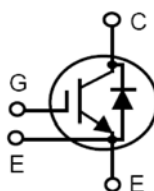


1200V XPT™ IGBT GenX3™ w/ Diode

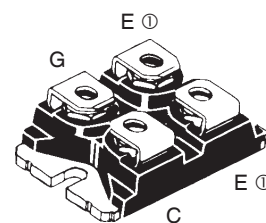
IXYN82N120C3H1

High-Speed IGBT
for 20-50 kHz Switching



$$\begin{aligned} V_{CES} &= 1200V \\ I_{C110} &= 46A \\ V_{CE(sat)} &\leq 3.2V \\ t_{fi(typ)} &= 93ns \end{aligned}$$

SOT-227B, miniBLOC
 E153432



G = Gate, C = Collector, E = Emitter
① either emitter terminal can be used as Main or Kelvin Emitter

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ\text{C}$ to 150°C	1200	V
V_{CGR}	$T_J = 25^\circ\text{C}$ to 150°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)	105	A
I_{C110}	$T_C = 110^\circ\text{C}$	46	A
I_{F110}	$T_C = 110^\circ\text{C}$	42	A
I_{CM}	$T_C = 25^\circ\text{C}$, 1ms	320	A
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	$T_C = 25^\circ\text{C}$	500	W
T_J		-55 ... +150	$^\circ\text{C}$
T_{JM}		150	$^\circ\text{C}$
T_{stg}		-55 ... +150	$^\circ\text{C}$
V_{ISOL}	50/60Hz	$t = 1\text{min}$	2500 V~
	$I_{ISOL} \leq 1\text{mA}$	$t = 1\text{s}$	3000 V~
M_d	Mounting Torque	1.5/13	Nm/lb.in.
	Terminal Connection Torque	1.3/11.5	Nm/lb.in.
Weight		30	g

Features

- Optimized for Low Switching Losses
- Square RBSOA
- Isolation Voltage 2500V~
- Anti-Parallel Ultra Fast Diode
- Positive Thermal Coefficient of $V_{ce(sat)}$
- 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
$V_{CE(sat)}$	$I_C = 82A$, $V_{GE} = 15V$, Note 1 $T_J = 125^\circ\text{C}$		2.75 3.50	3.20 V V

Symbol Test Conditions

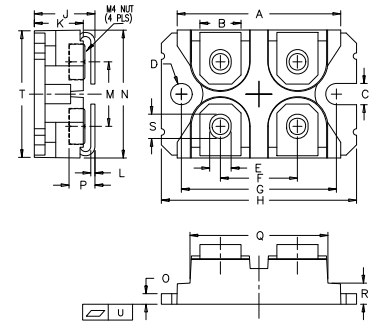
(T_J = 25°C Unless Otherwise Specified)

Characteristic Values

Min. Typ. Max.

g_{fs}	I _C = 60A, V _{CE} = 10V, Note 1	30	50	S
C_{ies}	V _{CE} = 25V, V _{GE} = 0V, f = 1MHz		4060	pF
C_{oes}			285	pF
C_{res}			110	pF
Q_{g(on)}	I _C = 75A, V _{GE} = 15V, V _{CE} = 0.5 • V _{CES}		215	nC
Q_{ge}			26	nC
Q_{gc}			84	nC
t_{d(on)}	Inductive load, T _J = 25°C I _C = 80A, V _{GE} = 15V V _{CE} = 0.5 • V _{CES} , R _G = 2Ω 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°C I _C = 80A, V _{GE} = 15V V _{CE} = 0.5 • V _{CES} , R _G = 2Ω 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}				0.25 °C/W
R_{thCS}		0.05		°C/W

SOT-227B miniBLOC (IXYN)



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	1.240	1.255	31.50	31.88
B	.307	.323	7.80	8.20
C	.161	.169	4.09	4.29
D	.161	.169	4.09	4.29
E	.161	.169	4.09	4.29
F	.587	.595	14.91	15.11
G	1.186	1.193	30.12	30.30
H	1.496	1.505	38.00	38.23
J	.460	.481	11.68	12.22
K	.351	.378	8.92	9.60
L	.030	.033	0.76	0.84
M	.496	.506	12.60	12.85
N	.990	1.001	25.15	25.42
O	.078	.084	1.98	2.13
P	.195	.235	4.95	5.97
Q	1.045	1.059	26.54	26.90
R	.155	.174	3.94	4.42
S	.186	.191	4.72	4.85
T	.968	.987	24.59	25.07
U	-.002	.004	-0.05	0.1

Reverse Diode (FRED)

Symbol Test Conditions

(T_J = 25°C, Unless Otherwise Specified)

Characteristic Values

Min. Typ. Max.

V_F	I _F = 60A, V _{GE} = 0V, Note 1 T _J = 125°C	1.9	2.7 V
I_{RM}	I _F = 60A, V _{GE} = 0V, T _J = 125°C -di _F /dt = 700A/μs, V _R = 600V	41	A
t_{rr}		420	ns
R_{thJC}			0.42 °C/W

Notes:

1. Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.
2. Switching times & energy losses may increase for higher V_{CE} (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	

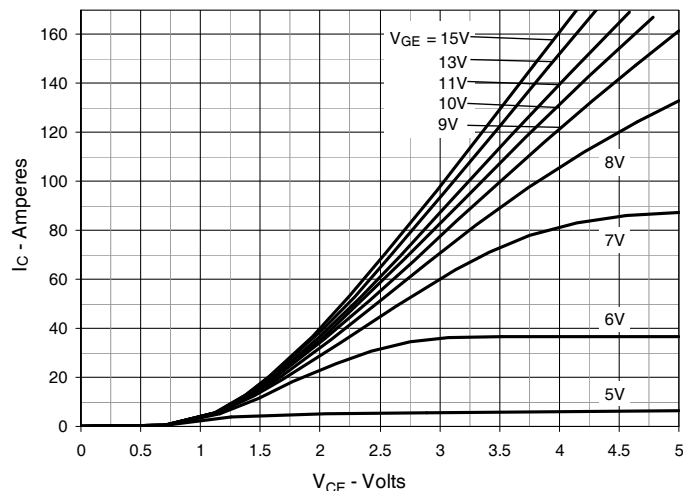
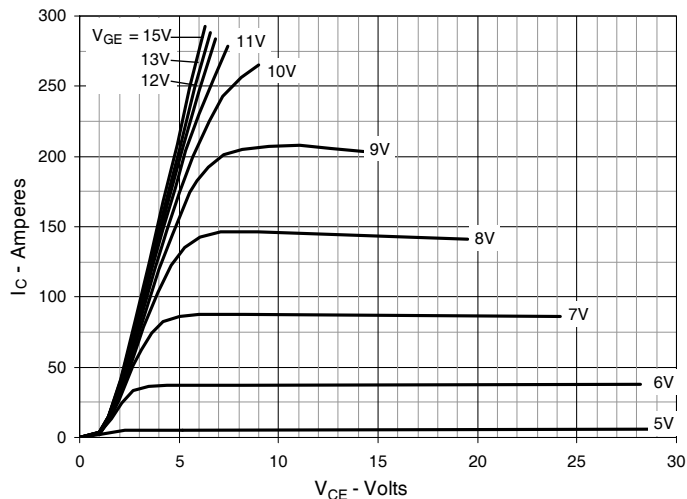
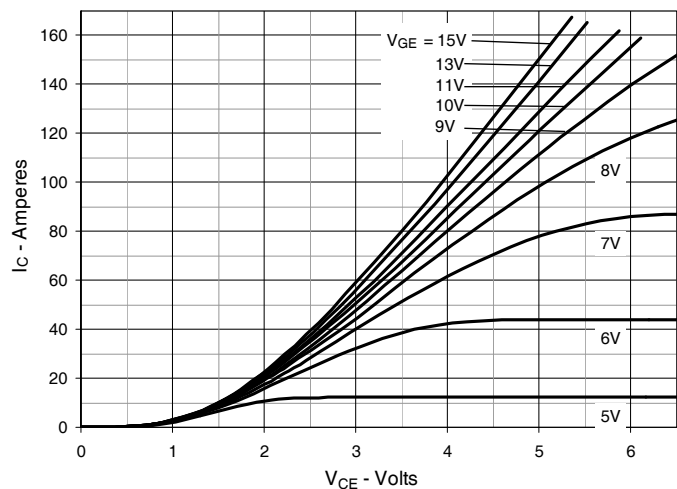
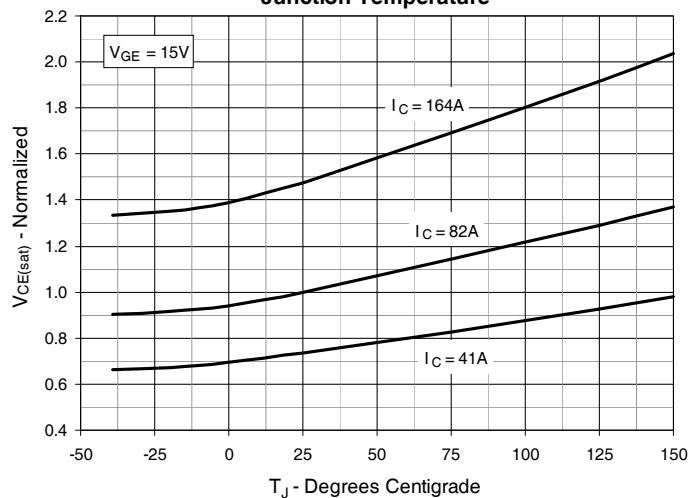
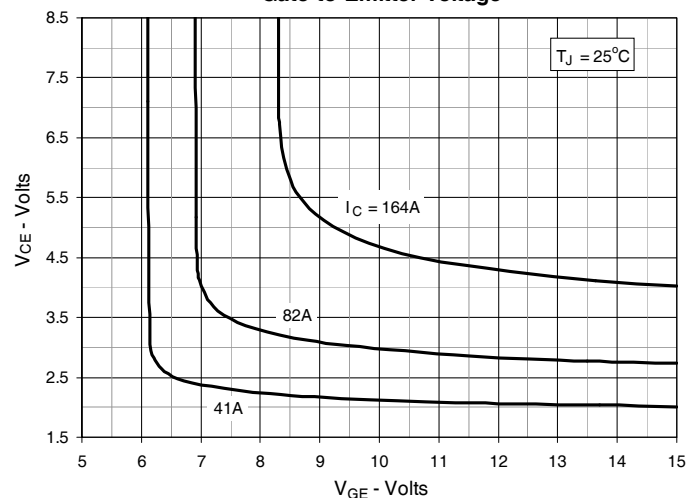
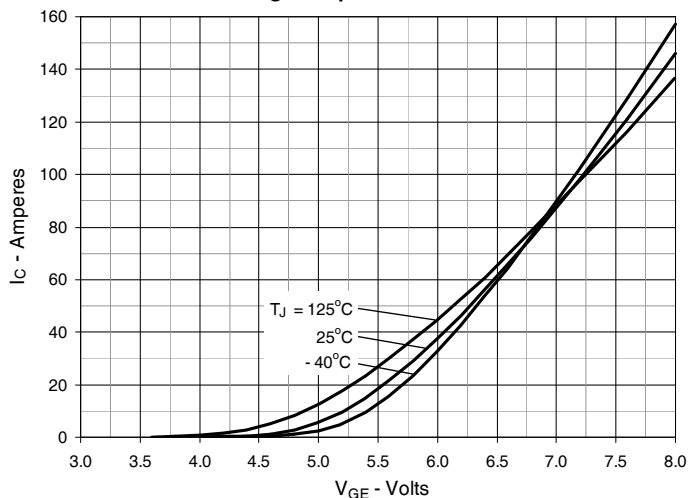
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

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


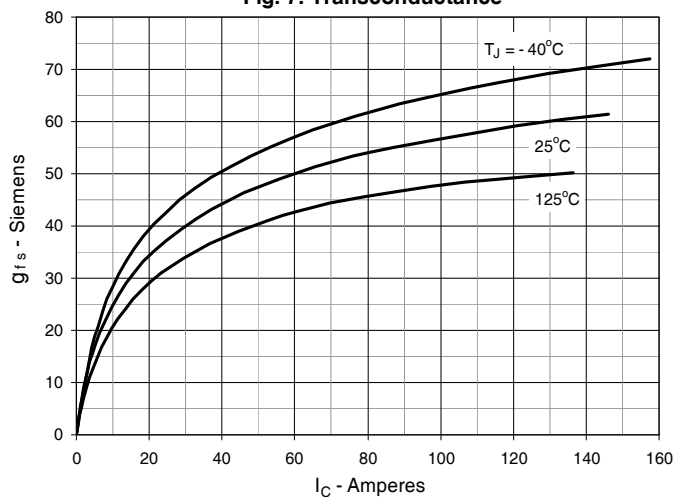
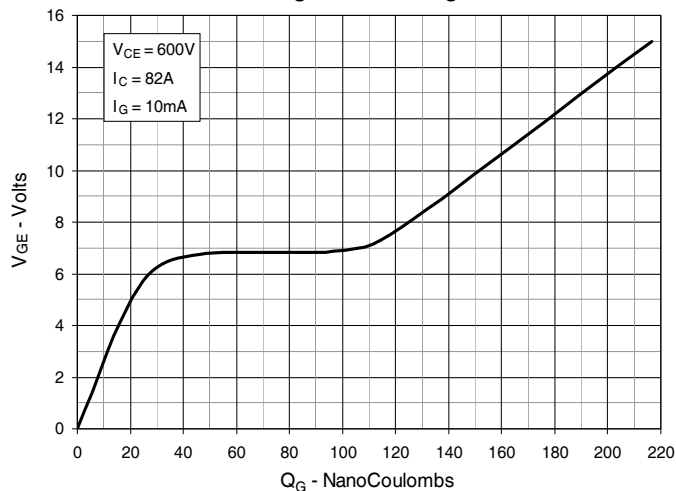
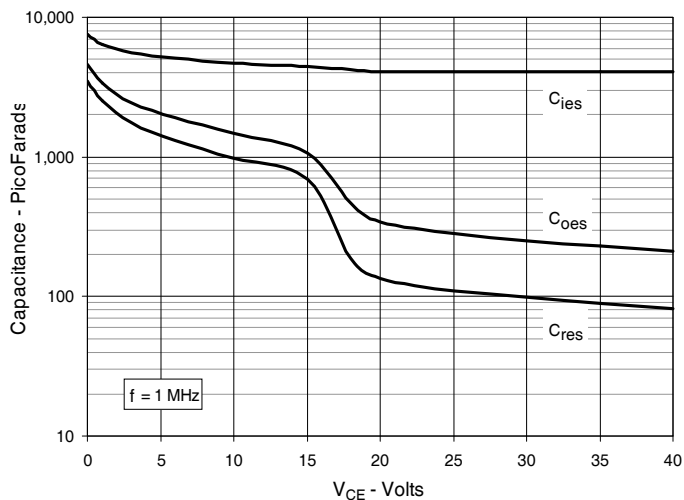
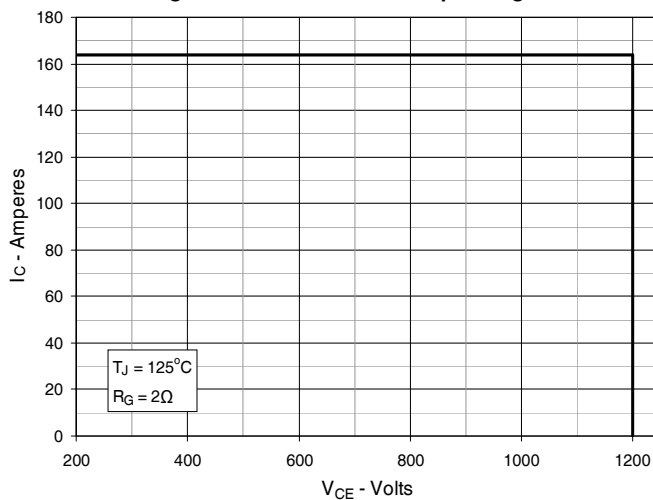
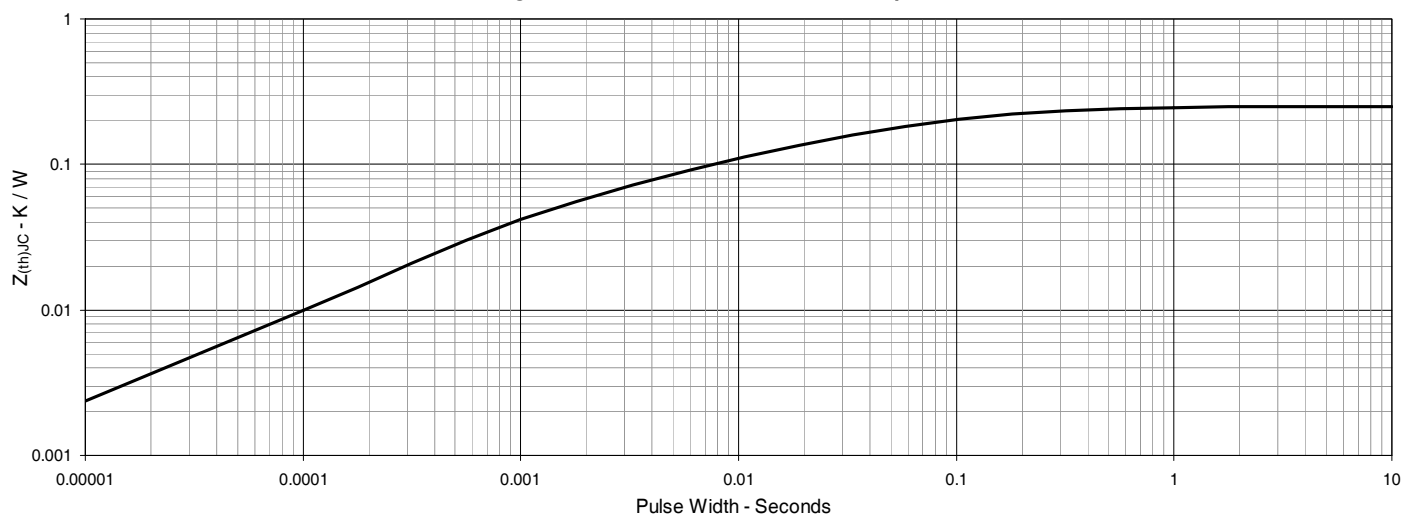
Fig. 7. Transconductance

Fig. 8. Gate Charge

Fig. 9. Capacitance

Fig. 10. Reverse-Bias Safe Operating Area

Fig. 11. Maximum Transient Thermal Impedance


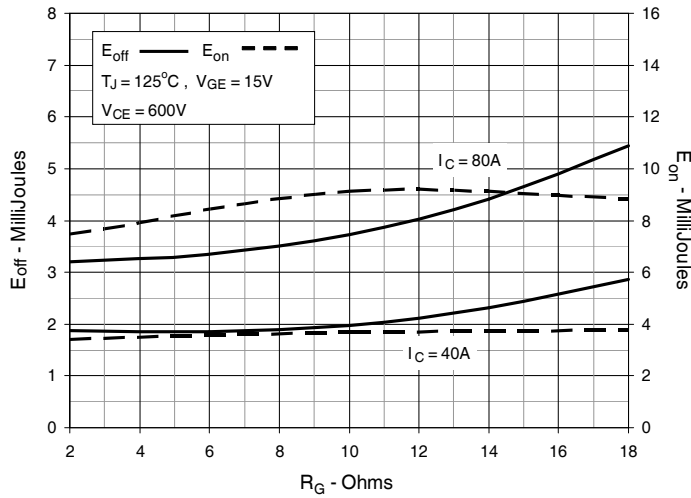
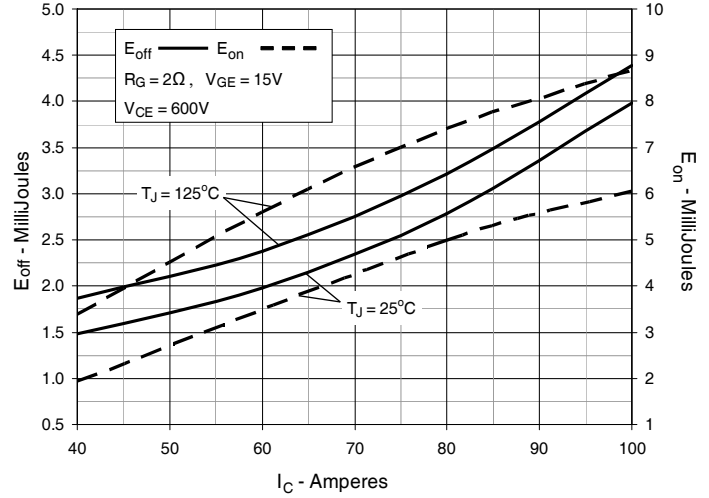
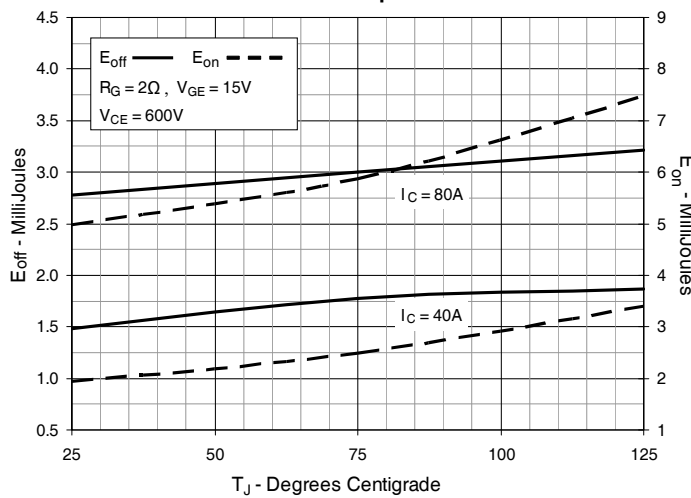
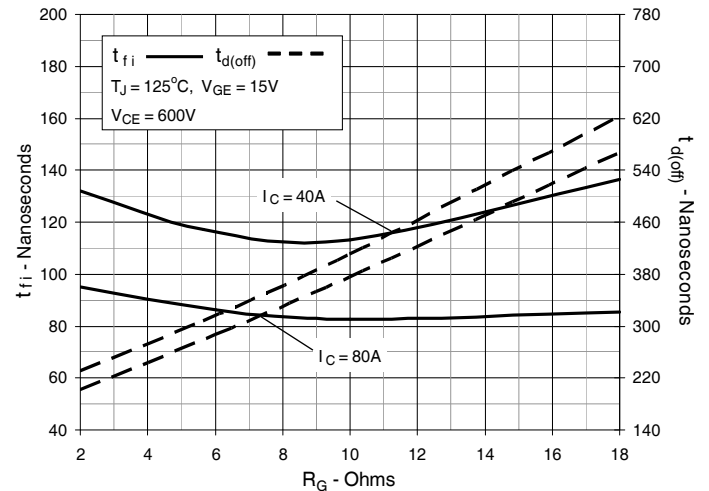
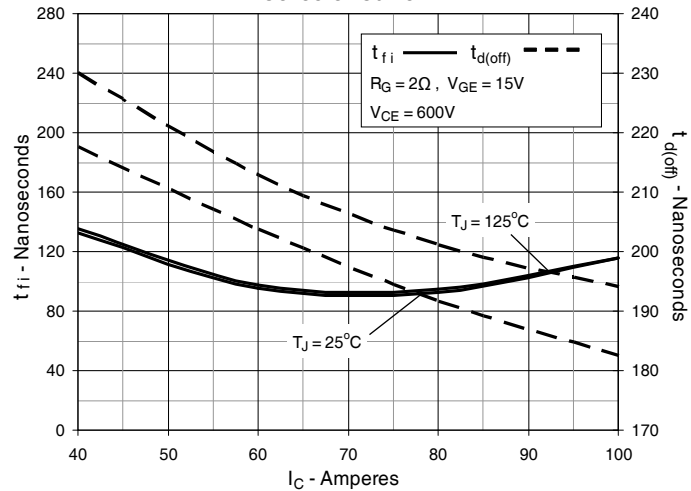
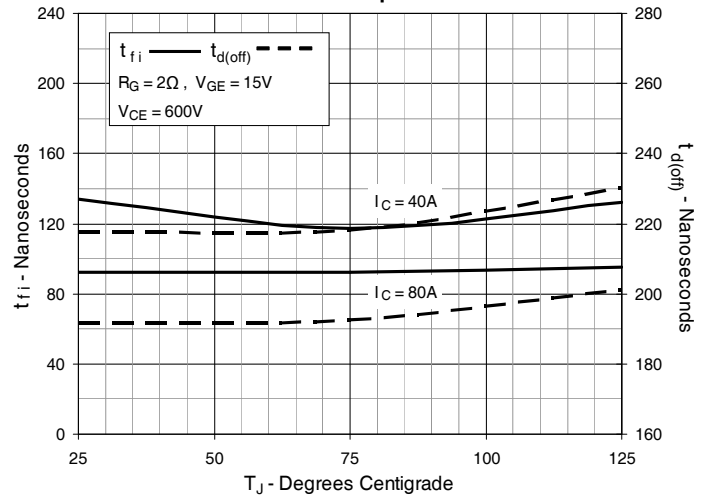
Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

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

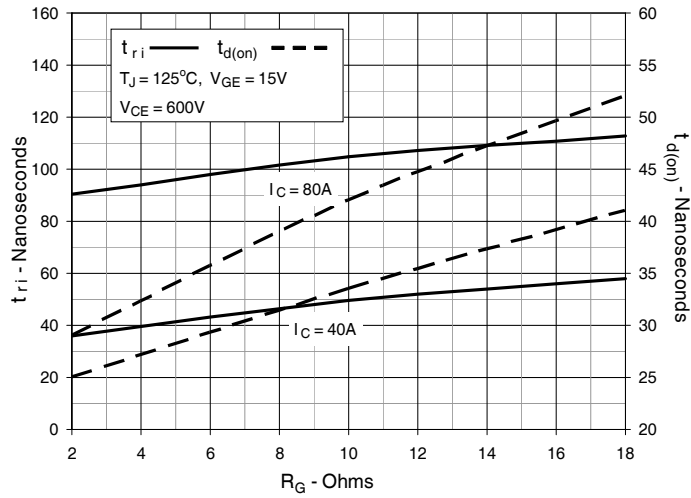


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

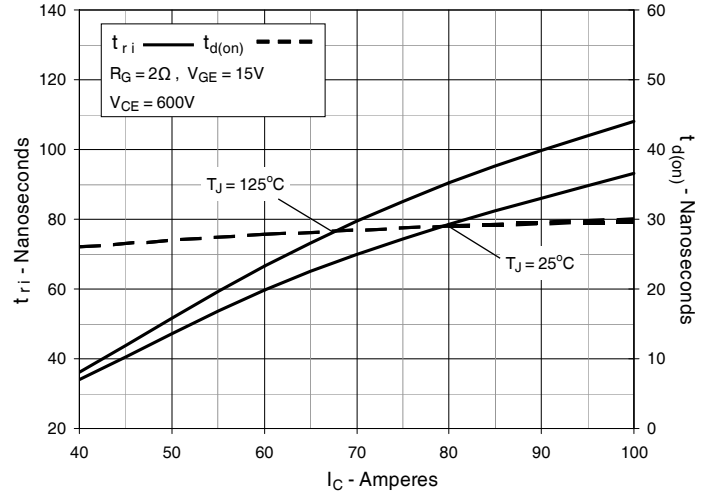


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature

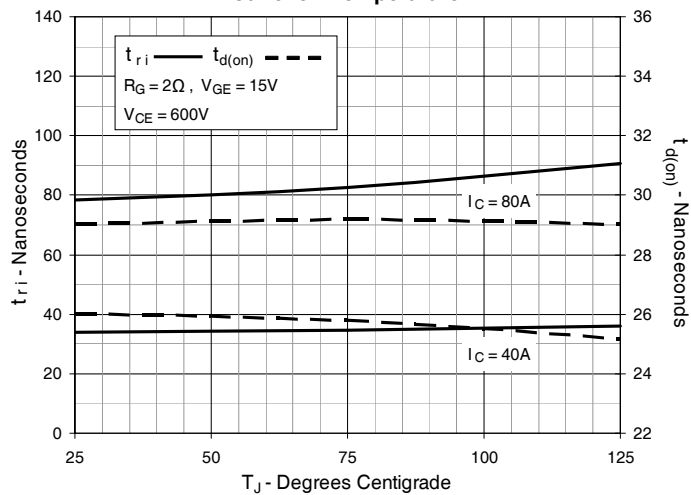


Fig. 21. Forward Characteristics

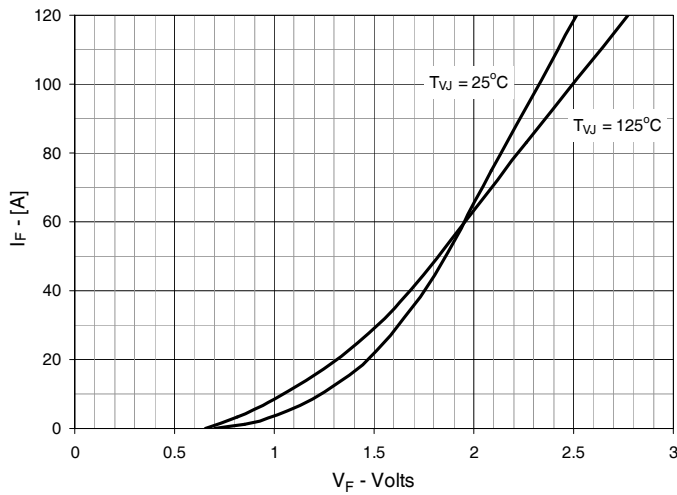


Fig. 22. Reverse Recovery Charge Q_{rr} vs. $-di_F/dt$

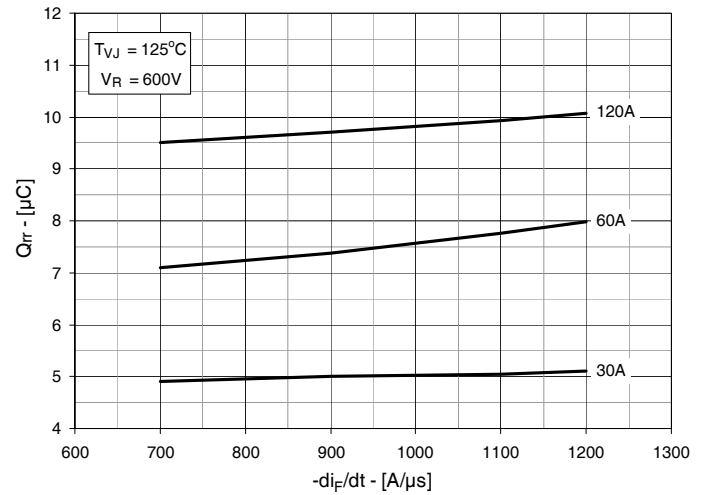


Fig. 23. Peak Reverse Current I_{RM} vs. $-di_F/dt$

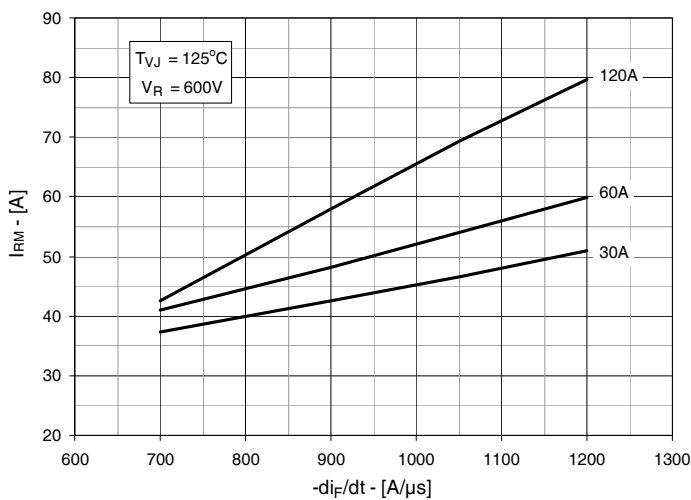


Fig. 24. Recovery Time t_{rr} vs. $-di_F/dt$

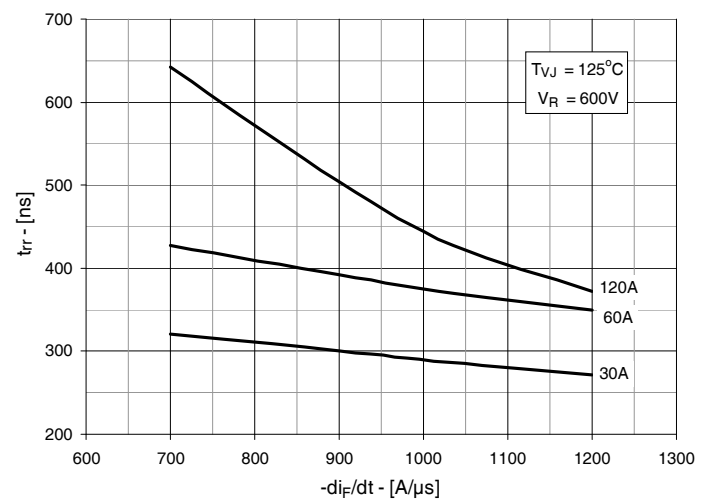


Fig. 25. Recovery Energy E_{rec} vs. $-di_F/dt$

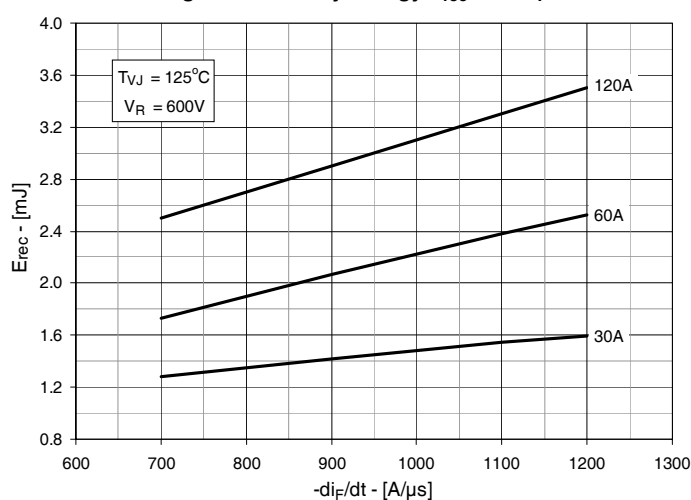
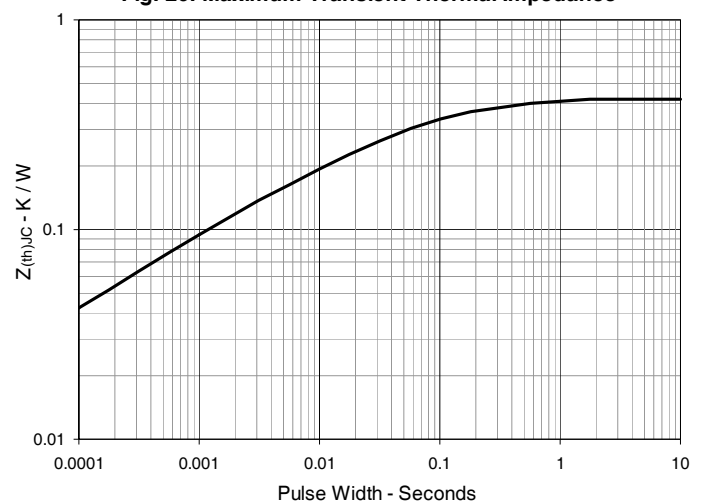


Fig. 26. Maximum Transient Thermal Impedance





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