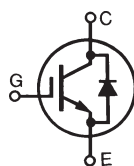


1200V XPT™ IGBT GenX3™ w/ Diode

IXYB82N120C3H1

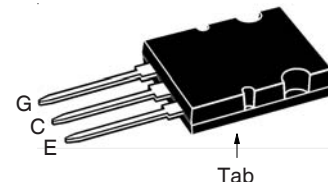
High-Speed IGBT
for 20-50 kHz Switching



$$\begin{aligned} V_{CES} &= 1200V \\ I_{C110} &= 82A \\ V_{CE(sat)} &\leq 3.2V \\ t_{fi(typ)} &= 93ns \end{aligned}$$

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ\text{C to } 150^\circ\text{C}$	1200	V
V_{CGR}	$T_J = 25^\circ\text{C to } 150^\circ\text{C}, R_{GE} = 1M\Omega$	1200	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ\text{C}$ (Chip Capability)	164	A
I_{LRMS}	Lead Current Limit	160	A
I_{C110}	$T_C = 110^\circ\text{C}$	82	A
I_{F110}	$T_C = 110^\circ\text{C}$	42	A
I_{CM}	$T_C = 25^\circ\text{C}, 1\text{ms}$	320	A
I_A	$T_C = 25^\circ\text{C}$	41	A
E_{AS}	$T_C = 25^\circ\text{C}$	800	mJ
SSOA (RBSOA)	$V_{GE} = 15V, T_{VJ} = 125^\circ\text{C}, R_G = 2\Omega$ Clamped Inductive Load	$I_{CM} = 164$ $@ V_{CE} \leq V_{CES}$	A
P_C	$T_C = 25^\circ\text{C}$	1040	W
T_J		-55 ... +150	$^\circ\text{C}$
T_{JM}		150	$^\circ\text{C}$
T_{stg}		-55 ... +150	$^\circ\text{C}$
T_L	Maximum Lead Temperature for Soldering	300	$^\circ\text{C}$
T_{SOLD}	1.6 mm (0.062in.) from Case for 10s	260	$^\circ\text{C}$
F_C	Mounting Force	30..120 / 6.7..27	N/lb.
Weight		10	g

PLUS264™



G = Gate C = Collector
E = Emitter Tab = Collector

Features

- Optimized for Low Switching Losses
- Square RBSOA
- Anti-Parallel Ultra Fast Diode
- Positive Thermal Coefficient of $V_{ce(sat)}$
- Avalanche Rated
- High Current Handling Capability
- International Standard Package

Advantages

- High Power Density
- Low Gate Drive Requirement

Applications

- High Frequency Power Inverters
- UPS
- Motor Drives
- SMPS
- PFC Circuits
- Battery Chargers
- Welding Machines
- Lamp Ballasts

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{CES}	$I_C = 250\mu\text{A}, V_{GE} = 0V$	1200		V
$V_{GE(th)}$	$I_C = 250\mu\text{A}, V_{CE} = V_{GE}$	3.0		5.0 V
I_{CES}	$V_{CE} = V_{CES}, V_{GE} = 0V$ $T_J = 125^\circ\text{C}$			50 μA 3 mA
I_{GES}	$V_{CE} = 0V, V_{GE} = \pm 20V$			± 100 nA
$V_{CE(sat)}$	$I_C = 82A, V_{GE} = 15V, \text{Note 1}$ $T_J = 125^\circ\text{C}$		2.75 3.50	V V

Symbol Test Conditions

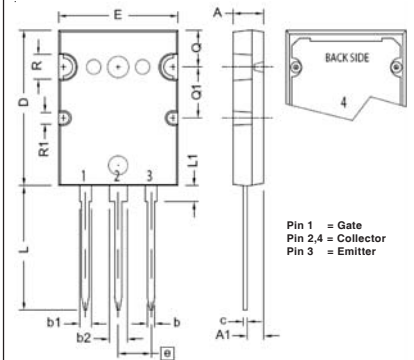
($T_J = 25^\circ\text{C}$ Unless Otherwise Specified)

Characteristic Values

Min. Typ. Max.

g_{fs}	$I_C = 60\text{A}, V_{CE} = 10\text{V}, \text{Note 1}$	30	50	S
C_{ies}	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		4060	pF
C_{oes}			285	pF
C_{res}			110	pF
$Q_{g(on)}$	$I_C = 82\text{A}, V_{GE} = 15\text{V}, V_{CE} = 0.5 \cdot V_{CES}$		215	nC
Q_{ge}			26	nC
Q_{gc}			84	nC
$t_{d(on)}$	Inductive load, $T_J = 25^\circ\text{C}$ $I_C = 80\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 0.5 \cdot V_{CES}, R_G = 2\Omega$ Note 2		29	ns
t_{ri}			78	ns
E_{on}			4.95	mJ
$t_{d(off)}$			192	ns
t_{fi}			93	ns
E_{off}			2.78	mJ
$t_{d(on)}$	Inductive load, $T_J = 125^\circ\text{C}$ $I_C = 80\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 0.5 \cdot V_{CES}, R_G = 2\Omega$ Note 2		29	ns
t_{ri}			90	ns
E_{on}			7.45	mJ
$t_{d(off)}$			200	ns
t_{fi}			95	ns
E_{off}			3.70	mJ
R_{thJC}				0.12 $^\circ\text{C/W}$
R_{thCS}		0.13		$^\circ\text{C/W}$

PLUS264™ (IXYB) Outline



Dim.	Millimeter		Inches	
	min	max	min	max
A	4.70	5.31	0.185	0.209
A1	2.59	3.00	0.102	0.118
b	0.94	1.40	0.037	0.055
b1	2.21	2.59	0.087	0.102
b2	2.79	3.20	0.110	0.126
c	0.43	0.74	0.017	0.029
D	25.58	26.59	1.007	1.047
E	19.30	20.29	0.760	0.799
e	5.45 BSC		0.215 BSC	
L	19.79	21.39	0.779	0.842
L1	2.21	2.59	0.087	0.102
Q	6.10	6.50	0.240	0.256
Q1	8.38	8.79	0.330	0.346
Q R	3.94	4.75	0.155	0.187
Q R1	2.16	2.36	0.085	0.093

Reverse Diode (FRED)

Symbol Test Conditions

($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)

Characteristic Values

Min. Typ. Max.

V_F	$I_F = 60\text{A}, V_{GE} = 0\text{V}, \text{Note 1}$	$T_J = 125^\circ\text{C}$		2.7 V
			1.9	V
I_{RM}	$I_F = 60\text{A}, V_{GE} = 0\text{V},$ $-di_F/dt = 700\text{A}/\mu\text{s}, V_R = 600\text{V}$	$T_J = 125^\circ\text{C}$	41	A
t_{rr}			420	ns
R_{thJC}				0.35 $^\circ\text{C/W}$

Notes:

1. Pulse test, $t \leq 300\mu\text{s}$, duty cycle, $d \leq 2\%$.
2. Switching times & energy losses may increase for higher $V_{CE}(\text{clamp})$, T_J or R_G .

IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:	4,835,592	4,931,844	5,049,961	5,237,481	6,162,665	6,404,065 B1	6,683,344	6,727,585	7,005,734 B2	7,157,338B2
	4,860,072	5,017,508	5,063,307	5,381,025	6,259,123 B1	6,534,343	6,710,405 B2	6,759,692	7,063,975 B2	
	4,881,106	5,034,796	5,187,117	5,486,715	6,306,728 B1	6,583,505	6,710,463	6,771,478 B2	7,071,537	

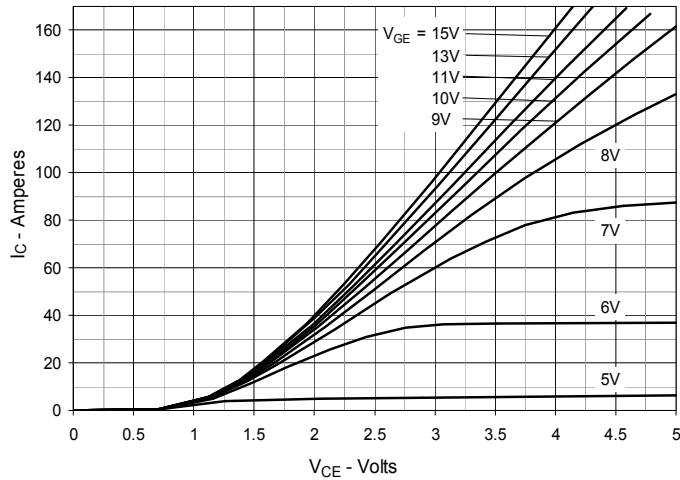
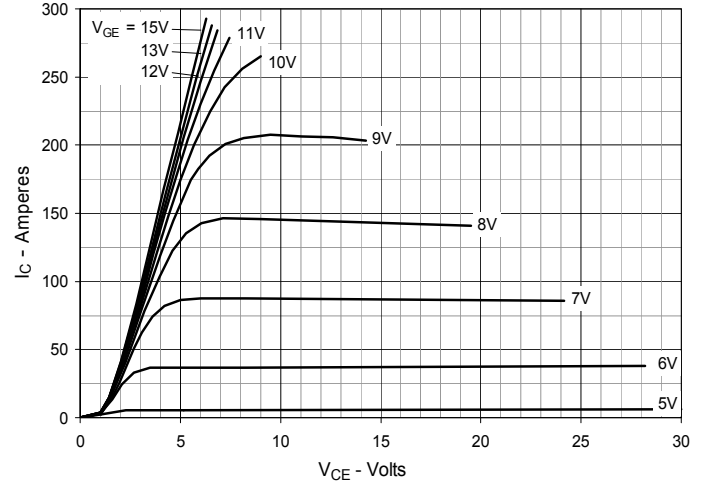
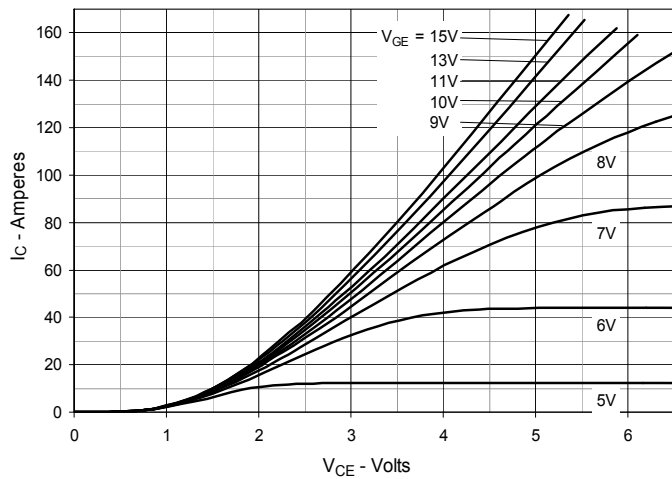
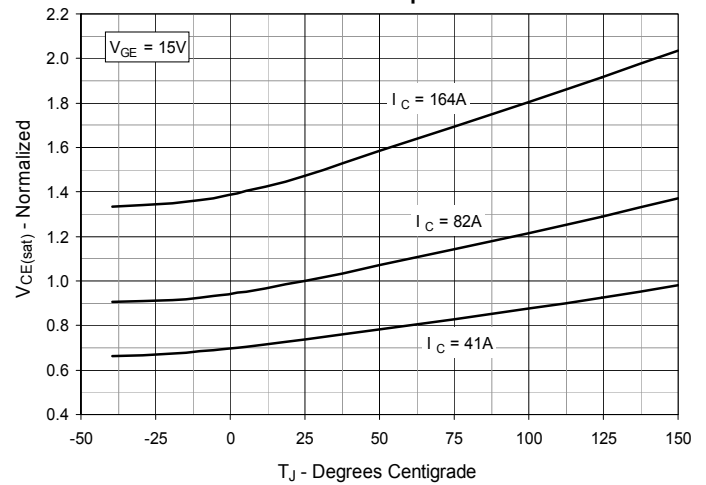
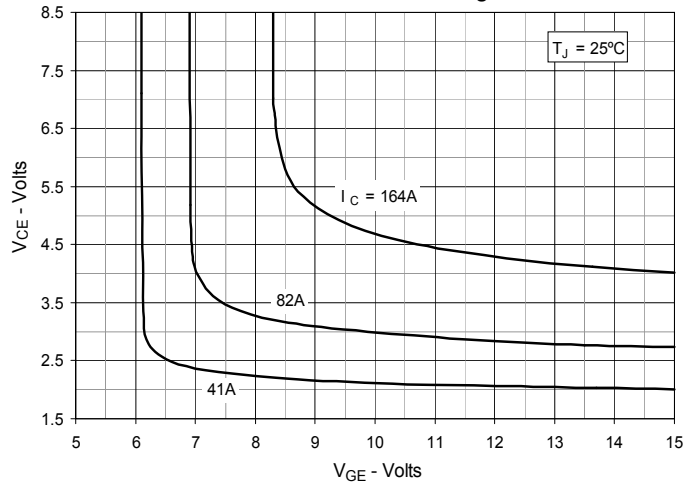
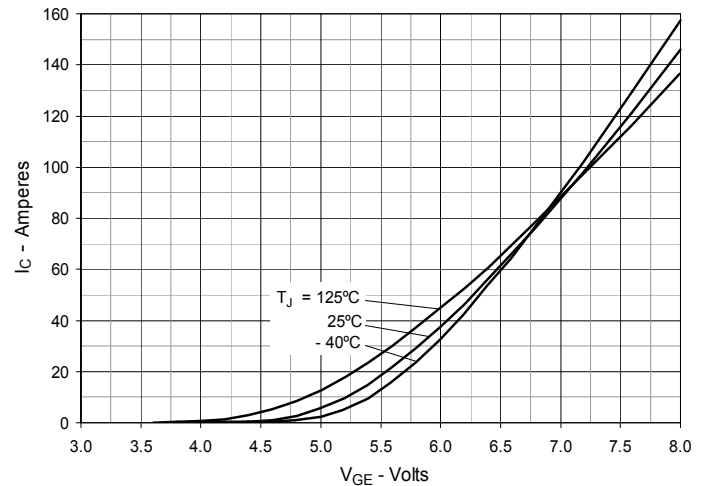
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

Fig. 3. Output Characteristics @ $T_J = 125^\circ\text{C}$

Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

Fig. 6. Input Admittance


Fig. 7. Transconductance

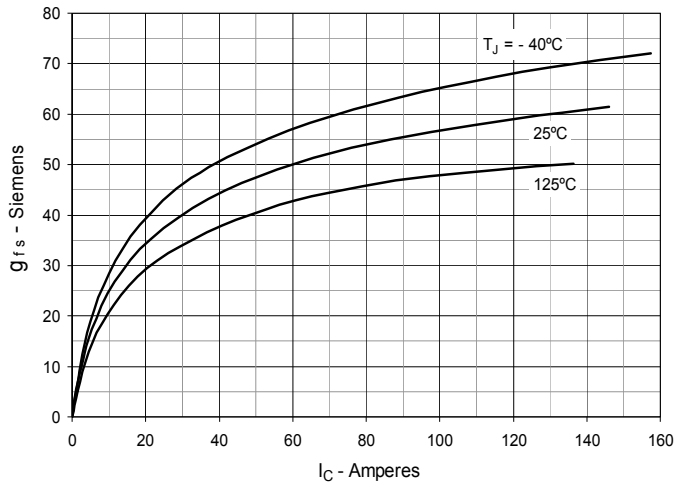


Fig. 8. Gate Charge

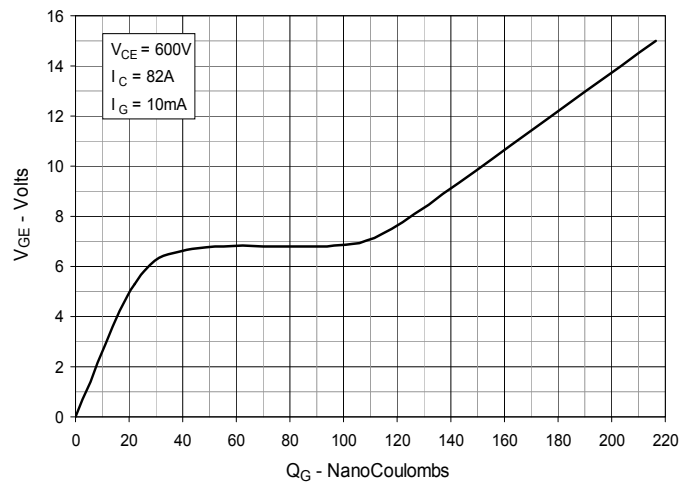


Fig. 9. Capacitance

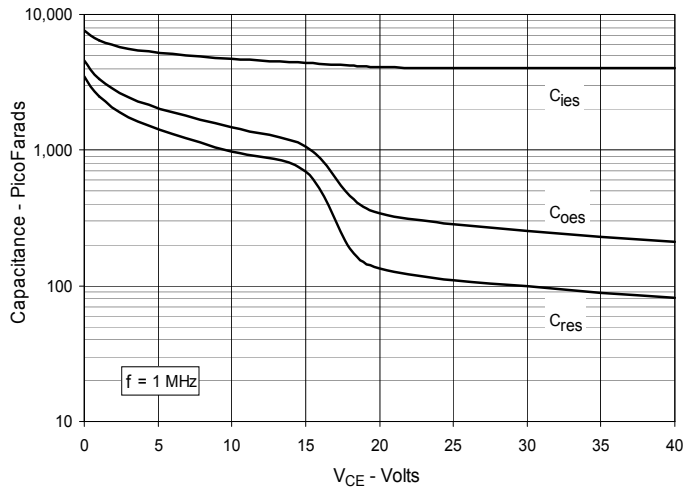


Fig. 10. Reverse-Bias Safe Operating Area

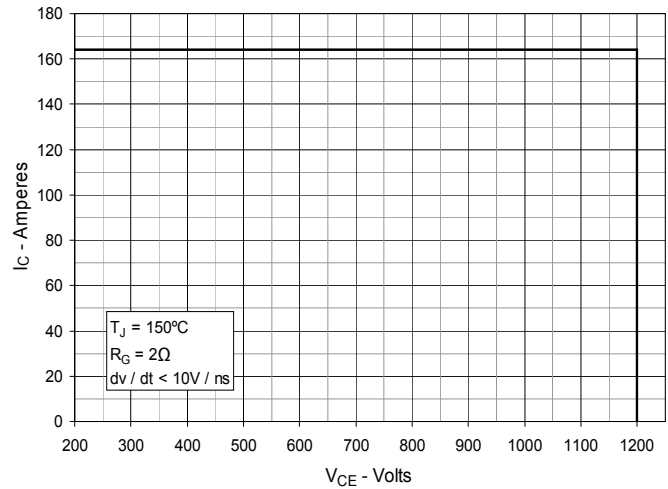


Fig. 11. Maximum Transient Thermal Impedance

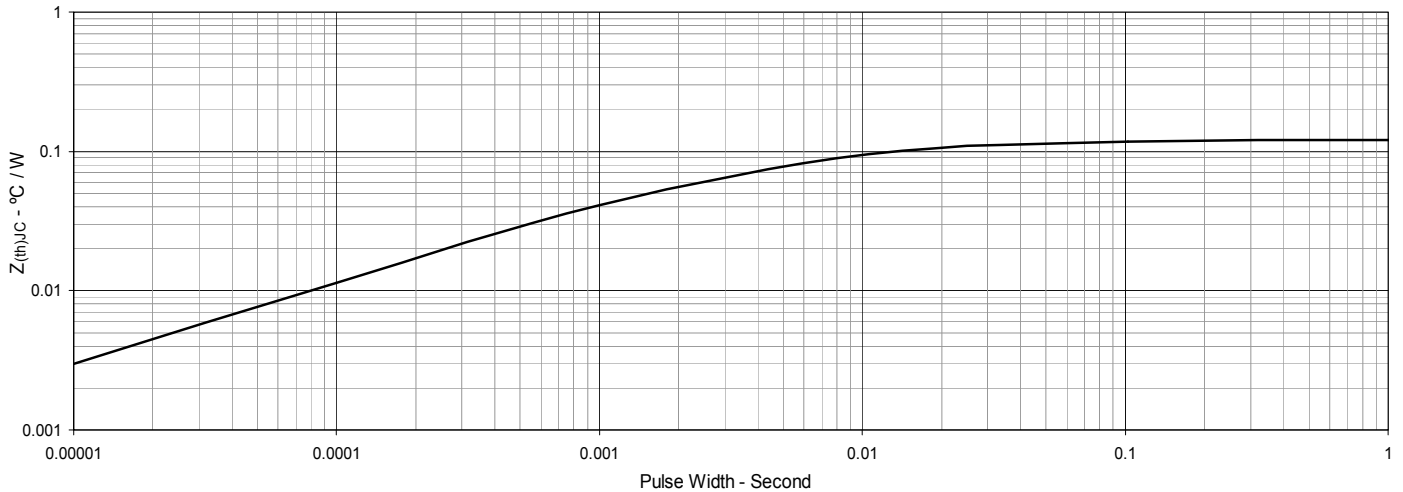


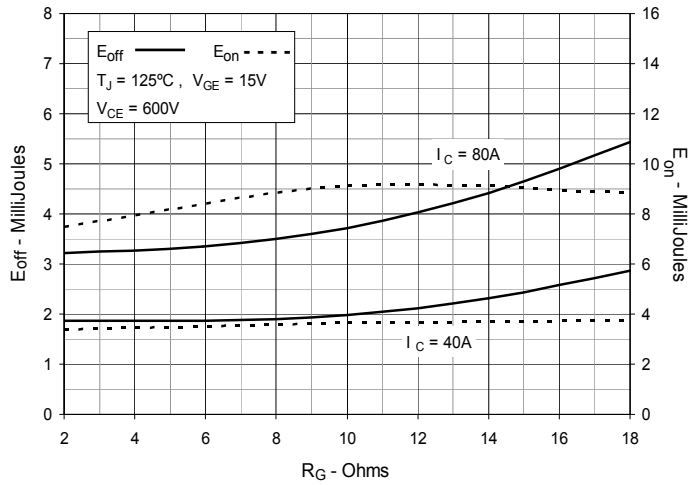
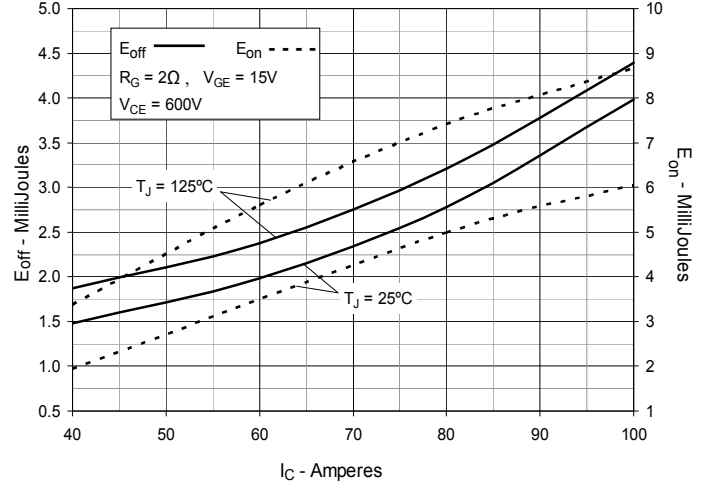
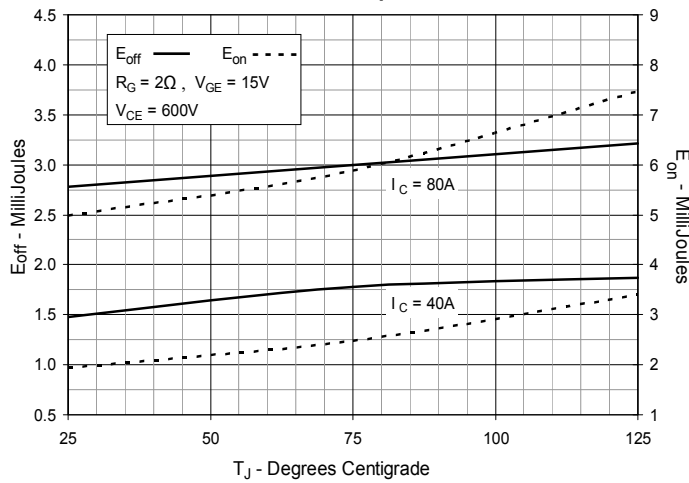
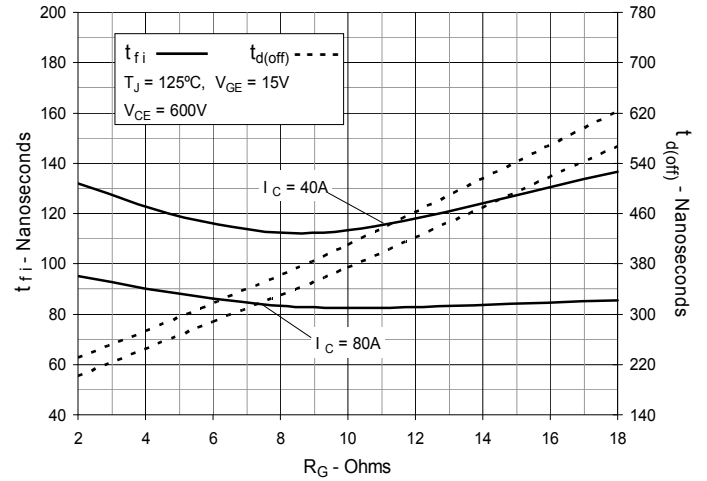
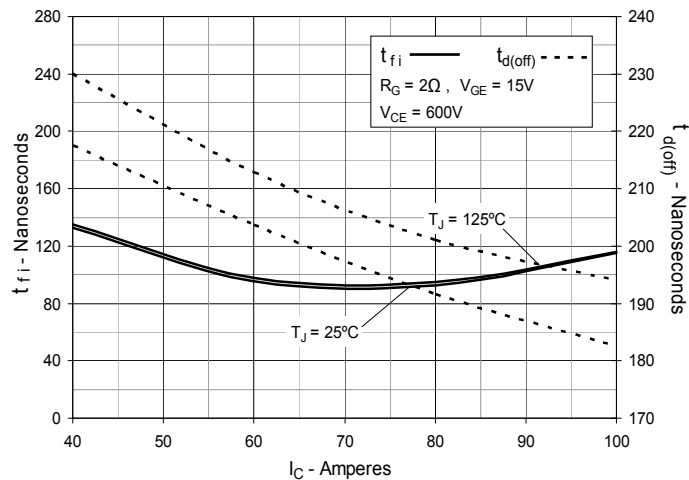
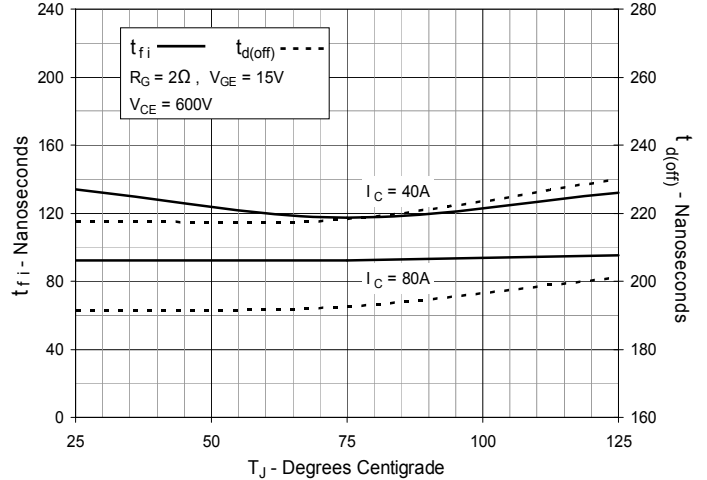
Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

Fig. 13. Inductive Switching Energy Loss vs. Collector Current

Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature


Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

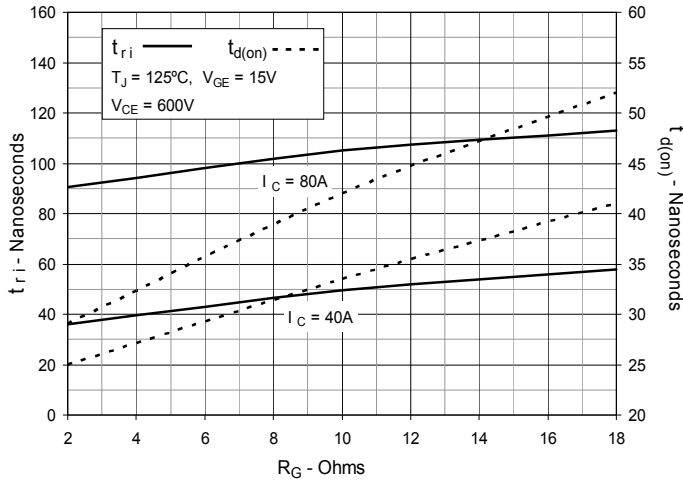


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

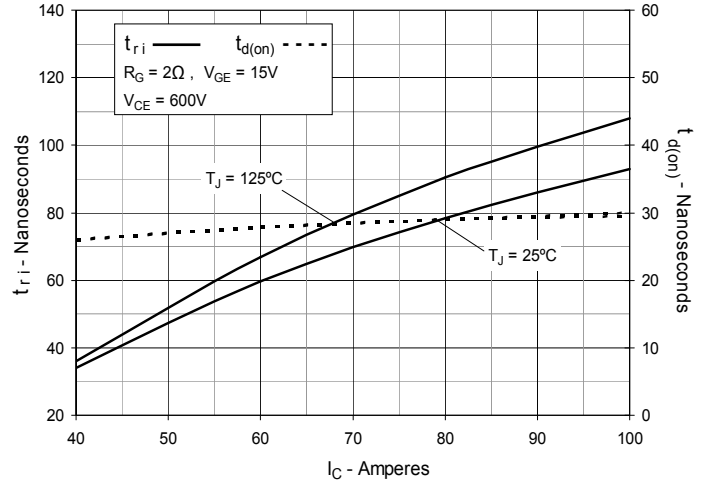


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature

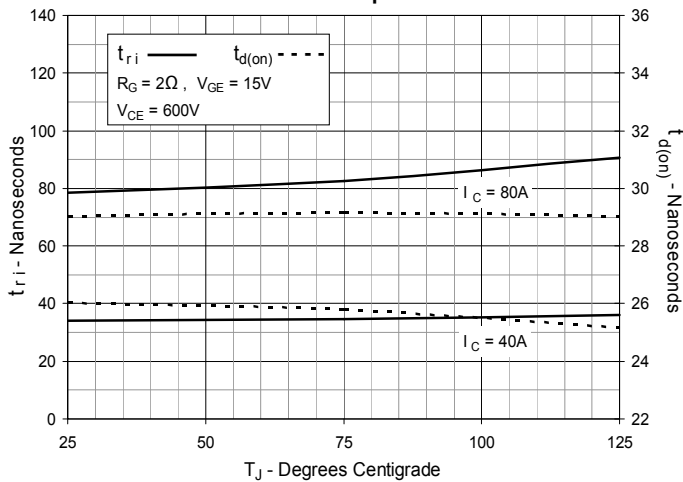


Fig. 21. Typ. Forward Characteristics

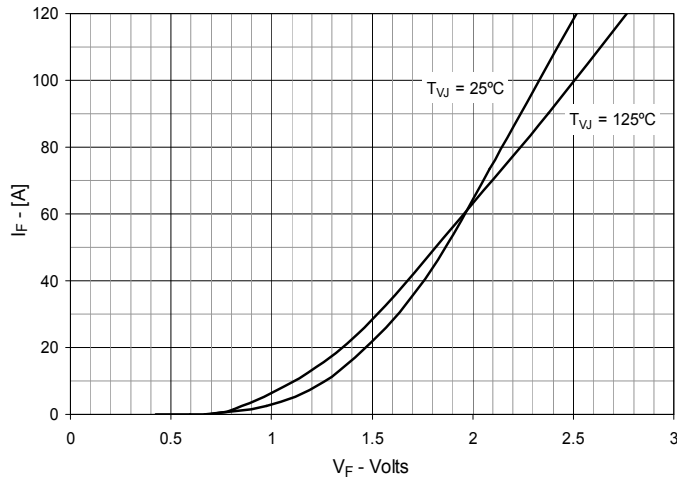


Fig. 22. Typ. Reverse Recovery Charge Q_{rr} vs. $-di_F/dt$

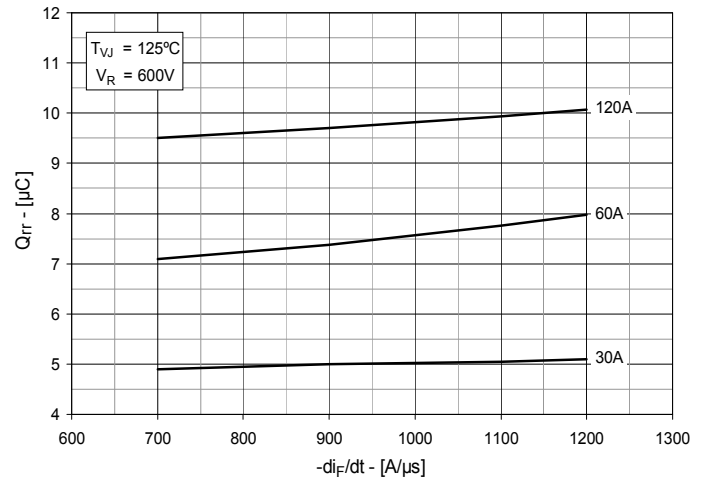


Fig. 23. Typ. Peak Reverse Current I_{RM} vs. $-di_F/dt$

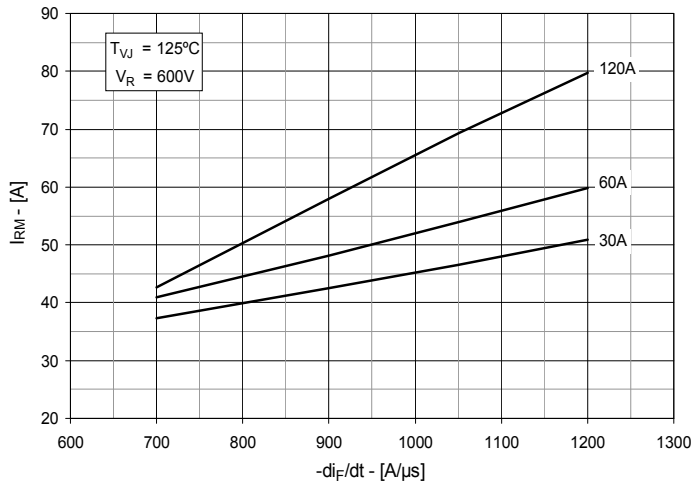


Fig. 24. Typ. Recovery Time t_{rr} vs. $-di_F/dt$

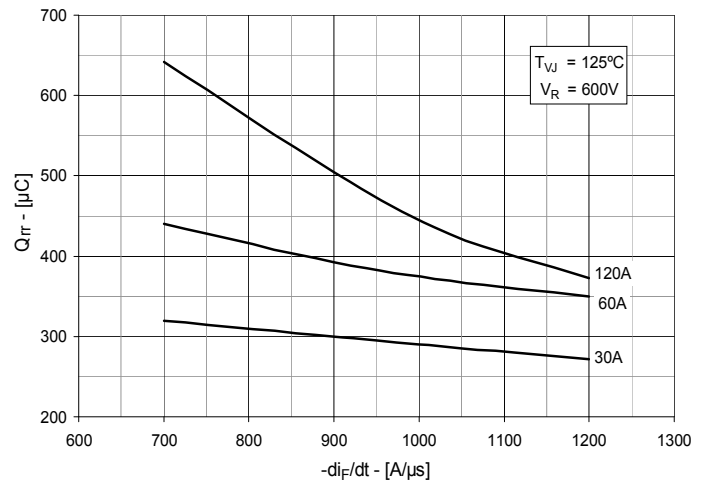


Fig. 25. Typ. Recovery Energy E_{rec} vs. $-di_F/dt$

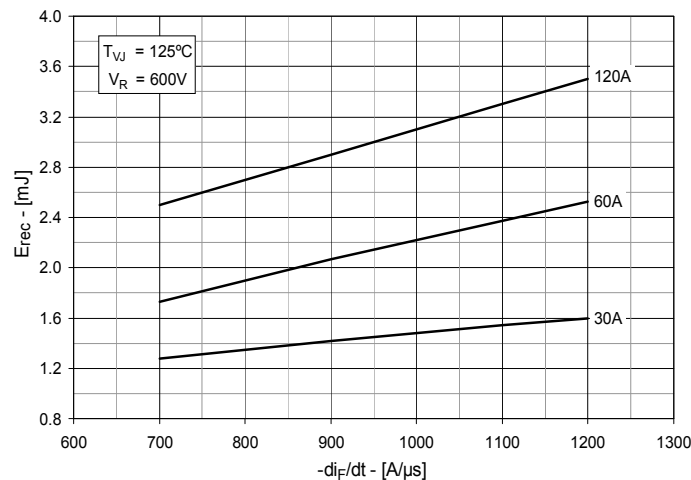
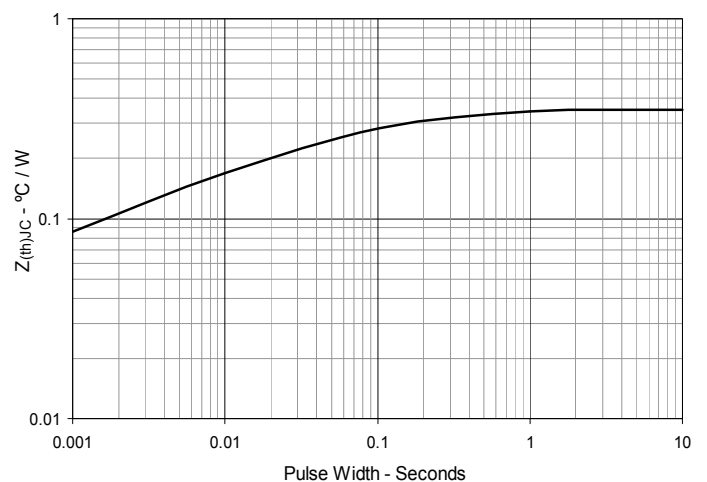


Fig. 26. Maximum Transient Thermal Impedance



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