IXYS

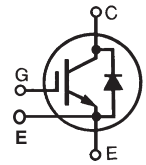
Advance Technical Information

XPT™ 650V IGBT GenX3™ w/ Diode

IXYN75N65C3D1

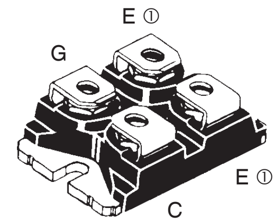
V_{CES}	=	650V
I_{C110}	=	75A
$V_{CE(sat)}$	≤	2.3V
$t_{fi(typ)}$	=	60ns

Extreme Light Punch through IGBT for 20-60kHz Switching



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 175°C	650	V
V_{CGR}	T_J = 25°C to 175°C, R_{GE} = 1MΩ	650	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C (Chip Capability)	150	A
I_{C110}	T_C = 110°C	75	A
I_{F110}	T_C = 110°C	60	A
I_{CM}	T_C = 25°C, 1ms	360	A
I_A	T_C = 25°C	30	A
E_{AS}	T_C = 25°C	300	mJ
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 150°C, R_G = 3Ω Clamped Inductive Load	I_{CM} = 150 $V_{CE} \leq V_{CES}$	A
t_{sc} (SCSOA)	V_{GE} = 15V, V_{CE} = 360V, T_J = 150°C R_G = 82Ω, Non Repetitive	8	µs
P_C	T_C = 25°C	600	W
T_J		-55 ... +175	°C
T_{JM}		175	°C
T_{stg}		-55 ... +175	°C
TV_{ISOL}	50/60Hz t = 1min	2500	V~
	$I_{ISOL} \leq$ 1mA t = 1s	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

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 250µA, V_{GE} = 0V	650			V
$V_{GE(th)}$	I_C = 250µA, V_{CE} = V_{GE}	3.5		6.0	V
I_{CES}	V_{CE} = V_{CES}, V_{GE} = 0V			25	µA
	T_J = 150°C			3	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±100	nA
$V_{CE(sat)}$	I_C = 60A, V_{GE} = 15V, Note 1		1.8	2.3	V
	T_J = 150°C		2.2		V

Features

- International Standard Package
- miniBLOC, with Aluminium Nitride Isolation
- 2500V~ Isolation Voltage
- Optimized for 20-60kHz Switching
- Square RBSOA
- Avalanche Rated
- Short Circuit Capability
- High Current Handling Capability
- Anti-Parallel Fast Diode

Advantages

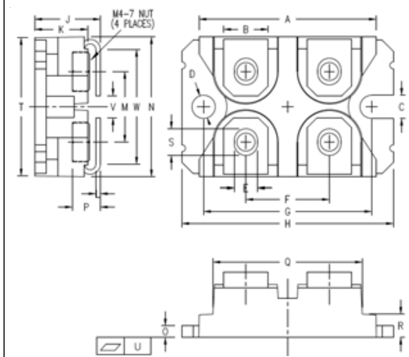
- High Power Density
- Low Gate Drive Requirement

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 = 60A, V_{CE} = 10V, Note 1	25	44		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		3410		pF
C_{oes}			330		pF
C_{res}			73		pF
$Q_{g(on)}$	I_C = 60A, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		122		nC
Q_{ge}			22		nC
Q_{gc}			60		nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**		26		ns
t_{ri}	I_C = 60A, V_{GE} = 15V		65		ns
E_{on}	V_{CE} = 400V, R_G = 3Ω		2.00		mJ
$t_{d(off)}$	Note 2		93		ns
t_{fi}			60		ns
E_{off}			0.95		mJ
$t_{d(on)}$	**Inductive load, T_J = 150°C**		26		ns
t_{ri}	I_C = 60A, V_{GE} = 15V		64		ns
E_{on}	V_{CE} = 400V, R_G = 3Ω		3.40		mJ
$t_{d(off)}$	Note 2		115		ns
t_{fi}			64		ns
E_{off}			1.30		mJ
R_{thJC}				0.25	°C/W
R_{thCS}			0.05		°C/W

SOT-227B miniBLOC (IXYN)



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	1.489	1.505	37.80	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
V	.130	.180	3.30	4.57
W	.780	.830	19.81	21.08

Reverse Diode (FRED)

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)		Characteristic Values Min.	Typ.	Max.	
V_F	I_F = 50A, V_{GE} = 0V, Note 1				2.50	V
		T_J = 150°C		1.45		V
I_{rr}	I_F = 50A, V_{GE} = 0V, -di_F/dt = 700A/μs, V_R = 400V	T_J = 150°C		30		A
t_{rr}		T_J = 150°C		135		ns
R_{thJC}					0.52	°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.

ADVANCE TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

Fig. 1. Output Characteristics @ T_J = 25ºC

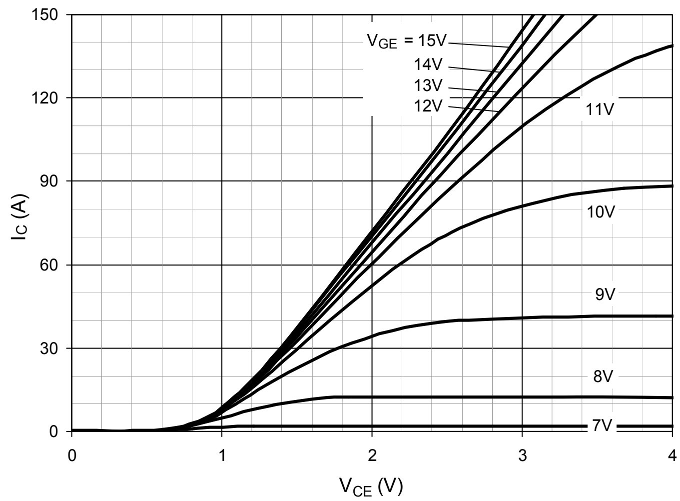


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

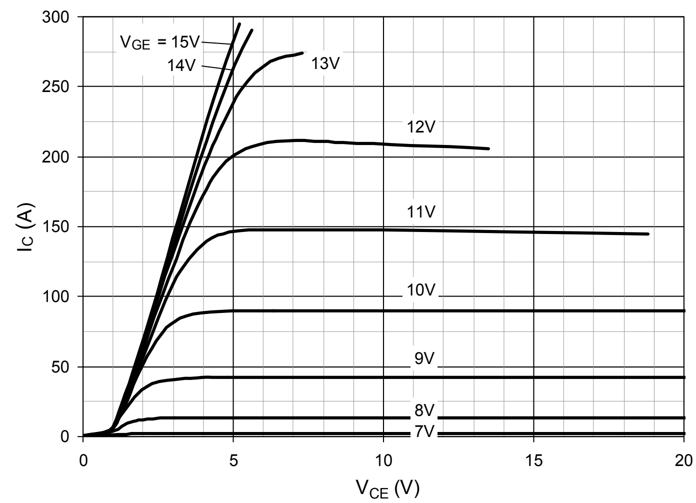


Fig. 3. Output Characteristics @ T_J = 150ºC

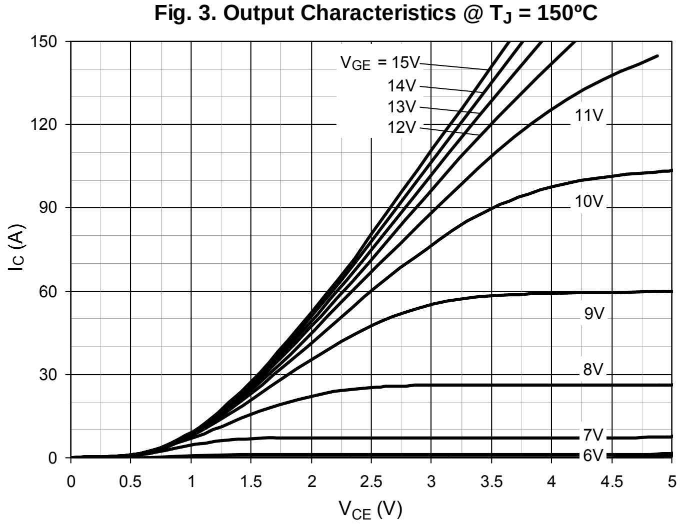


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

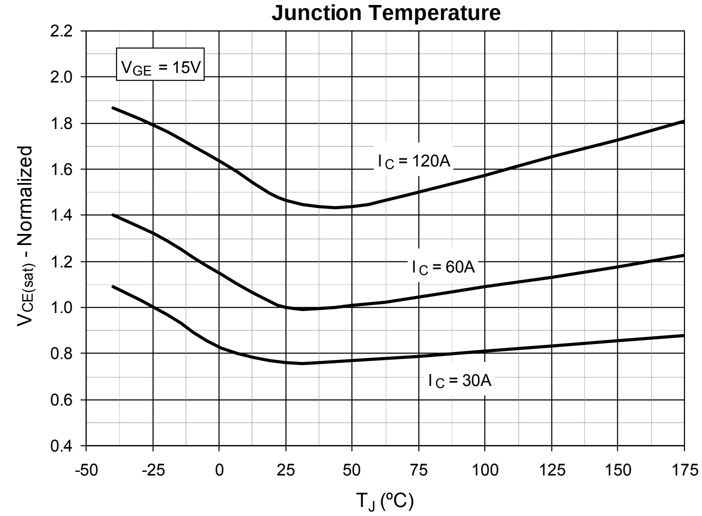


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

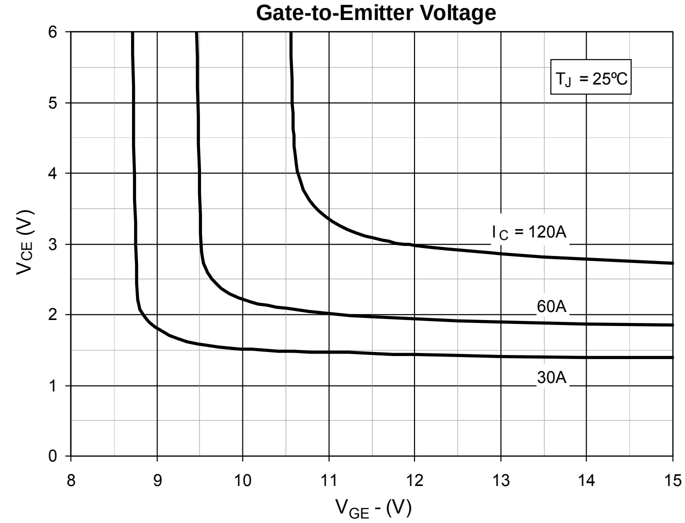


Fig. 6. Input Admittance

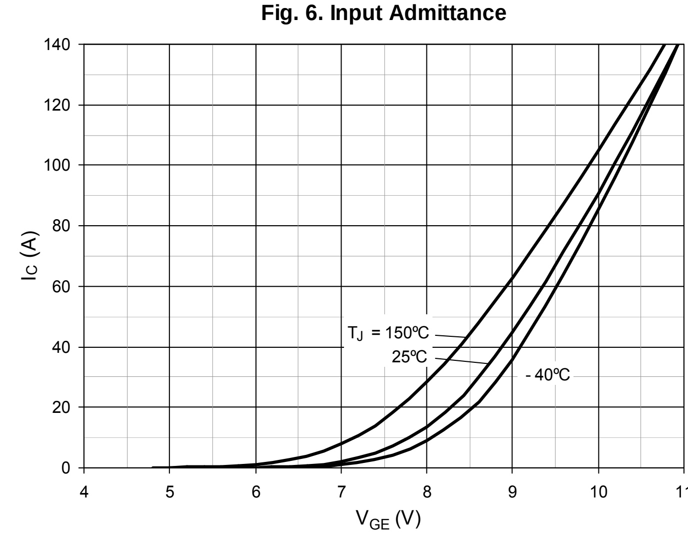


Fig. 7. Transconductance

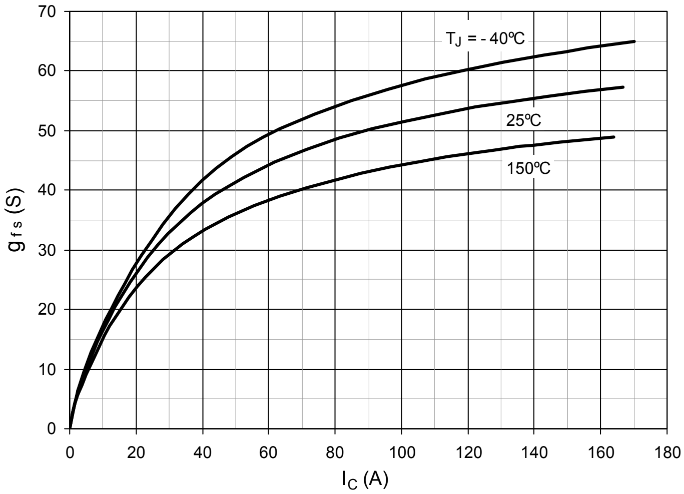


Fig. 8. Gate Charge

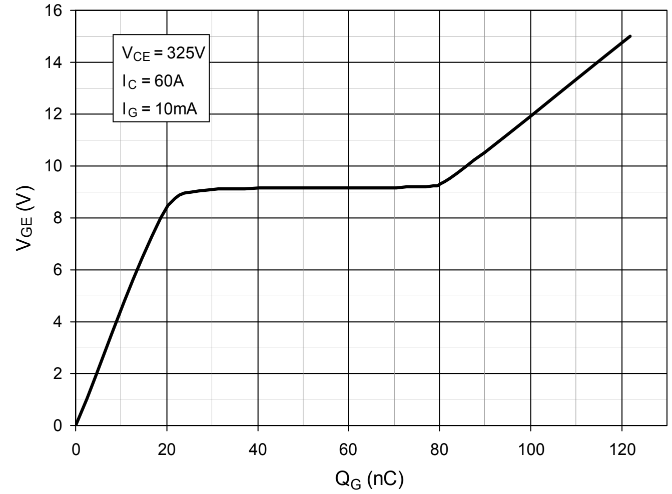


Fig. 9. Capacitance

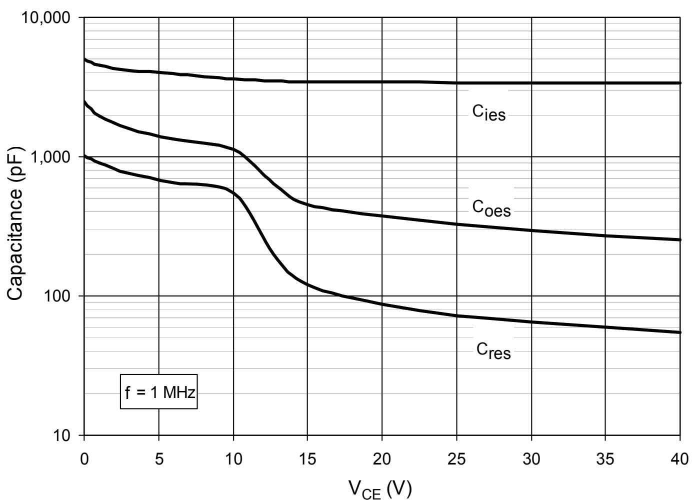


Fig. 10. Reverse-Bias Safe Operating Area

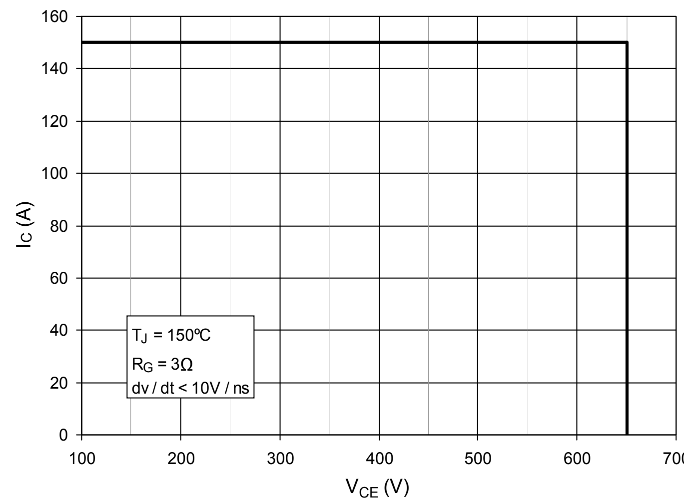


Fig. 11. Forward-Bias Safe Operating Area

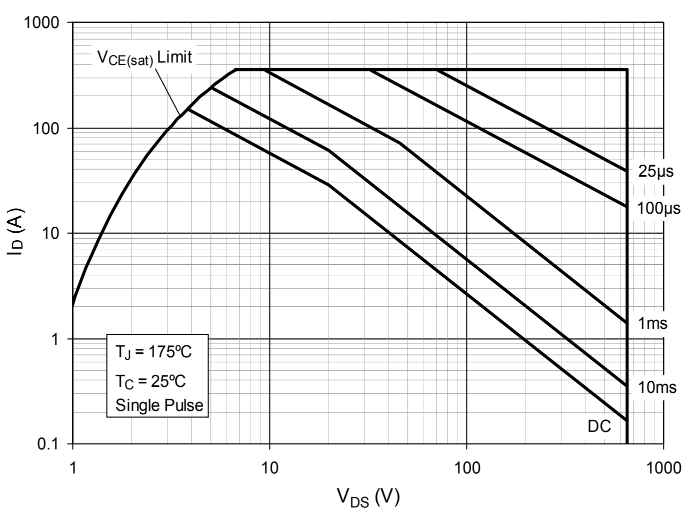


Fig. 12. Maximum Transient Thermal Impedance (IGBT)

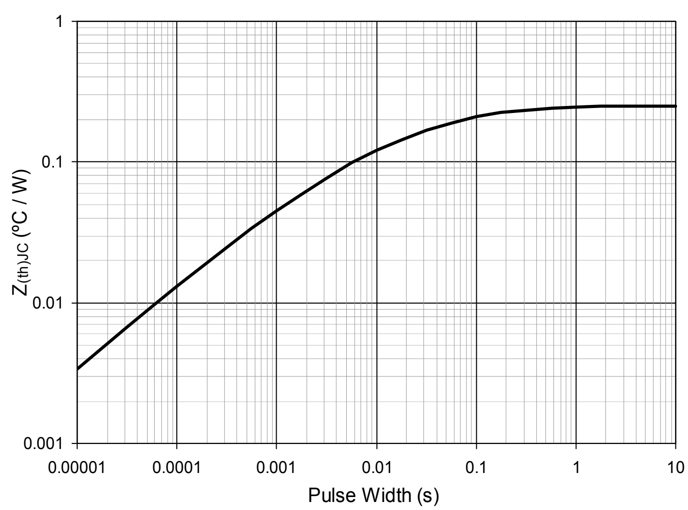


Fig. 13. Inductive Switching Energy Loss vs. Gate Resistance

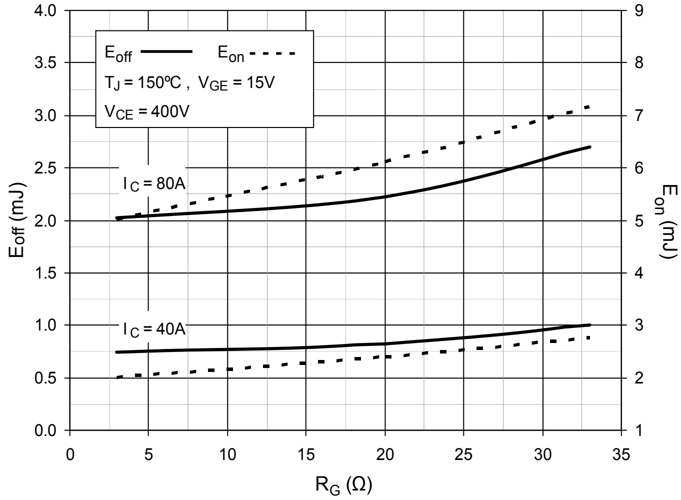


Fig. 14. Inductive Switching Energy Loss vs. Collector Current

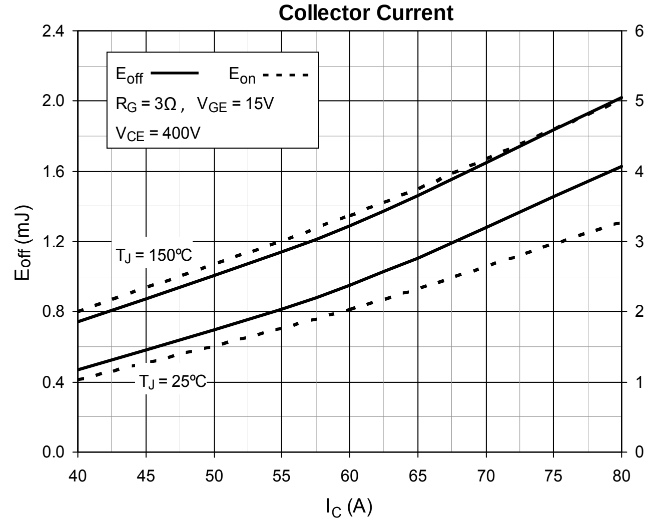


Fig. 15. Inductive Switching Energy Loss vs. Junction Temperature

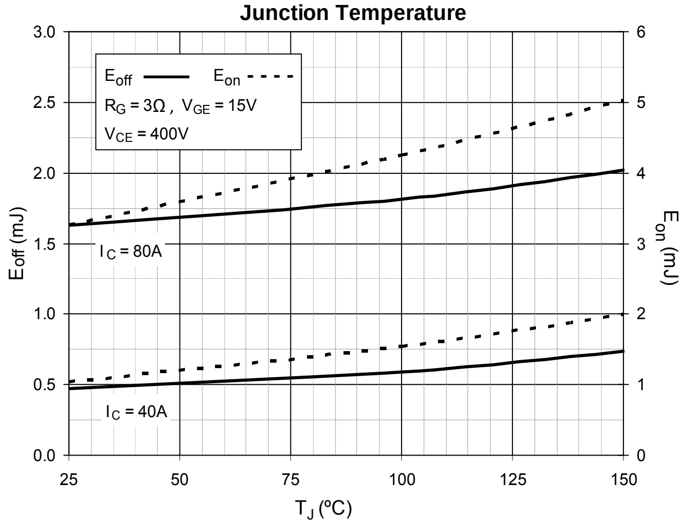


Fig. 16. Inductive Turn-off Switching Times vs. Gate Resistance

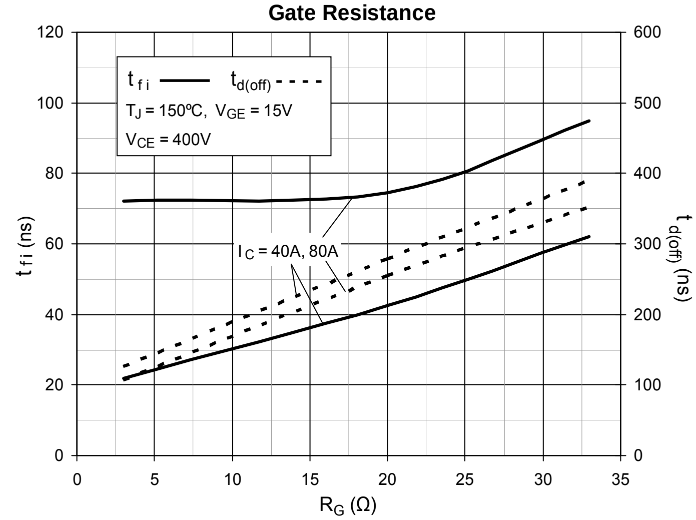


Fig. 17. Inductive Turn-off Switching Times vs. Collector Current

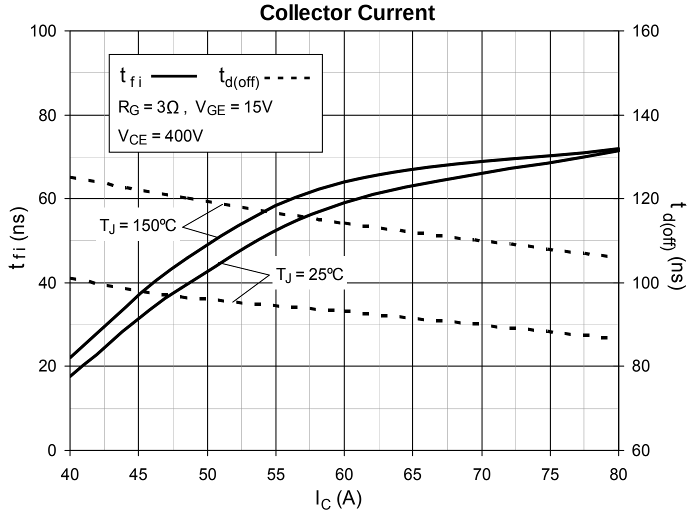


Fig. 18. Inductive Turn-off Switching Times vs. Junction Temperature

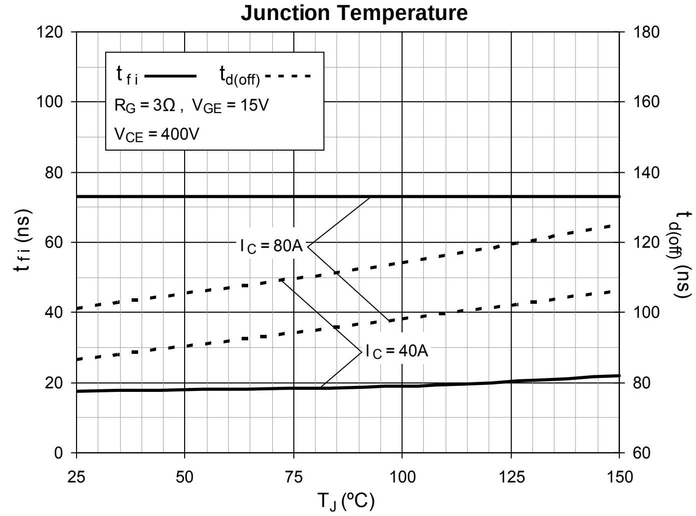


Fig. 19. Inductive Turn-on Switching Times vs. Gate Resistance

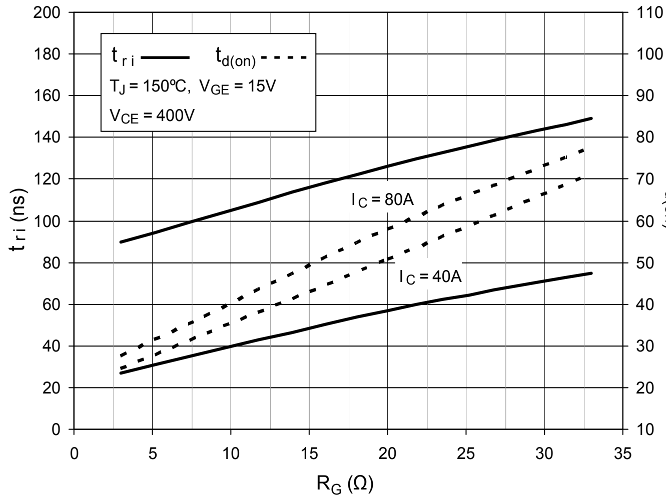


Fig. 20. Inductive Turn-on Switching Times vs. Collector Current

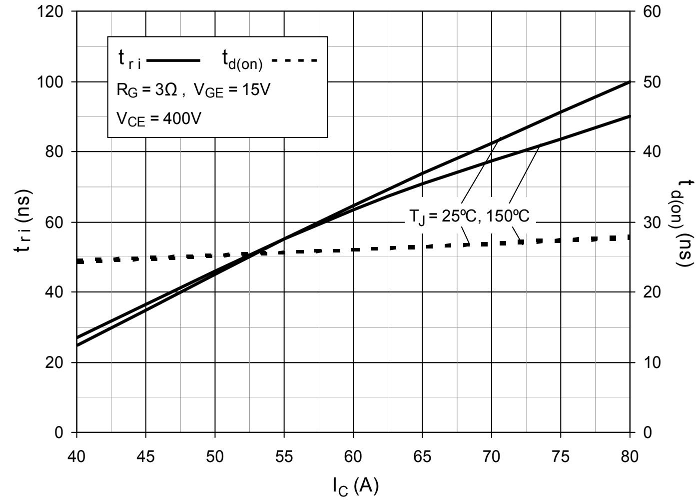


Fig. 21. Inductive Turn-on Switching Times vs. Junction Temperature

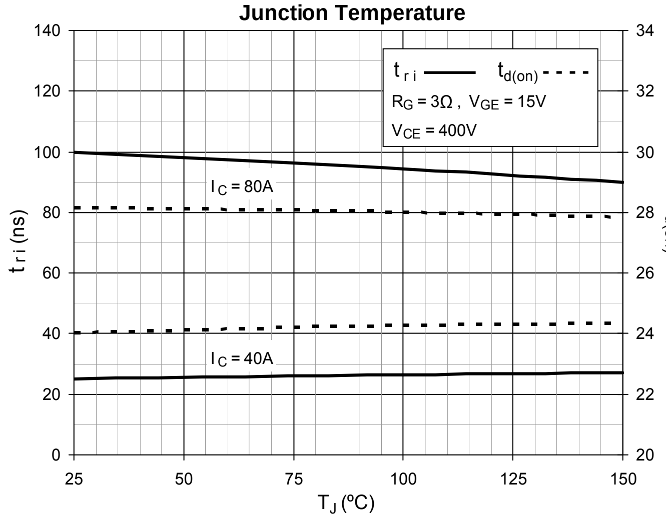


Fig. 22. Maximum Peak Load Current vs. Frequency

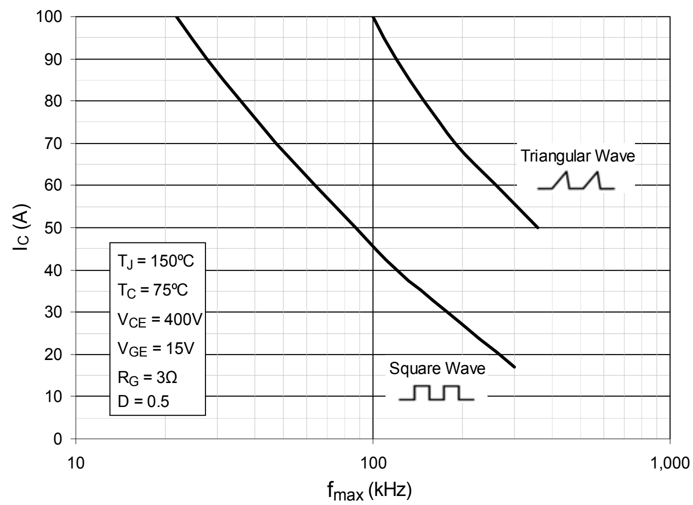


Fig. 23. Diode Forward Characteristics

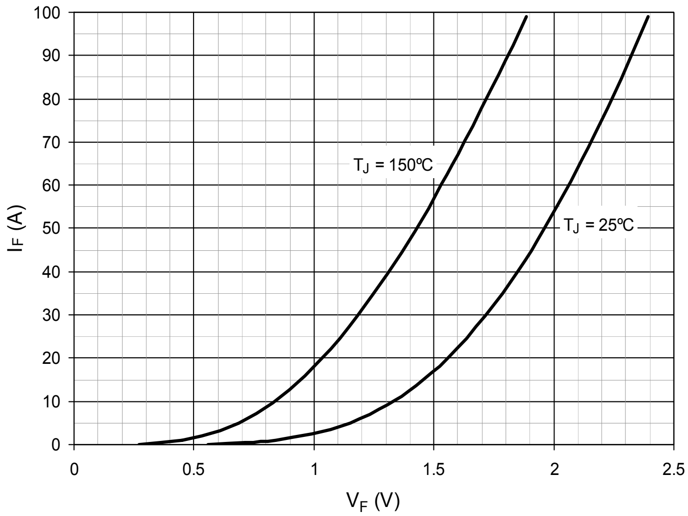


Fig. 24. Reverse Recovery Charge vs. -di$_F$/dt

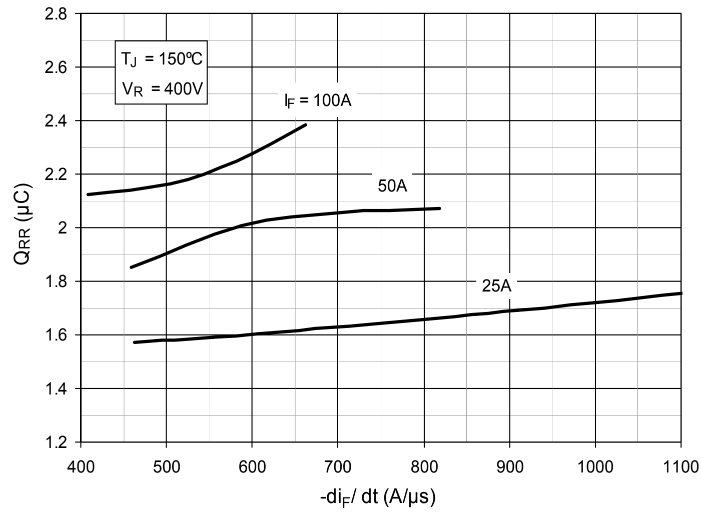


Fig. 25. Reverse Recovery Current vs. -di$_F$/dt

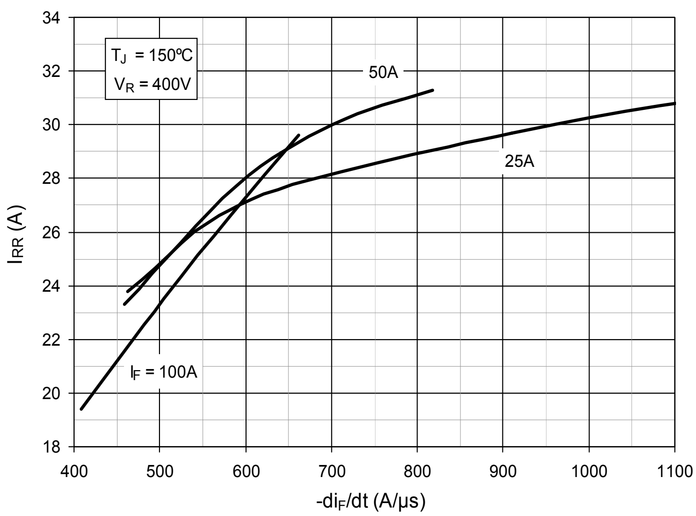


Fig. 26. Reverse Recovery Time vs. -di$_F$/dt

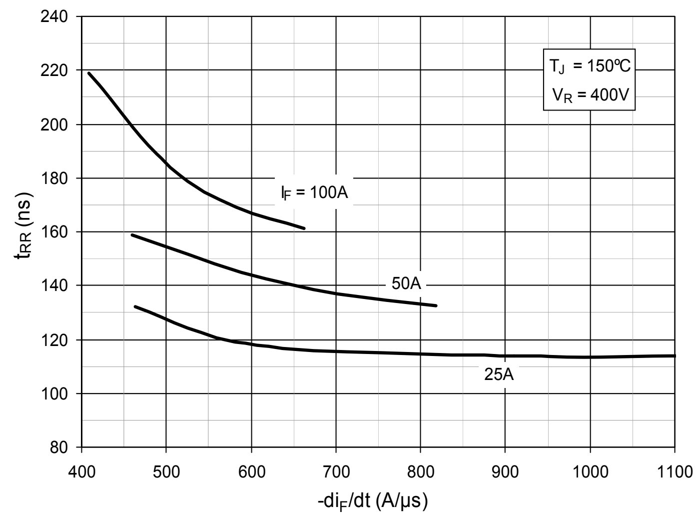


Fig. 27. Dynamic Parameters Q_{RR}, I_{RR} vs. Junction Temperature

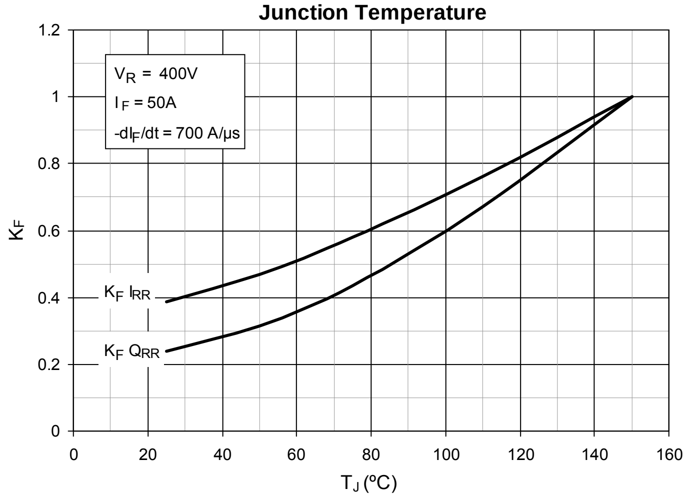


Fig. 28. Maximum Transient Thermal Impedance (Diode)