



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

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.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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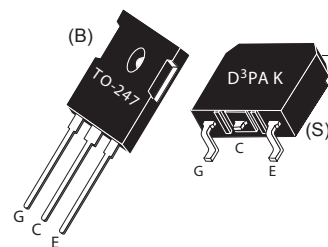


## Ultra Fast NPT - IGBT®

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



Combi (IGBT and Diode)



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	$\pm 30$	
$I_{C1}$	Continuous Collector Current @ $T_C = 25^\circ\text{C}$	75	A
$I_{C2}$	Continuous Collector Current @ $T_C = 125^\circ\text{C}$	25	
$I_{CM}$	Pulsed Collector Current <sup>①</sup>	100	
SCWT	Short Circuit Withstand Time: $V_{CE} = 600V$ , $V_{GE} = 15V$ , $T_C = 125^\circ\text{C}$	10	$\mu\text{s}$
$P_D$	Total Power Dissipation @ $T_C = 25^\circ\text{C}$	521	W
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	-55 to 150	$^\circ\text{C}$
$T_L$	Max. Lead Temp. for Soldering: 0.063" from Case for 10 Sec.	300	

### STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Min	Typ	Max	Unit
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage ( $V_{GE} = 0V$ , $I_C = 500\mu\text{A}$ )	1200			Volts
$V_{GE(TH)}$	Gate Threshold Voltage ( $V_{CE} = V_{GE}$ , $I_C = 1.0\text{mA}$ , $T_J = 25^\circ\text{C}$ )	3.5	5.0	6.5	
$V_{CE(ON)}$	Collector-Emitter On Voltage ( $V_{GE} = 15V$ , $I_C = 25A$ , $T_J = 25^\circ\text{C}$ )		2.5	3.2	
	Collector-Emitter On Voltage ( $V_{GE} = 15V$ , $I_C = 25A$ , $T_J = 125^\circ\text{C}$ )		3.3		
	Collector-Emitter On Voltage ( $V_{GE} = 15V$ , $I_C = 50A$ , $T_J = 25^\circ\text{C}$ )		3.5		
$I_{CES}$	Collector Cut-off Current ( $V_{CE} = 1200V$ , $V_{GE} = 0V$ , $T_J = 25^\circ\text{C}$ ) <sup>②</sup>		25	700	$\mu\text{A}$
	Collector Cut-off Current ( $V_{CE} = 1200V$ , $V_{GE} = 0V$ , $T_J = 125^\circ\text{C}$ ) <sup>②</sup>		250		
$I_{GES}$	Gate-Emitter Leakage Current ( $V_{GE} = \pm 20V$ )			$\pm 250$	nA



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

# DYNAMIC CHARACTERISTICS

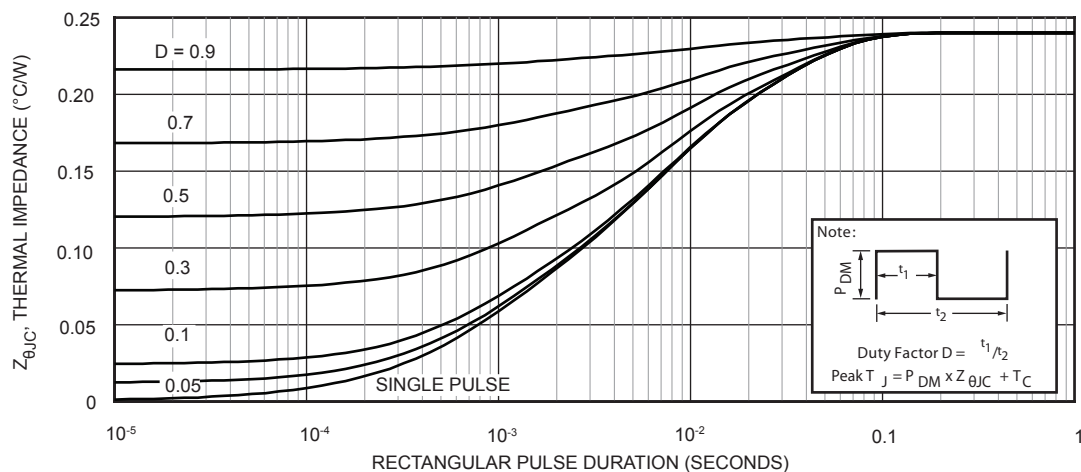
APT25GR120B\_SS CD10

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
$C_{ies}$	Input Capacitance	Capacitance $V_{GE} = 0V, V_{CE} = 25V$ $f = 1MHz$		2484		pF
$C_{oes}$	Output Capacitance			271		
$C_{res}$	Reverse Transfer Capacitance			75		
$V_{GEP}$	Gate to Emitter Plateau Voltage	Gate Charge $V_{GE} = 15V$ $V_{CE} = 600V$ $I_C = 25A$		7.5		V
$Q_g^{(3)}$	Total Gate Charge			154	203	nC
$Q_{ge}$	Gate-Emitter Charge			20	27	
$Q_{gc}$	Gate- Collector Charge			76	97	
$t_{d(on)}$	Turn-On Delay Time	Inductive Switching (25°C) $V_{CC} = 600V$ $V_{GE} = 15V$ $I_C = 25A$ $R_G = 4.3 \Omega^{(4)}$ $T_J = +25^\circ C$		16		ns
$t_r$	Current Rise Time			10		
$t_{d(off)}$	Turn-Off Delay Time			122		
$t_f$	Current Fall Time			20		
$E_{on2}^{(5)}$	Turn-On Switching Energy			434	650	$\mu J$
$E_{off}^{(6)}$	Turn-Off Switching Energy			466	700	
$t_{d(on)}$	Turn-On Delay Time	Inductive Switching (125°C) $V_{CC} = 600V$ $V_{GE} = 15V$ $I_C = 25A$ $R_G = 4.3 \Omega^{(4)}$ $T_J = +125^\circ C$		16		ns
$t_r$	Current Rise Time			10		
$t_{d(off)}$	Turn-Off Delay Time			136		
$t_f$	Current Fall Time			28		
$E_{on2}^{(5)}$	Turn-On Switching Energy			506	760	$\mu J$
$E_{off}^{(6)}$	Turn-Off Switching Energy			480	720	

# THERMAL AND MECHANICAL CHARACTERISTICS

Symbol	Characteristic	Min	Typ	Max	Unit
$R_{\theta JC}$	Junction to Case Thermal Resistance (IGBT)			.24	$^\circ C/W$
	Junction to Case Thermal Resistance (Diode)			1.00	
$R_{\theta JA}$	Junction to Ambient Thermal Resistance			40	
$W_T$	Package Weight		.22		oz
			6.2		g
Torque	Terminals and Mounting Screws.			10	in·lbf
				1.1	N·m

- 1 Repetitive Rating: Pulse width and case temperature limited by maximum junction temperature.
  - 2 Pulse test: Pulse Width < 380 $\mu s$ , 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 energy loss at turn-on and includes the charge stored in the freewheeling 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.





# TYPICAL PERFORMANCE CURVES

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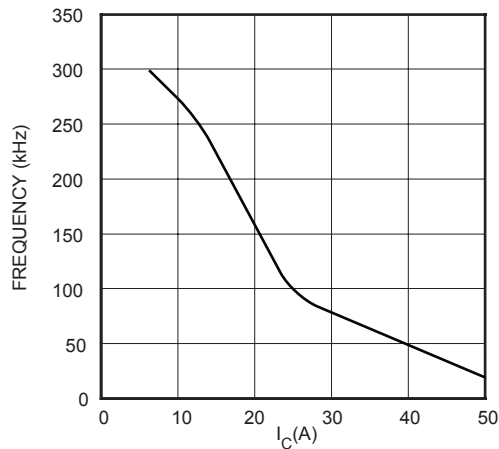


FIGURE 2, Max Frequency vs Current ( $T_{case} = 75^{\circ}C$ )

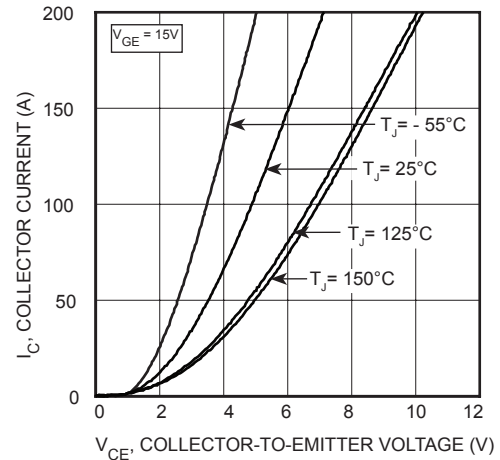


FIGURE 3, Output Characteristics

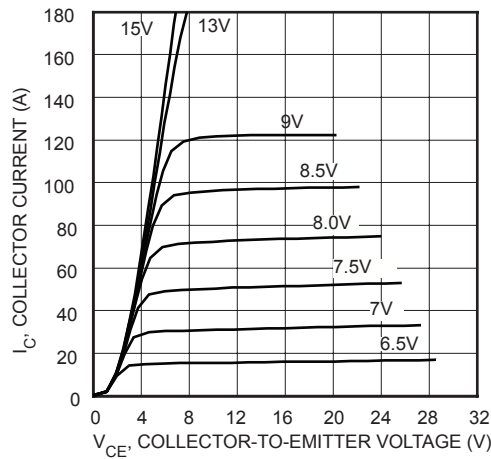


FIGURE 4, Output Characteristics ( $T_J = 25^{\circ}C$ )

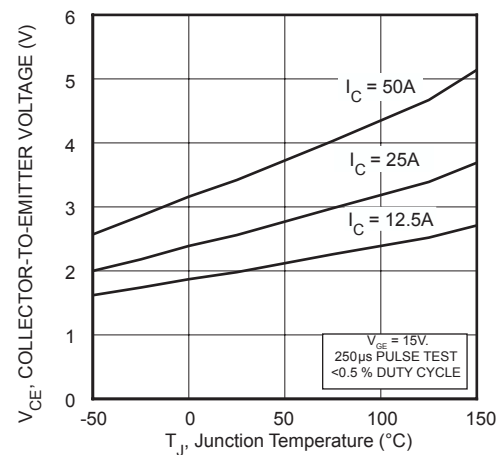


FIGURE 5, On State Voltage vs Junction Temperature

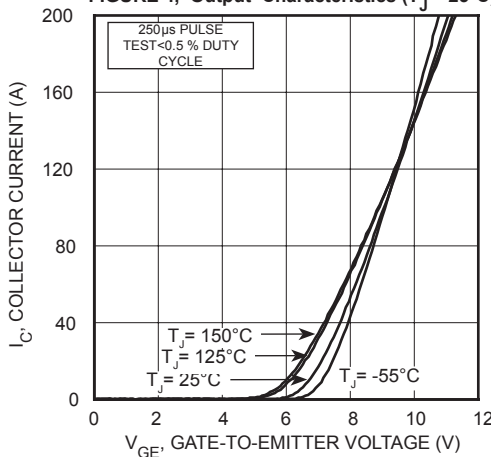


FIGURE 6, Transfer Characteristics

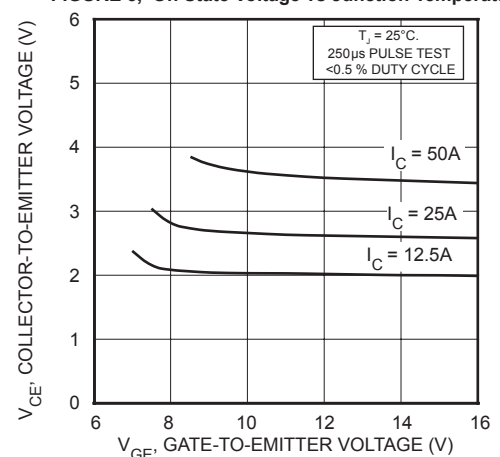


FIGURE 7, On State Voltage vs Gate-to-Emitter Voltage

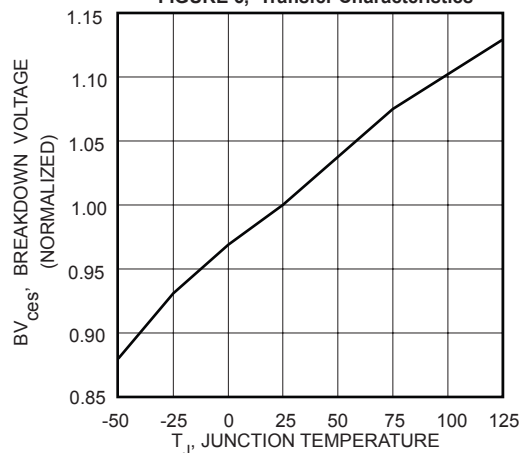


FIGURE 8, Breakdown Voltage vs Junction Temperature

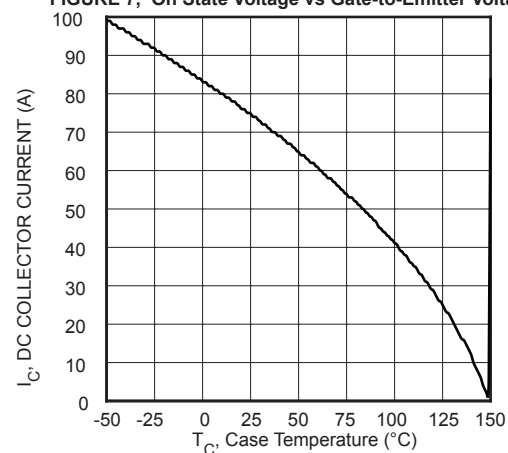


FIGURE 9, DC Collector Current vs Case Temperature

## TYPICAL PERFORMANCE CURVES

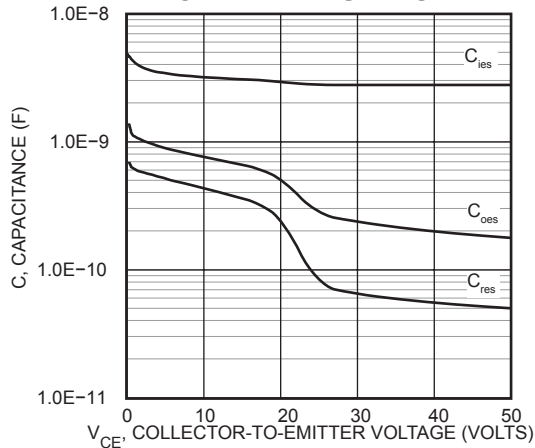


FIGURE 10, Capacitance vs Collector-To-Emitter Voltage

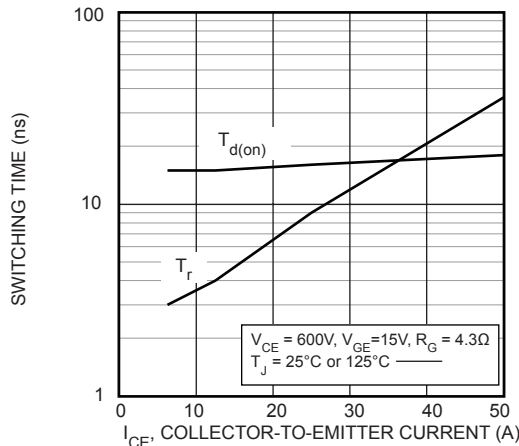


FIGURE 12, Turn-On Time vs Collector Current

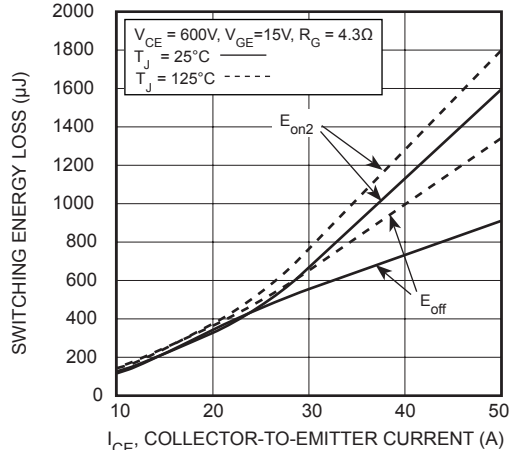


FIGURE 14, Energy Loss vs Collector Current

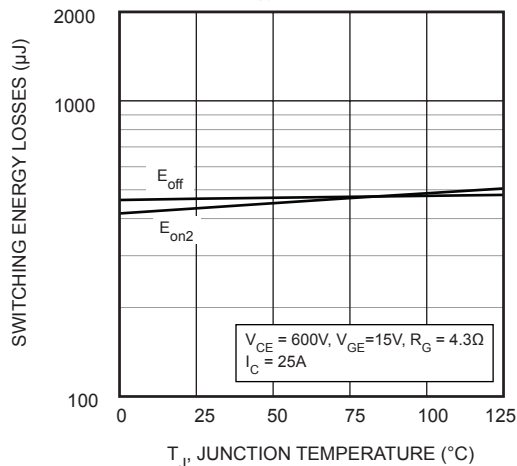


FIGURE 16, Energy Losses vs Junction Temperature

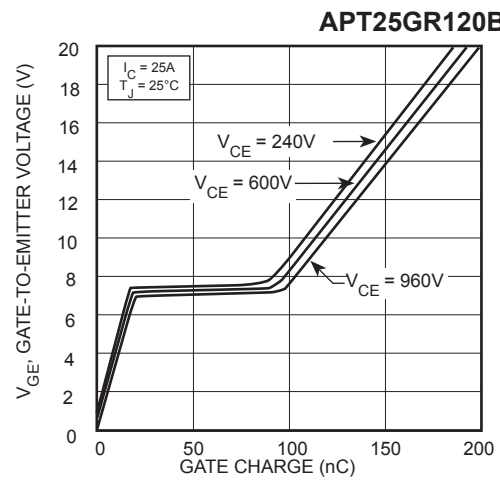


FIGURE 11, Gate charge vs. Gate-to-Emitter Voltage

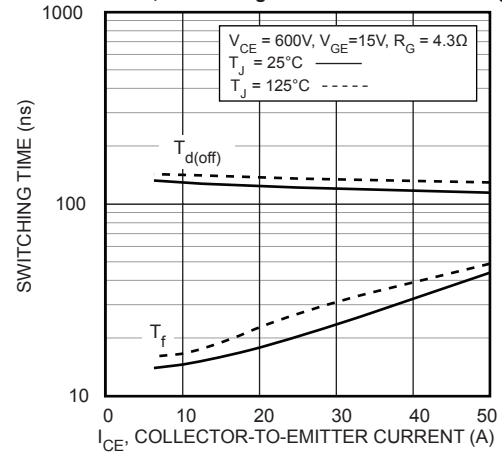


FIGURE 13, Turn-Off Time vs Collector Current

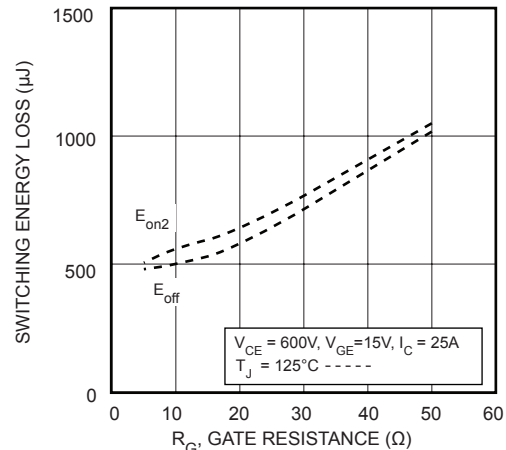


FIGURE 15, Energy Loss vs Gate Resistance

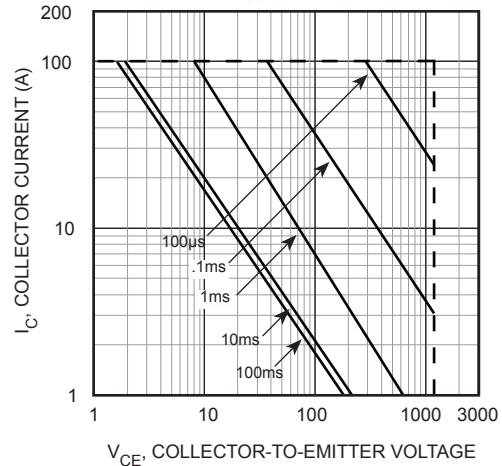


FIGURE 17, Minimum Switching Safe Operating Area

# ZERO RECOVERY LOW LEAKAGE SIC ANTI-PARALLEL DIODE

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

Symbol	Characteristic / Test Conditions	Ratings	Unit
$I_F$	Maximum D.C. Forward Current	$T_C = 25^\circ\text{C}$	36
		$T_C = 135^\circ\text{C}$	10
$I_{FRM}$	Repetitive Peak Forward Surge Current ( $T_J = 45^\circ\text{C}$ , $t_p = 10\text{ms}$ , Half Sine Wave)	50	Amps
$I_{FSM}$	Non-Repetitive Forward Surge Current ( $T_J = 25^\circ\text{C}$ , $t_p = 10\text{ms}$ , Half Sine)	110	

## STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	Min	Typ	Max	Unit
$V_F$	Forward Voltage		$I_F = 10\text{A}$ , $T_J = 25^\circ\text{C}$	1.5	Volts
			$I_F = 10\text{A}$ , $T_J = 150^\circ\text{C}$	2.1	
$Q_c$	Total Capacitive Charge $V_R = 800\text{V}$ , $I_F = 10\text{A}$ , $di/dt = -100\text{A}/\mu\text{s}$ , $T_J = 25^\circ\text{C}$		30		nC
$C_T$	Junction Capacitance $V_R = 0\text{V}$ , $T_J = 25^\circ\text{C}$ , $f = 1\text{MHz}$		600		pF
	Junction Capacitance $V_R = 200\text{V}$ , $T_J = 25^\circ\text{C}$ , $f = 1\text{MHz}$		71		
	Junction Capacitance $V_R = 400\text{V}$ , $T_J = 25^\circ\text{C}$ , $f = 1\text{MHz}$		52		

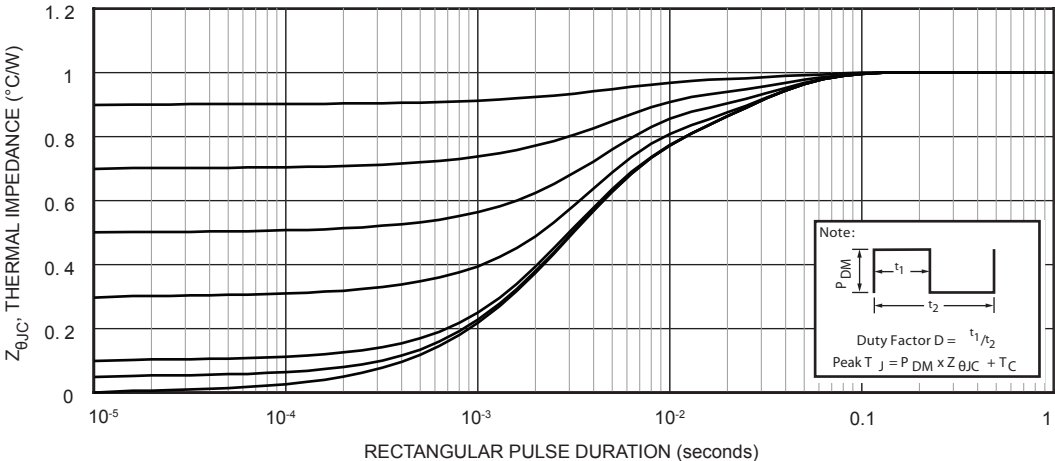


FIGURE 18. MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs. PULSE DURATION

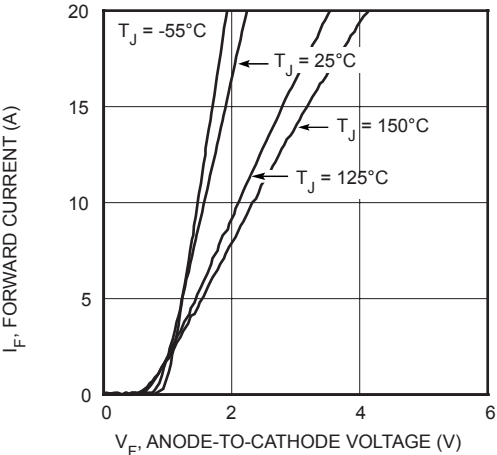


FIGURE 19. Forward Current vs. Forward Voltage

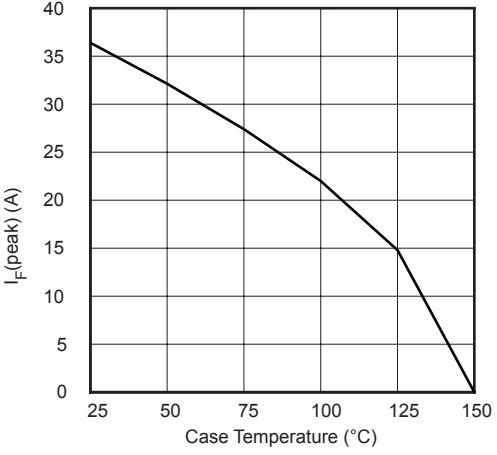


FIGURE 20. Maximum Forward Current vs. Case Temperature

# TYPICAL PERFORMANCE CURVES

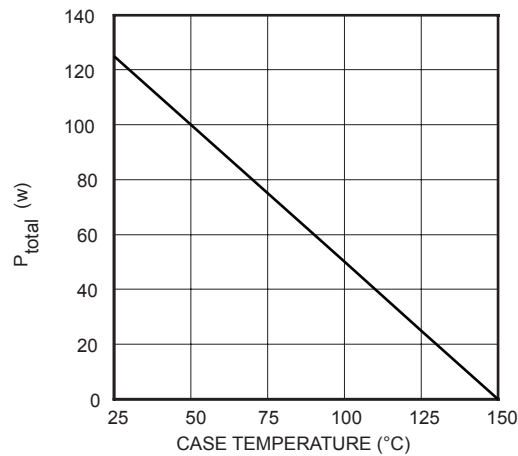


Figure 21. Maximum Power Dissipation vs. Case Temperature

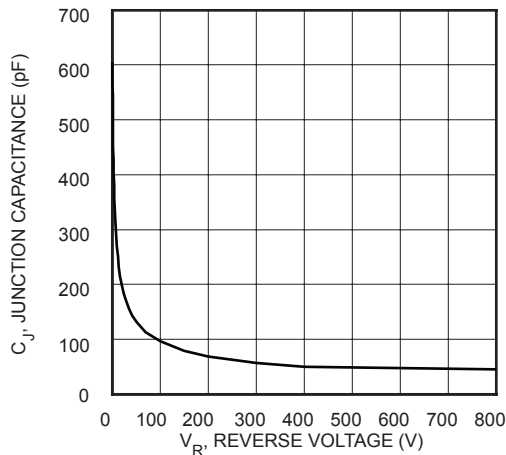


Figure 23. Junction Capacitance vs. Reverse Voltage

# APT25GR120B\_SS CD10

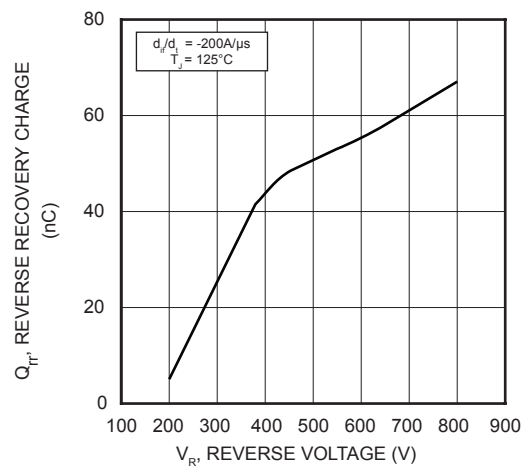
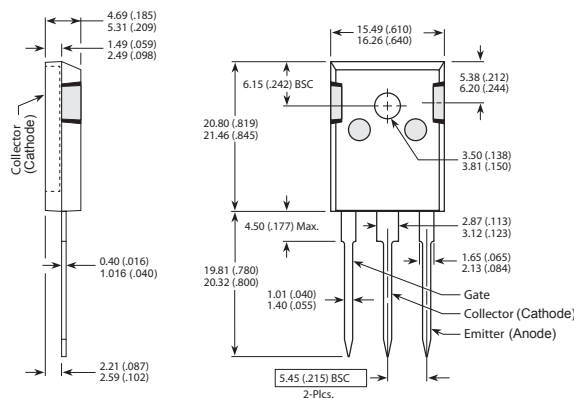
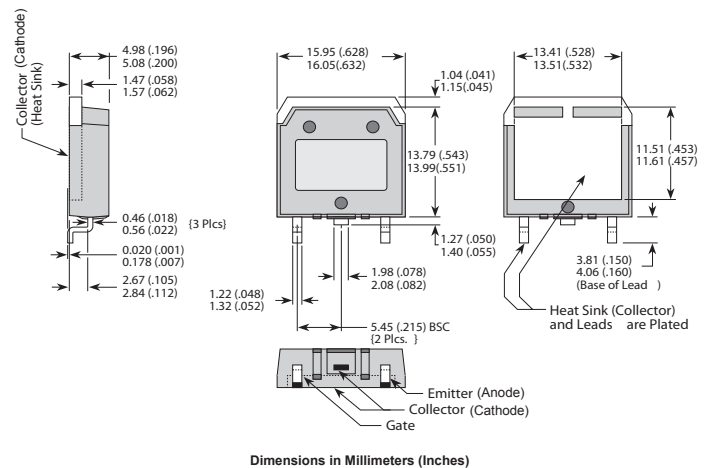


Figure 22. Reverse Recovery Charge vs. V<sub>R</sub>

## TO-247 Package Outline



## D<sup>3</sup>PAK Package Outline



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