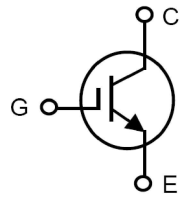
High Voltage XPT™ IGBT

IXYX40N250CHV

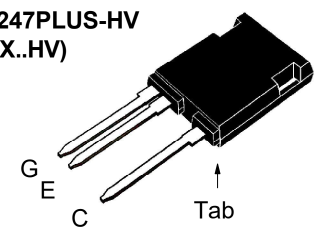
V_{CES} = 2500V
I_{C110} = 40A
$V_{CE(sat)}$ ≤ 4.0V
$t_{fi(typ)}$ = 134ns



Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 175°C	2500	V
V_{CGR}	T_J = 25°C to 175°C, R_{GE} = 1MΩ	2500	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C	154	A
I_{C110}	T_C = 110°C	40	A
I_{CM}	T_C = 25°C, 1ms	370	A
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 150°C, R_G = 1Ω Clamped Inductive Load	I_{CM} = 80 1500	A V
P_C	T_C = 25°C	1500	W
T_J		-55 ... +175	°C
T_{JM}		175	°C
T_{stg}		-55 ... +175	°C
T_L	Maximum Lead Temperature for Soldering 1.6 mm (0.062 in.) from Case for 10s	300	°C
F_C	Mounting Force	20..120/4.5..27	N/lb
Weight		6	g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 250µA, V_{GE} = 0V	2500			V
$V_{GE(th)}$	I_C = 250µA, V_{CE} = V_{GE}	3.0		5.0	V
I_{CES}	V_{CE} = V_{CES}, V_{GE} = 0V			15	µA
	T_J = 150°C			4	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±100	nA
$V_{CE(sat)}$	I_C = 40A, V_{GE} = 15V, Note 1		3.2	4.0	V
	T_J = 150°C		4.4		V

TO-247PLUS-HV (IXYX..HV)



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

Features

- High Voltage Package
- High Blocking Voltage
- High Peak Current Capability
- Low Saturation Voltage

Advantages

- Low Gate Drive Requirement
- High Power Density

Applications

- UPS
- Motor Drives
- SMPS
- PFC Circuits
- High Frequency Power Inverters

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Min.	Typ.	Max.	
g_{fs}	I_C = 40A, V_{CE} = 10V, Note 1	24	42		S
R_{Gi}	Gate Input Resistance		2.0		Ω
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		5470		pF
C_{oes}			204		pF
C_{res}			74		pF
$Q_{g(on)}$	I_C = 40A, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		270		nC
Q_{ge}			28		nC
Q_{gc}			110		nC
$t_{d(on)}$	**Inductive load, T_J = 25°C** I_C = 40A, V_{GE} = 15V V_{CE} = 0.5 • V_{CES}, R_G = 1Ω Note 2		21		ns
t_{ri}			22		ns
E_{on}			11.7		mJ
$t_{d(off)}$			200		ns
t_{fi}			134		ns
E_{off}			6.9		mJ
$t_{d(on)}$	**Inductive load, T_J = 150°C** I_C = 40A, V_{GE} = 15V V_{CE} = 0.5 • V_{CES}, R_G = 1Ω Note 2		21		ns
t_{ri}			22		ns
E_{on}			14.7		mJ
$t_{d(off)}$			255		ns
t_{fi}			250		ns
E_{off}			11.5		mJ
R_{thJC}				0.10	°C/W
R_{thCS}			0.15		°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

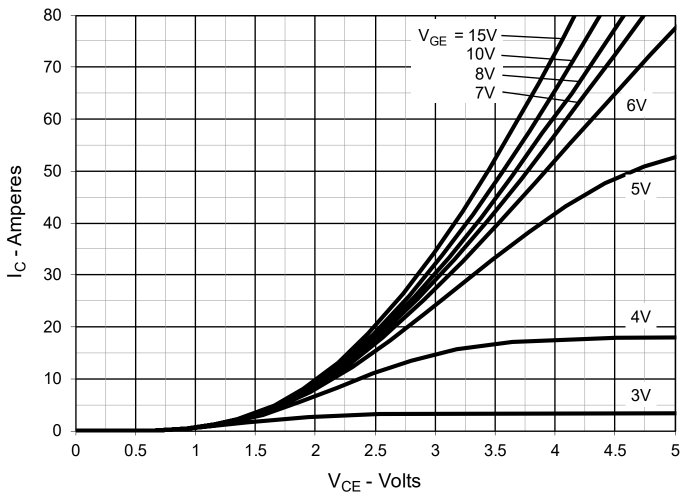


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

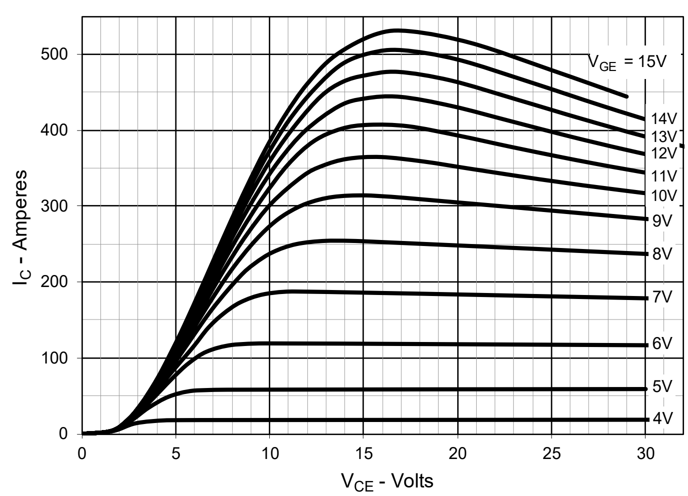


Fig. 3. Output Characteristics @ T_J = 150ºC

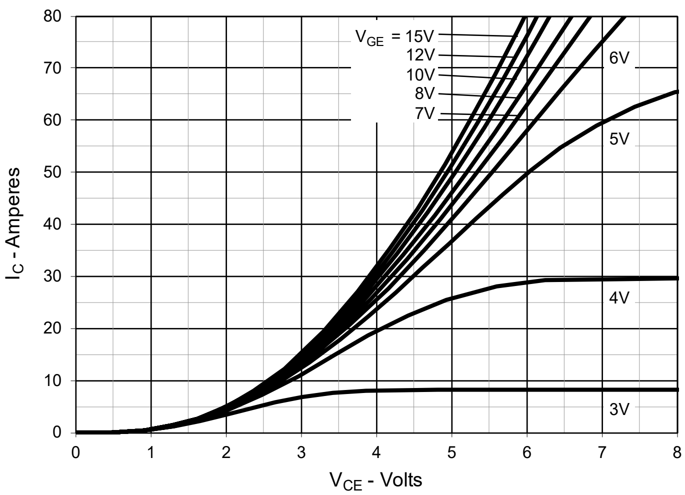


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

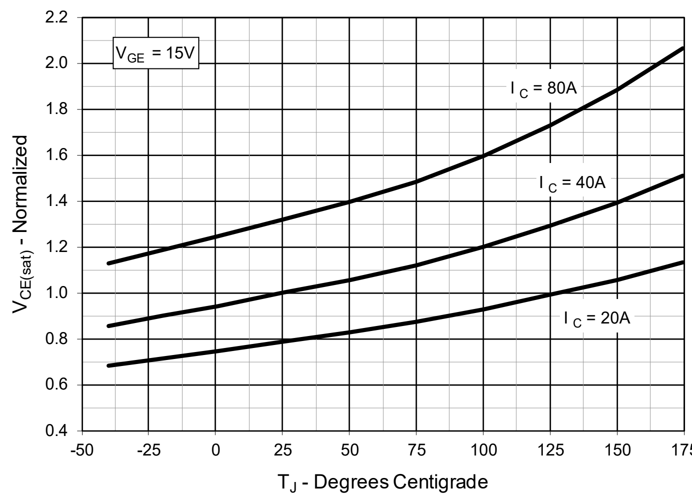


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

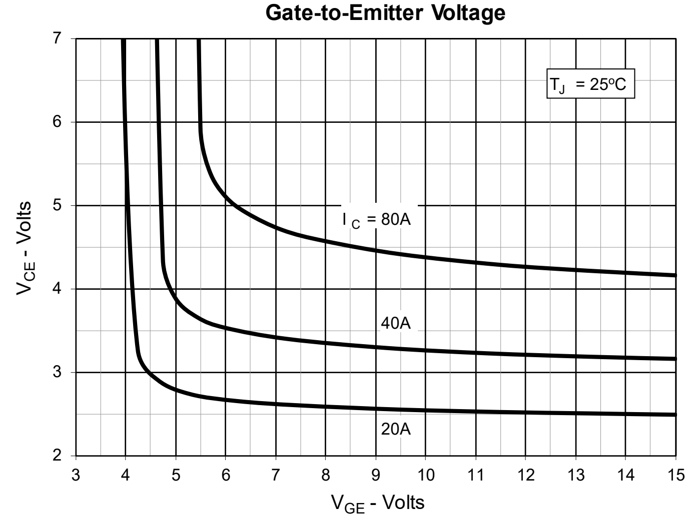


Fig. 6. Input Admittance

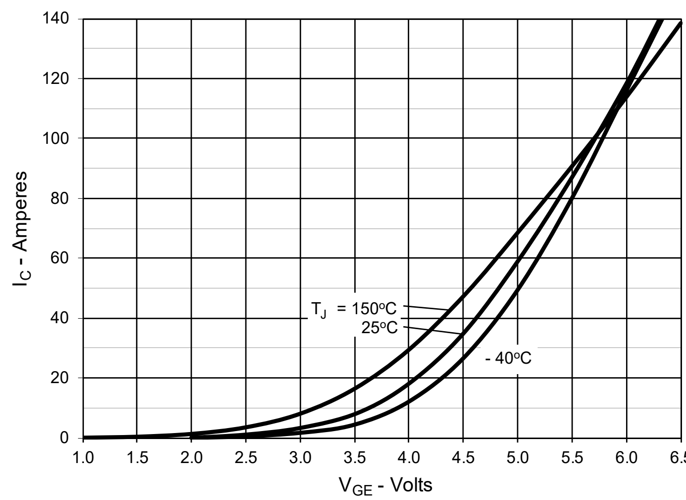


Fig. 7. Transconductance

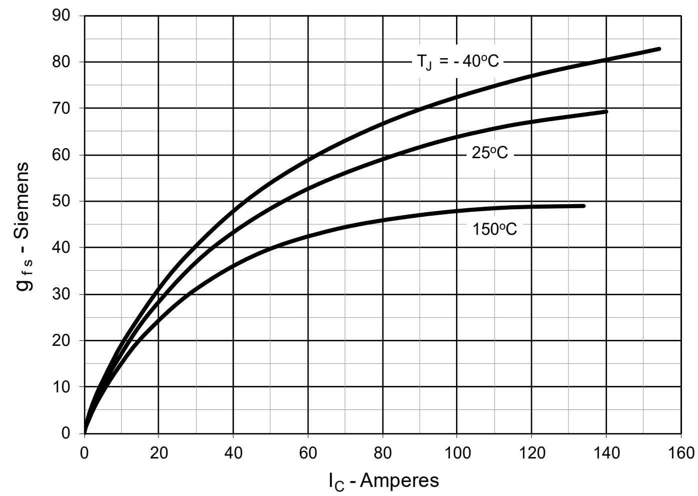


Fig. 8. Gate Charge

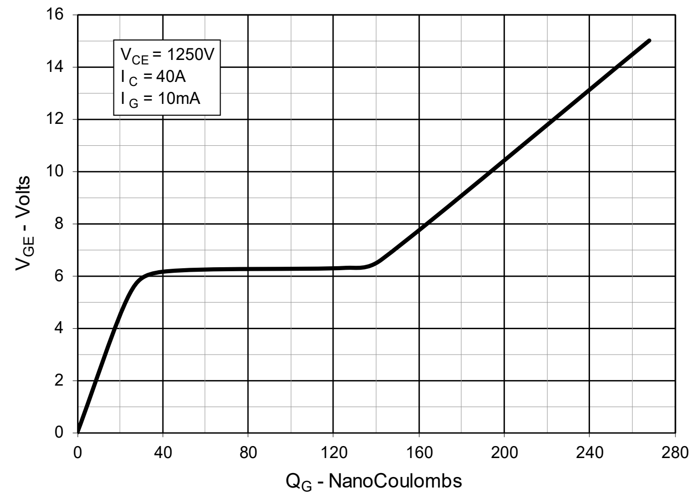


Fig. 9. Capacitance

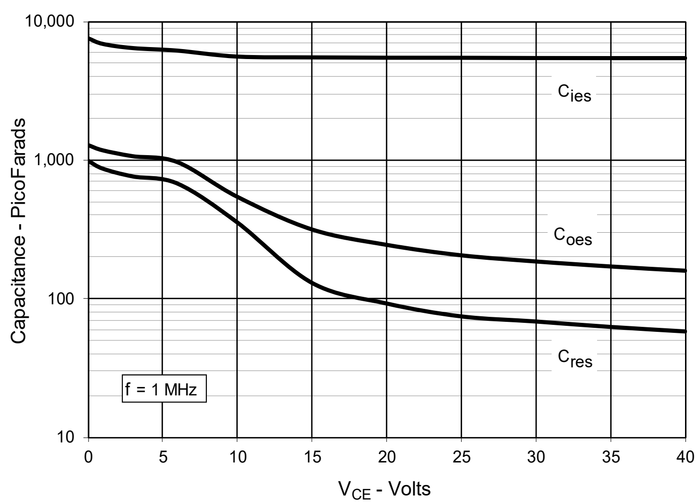


Fig. 10. Reverse-Bias Safe Operating Area

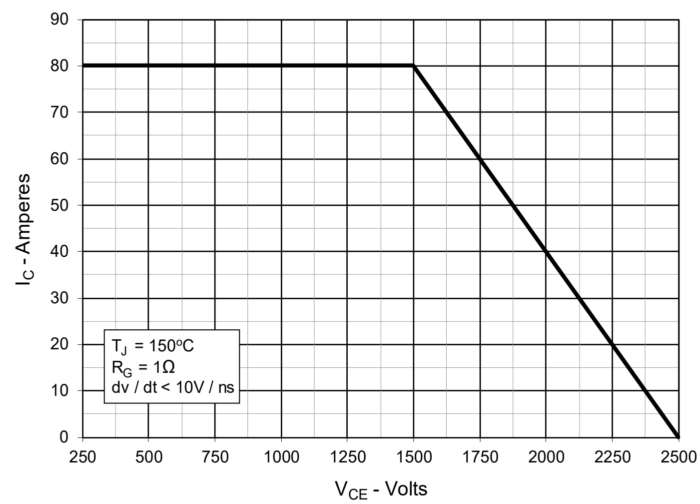


Fig. 11. Maximum Transient Thermal Impedance

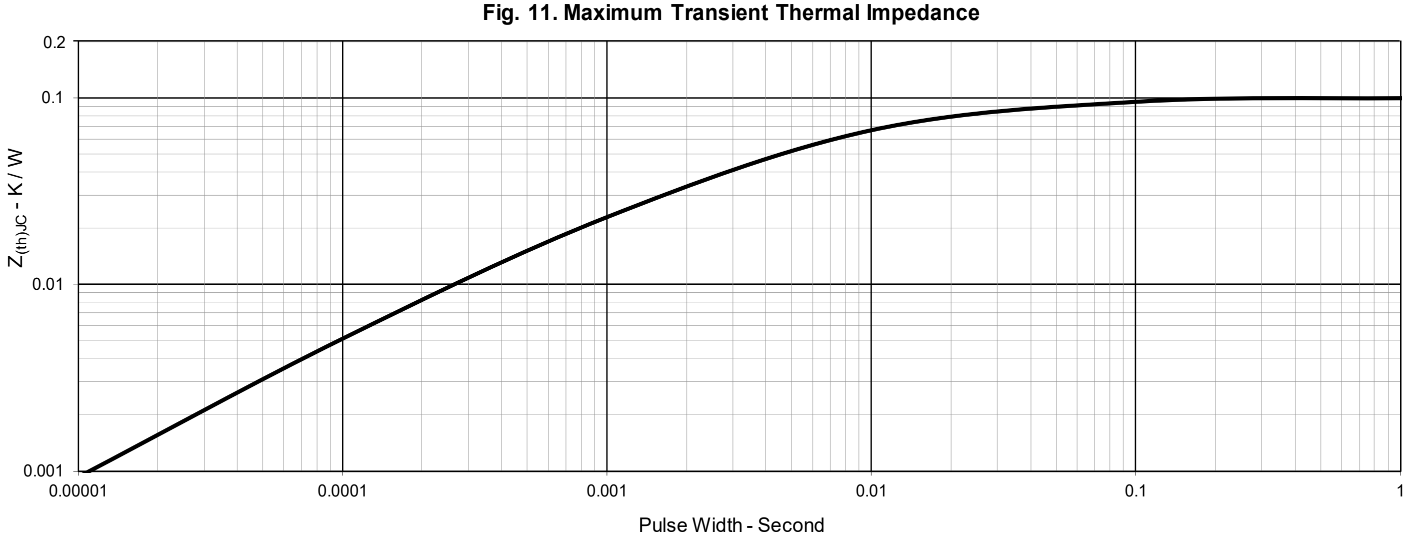


Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

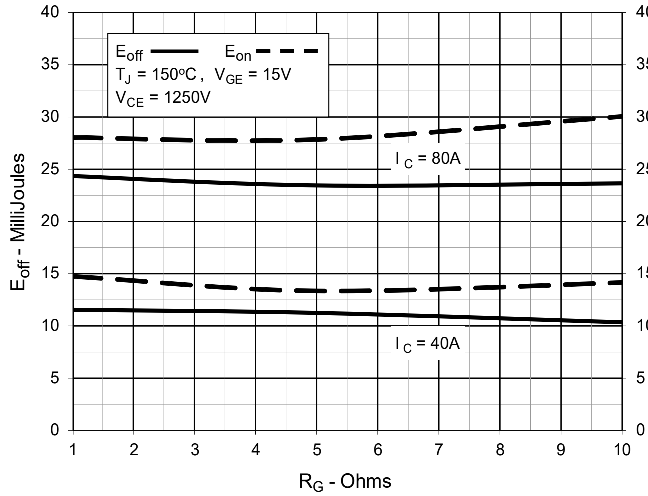


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

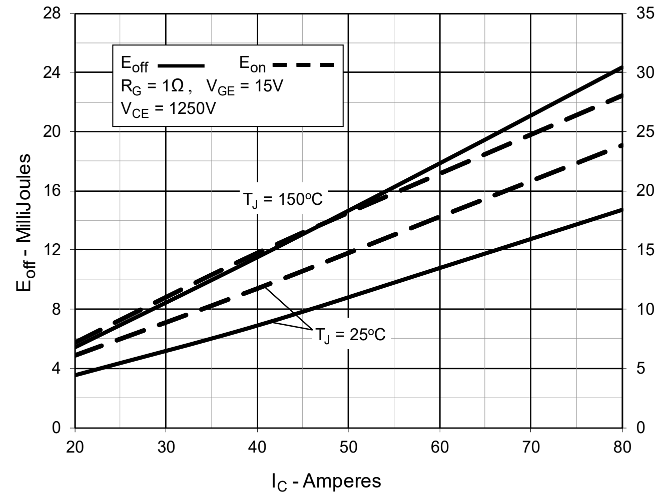


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

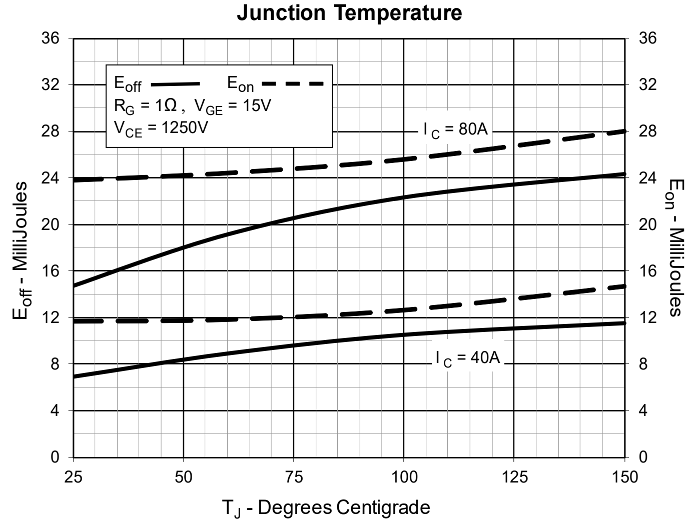


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

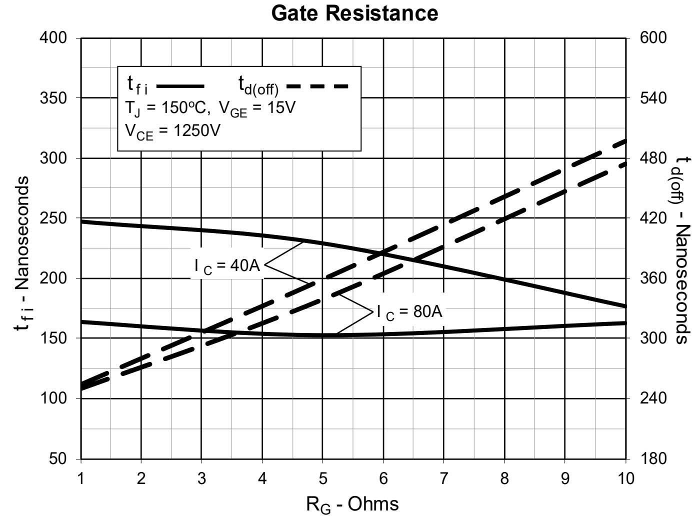


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

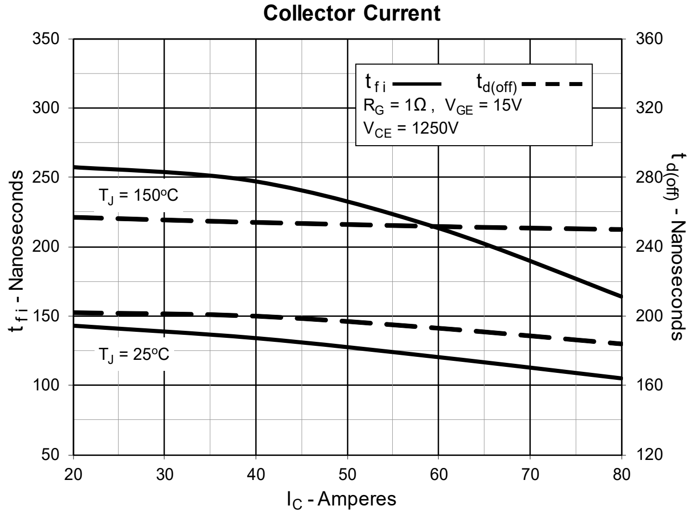


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature

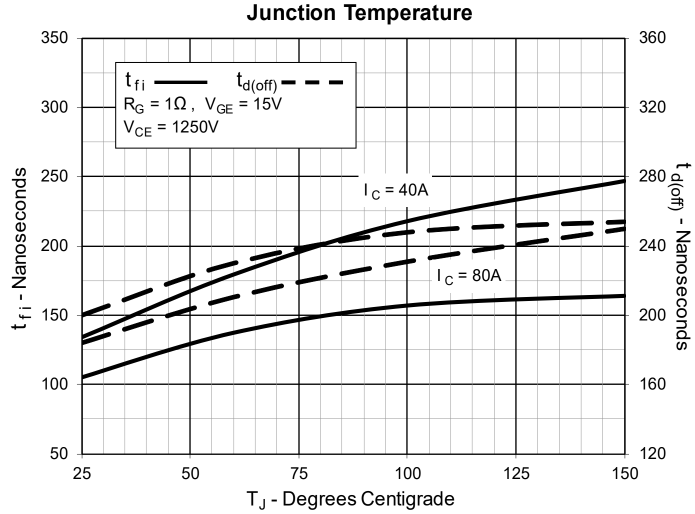


Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

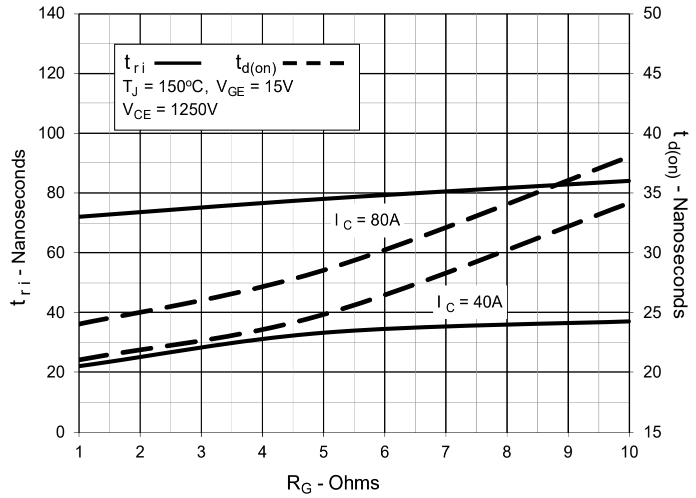


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

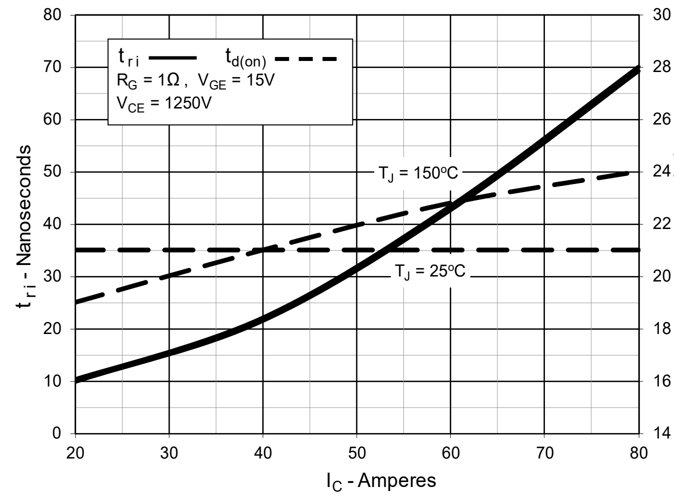
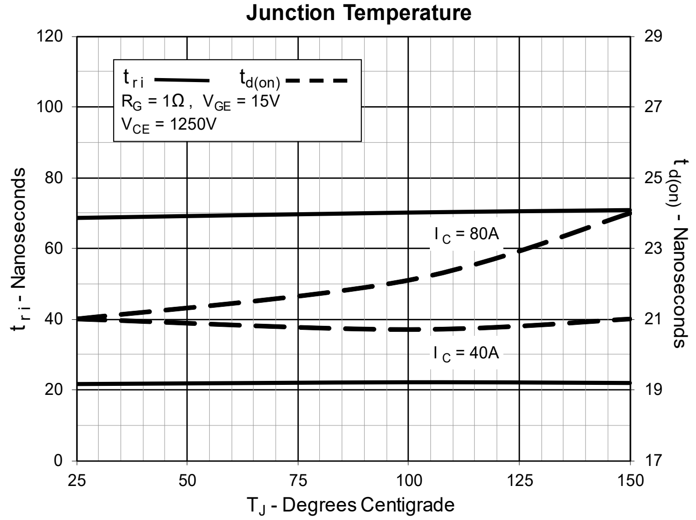
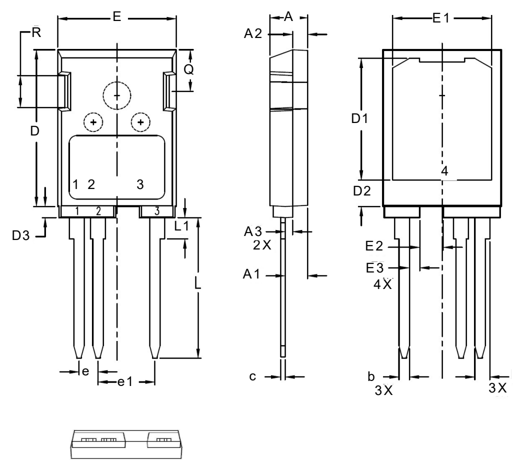


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature



TO-247PLUS-HV Outline



1 - Gate
2,4 - Emitter
3 - Collector

SYM	Inches		Millimeters	
	MIN	MAX	MIN	MAX
A	0.193	0.201	4.90	5.10
A1	0.114	0.122	2.90	3.10
A2	0.075	0.083	1.90	2.10
A3	0.035	0.043	0.90	1.10
b	0.053	0.059	1.35	1.50
b1	0.075	0.083	1.90	2.10
c	0.022	0.030	0.55	0.75
D	0.819	0.843	20.8	21.4
D1	0.638	0.646	16.2	16.4
D2	0.134	0.146	3.40	3.70
D3	0.055	0.063	1.40	1.60
E	0.622	0.638	15.8	16.2
E1	0.520	0.528	13.2	13.4
E2	0.118	0.126	3.00	3.20
E3	0.051	0.059	1.30	1.50
e	0.100	BSC	2.54	BSC
e1	0.300	BSC	7.62	BSC
L	0.732	0.748	18.60	19.0
L1	0.106	0.118	2.70	3.00
Q	0.216	0.224	5.50	5.70
R	0.165	0.169	4.20	4.30