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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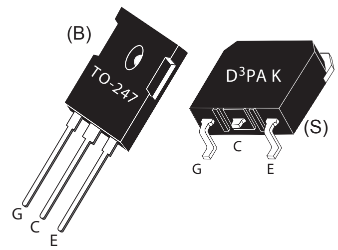
APT25GR120BSCD10
APT25GR120SSCD10

Microsemi POWER PRODUCTS GROUP

1200V, 25A, $V_{CE(on)}$ = 2.5V Typical

Ultra Fast NPT - IGBT®

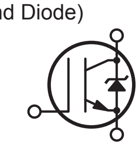


The Ultra Fast NPT - IGBT® is a new generation of high voltage power IGBTs. Using Non-Punch-Through Technology, the Ultra Fast NPT-IGBT® offers superior ruggedness and ultrafast switching speed.

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°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°C	75	A
I_{C2}	Continuous Collector Current @ T_C = 125°C	25	
I_{CM}	Pulsed Collector Current ①	100	
SCWT	Short Circuit Withstand Time: V_{CE} = 600V, V_{GE} = 15V, T_C=125°C	10	μs
P_D	Total Power Dissipation @ T_C = 25°C	521	W
T_J,T_{STG}	Operating and Storage Junction Temperature Range	-55 to 150	°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 = 500μA)	1200			Volts
$V_{GE(TH)}$	Gate Threshold Voltage (V_{CE} = V_{GE}, I_C = 1.0mA, T_j = 25°C)	3.5	5.0	6.5	
$V_{CE(ON)}$	Collector-Emitter On Voltage (V_{GE} = 15V, I_C = 25A, T_j = 25°C)		2.5	3.2	
	Collector-Emitter On Voltage (V_{GE} = 15V, I_C = 25A, T_j = 125°C)		3.3		
	Collector-Emitter On Voltage (V_{GE} = 15V, I_C = 50A, T_j = 25°C)		3.5		
I_{CES}	Collector Cut-off Current (V_{CE} = 1200V, V_{GE} = 0V, T_j = 25°C) ②		25	700	μA
	Collector Cut-off Current (V_{CE} = 1200V, V_{GE} = 0V, T_j = 125°C) ②		250		
I_{GES}	Gate-Emitter Leakage Current (V_{GE} = ±20V)			±250	nA

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

DYNAMIC CHARACTERISTICS

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

THERMAL AND MECHANICAL CHARACTERISTICS

Symbol	Characteristic	Min	Typ	Max	Unit
$R_{\theta JC}$	Junction to Case Thermal Resistance (IGBT)			.24	°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 < 380μs, 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.

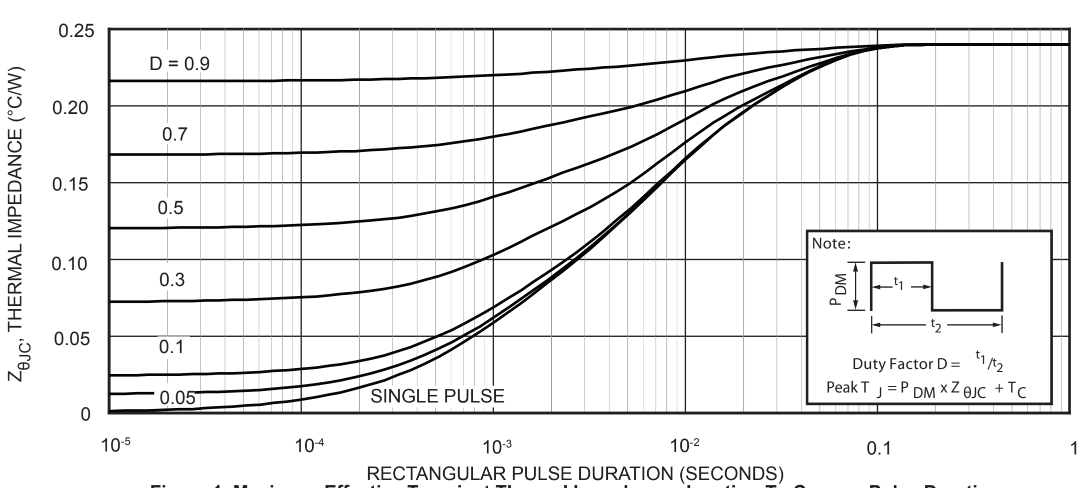


Figure 1, Maximum Effective Transient Thermal Impedance, Junction-To-Case vs Pulse Duration

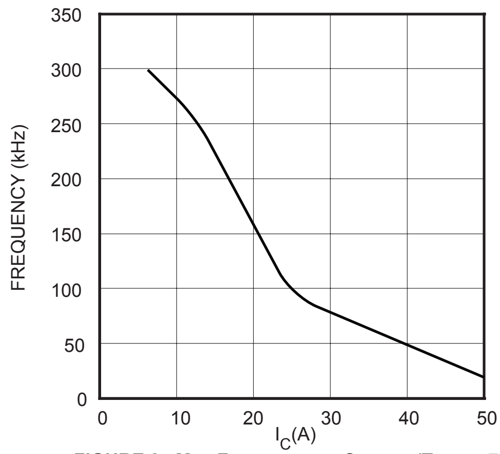


FIGURE 2, Max Frequency vs Current (T_{case} = 75°C)

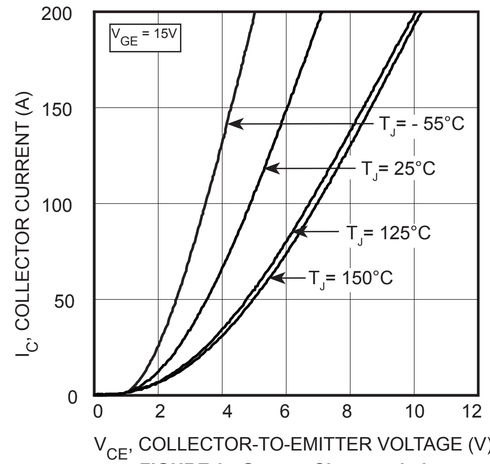


FIGURE 3, Output Characteristics

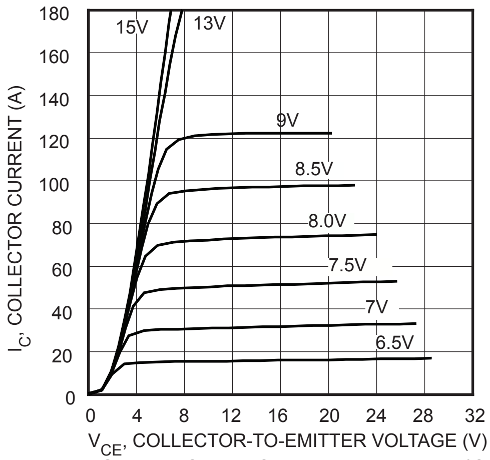


FIGURE 4, Output Characteristics (T_J = 25°C)

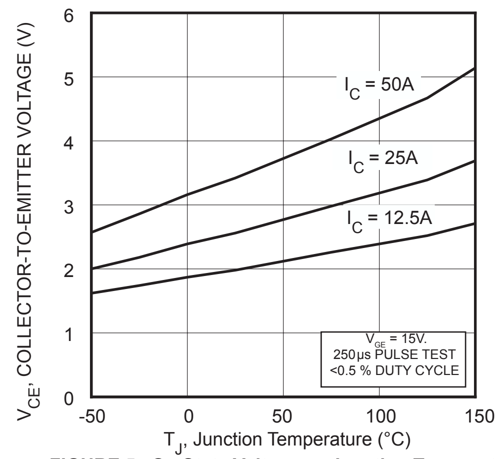


FIGURE 5, On State Voltage vs Junction Temperature

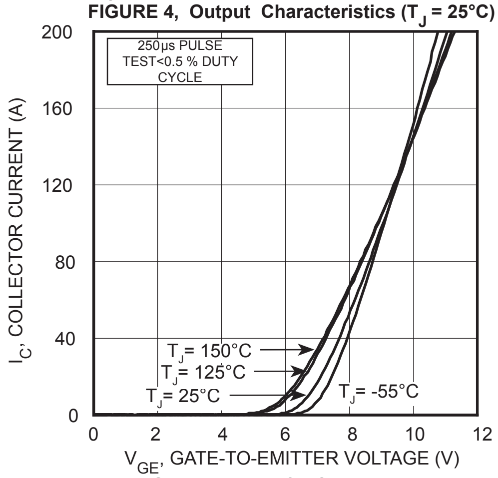


FIGURE 6, Transfer Characteristics

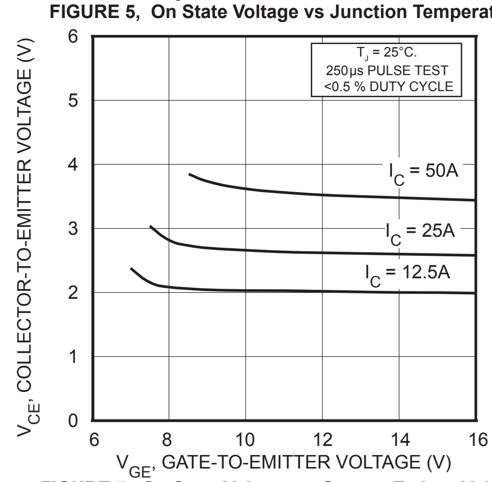


FIGURE 7, On State Voltage vs Gate-to-Emitter Voltage

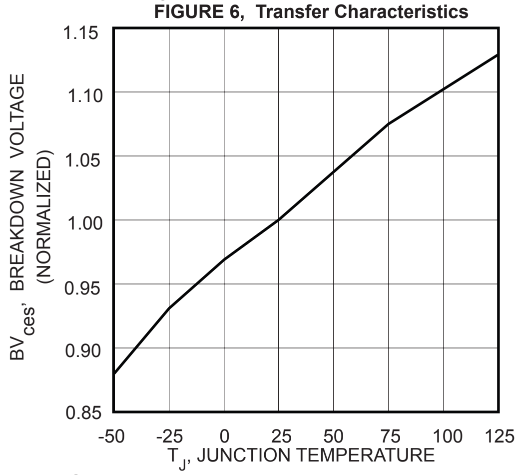


FIGURE 8, Breakdown Voltage vs Junction Temperature

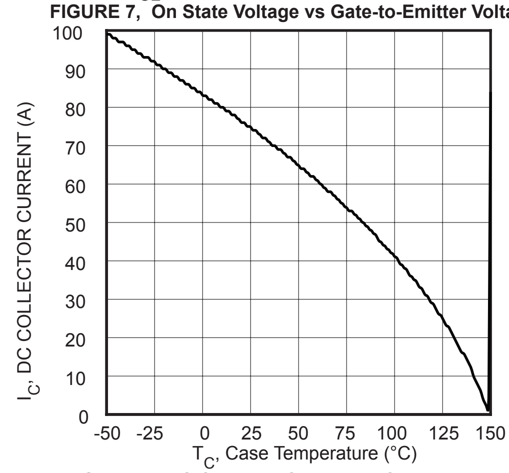


FIGURE 9, DC Collector Current vs Case Temperature

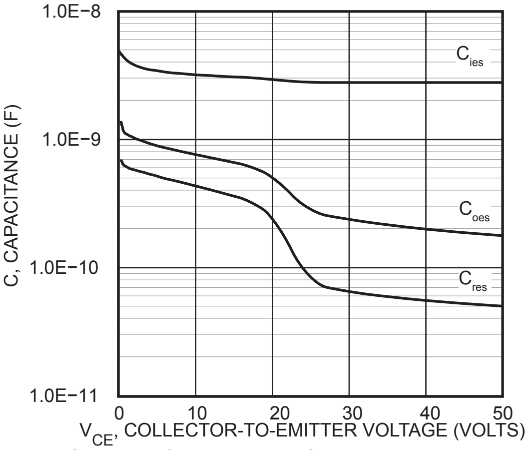


FIGURE 10, Capacitance vs Collector-To-Emitter Voltage

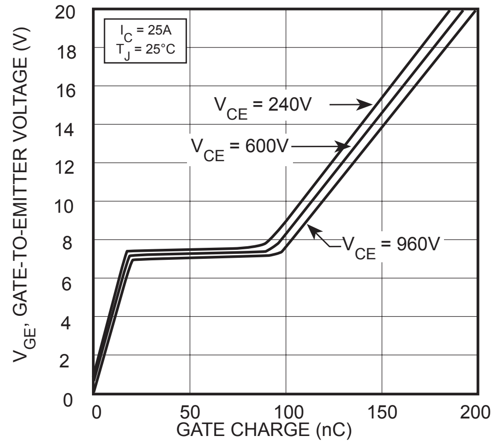


FIGURE 11, Gate charge vs. Gate-to-Emitter Voltage

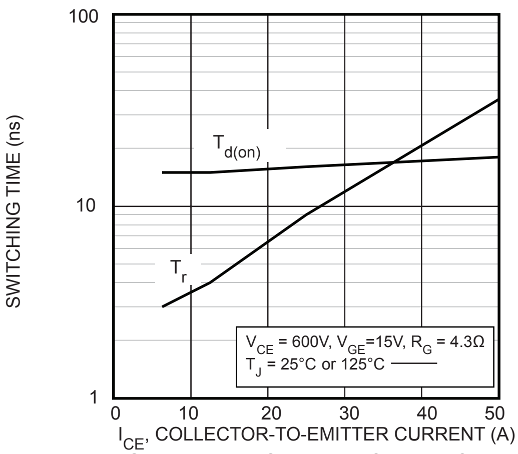


FIGURE 12, Turn-On Time vs Collector Current

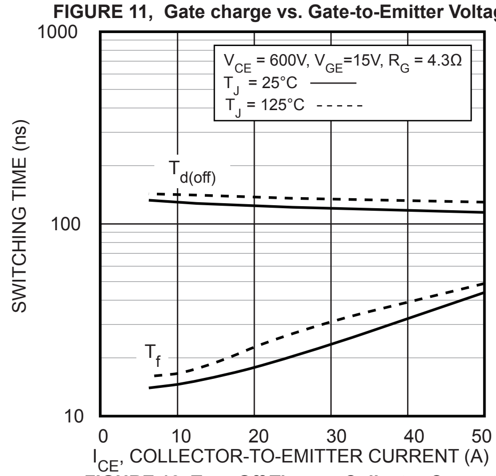


FIGURE 13, Turn-Off Time vs Collector Current

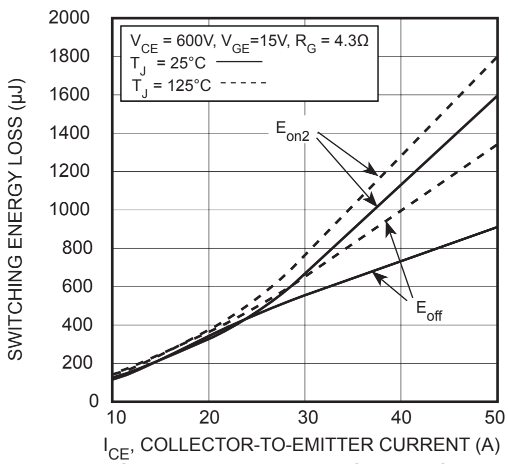


FIGURE 14, Energy Loss vs Collector Current

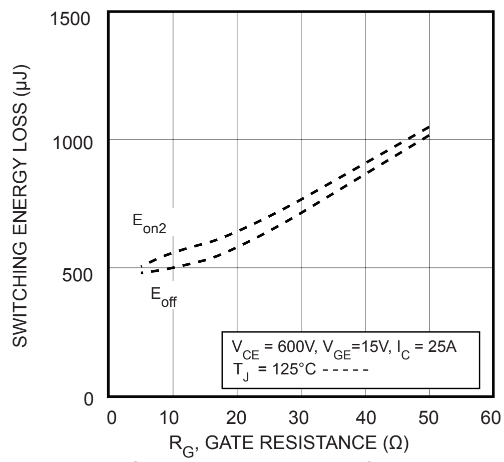


FIGURE 15, Energy Loss vs Gate Resistance

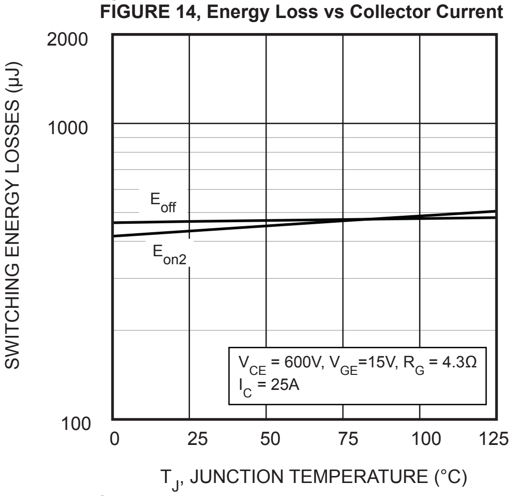


FIGURE 16, Energy Losses vs Junction Temperature

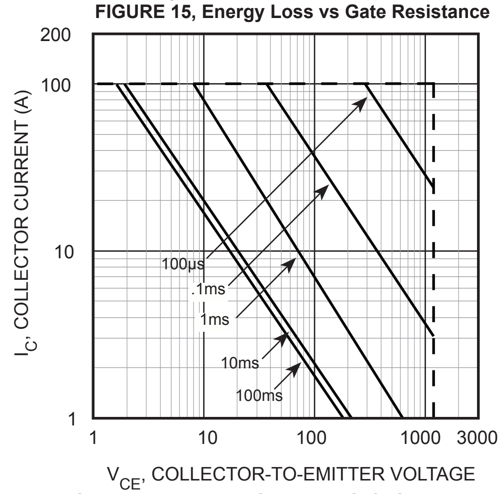


FIGURE 17, Minimum Switching Safe Operating Area

ZERO RECOVERY LOW LEAKAGE SIC ANTI-PARALLEL DIODE

MAXIMUM RATINGS

All Ratings: T_C = 25°C unless otherwise specified.

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

STATIC ELECTRICAL CHARACTERISTICS

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

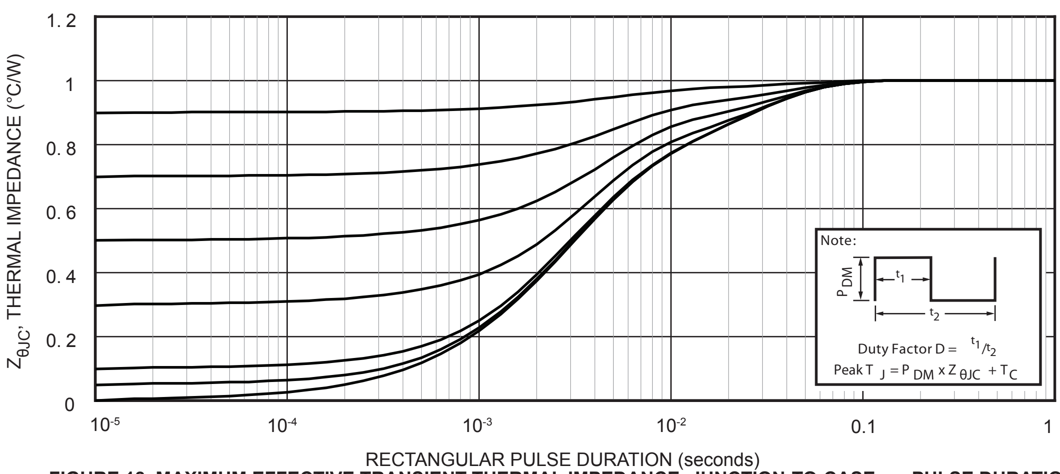


FIGURE 18. MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs. PULSE DURATION

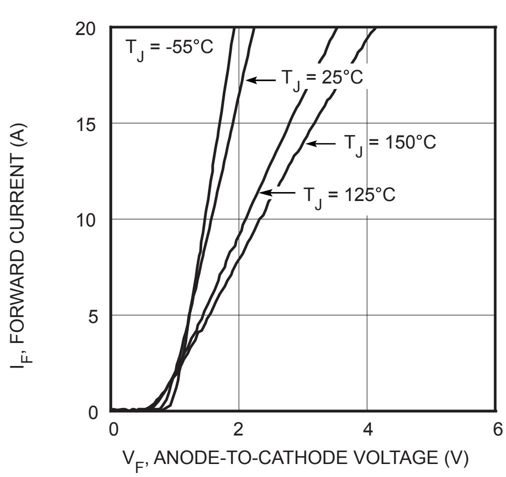


FIGURE 19, Forward Current vs. Forward Voltage

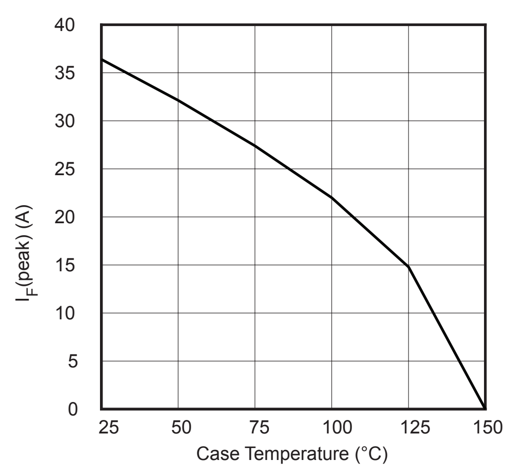


FIGURE 20, Maximum Forward Current vs. Case Temperature

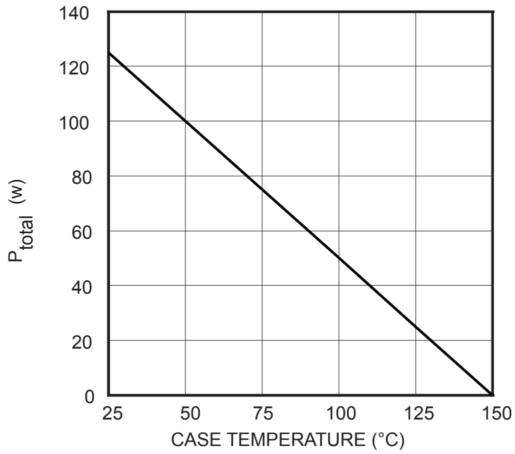


Figure 21. Maximum Power Dissipation *vs.* Case Temperature

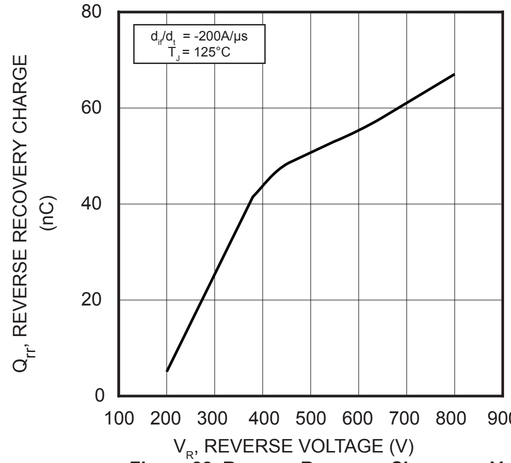


Figure 22. Reverse Recovery Charge *vs.* V_R

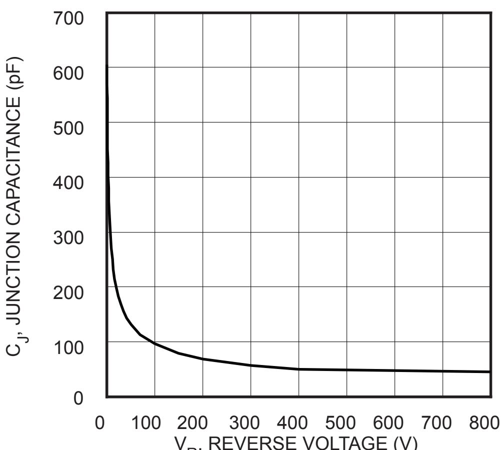
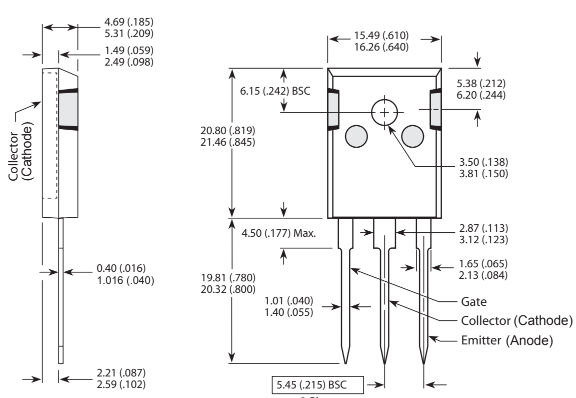


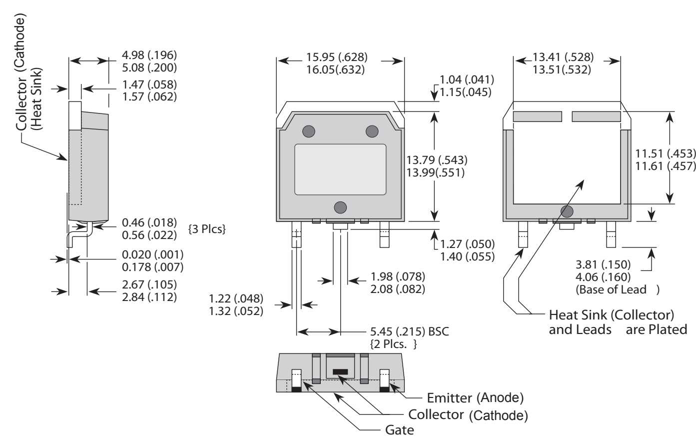
Figure 23. Junction Capacitance *vs.* Reverse Voltage

TO-247 Package Outline



Dimensions in Millimeters (Inches)

D³PAK Package Outline



Dimensions in Millimeters (Inches)

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