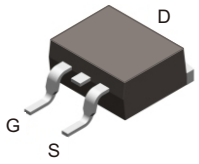
ACMS78P06D2-HF

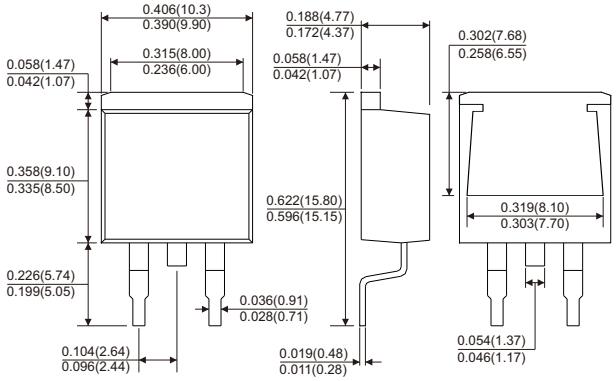
P-Channel
RoHS Device
Halogen Free



Features

- High density cell design for ultralow $R_{DS(ON)}$.
- Fully characterized avalanche voltage and current.
- Good stability and uniformity with high E_{AS}.
- Excellent package for good heat dissipation.
- JESD22-A114-B ESD rating of class 1C per human body model.
- AEC-Q101 Qualified.

TO-263



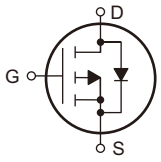
Dimensions in inches and (millimeters)

Mechanical data

- Case: TO-263, molded plastic.
- Terminals: Matte tin-plated leads, solderability per MIL-STD-202, method 208.
- Mounting position: Any.

Circuit Diagram

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



Maximum Ratings (at T_C=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	-60	V
Gate-source voltage	V_{GS}	±20	V
Continuous drain current (T_C=25°C)	I_D	-78	A
Continuous drain current (T_C=100°C)	I_D	-55	
Continuous drain current (T_A=25°C) (Note 1)	I_D	-13	
Continuous drain current (T_A=100°C) (Note 1)	I_D	-9	
Pulsed drain current (tp=10μs, T_C=25°C)	I_{DM}	-312	A
Single pulse avalanche energy (Note 3)	E_{AS}	240	mJ
Power dissipation (T_C=25°C)	P_D	187	W
Operating junction temperature range	T_J	-55 to +175	°C
Storage temperature range	T_{STG}	-55 to +175	°C

Thermal Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
Thermal resistance junction to case	$R_{\theta JC}$		0.6	0.8	°C/W
Thermal resistance junction to air (Note 1)	$R_{\theta JA}$		16	30	°C/W

Electrical Characteristics (at T_C=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	BV_{DSS}	V_{GS} = 0V, I_D = -250μA	-60			V
Zero gate voltage drain current	I_{DSS}	V_{DS} = -60V, V_{GS} = 0V			-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 = -20A		11	15	mΩ
	$R_{DS(on)}$	V_{GS} = -4.5V, I_D = -20A		13	18	mΩ
Gate threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250μA	-1	-1.7	-2.5	V
Gate resistance	R_G	V_{GS} = 0V, f = 1MHz		3.2		Ω
Dynamic Characteristics						
Forward transconductance	g_{fs}	V_{DS} = -5V, I_D = -20A		65		S
Input capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = -30V, f = 1MHz		5007		pF
Output capacitance	C_{oss}			337		
Reverse transfer capacitance	C_{rss}			246		
Switching Characteristics						
Turn-on delay time (Note 4)	$t_{d(on)}$	V_{DD} = -30V, V_{GS} = -10V, R_G = 3Ω R_L = 1.5Ω		18		ns
Turn-on rise time (Note 4)	t_r			20		
Turn-off delay time (Note 4)	$t_{d(off)}$			55		
Turn-off fall time (Note 4)	t_f			35		
Total gate charge	Q_g	V_{DD} = -30V, V_{GS} = -10V, I_D = -20A		93		nC
Gate to source charge	Q_{gs}			15.7		
Gate to drain (miller) charge	Q_{gd}			15.8		
Source-Drain Diode Characteristics						
Diode forward voltage (Note 2)	V_{SD}	I_{SD} = -20A, V_{GS} = 0V, T_J = 25°C		-0.8	-1.2	V
Reverse recovery time	t_{rr}	I_F = -20A, V_{GS} = 0V, d_{IF}/d_t = 100A/μs		40		ns
Reverse recovery change	Q_{rr}			35		nC

Notes: 1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.

2. The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%.

3. The E_{AS} data shows max. rating. The test condition is V_{DD}= -30V, V_{GS}= -10V, L=0.5mH.

4. Guaranteed by design, not subject to production.

Typical Rating and Characteristic Curves (ACMS78P06D2-HF)

Fig.1 - Power Dissipation

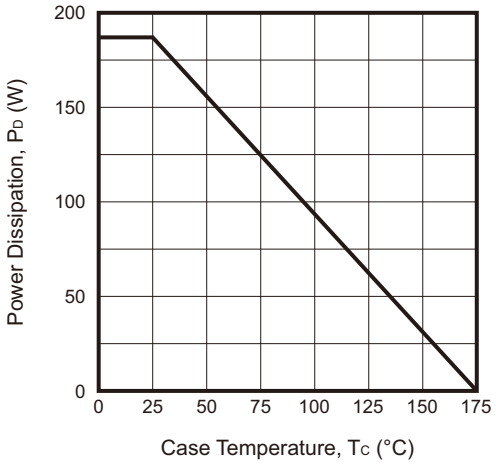


Fig.2 - Drain Current

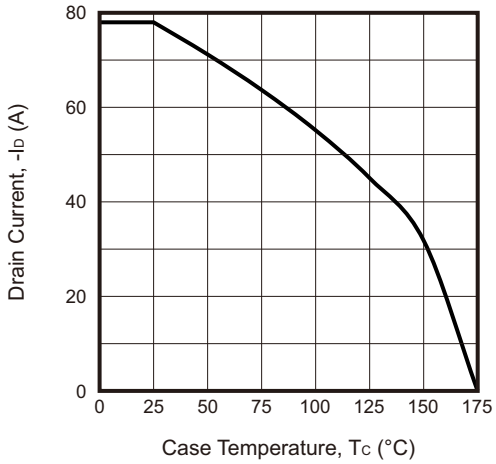


Fig.3 - Typical Output Characteristics

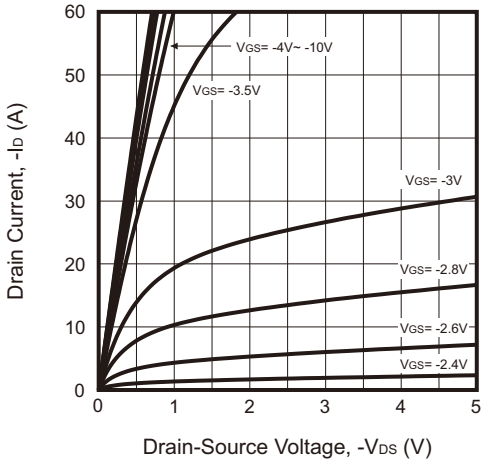


Fig.4 - On-Resistance vs. Drain Current and Gate Voltage

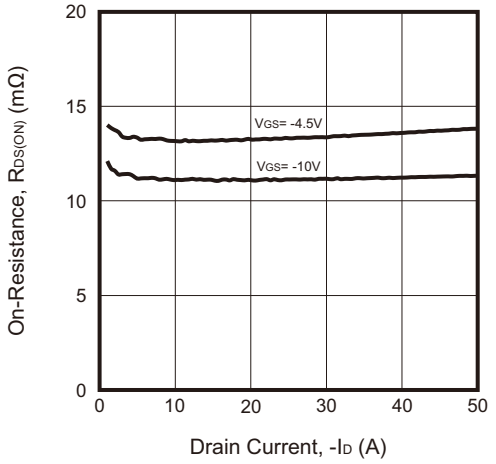


Fig.5 - On-Resistance vs. Gate-Source Voltage

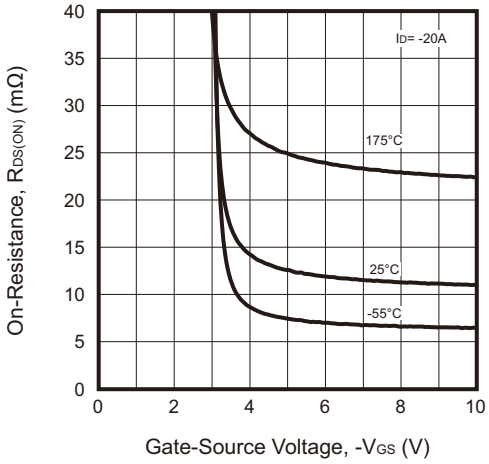
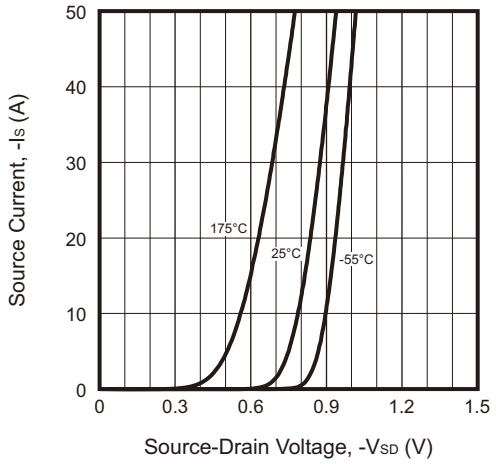


Fig.6 - Body-Diode Characteristics



Typical Rating and Characteristic Curves (ACMS78P06D2-HF)

Fig.7 - Normalized On-Resistance vs. Junction Temperature

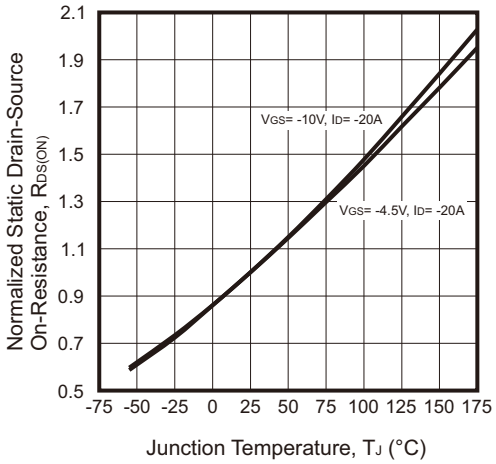


Fig.8 - Transfer Characteristics

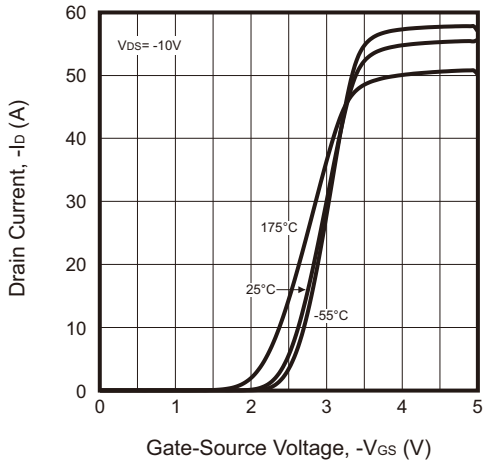


Fig.9 - Capacitance Characteristics

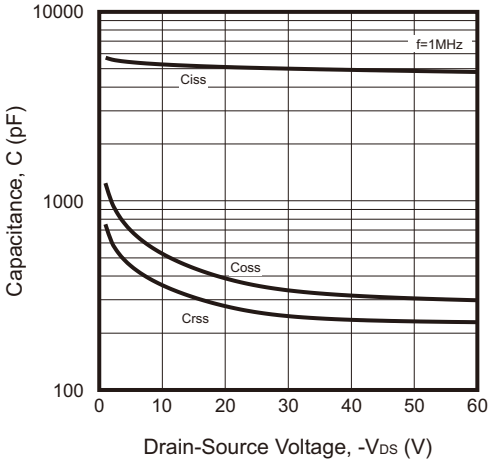


Fig.10 - Gate Charge Characteristics

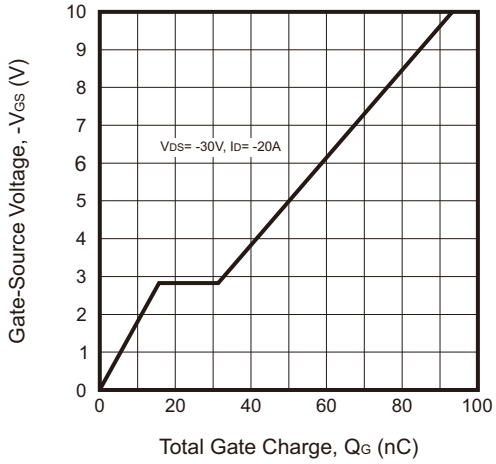


Fig.11 - Normalized Breakdown Voltage vs. Junction Temperature

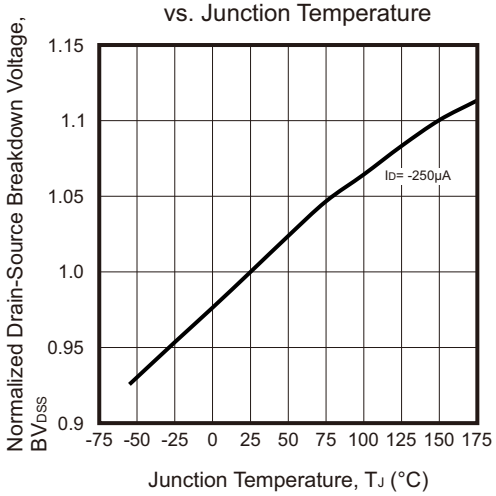
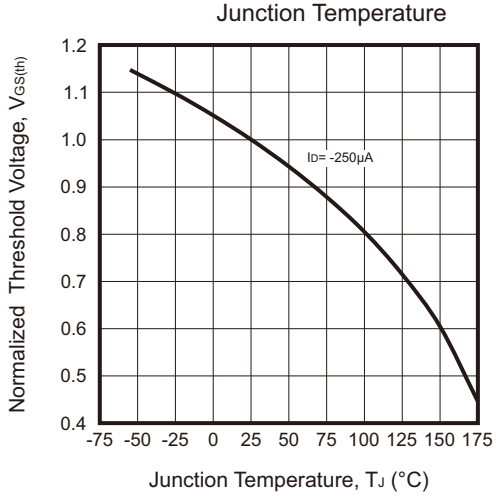
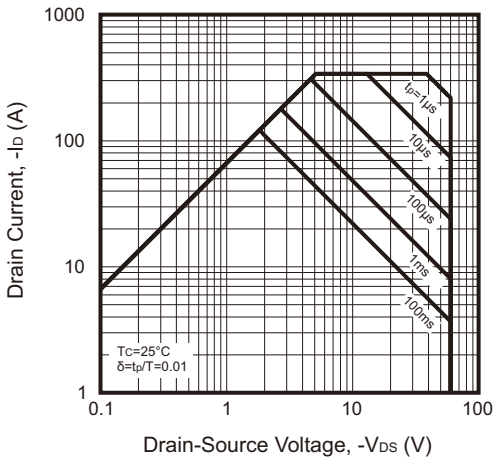


Fig.12 - Normalized $V_{GS(th)}$ vs. Junction Temperature

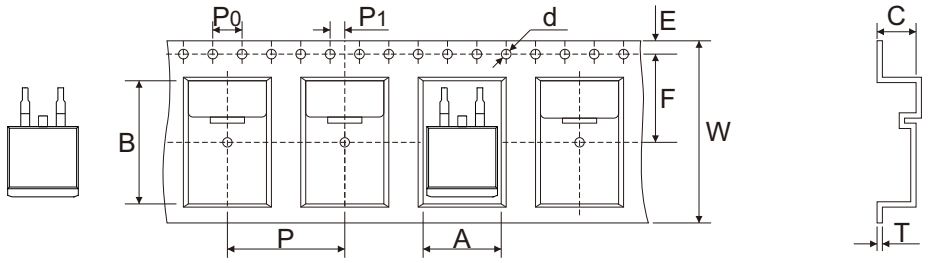


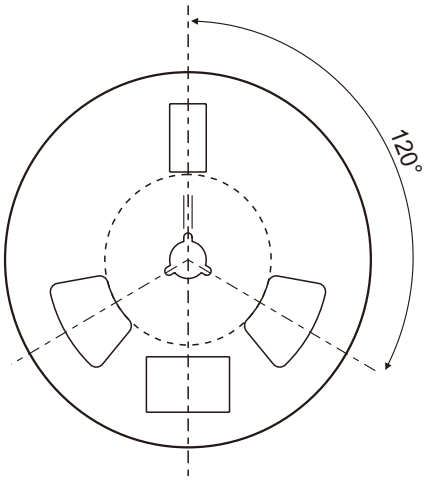
Typical Rating and Characteristic Curves (ACMS78P06D2-HF)

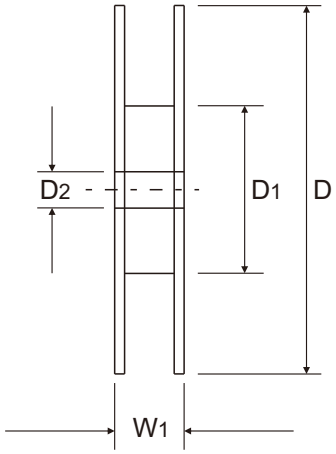
Fig.13 - Safe Operation Area

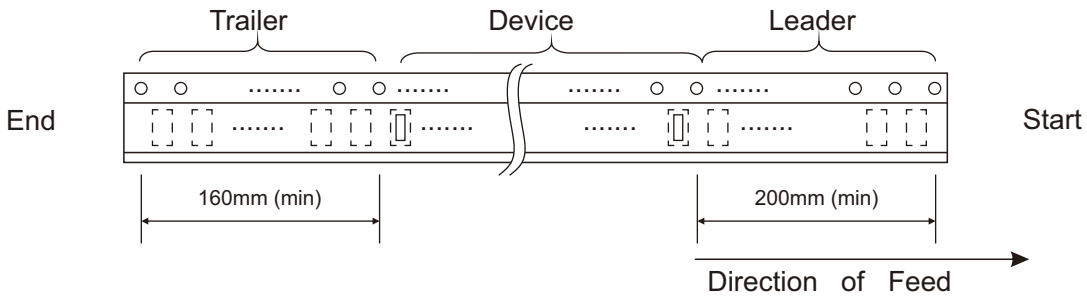


Reel Taping Specification







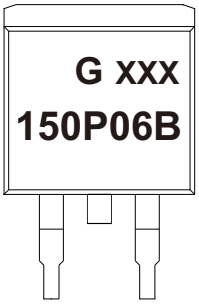


	SYMBOL	A	B	C	d	D	D1	D2
TO-263	(mm)	10.80 ± 0.10	16.13 ± 0.10	5.21 ± 0.10	1.55 ± 0.05	330.00 ± 0.20	100.00 ± 0.20	13.00 ± 0.20
	(inch)	0.425 ± 0.004	0.635 ± 0.004	0.205 ± 0.004	0.061 ± 0.002	12.992 ± 0.008	3.937 ± 0.008	0.512 ± 0.008

	SYMBOL	E	F	P	P0	P1	T	W	W1
TO-263	(mm)	1.75 ± 0.10	11.50 ± 0.10	16.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.10	0.35 ± 0.03	24.00 + 0.30 − 0.10	24.00 ± 0.20
	(inch)	0.069 ± 0.004	0.453 ± 0.004	0.630 ± 0.004	0.157 ± 0.004	0.079 ± 0.004	0.014 ± 0.001	0.945 + 0.012 − 0.004	0.945 ± 0.008

Marking Code

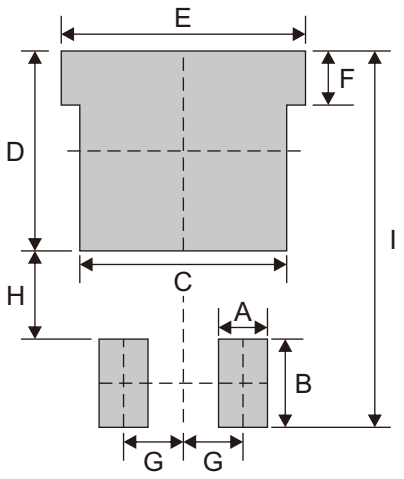
Part Number	Marking Code
ACMS78P06D2-HF	150P06B



XXX = Control code

Suggested P.C.B. PAD Layout

SIZE	TO-263	
	(mm)	(inch)
A	2.08	0.110
B	3.50	0.138
C	8.80	0.346
D	9.00	0.354
E	10.4	0.409
F	2.30	0.091
G	2.54	0.100
H	4.00	0.157
I	16.5	0.650



Standard Packaging

Case Type	REEL PACK	
	REEL (pcs)	Reel Size (inch)
TO-263	800	13