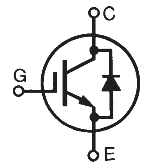
IXYS

GenX3™ 600V IGBT with Diode

IXGN72N60C3H1

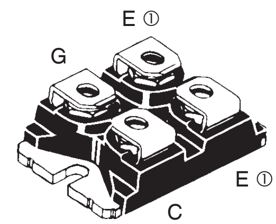
High-Speed Low-Vsat PT IGBTs 40-100 kHz Switching



V_{CES}	=	600V
I_{C110}	=	52A
$V_{CE(sat)}$	≤	2.50V
$t_{fi(typ)}$	=	55ns

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°C to 150°C	600	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	600	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C	78	A
I_{C110}	T_C = 110°C	52	A
I_{CM}	T_C = 25°C, 1ms	360	A
I_A	T_C = 25°C	50	A
E_{AS}	T_C = 25°C	500	mJ
SSOA (RBSOA)	V_{GE}= 15V, T_{VJ} = 125°C, R_G = 2Ω Clamped Inductive Load	I_{CM} = 150 @ $V_{CE} \le V_{CES}$	A
P_C	T_C = 25°C	360	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
V_{ISOL}	50/60Hz t = 1min $I_{ISOL} \le$ 1mA t = 1s	2500 3000	V~ V~
M_d	Mounting Torque Terminal Connection Torque	1.5/13 1.3/11.5	Nm/lb.in. Nm/lb.in.
Weight		30	g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
$V_{GE(th)}$	I_C = 250μA, V_{CE} = V_{GE}	3.0		5.5	V
I_{CES}	V_{CE} = V_{CES}, V_{GE} = 0V			250	μA
	T_J = 125°C			3	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±100	nA
$V_{CE(sat)}$	I_C = 50A, V_{GE} = 15V, Note 1		2.10	2.50	V
	T_J = 125°C		1.65		

Features

- Optimized for Low Switching Losses
- Square RBSOA
- Aluminium Nitride Isolation
  - High Power Dissipation
- Isolation Voltage 3000V~
- Avalanche Rated
- Anti-Parallel Ultra Fast Diode
- International Standard Package

Advantages

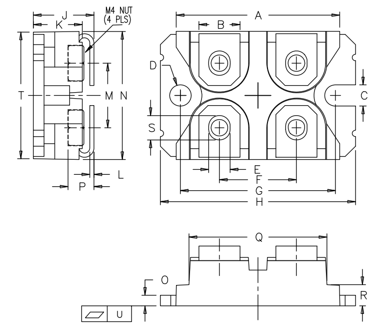
- High Power Density
- Low Gate Drive Requirement

Applications

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

Symbol	Test Conditions ($T_J = 25°C$, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	I_C = 50A, V_{CE} = 10V, Note 1	33	55		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		4780		pF
C_{oes}			330		pF
C_{res}			117		pF
Q_g	I_C = 50A, V_{GE} = 15V, $V_{CE} = 0.5 \cdot V_{CES}$		174		nC
Q_{ge}			33		nC
Q_{gc}			72		nC
$t_{d(on)}$	**Inductive load, $T_J = 25°C$**		27		ns
t_{ri}	I_C = 50A, V_{GE} = 15V		37		ns
E_{on}	V_{CE} = 480V, R_G = 2Ω, Note 2		1.03		mJ
$t_{d(off)}$			77	130	ns
t_{fi}			55	110	ns
E_{off}			0.48	0.95	mJ
$t_{d(on)}$	**Inductive load, $T_J = 125°C$**		26		ns
t_{ri}	I_C = 50A, V_{GE} = 15V		36		ns
E_{on}	V_{CE} = 480V, R_G = 2Ω, Note 2		1.48		mJ
$t_{d(off)}$			120		ns
t_{fi}			124		ns
E_{off}			0.93		mJ
R_{thJC}				0.35	°C/W
R_{thCS}			0.05		°C/W

SOT-227B miniBLOC



M4 screws (4x) supplied

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS 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			1.6	2.0	V
		T_J = 150°C		1.4	1.8	V
I_{RM}	I_F = 60A, V_{GE} = 0V,	T_J = 100°C		8.3		A
t_{rr}	$-di_F/dt$ = 200A/μs, V_R = 300V			140		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.

Fig. 1. Output Characteristics @ T_J = 25ºC

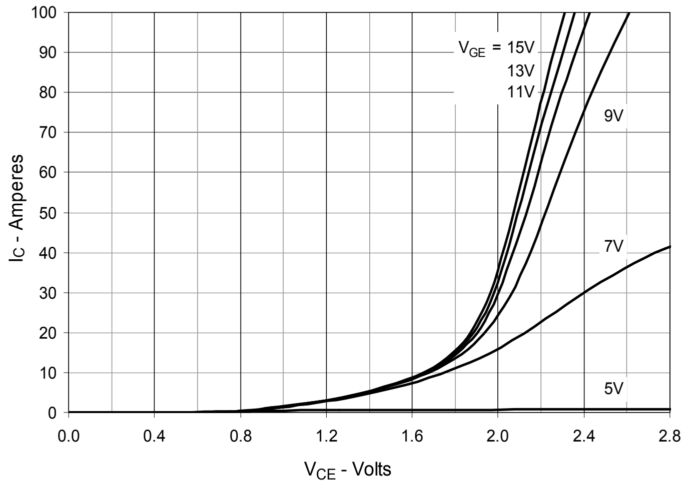


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

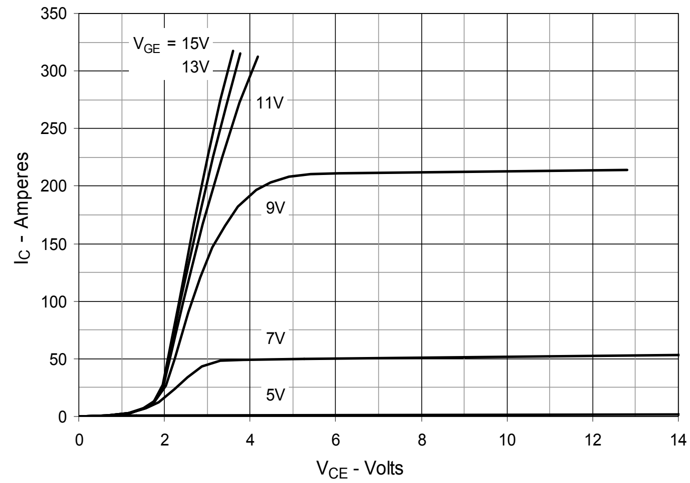


Fig. 3. Output Characteristics @ T_J = 125ºC

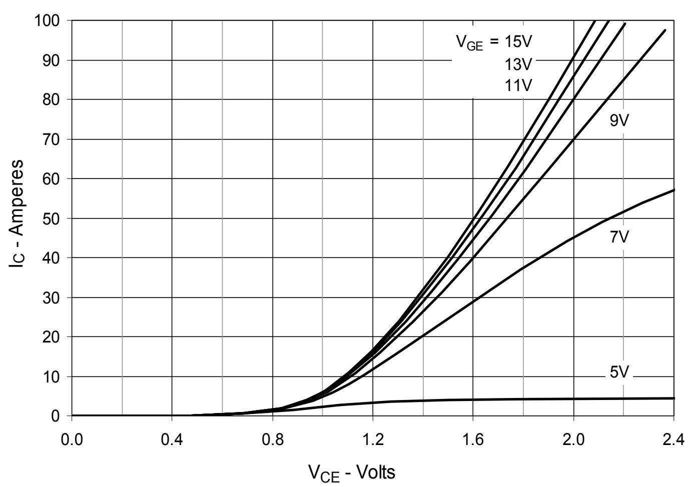


Fig. 4. Dependence of $V_{CE(sat)}$ on JunctionTemperature

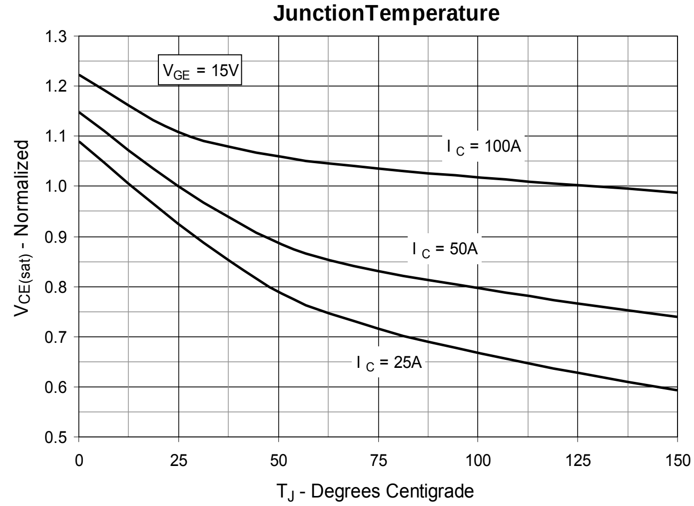


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

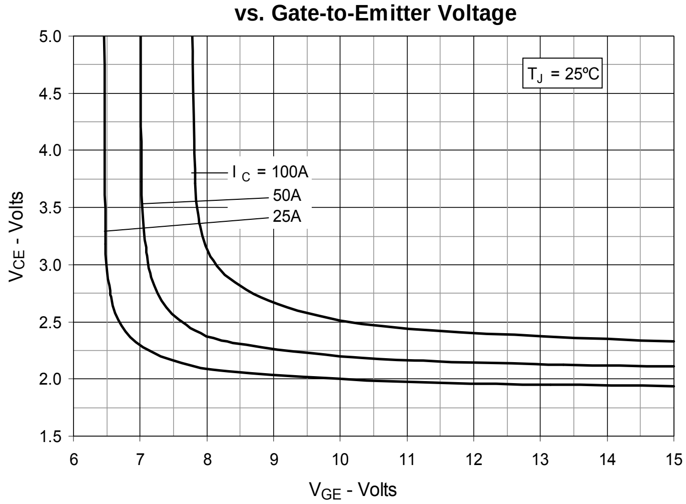


Fig. 6. Input Admittance

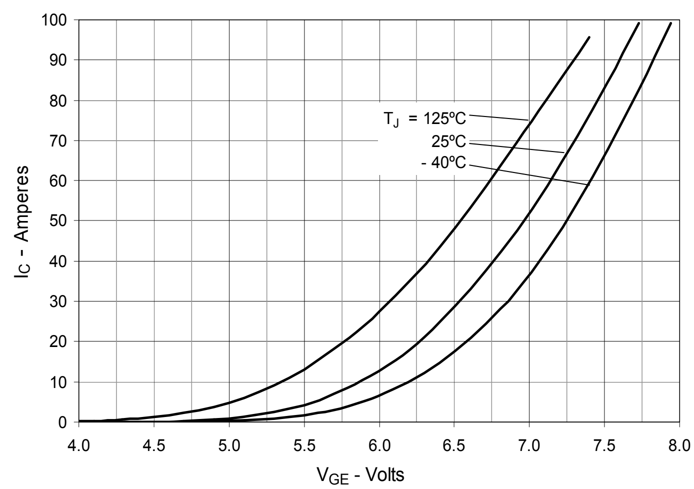


Fig. 7. Transconductance

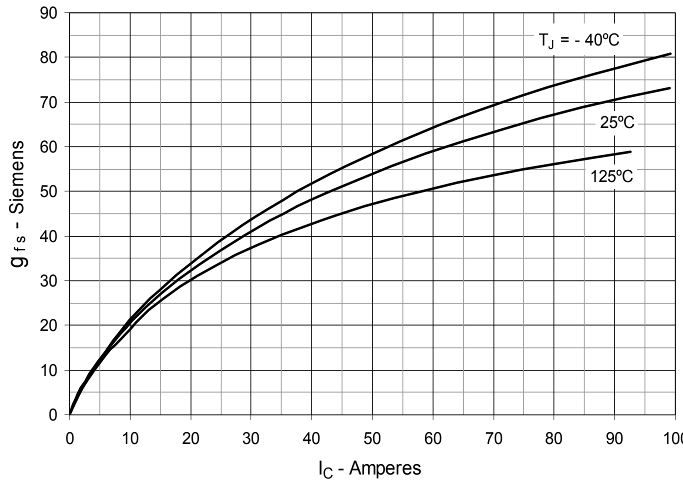


Fig. 8. Gate Charge

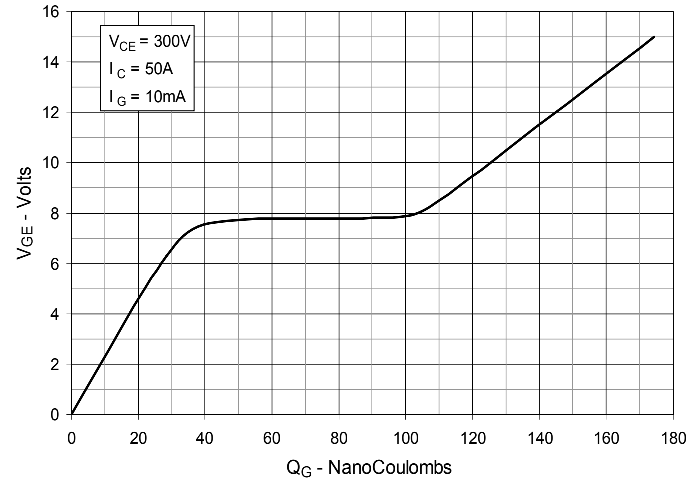


Fig. 9. Capacitance

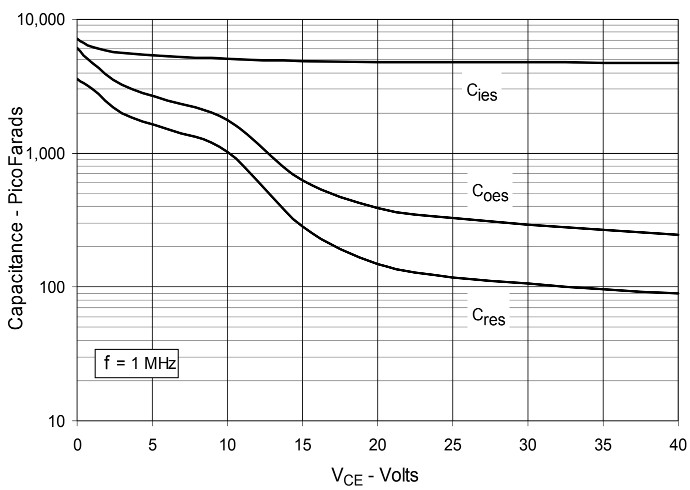


Fig. 10. Reverse-Bias Safe Operating Area

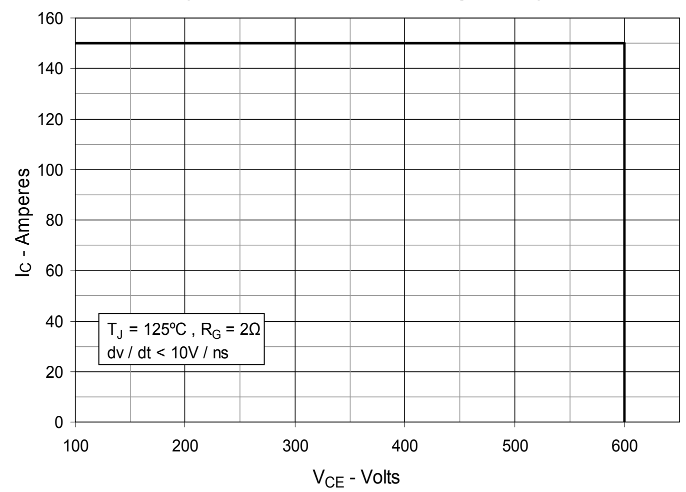


Fig. 11. Maximum Transient Thermal Impedance

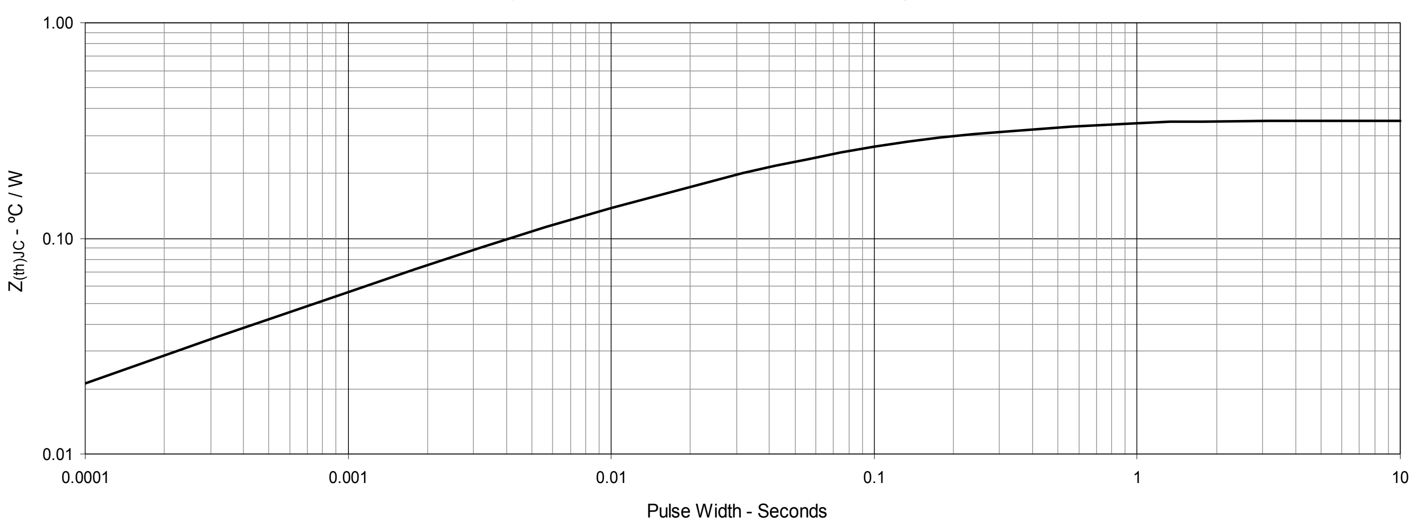


Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

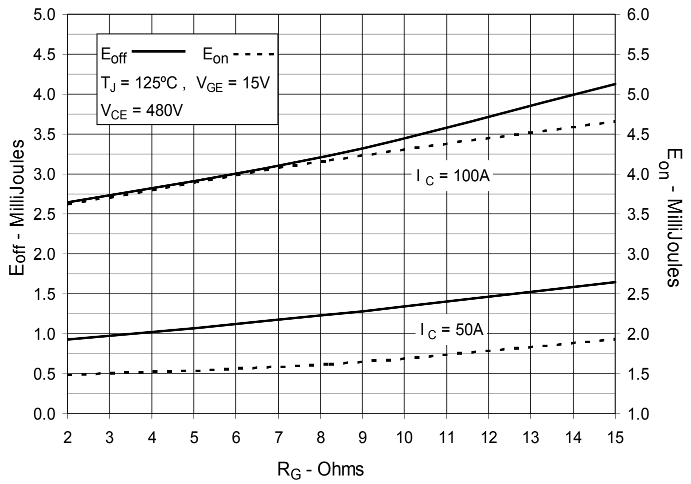


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

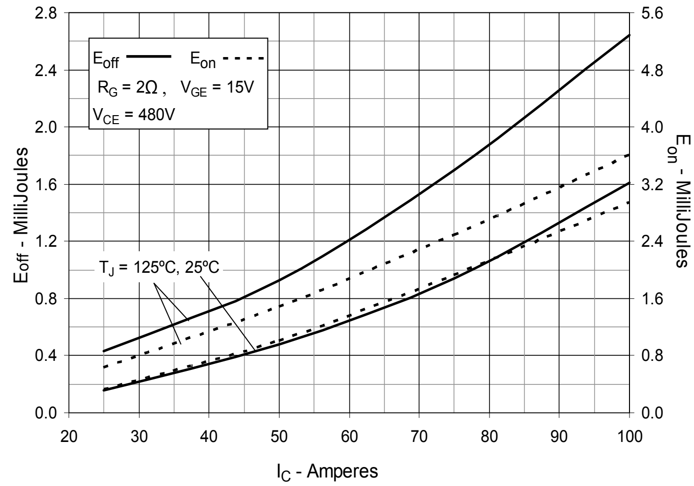


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

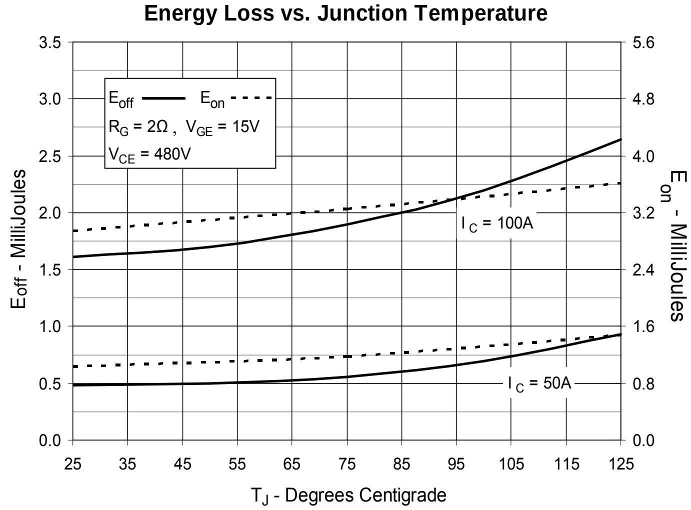


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

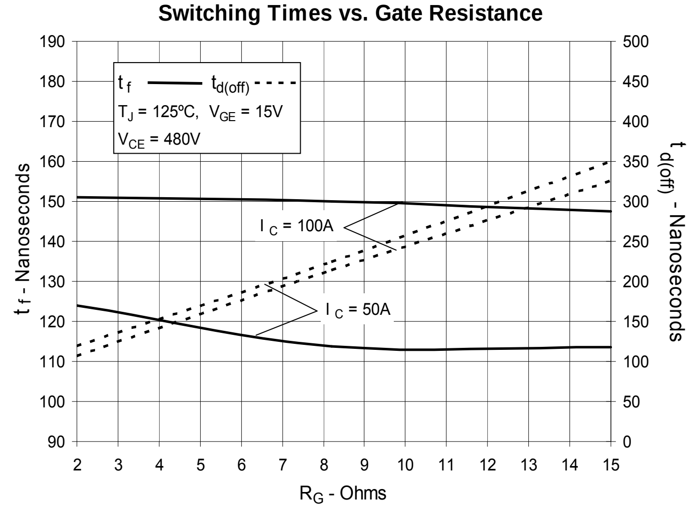


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

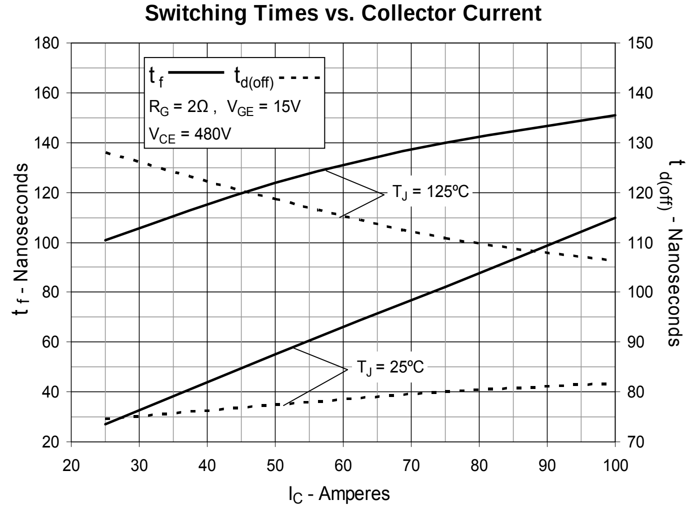
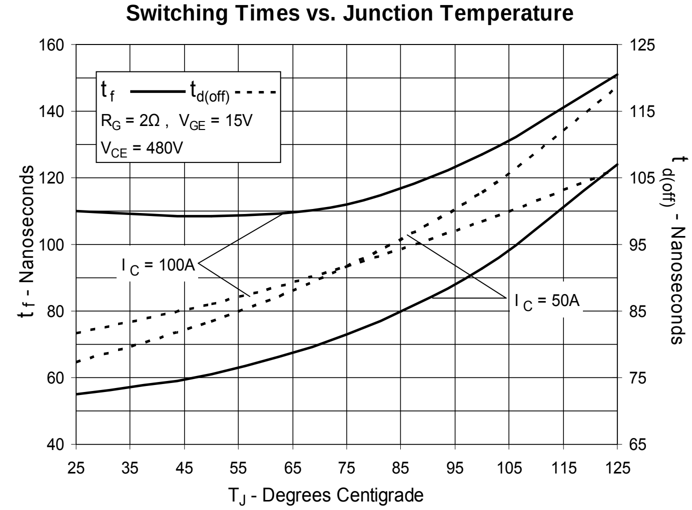


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature



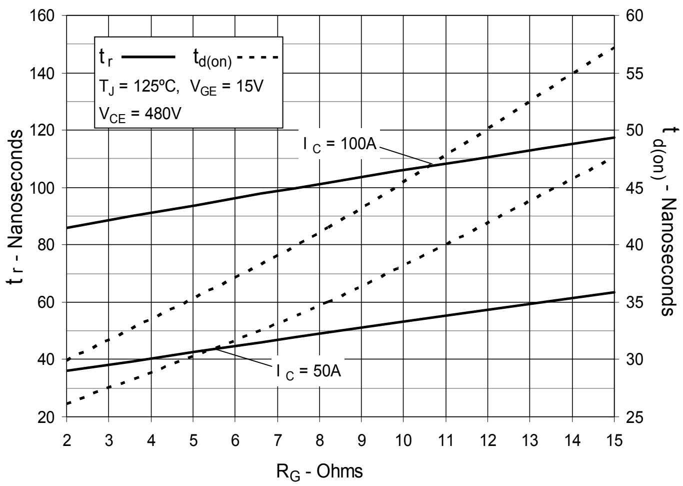


Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

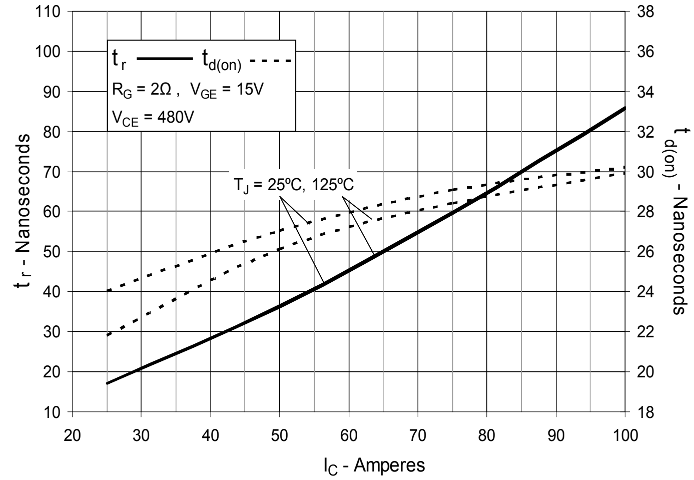


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

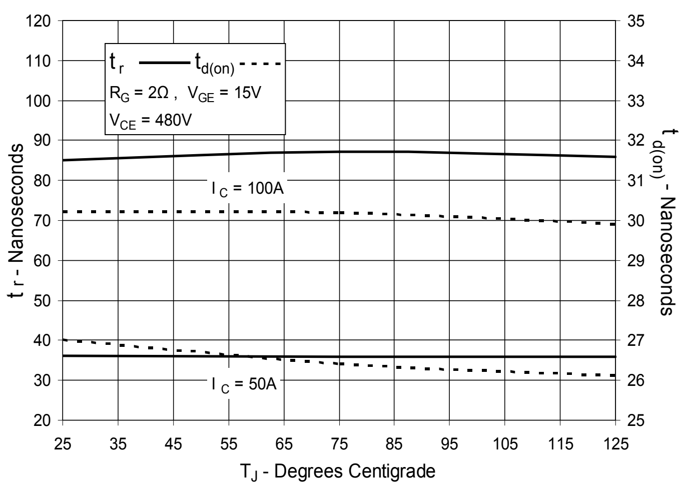


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature

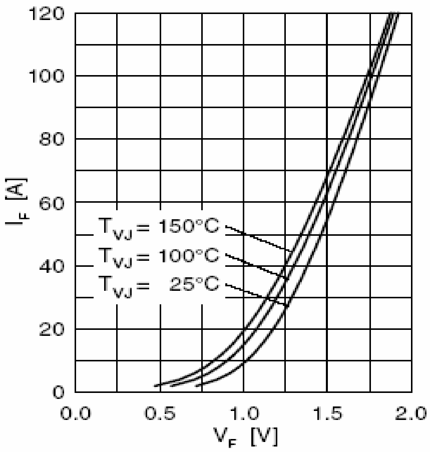


Fig. 21 Forward current I_F vs. V_F

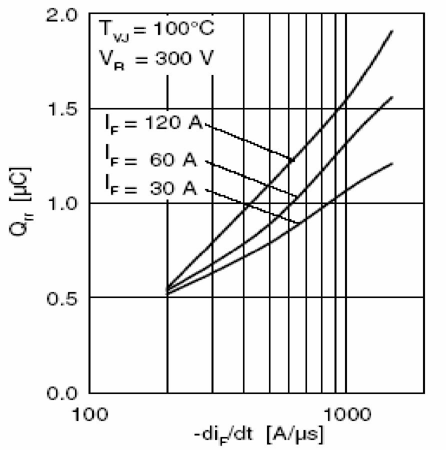


Fig. 22 Typ. reverse recovery charge Q_{rr}

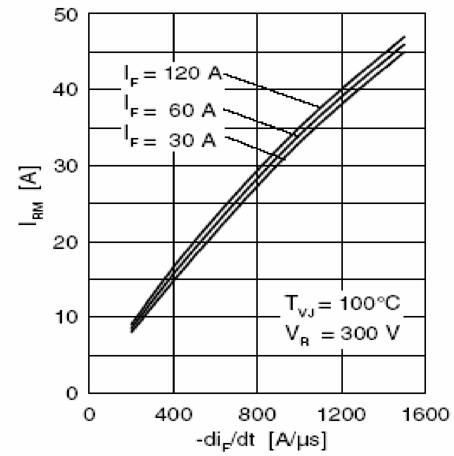


Fig. 23 Typ. peak reverse current I_{RM}

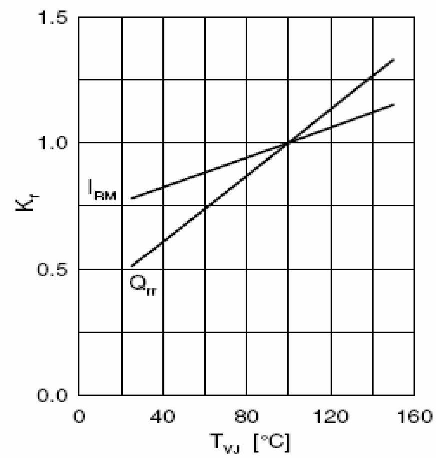


Fig. 24 Typ. dynamic parameters Q_{rr}, I_{RM}

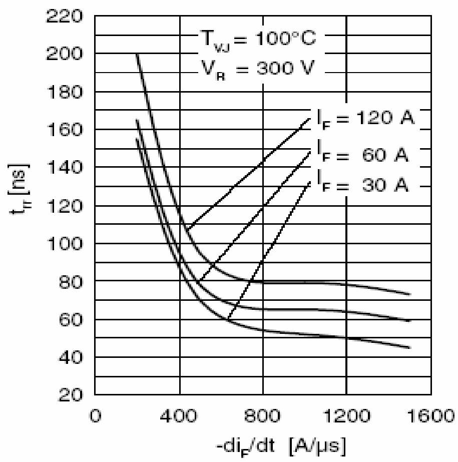


Fig. 25 Typ. recovery time t_{rr}

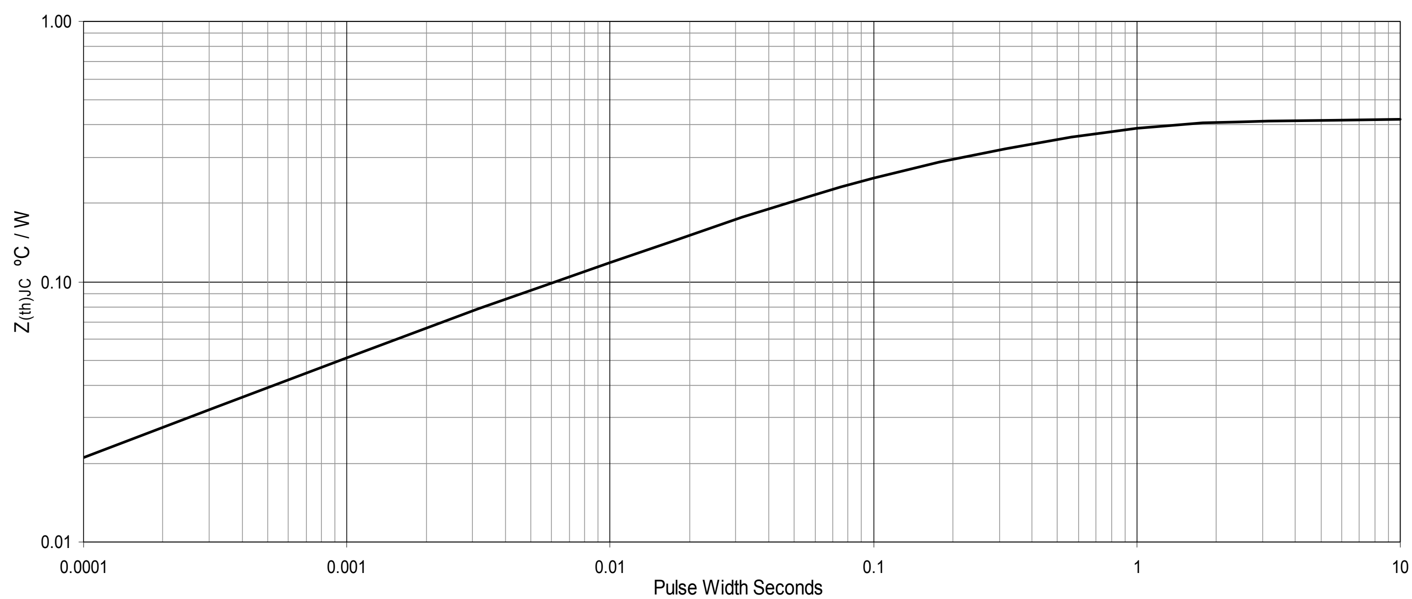


Fig. 26. Maximum Transient Thermal Impedance