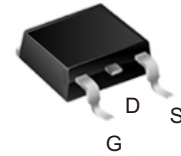


ACMS56P04D-HF

P-Channel

RoHS Device

Halogen Free



Features

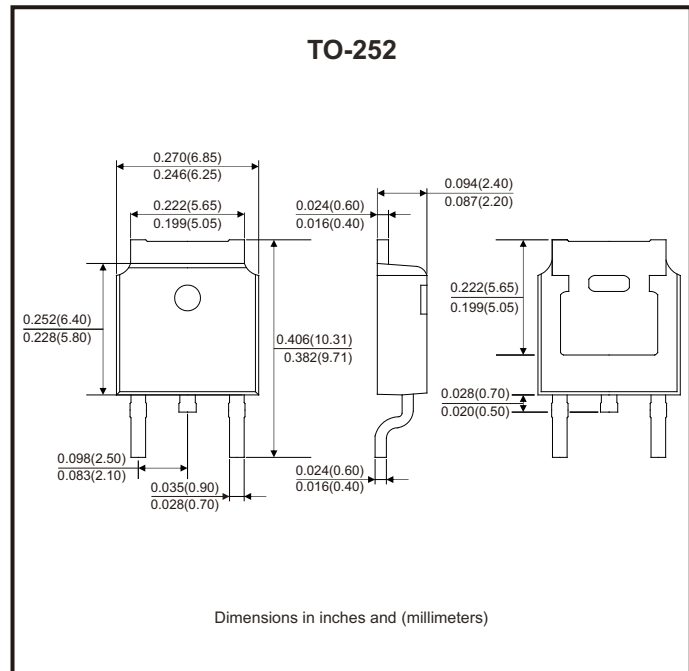
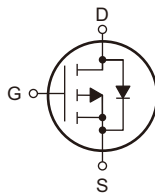
- Super low gate charge.
- Excellent C_{dv}/dt effect decline.
- Advanced high cell density technology.
- AEC-Q101 Qualified.

Mechanical data

- Case: TO-252, molded plastic.
- Molding compound: UL flammability classification rating 94V-0.
- Terminals: Matte tin-plated leads, solderability-per MIL-STD-202, method 208.

Circuit Diagram

- G : Gate
- S : Source
- D : Drain



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

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	-40	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current ($T_C=25^\circ\text{C}$)	I_D	-56	A
Continuous drain current ($T_C=100^\circ\text{C}$)	I_D	-39	
Continuous drain current ($T_A=25^\circ\text{C}$) (Note 1)	I_D	-14	
Continuous drain current ($T_A=100^\circ\text{C}$) (Note 1)	I_D	-10	
Pulsed drain current ($t_p=10\mu\text{s}$, $T_C=25^\circ\text{C}$)	I_{DM}	-224	A
Single pulse avalanche energy (Note 3)	E_{AS}	125	mJ
Power dissipation ($T_C=25^\circ\text{C}$)	P_D	75	W
Operating junction temperature range	T_J	-55 to +175	$^\circ\text{C}$
Storage temperature range	T_{STG}	-55 to +175	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
Thermal resistance junction to case	$R_{\theta JC}$		1.71	2	$^\circ\text{C}/\text{W}$
Thermal resistance junction to air (Note 1)	$R_{\theta JA}$		22	30	$^\circ\text{C}/\text{W}$

REV:A

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{DS}	V _{GS} = 0V, I _D = -250μA	-40			V
Zero gate voltage drain current	I _{DSS}	V _{DS} = -32V, V _{GS} = 0V, T _C = 25°C			-1	μA
Gate-body leakage current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V			±100	nA
On Characteristics						
Static drain-source on-resistance (Note 2)	R _{DS(on)}	V _{GS} = -10V, I _D = -15A		11.7	13	mΩ
	R _{DS(on)}	V _{GS} = -4.5V, I _D = -10A		15.8	20	mΩ
Gate threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250μA	-1	-1.47	-2.5	V
		V _{DS} = V _{GS} , I _D = -85μA	-1	-1.40	-2.5	
Gate resistance	R _G	V _{GS} = 0V, f = 1MHz		7.5		Ω
Dynamic Characteristics						
Input capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = -25V, f = 1MHz		3471		pF
Output capacitance	C _{oss}			262		
Reverse transfer capacitance	C _{rss}			237		
Switching Characteristics						
Turn-on delay time (Note 4)	t _{d(on)}	V _{DD} = -15V, V _{GS} = -10V R _G = 3.3Ω, R _L = 15Ω, I _D = -1A		40		ns
Turn-on rise time (Note 4)	t _r			35		
Turn-off delay time (Note 4)	t _{d(off)}			100		
Turn-off fall time (Note 4)	t _f			9.6		
Total gate charge	Q _g	V _{DD} = -32V, V _{GS} = -10V, I _D = -50A		67.5		nC
Gate to source charge	Q _{gs}			16		
Gate to drain (miller) charge	Q _{gd}			9		
Source-Drain Diode Characteristics						
Diode forward voltage (Note 2)	V _{SD}	I _{SD} = -1.7A, V _{GS} = 0V, T _J = 25°C		-0.71	-1.2	V
Reverse recovery time	t _{rr}	I _{SD} = -15A, V _{GS} = 0V, dI/dt = 100A/μs		58		ns
Reverse recovery charge	Q _{rr}			42		nC

Notes: 1. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.

2. The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.

3. The EAS data shows max. rating. The test condition is $V_{DD}=-25\text{V}, V_{GS}=-10\text{V}, L=0.5\text{mH}$.

4. Guaranteed by design, not subject to production.

Typical Rating and Characteristic Curves (ACMS56P04D-HF)

Fig.1 - Typical Output Characteristics

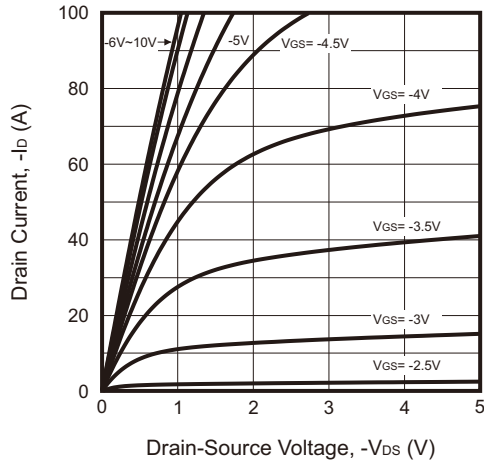


Fig.2 - On-Resistance vs. Drain Current and Gate Voltage

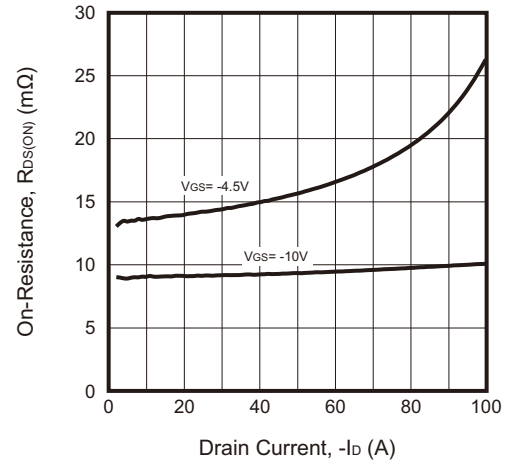


Fig.3 - On-Resistance vs. Gate-Source Voltage

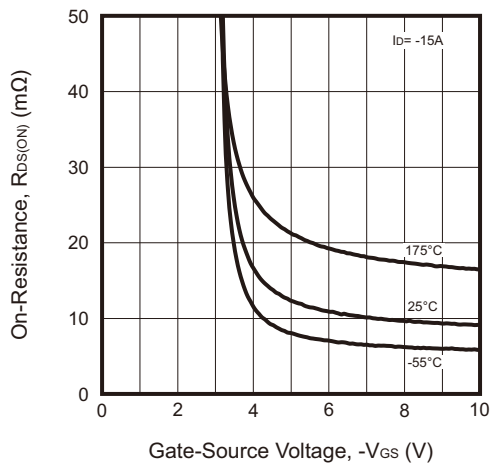


Fig.4 - Body-Diode Characteristics

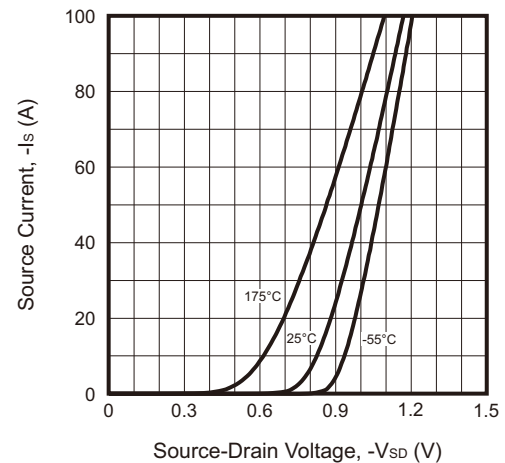


Fig.5 - Normalized On-Resistance vs. Junction Temperature

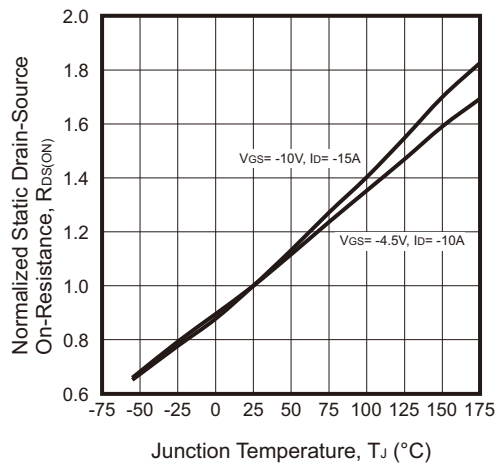
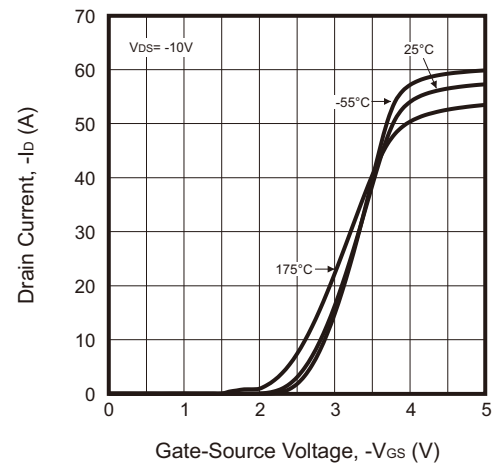


Fig.6 - Transfer Characteristics



Typical Rating and Characteristic Curves (ACMS56P04D-HF)

Fig.7 - Capacitance Characteristics

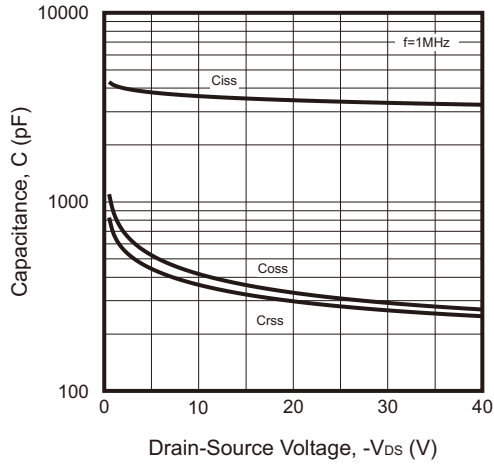


Fig.8 - Gate Charge Characteristics

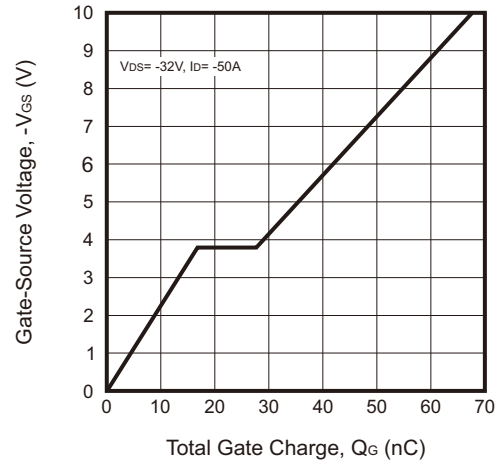


Fig.9 - Normalized Breakdown Voltage vs. Junction Temperature

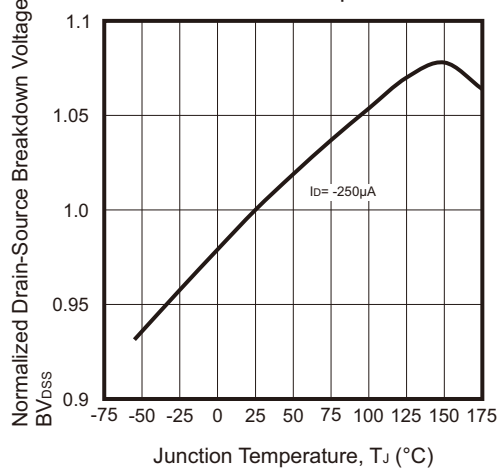


Fig.10 - Normalized $V_{GS(th)}$ vs. Junction Temperature

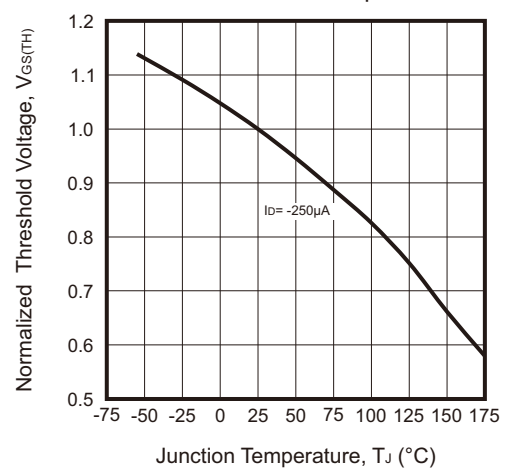
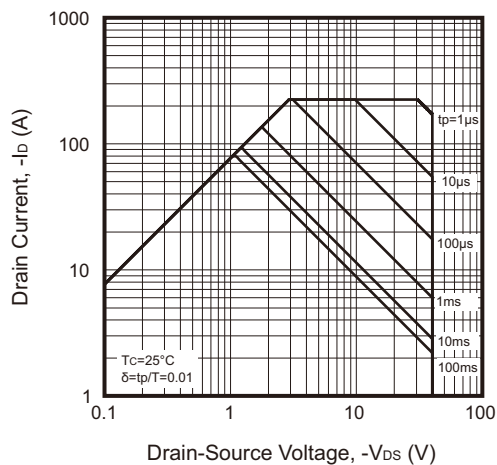
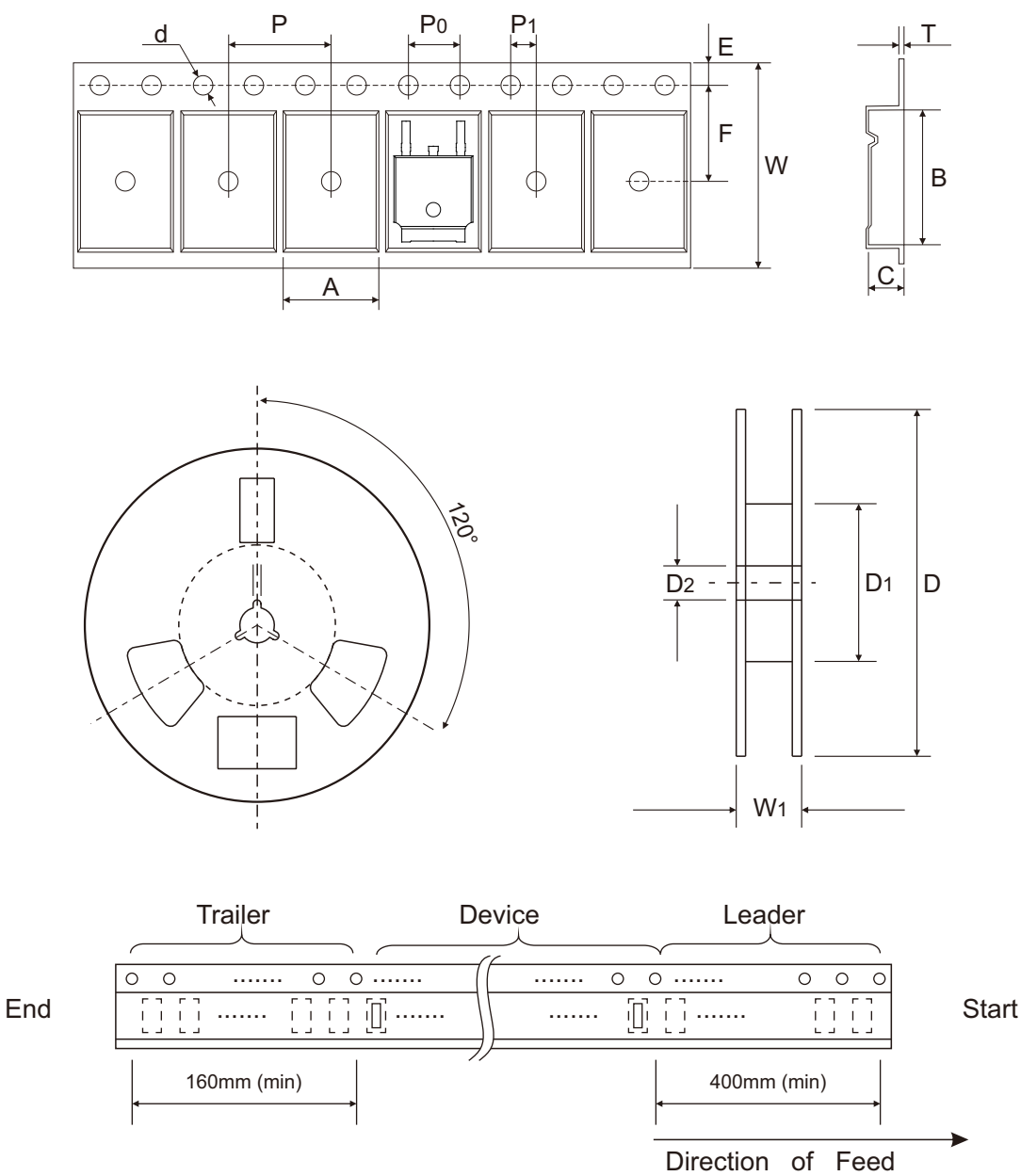


Fig.11 - Safe Operating Area



Reel Taping Specification

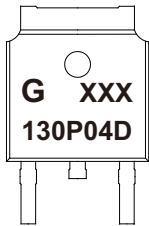


TO-252	SYMBOL	A	B	C	d	D	D1	D2
	(mm)	6.90 ± 0.10	10.50 ± 0.10	2.70 ± 0.10	1.50 ± 0.25	330 ± 1.00	100 ± 1.00	13.00 ± 0.20
	(inch)	0.272 ± 0.004	0.413 ± 0.004	0.106 ± 0.004	0.059 ± 0.010	12.992 ± 0.039	3.937 ± 0.039	0.512 ± 0.008

TO-252	SYMBOL	E	F	P	P0	P1	T	W	W1
	(mm)	1.75 ± 0.10	7.50 ± 0.10	8.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.10	0.30 ± 0.10	16.00 + 0.30 - 0.20	21.00 ± 0.30
	(inch)	0.069 ± 0.004	0.295 ± 0.004	0.315 ± 0.004	0.157 ± 0.004	0.079 ± 0.004	0.012 ± 0.004	0.630 + 0.012 - 0.008	0.827 ± 0.012

Marking Code

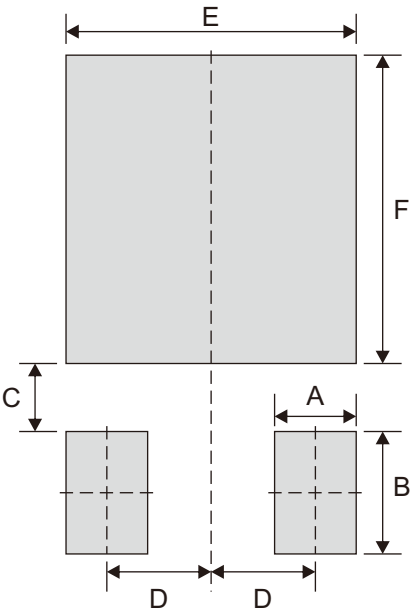
Part Number	Marking Code
ACMS56P04D-HF	130P04D



XXX = Control code

Suggested P.C.B. PAD Layout

SIZE	TO-252	
	(mm)	(inch)
A	1.80	0.071
B	2.70	0.106
C	1.50	0.059
D	2.30	0.091
E	6.40	0.252
F	6.80	0.268



Standard Packaging

Case Type	REEL PACK	
	REEL (pcs)	Reel Size (inch)
TO-252	2,500	13