

FME6G30US60

Econo Type Module

General Description

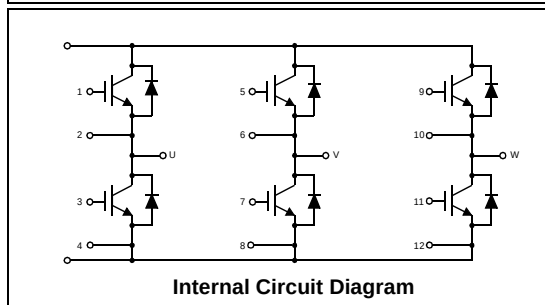
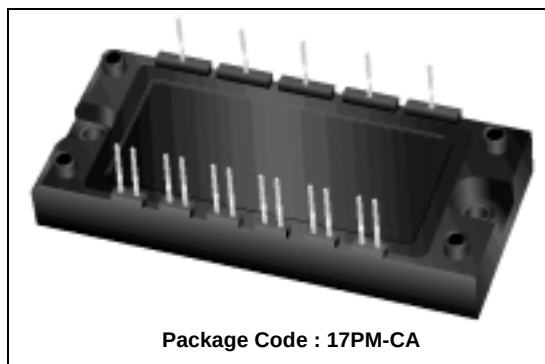
Fairchild IGBT Power Module provides low conduction and switching losses as well as short circuit ruggedness. It's designed for the applications such as motor control, UPS and general inverters where short-circuit ruggedness is required.

Features

- Short Circuit rated 10us @ $T_C = 100^\circ\text{C}$, $V_{GE} = 15\text{V}$
- High Speed Switching
- Low Saturation Voltage : $V_{CE(sat)} = 2.2\text{ V @ } I_C = 30\text{A}$
- High Input Impedance
- Fast & Soft Anti-Parallel FWD

Application

- AC & DC Motor Controls
- General Purpose Inverters
- Robotics
- Servo Controls
- UPS



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

Symbol	Description	FME6G30US60	Units
V_{CES}	Collector-Emitter Voltage	600	V
V_{GES}	Gate-Emitter Voltage	± 20	V
I_C	Collector Current @ $T_C = 25^\circ\text{C}$	30	A
$I_{CM(1)}$	Pulsed Collector Current	60	A
I_F	Diode Continuous Forward Current @ $T_C = 100^\circ\text{C}$	30	A
I_{FM}	Diode Maximum Forward Current	60	A
T_{SC}	Short Circuit Withstand Time @ $T_C = 100^\circ\text{C}$	10	us
P_D	Maximum Power Dissipation @ $T_C = 25^\circ\text{C}$	83	W
T_J	Operating Junction Temperature	-40 to +150	$^\circ\text{C}$
T_{stg}	Storage Temperature Range	-40 to +125	$^\circ\text{C}$
V_{iso}	Isolation Voltage @ AC 1minute	2500	V
Mounting Torque	Mounting Screw : M5	2.0	N.m

Notes :

(1) Repetitive rating : Pulse width limited by max. junction temperature

Electrical Characteristics of IGBT $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units	
Off Characteristics							
BV_{CES}	Collector-Emitter Breakdown Voltage	$V_{GE} = 0V, I_C = 250\mu A$	600	--	--	V	
$\Delta B_{V_{CES}} / \Delta T_J$	Temperature Coeff. of Breakdown Voltage	$V_{GE} = 0V, I_C = 1mA$	--	0.6	--	V/°C	
I_{CES}	Collector Cut-Off Current	$V_{CE} = V_{CES}, V_{GE} = 0V$	--	--	250	uA	
I_{GES}	G-E Leakage Current	$V_{GE} = V_{GES}, V_{CE} = 0V$	--	--	± 100	nA	
On Characteristics							
$V_{GE(th)}$	G-E Threshold Voltage	$I_C = 30mA, V_{CE} = V_{GE}$	5.0	6.0	8.5	V	
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	$I_C = 30A, V_{GE} = 15V$	--	2.2	2.8	V	
Dynamic Characteristics							
C_{ies}	Input Capacitance	$V_{CE} = 30V, V_{GE} = 0V, f = 1MHz$	--	1970	--	pF	
C_{oes}	Output Capacitance		--	310	--	pF	
C_{res}	Reverse Transfer Capacitance		--	74	--	pF	
Switching Characteristics							
$t_{d(on)}$	Turn-On Delay Time	$V_{CC} = 300V, I_C = 30A, R_G = 7\Omega, V_{GE} = 15V, \text{Inductive Load}, T_C = 25^\circ C$	--	30	--	ns	
t_r	Rise Time		--	65	--	ns	
$t_{d(off)}$	Turn-Off Delay Time		--	54	80	ns	
t_f	Fall Time		--	138	200	ns	
E_{on}	Turn-On Switching Loss		--	0.92	--	mJ	
E_{off}	Turn-Off Switching Loss		--	0.81	--	mJ	
E_{ts}	Total Switching Loss		--	1.73	2.43	mJ	
$t_{d(on)}$	Turn-On Delay Time	$V_{CC} = 300V, I_C = 30A, R_G = 7\Omega, V_{GE} = 15V, \text{Inductive Load}, T_C = 125^\circ C$	--	34	--	ns	
t_r	Rise Time		--	67	--	ns	
$t_{d(off)}$	Turn-Off Delay Time		--	60	90	ns	
t_f	Fall Time		--	281	400	ns	
E_{on}	Turn-On Switching Loss		--	0.92	--	mJ	
E_{off}	Turn-Off Switching Loss		--	1.56	--	mJ	
E_{ts}	Total Switching Loss		--	2.48	3.47	mJ	
T_{sc}	Short Circuit Withstand Time		$V_{CC} = 300V, V_{GE} = 15V @ T_C = 100^\circ C$	10	--	--	us
Q_g	Total Gate Charge		$V_{CE} = 300V, I_C = 30A, V_{GE} = 15V$	--	85	120	nC
Q_{ge}	Gate-Emitter Charge	--		17	25	nC	
Q_{gc}	Gate-Collector Charge	--		39	55	nC	

Electrical Characteristics of DIODE $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Units
V _{FM}	Diode Forward Voltage	I _F = 30A	T _C = 25°C	--	2.0	2.8	V
			T _C = 100°C	--	2.0	--	
t _{rr}	Diode Reverse Recovery Time	I _F = 30A di / dt = 60 A/us	T _C = 25°C	--	90	180	ns
			T _C = 100°C	--	130	--	
I _{rr}	Diode Peak Reverse Recovery Current		T _C = 25°C	--	2.2	3.4	A
			T _C = 100°C	--	3.4	--	
Q _{rr}	Diode Reverse Recovery Charge		T _C = 25°C	--	400	600	nC
			T _C = 100°C	--	880	--	

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case (IGBT Part, per 1/6 Module)	--	1.5	$^\circ\text{C/W}$
$R_{\theta JC}$	Junction-to-Case (DIODE Part, per 1/6 Module)	--	2.4	$^\circ\text{C/W}$
Weight	Weight of Module	--	180	g

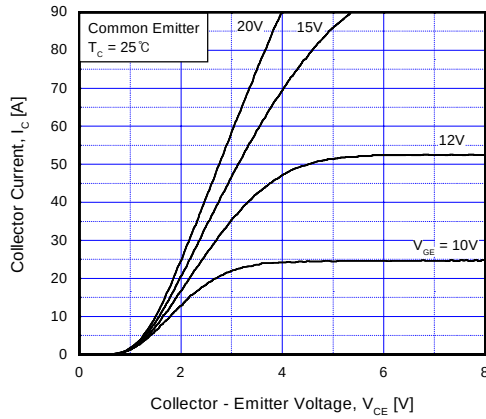


Fig 1. Typical Output Characteristics

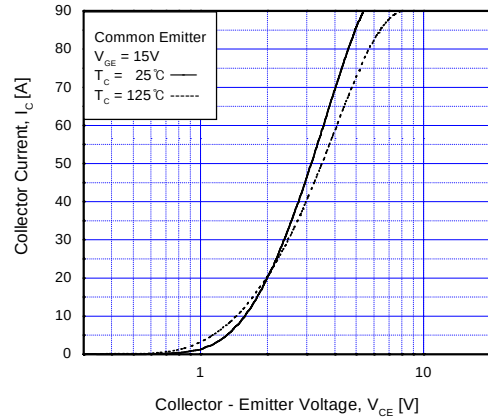


Fig 2. Typical Saturation Voltage Characteristics

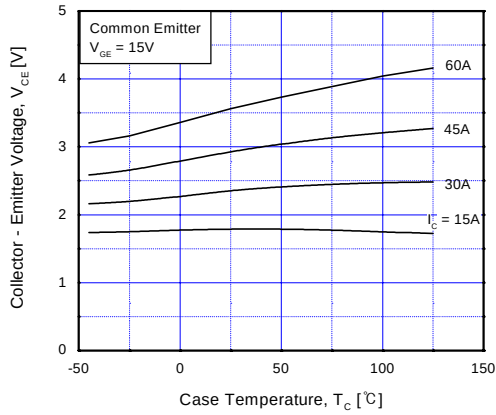


Fig 3. Saturation Voltage vs. Case Temperature at Variant Current Level

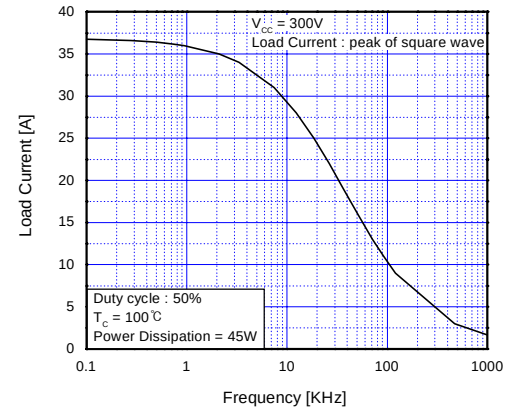


Fig 4. Load Current vs. Frequency

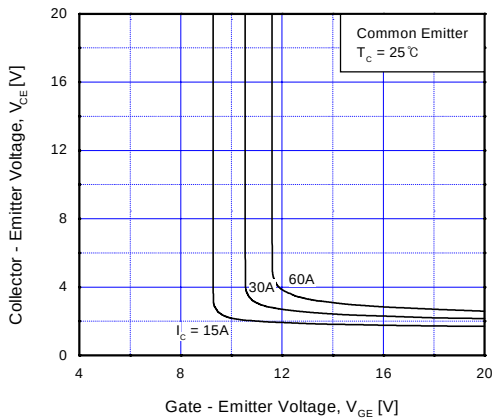


Fig 5. Saturation Voltage vs. V_{GE}

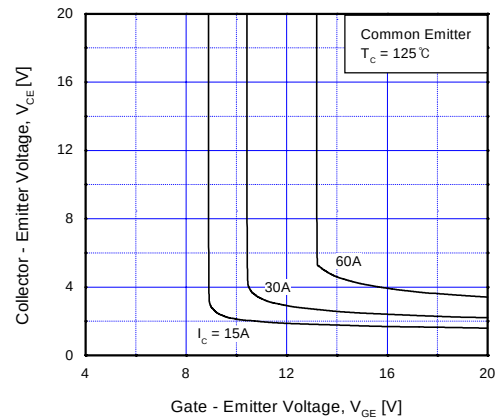


Fig 6. Saturation Voltage vs. V_{GE}

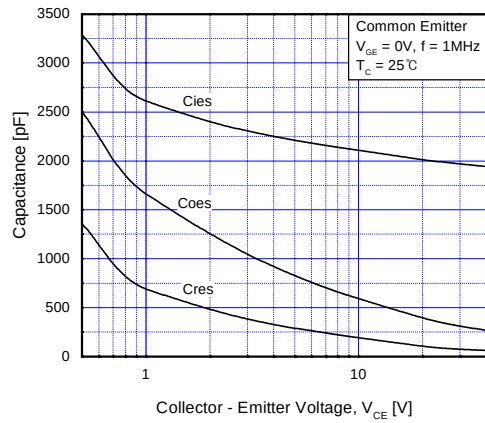


Fig 7. Capacitance Characteristics

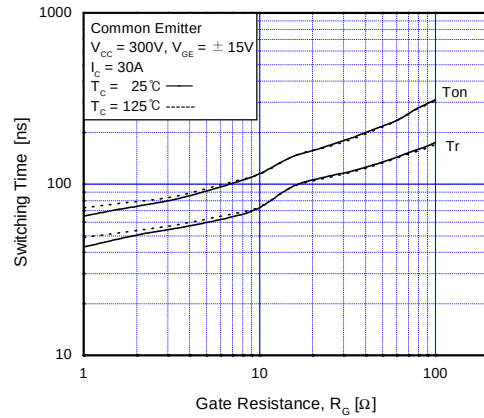


Fig 8. Turn-On Characteristics vs. Gate Resistance

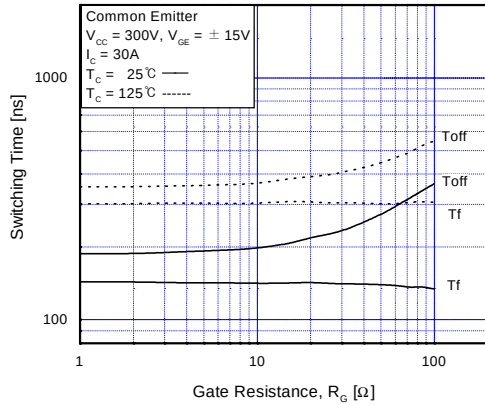


Fig 9. Turn-Off Characteristics vs. Gate Resistance

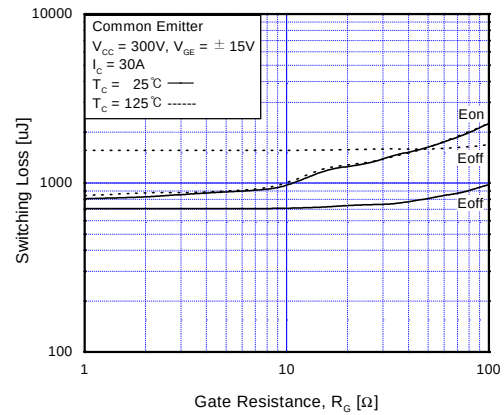


Fig 10. Switching Loss vs. Gate Resistance

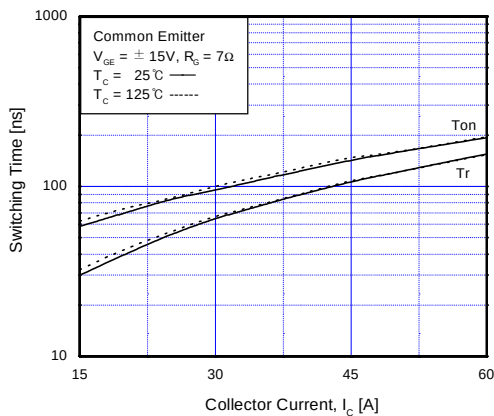


Fig 11. Turn-On Characteristics vs. Collector Current

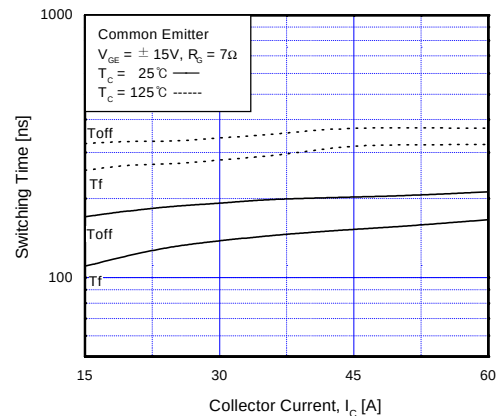


Fig 12. Turn-Off Characteristics vs. Collector Current

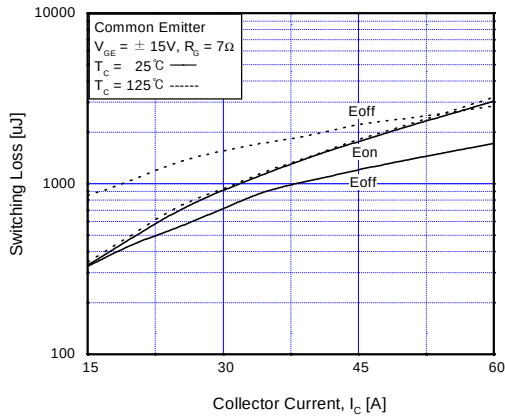


Fig 13. Switching Loss vs. Collector Current

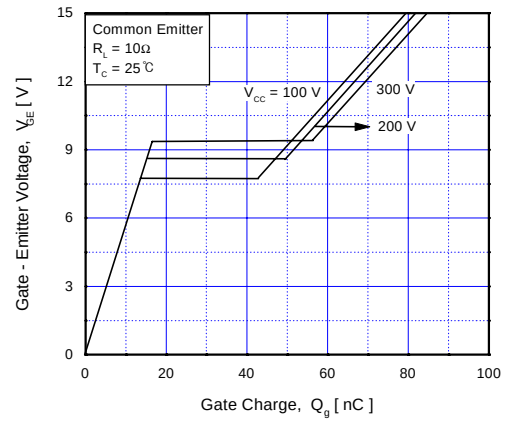


Fig 14. Gate Charge Characteristics

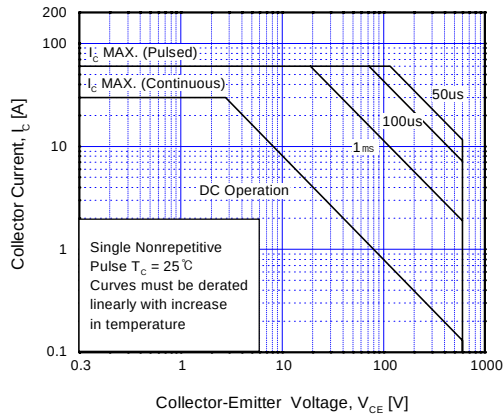


Fig 15. SOA Characteristics

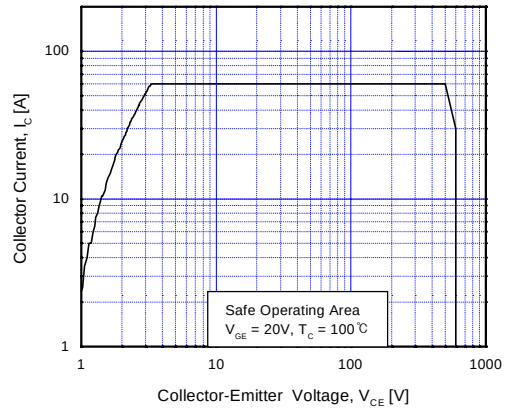


Fig 16. Turn-Off SOA Characteristics

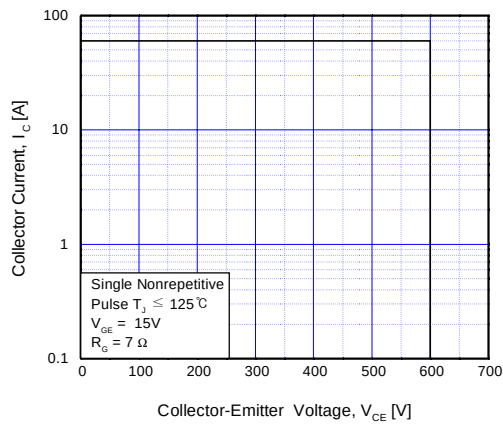


Fig 17. RBSOA Characteristics

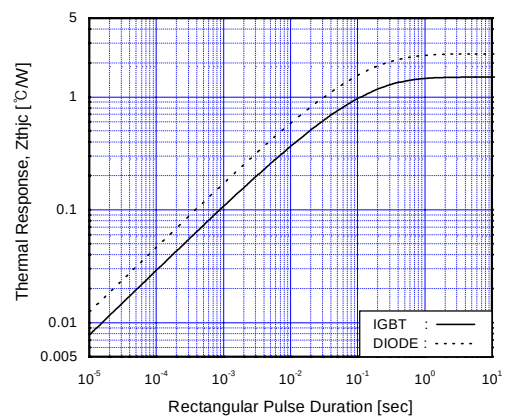


Fig 18. Transient Thermal Impedance

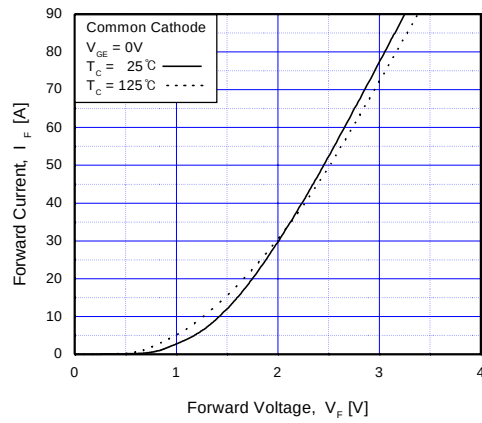


Fig 19. Forward Characteristics

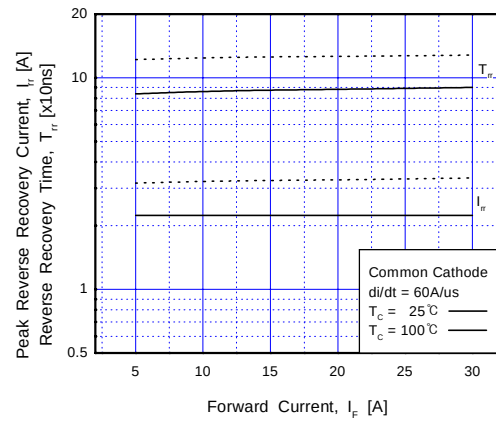
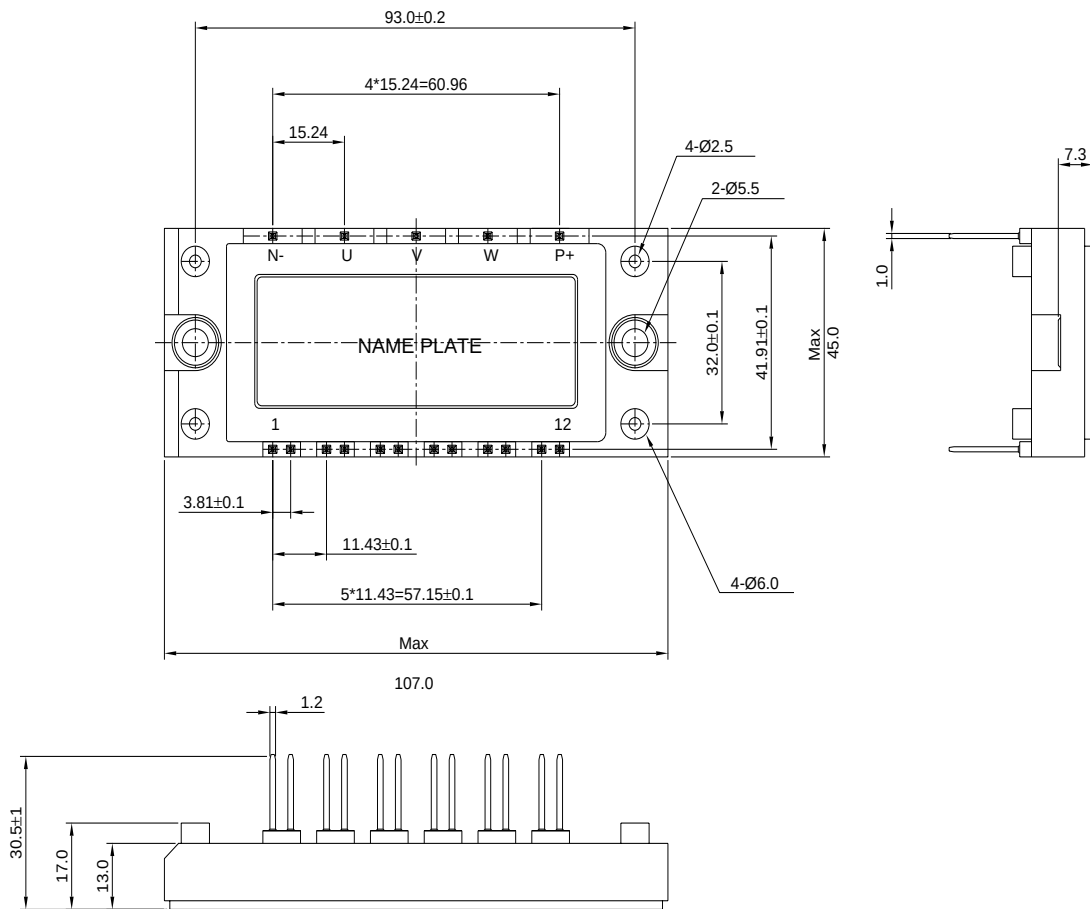


Fig 20. Reverse Recovery Characteristics

Package Dimension

17PM-CA (FS PKG CODE BH)



Dimensions in Millimeters

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