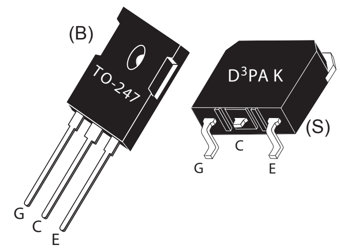
APT25GR120BD15
APT25GR120SD15

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

Ultra Fast NPT - IGBT®

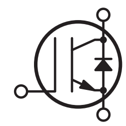
The Ultra Fast NPT - IGBT® family of products is the newest generation of planar IGBTs optimized for outstanding ruggedness and the best trade-off between conduction and switching losses.



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 = 600μA)	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		10	600	μA
	Collector Cut-off Current (V_{CE} = 1200V, V_{GE} = 0V, T_j = 125°C) ②		100		
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.

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DYNAMIC CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	Capacitance		2784		pF
C_{oes}	Output Capacitance	V_{GE} = 0V, V_{CE} = 25V		271		
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	nC
Q_{ge}	Gate-Emitter Charge	V_{CE}= 600V		20	27	
Q_{gc}	Gate- Collector Charge	I_C = 25A		76	97	
$t_{d(on)}$	Turn-On Delay Time	Inductive Switching (25°C)		16		ns
t_r	Current Rise Time	V_{CC} = 600V		10		
$t_{d(off)}$	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)		742	1110	μJ
E_{off} (6)	Turn-Off Switching Energy	T_J = +25°C		427	640	
$t_{d(on)}$	Turn-On Delay Time	Inductive Switching (125°C)		16		ns
t_r	Current Rise Time	V_{CC} = 600V		10		
$t_{d(off)}$	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)		1297	1945	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)			1.18	
$R_{\theta JA}$	Junction to Ambient Thermal Resistance			40	
W_T	Package Weight		.22		oz
			6.2		g
Torque	Mounting Torque (TO-247 Package), 4-40 or M3 screw			10	in-lbf
				6.2	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 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.

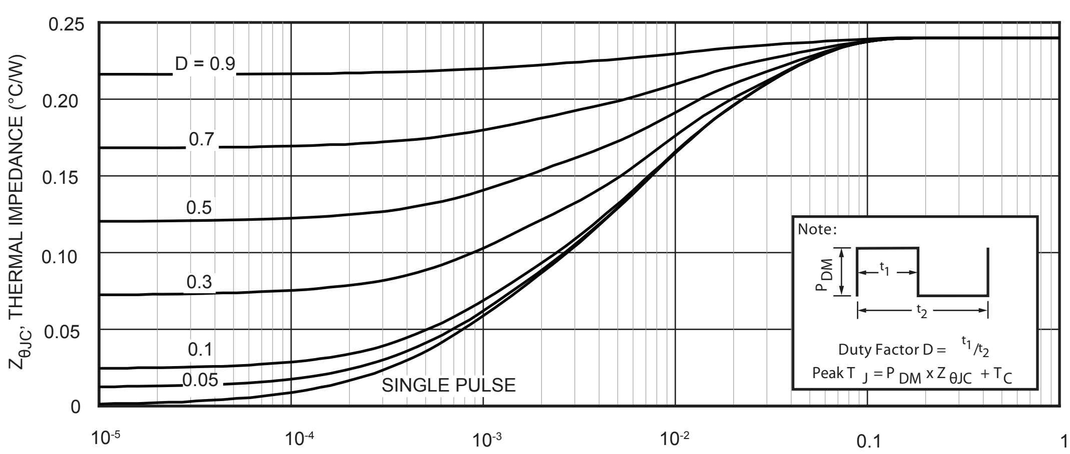


Figure 1, Maximum Effective Transient Thermal Impedance, Junction-To-Case vs Pulse Duration

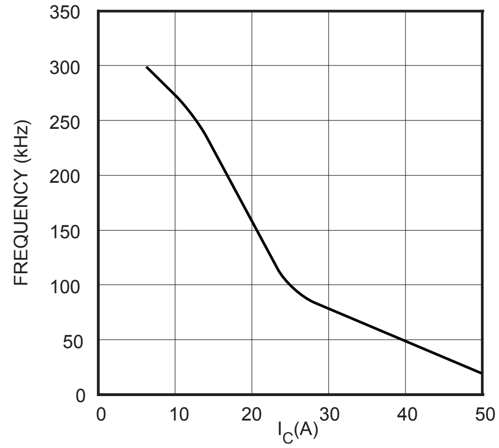


FIGURE 2, Max Frequency vs Current (T_{case} = 75°C)

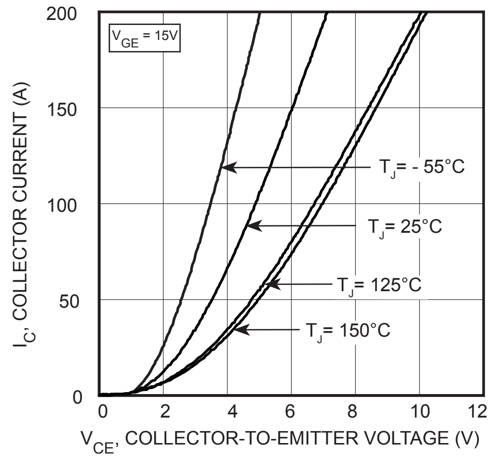


FIGURE 3, Saturation Voltage Characteristics (T_J = 25°C)

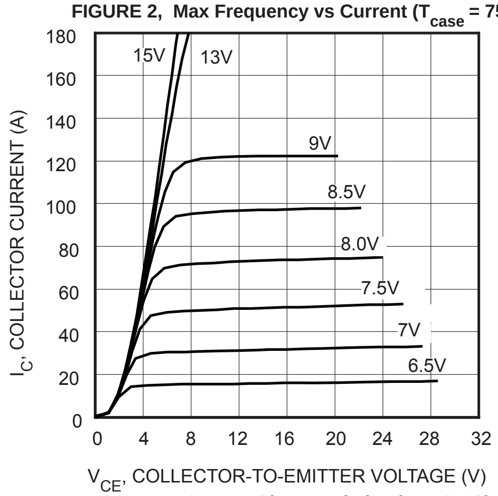


FIGURE 4, Output Characteristics (T_J = 25°C)

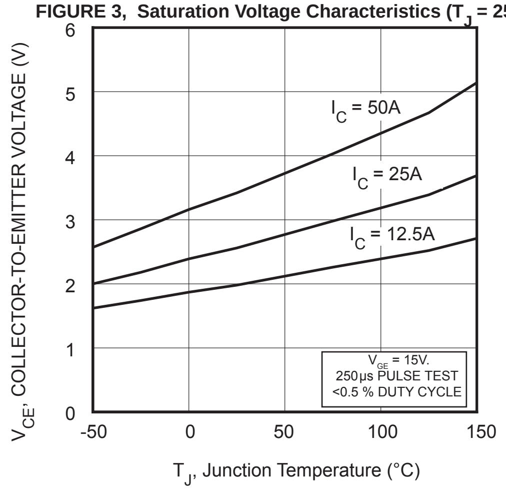


FIGURE 5, On State Voltage vs Junction Temperature

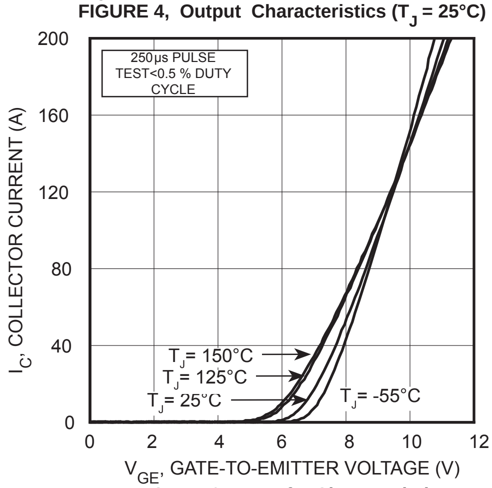


FIGURE 6, Transfer Characteristics

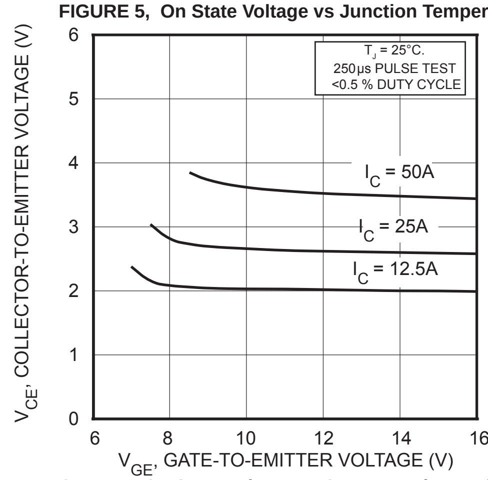


FIGURE 7, On State Voltage vs Gate-to-Emitter Voltage

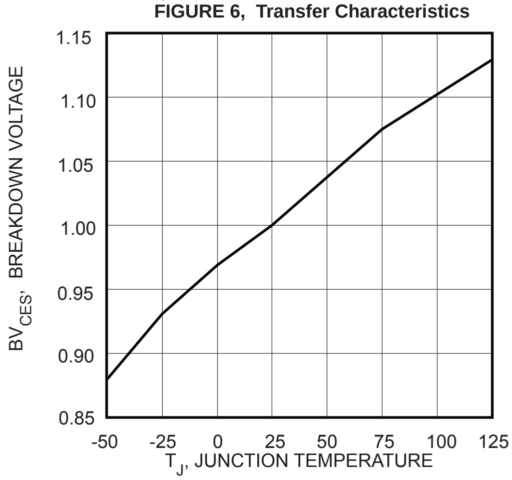


FIGURE 8, Breakdown Voltage vs Junction Temperature

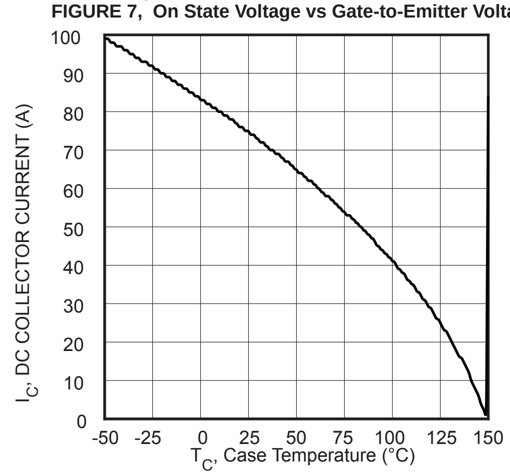


FIGURE 9, DC Collector Current vs Case Temperature

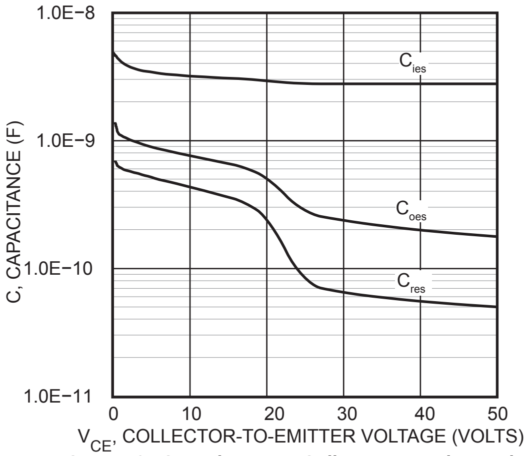


FIGURE 10, Capacitance vs Collector-To-Emitter Voltage

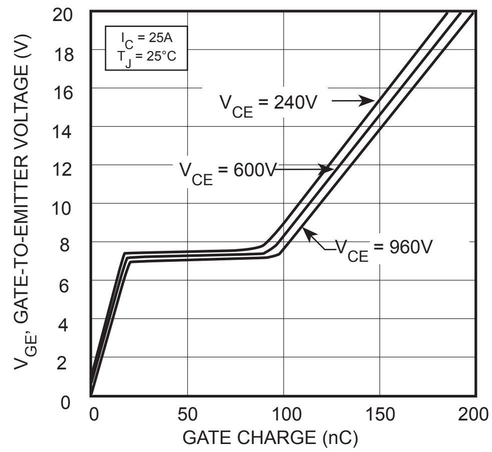


FIGURE 11, Gate charge

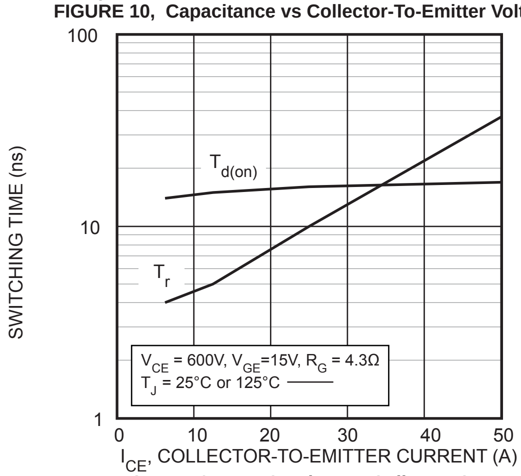


FIGURE 12, Turn-On Time vs Collector Current

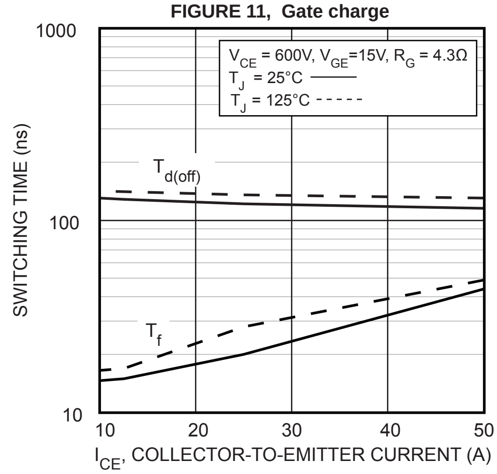


FIGURE 13, Turn-Off Time vs Collector Current

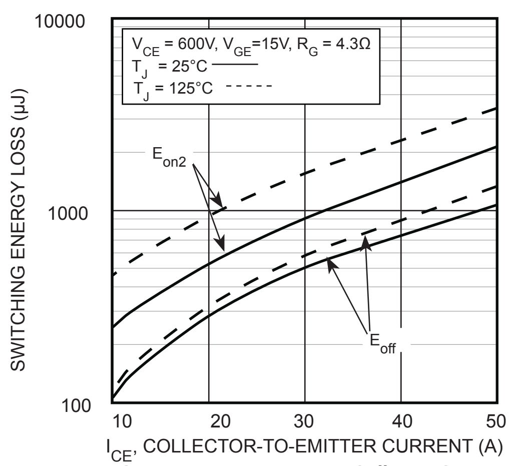


FIGURE 14, Energy Loss vs Collector Current

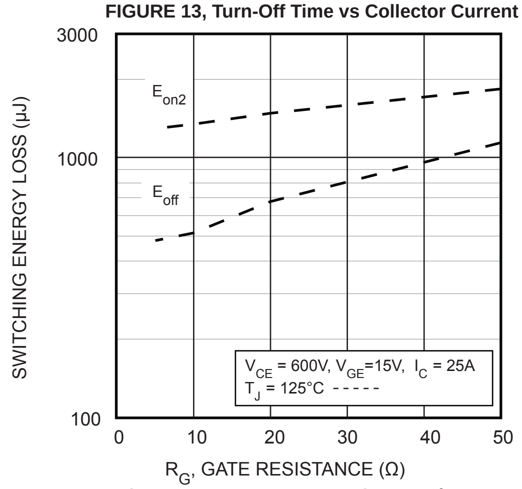


FIGURE 15, Energy Loss vs Gate Resistance

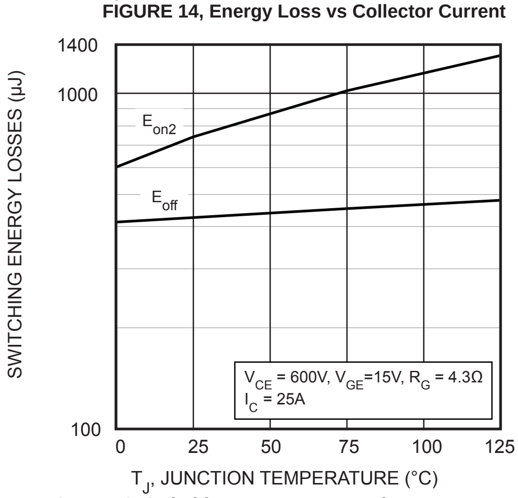


FIGURE 16, Switching Energy vs Junction Temperature

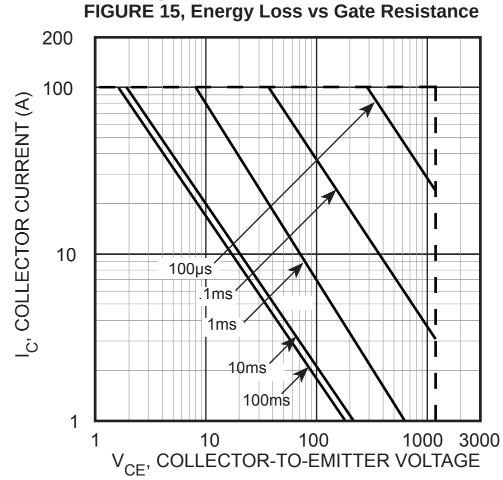


FIGURE 17, Minimum Switching Safe Operating Area

ULTRAFAST SOFT RECOVERY RECTIFIER DIODE

MAXIMUM RATINGS

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

Symbol	Characteristic / Test Conditions	APT25GR120B_SD15	Unit
$I_{F(AV)}$	Maximum Average Forward Current (T_C = 126°C, Duty Cycle = 0.5)	15	Amps
$I_{F(RMS)}$	RMS Forward Current (Square wave, 50% duty)	29	
I_{FSM}	Non-Repetitive Forward Surge Current (T_J = 45°C, 8.3 ms)	110	

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions		Min	Type	Max	Unit
V_F	Forward Voltage	I_F = 15A		2.8		Volts
		I_F = 30A		3.4		
		I_F = 15A, T_J = 125°C		2.45		

DYNAMIC CHARACTERISTICS

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse Recovery Time	I_F = 1A, di_F/dt = -100A/µs, V_R = 30V, T_J = 25°C	-	21	-	ns
t_{rr}	Reverse Recovery Time	I_F = 15A, di_F/dt = -200A/µs V_R = 800V, T_C = 25°C	-	240	-	
Q_{rr}	Reverse Recovery Charge		-	260	-	nC
I_{RRM}	Maximum Reverse Recovery Current		-	3	-	Amps
t_{rr}	Reverse Recovery Time	I_F = 15A, di_F/dt = -200A/µs V_R = 800V, T_C = 125°C	-	290	-	ns
Q_{rr}	Reverse Recovery Charge		-	960	-	nC
I_{RRM}	Maximum Reverse Recovery Current		-	6	-	Amps
t_{rr}	Reverse Recovery Time	I_F = 15A, di_F/dt = -1000A/µs V_R = 800V, T_C = 125°C	-	130	-	ns
Q_{rr}	Reverse Recovery Charge		-	1340	-	nC
I_{RRM}	Maximum Reverse Recovery Current		-	19	-	Amps

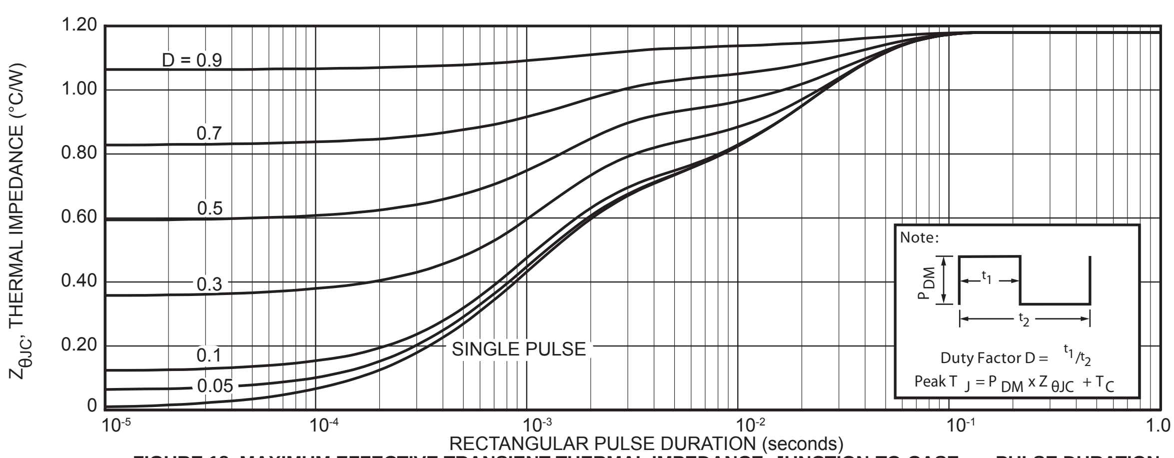


FIGURE 18. MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs. PULSE DURATION

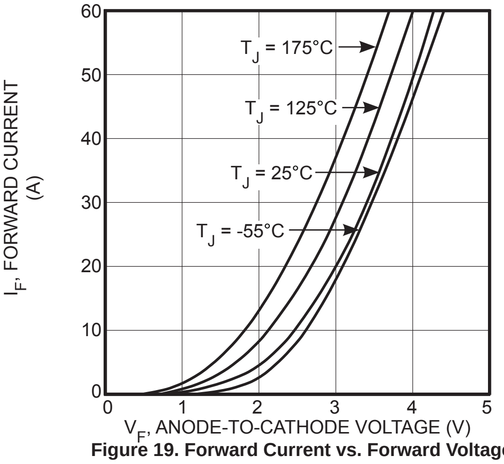


Figure 19. Forward Current vs. Forward Voltage

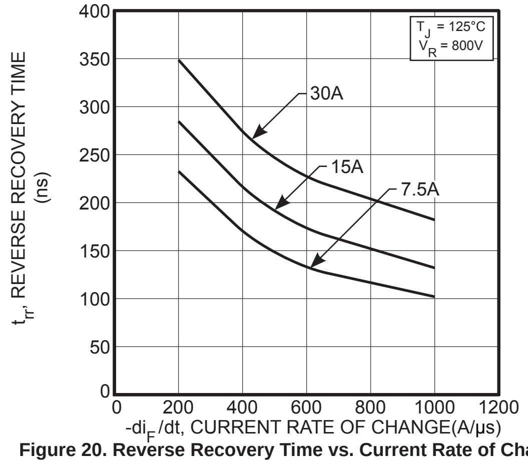


Figure 20. Reverse Recovery Time vs. Current Rate of Change

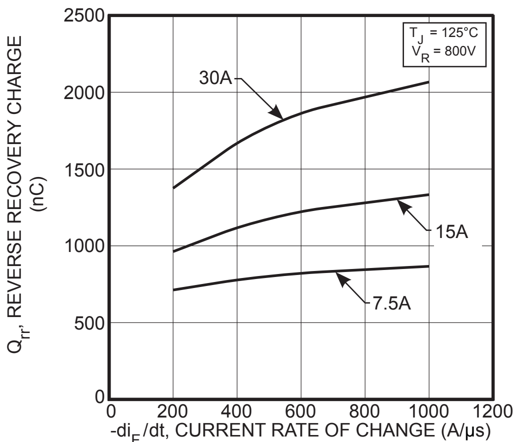


Figure 21. Reverse Recovery Charge vs. Current Rate of Change

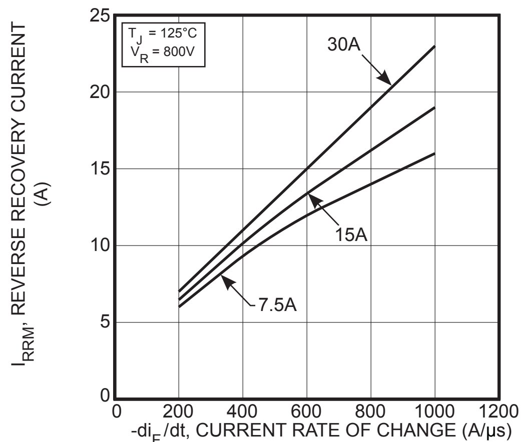


Figure 22. Reverse Recovery Current vs. Current Rate of ChangeTum testic

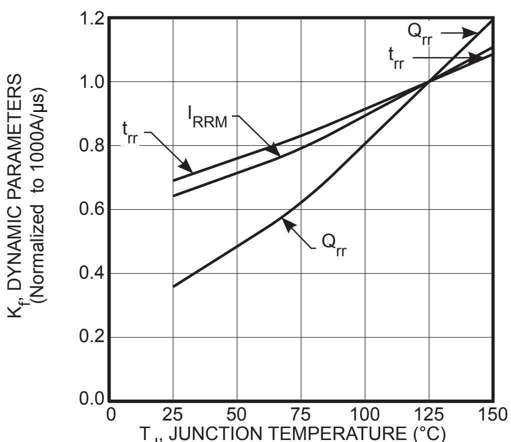


Figure 23. Dynamic Parameters vs. Junction Temperature

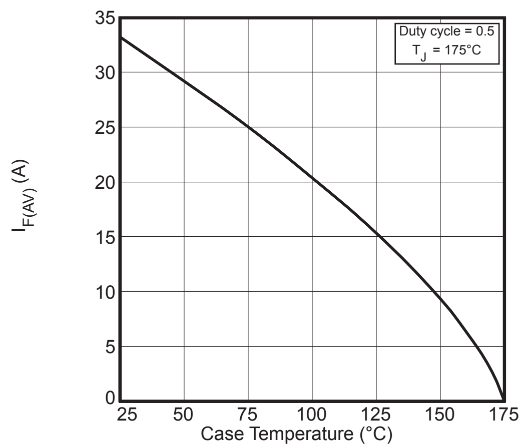


Figure 24. Maximum Average Forward Current vs. CaseTemperature

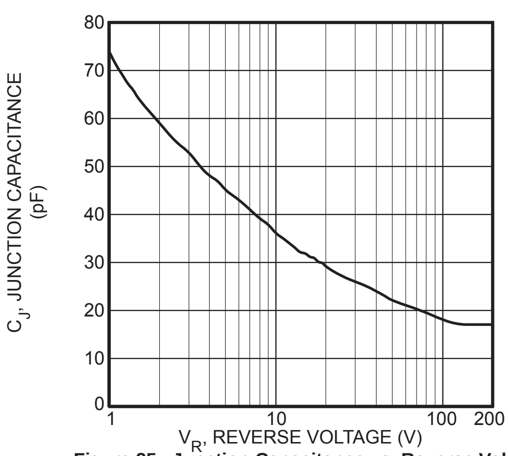


Figure 25. Junction Capacitance vs. Reverse Voltage

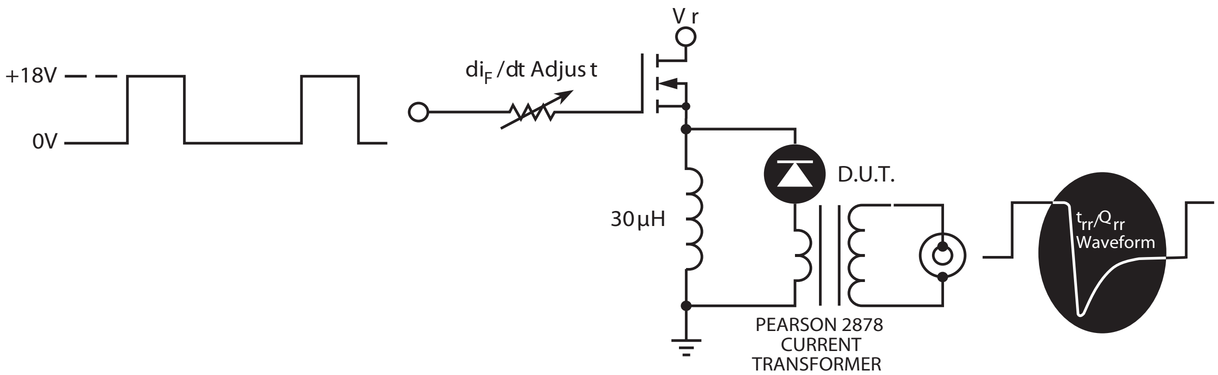


Figure 26. Diode Test Circuit

1. I_F - Forward Conduction Current
2. di_F/dt - Rate of Diode Current Change Through Zero Crossing.
3. I_{RRM} - Maximum Reverse Recovery Current
4. t_{rr} - Reverse Recovery Time measured from zero crossing where diode current goes from positive to negative, to the point at which the straight line through I_{RRM} and 0.25, I_{RRM} passes through zero.
5. Q_{rr} - Area Under the Curve Defined by I_{RRM} and $t_{RR.}$

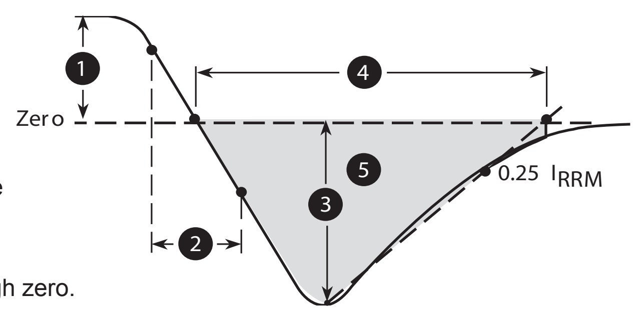
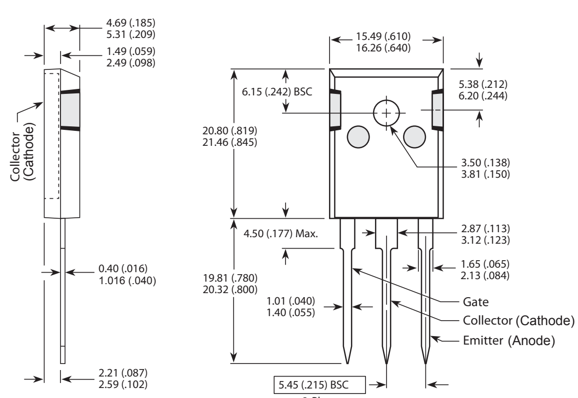


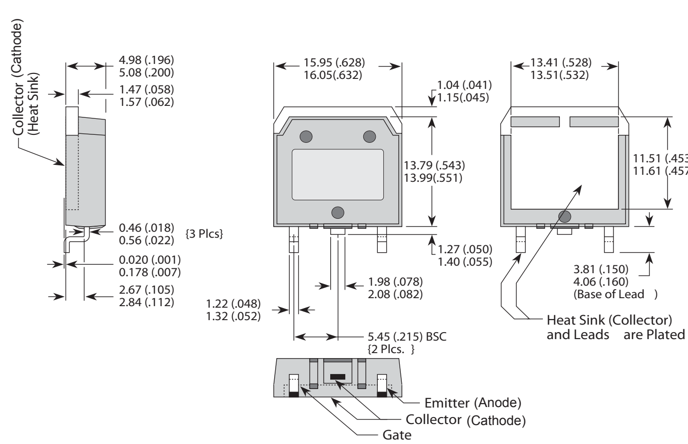
Figure 27. Diode Reverse Recovery Waveform Definition

TO-247 Package Outline



Dimensions in Millimeters (Inches)

D³PAK Package Outline



Dimensions in Millimeters (Inches)

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Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.

Как с нами связаться

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Факс: 8 (812) 320-02-42
Электронная почта: org@eplast1.ru
Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.