1.35	0.053
D	2.00	0.079
E	2.90	0.114



Standard Packaging

Case Type	REEL PACK	
	REEL (pcs)	Reel Size (inch)
SOT-23	3,000	7