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With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

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Ultra Fast NPT - IGBT®

The Ultra Fast NPT - IGBT® is a new generation of high voltage power IGBTs. Using Non-Punch-Through Technology, the Ultra Fast NPT-IGBT® offers superior ruggedness and ultrafast switching speed.



Features

- Low Saturation Voltage
- Low Tail Current
- RoHS Compliant 
- Short Circuit Withstand Rated
- High Frequency Switching
- Ultra Low Leakage Current

Unless stated otherwise, Microsemi discrete IGBTs contain a single IGBT die. This device is recommended for applications such as induction heating (IH), motor control, general purpose inverters and uninterruptible power supplies (UPS).



MAXIMUM RATINGS

All Ratings: $T_C = 25^\circ\text{C}$ unless otherwise specified.

Symbol	Parameter	Ratings	Unit
V_{ces}	Collector Emitter Voltage	1200	V
V_{GE}	Gate-Emitter Voltage	± 30	
I_{C1}	Continuous Collector Current @ $T_C = 25^\circ\text{C}$	112	A
I_{C2}	Continuous Collector Current @ $T_C = 86^\circ\text{C}$	70	
I_{CM}	Pulsed Collector Current ^①	280	
SCWT	Short Circuit Withstand Time: $V_{CE} = 600V, V_{GE} = 15V, T_C = 125^\circ\text{C}$	10	μs
P_D	Total Power Dissipation @ $T_C = 25^\circ\text{C}$	543	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to 150	

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Min	Typ	Max	Unit
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage ($V_{GE} = 0V, I_C = 1.0mA$)	1200			Volts
$V_{GE(TH)}$	Gate Threshold Voltage ($V_{CE} = V_{GE}, I_C = 2.5mA, T_J = 25^\circ\text{C}$)	3.5	5.0	6.5	
$V_{CE(ON)}$	Collector-Emitter On Voltage ($V_{GE} = 15V, I_C = 70A, T_J = 25^\circ\text{C}$)		2.5	3.2	
	Collector-Emitter On Voltage ($V_{GE} = 15V, I_C = 70A, T_J = 125^\circ\text{C}$)		3.3		
	Collector-Emitter On Voltage ($V_{GE} = 15V, I_C = 140A, T_J = 25^\circ\text{C}$)		3.5		
I_{CES}	Collector Cut-off Current ($V_{CE} = 1200V, V_{GE} = 0V, T_J = 25^\circ\text{C}$) ^②		10	1000	μA
	Collector Cut-off Current ($V_{CE} = 1200V, V_{GE} = 0V, T_J = 125^\circ\text{C}$) ^②		100		
I_{GES}	Gate-Emitter Leakage Current ($V_{GE} = \pm 20V$)			± 250	nA



CAUTION: These Devices are Sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

DYNAMIC CHARACTERISTICS

APT70GR120J

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	Capacitance $V_{GE} = 0V, V_{CE} = 25V$ $f = 1MHz$		7260		pF
C_{oes}	Output Capacitance			643		
C_{res}	Reverse Transfer Capacitance			199		
V_{GEP}	Gate to Emitter Plateau Voltage	Gate Charge $V_{GE} = 15V$ $V_{CE} = 600V$ $I_C = 70A$		7.5		V
$Q_g^{(3)}$	Total Gate Charge			412	544	
Q_{ge}	Gate-Emitter Charge			48	62	
Q_{gc}	Gate- Collector Charge			204	275	
$t_{d(on)}$	Turn-On Delay Time	Inductive Switching (25°C) $V_{CC} = 600V$ $V_{GE} = 15V$ $I_C = 70A$ $R_G = 4.3 \Omega^{(4)}$ $T_J = +25^\circ C$		33		ns
t_r	Current Rise Time			48		
$t_{d(off)}$	Turn-Off Delay Time			278		
t_f	Current Fall Time			64		
$E_{on2}^{(5)}$	Turn-On Switching Energy			3816	5720	μJ
$E_{off}^{(6)}$	Turn-Off Switching Energy			2582	3870	
$t_{d(on)}$	Turn-On Delay Time	Inductive Switching (125°C) $V_{CC} = 600V$ $V_{GE} = 15V$ $I_C = 70A$ $R_G = 4.3 \Omega^{(4)}$ $T_J = +125^\circ C$		33		ns
t_r	Current Rise Time			48		
$t_{d(off)}$	Turn-Off Delay Time			320		
t_f	Current Fall Time			74		
$E_{on2}^{(5)}$	Turn-On Switching Energy			5651	8475	μJ
$E_{off}^{(6)}$	Turn-Off Switching Energy			3323	4980	

THERMAL AND MECHANICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	Min	Typ	Max	Unit
$R_{\theta JC}$	Junction to Case	-	-	0.23	$^\circ C/W$
W_T	Package Weight	-	1.03	-	oz
Torque	Terminals and Mounting Screws.	-	-	10	in·lbf
		-	-	1.1	N·m
$V_{Isolation}$	RMS Voltage (50-60Hz Sinusoidal Waveform from Terminals to Mounting Base for 1 Min.)	2500	-	-	Volts

- 1 Repetitive Rating: Pulse width and case temperature limited by maximum junction temperature.
 - 2 Pulse test: Pulse Width < 380 μs , duty cycle < 2%.
 - 3 See Mil-Std-750 Method 3471.
 - 4 R_G is external gate resistance, not including internal gate resistance or gate driver impedance. (MIC4452)
 - 5 E_{on2} is the clamped inductive turn on energy that includes a commutating diode reverse recovery current in the IGBT turn on energy loss. A combi device is used for the clamping diode.
 - 6 E_{off} is the clamped inductive turn-off energy measured in accordance with JEDEC standard JESD24-1.
- Microsemi reserves the right to change, without notice, the specifications and information contained herein.

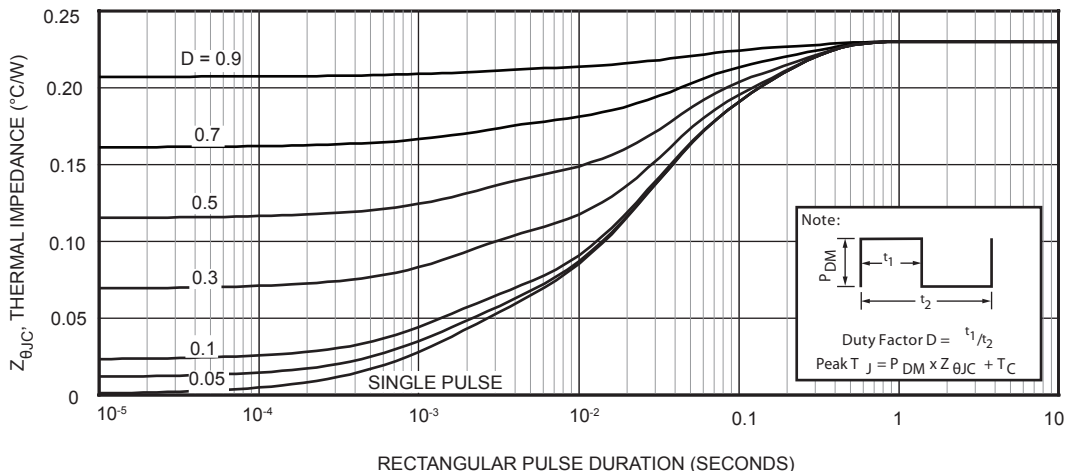


Figure 1, Maximum Effective Transient Thermal Impedance, Junction-To-Case vs Pulse Duration

TYPICAL PERFORMANCE CURVES

APT70GR120J

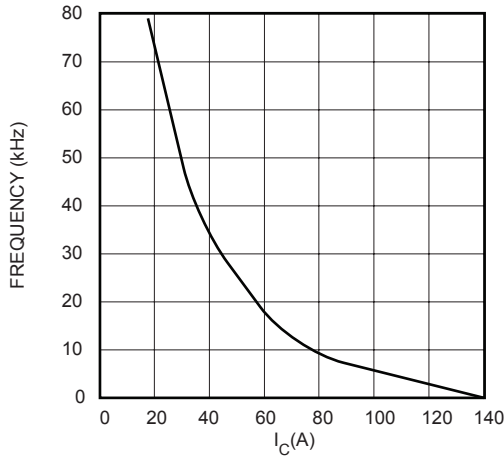


FIGURE 2, Max Frequency vs Current ($T_{case} = 75^{\circ}C$)

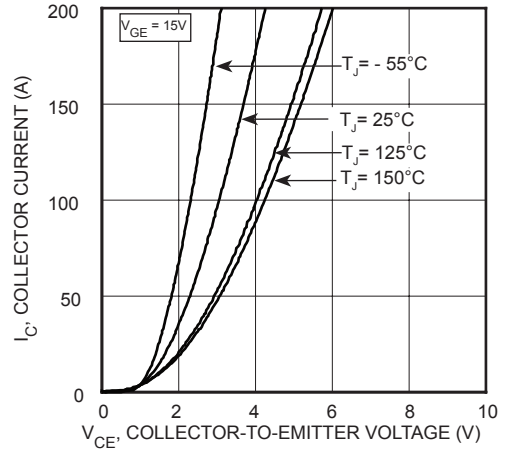


FIGURE 3, Saturation Voltage Characteristics ($T_J = 25^{\circ}C$)

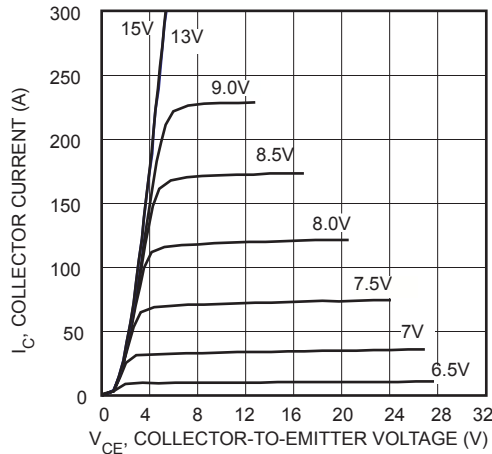


FIGURE 4, Output Characteristics ($T_J = 25^{\circ}C$)

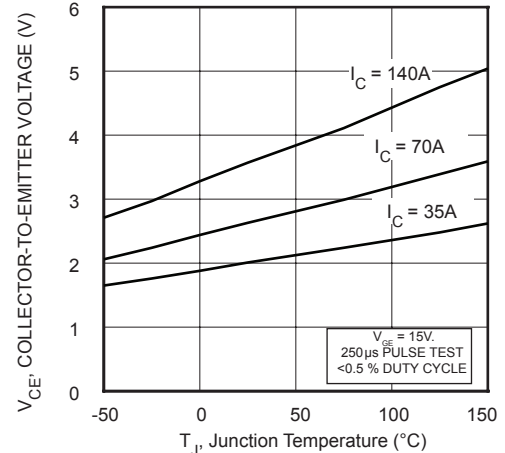


FIGURE 5, On State Voltage vs Junction Temperature

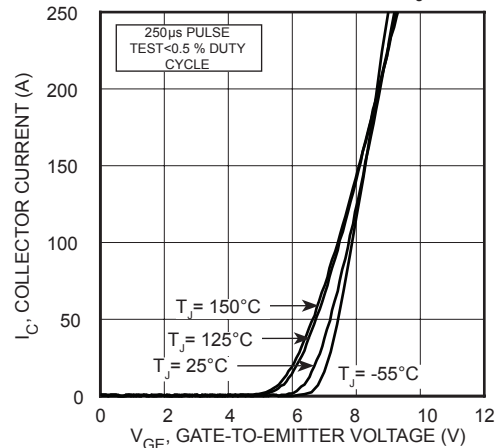


FIGURE 6, Transfer Characteristics

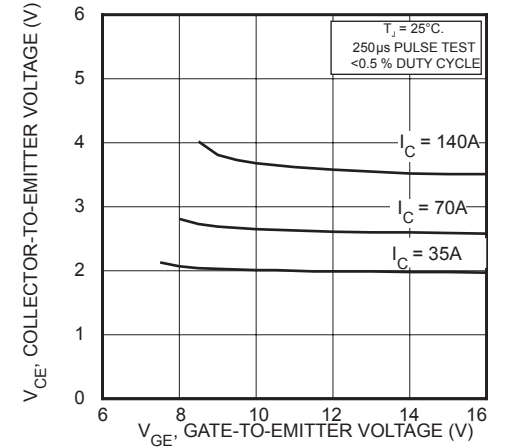


FIGURE 7, On State Voltage vs Gate-to-Emitter Voltage

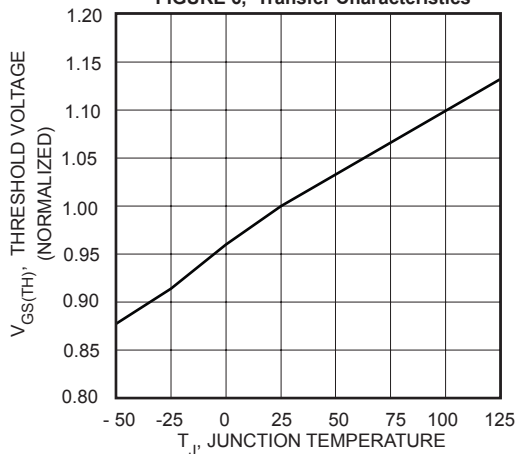


FIGURE 8, Threshold Voltage vs Junction Temperature

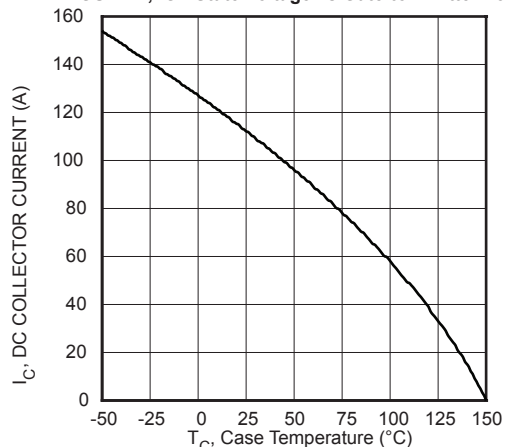


FIGURE 9, DC Collector Current vs Case Temperature

TYPICAL PERFORMANCE CURVES

APT70GR120J

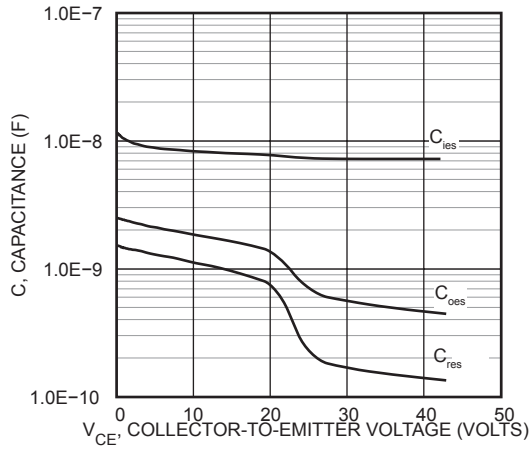


FIGURE 10, Capacitance vs Collector-To-Emitter Voltage

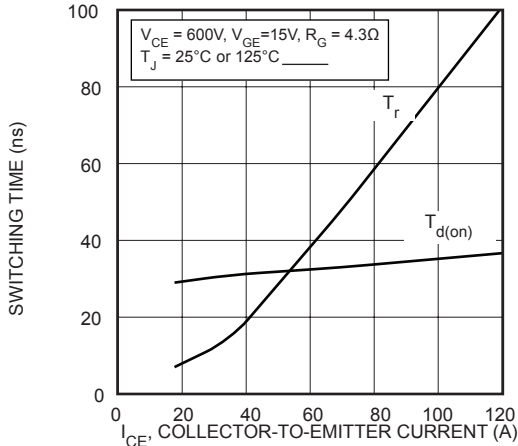


FIGURE 12, Turn-On Time vs Collector Current

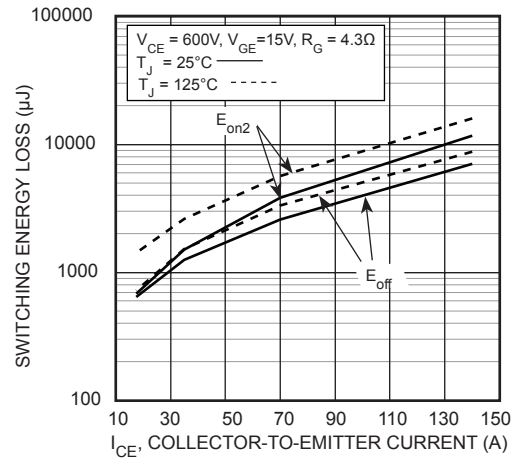


FIGURE 14, Energy Loss vs Collector Current

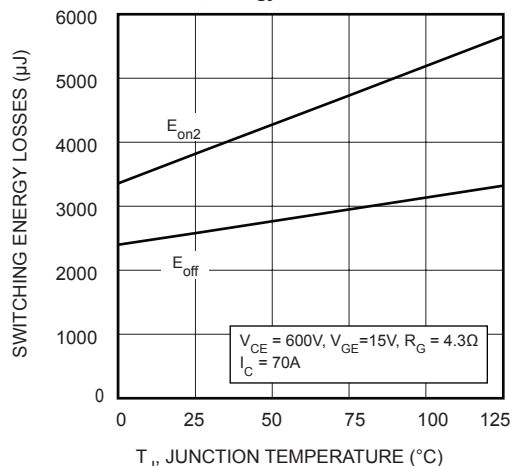


FIGURE 16, Switching Energy vs Junction Temperature

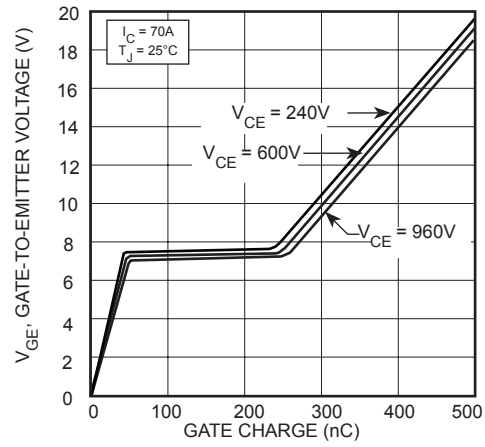


FIGURE 11, Gate charge

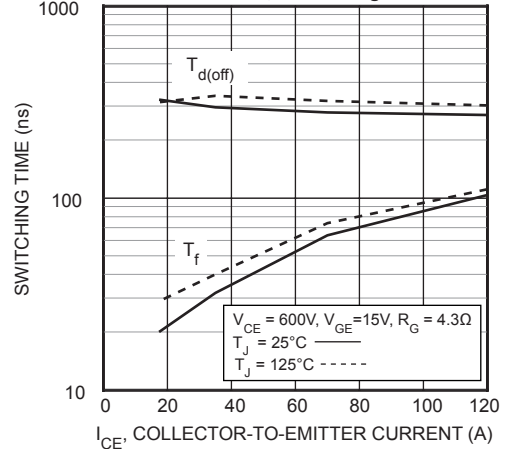


FIGURE 13, Turn-Off Time vs Collector Current

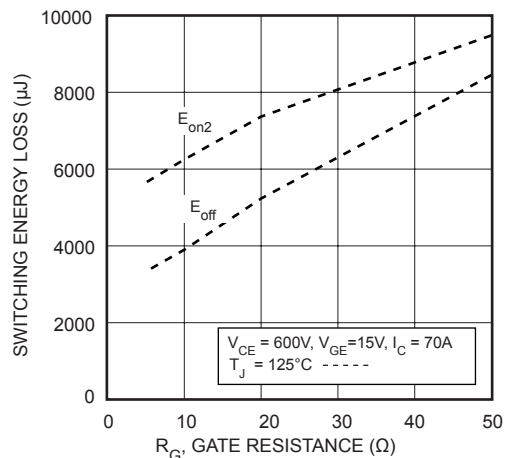


FIGURE 15, Energy Loss vs Gate Resistance

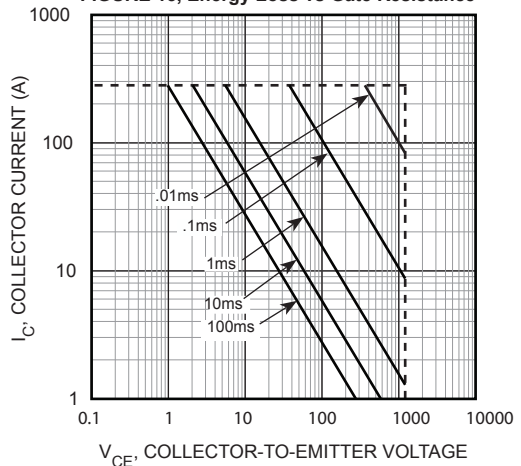
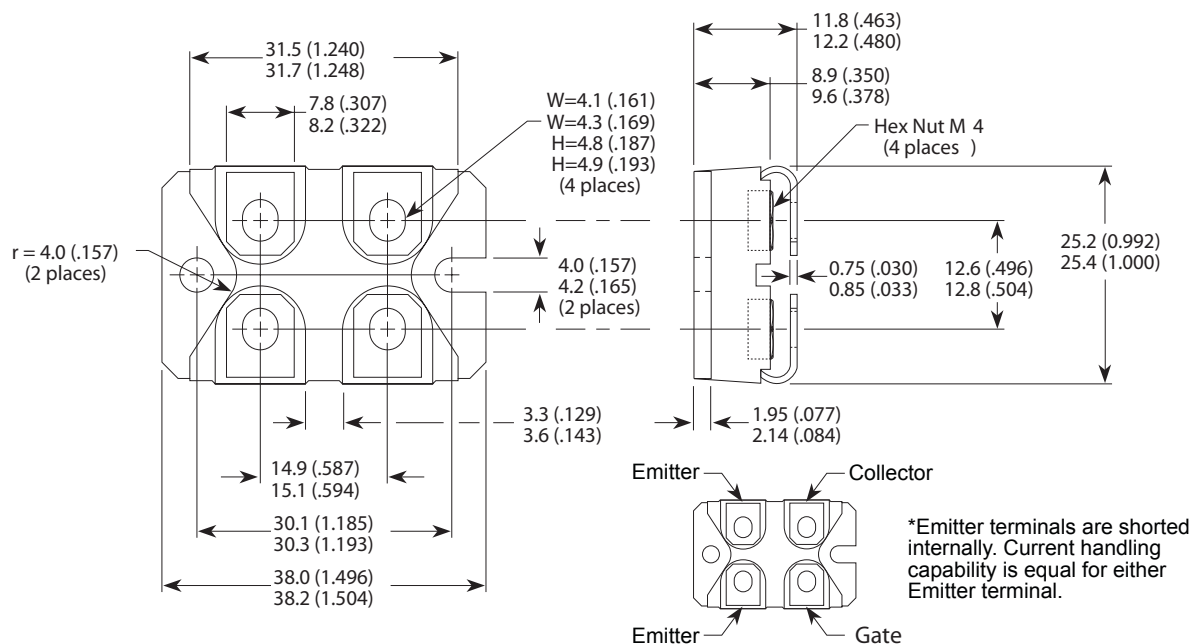


FIGURE 17, Minimum Switching Safe Operating Area

SOT-227 (ISOTOP®) Package Outline



*Emitter terminals are shorted internally. Current handling capability is equal for either Emitter terminal.

Dimensions in Millimeters and (Inches)

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