

NCE10G120

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1200V, 10A, Trench NPT IGBT

Features

- Trench NPT(Non Punch Through) IGBT
- High speed switching
- Low saturation voltage: $V_{CE(sat)}=2.0V@I_C=10A$
- High input impedance

Applications

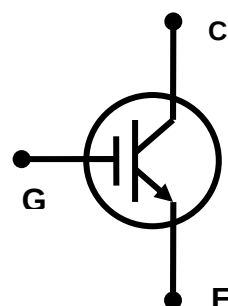
- Inductive heating, Microwave oven, Inverter, UPS, etc.
- Soft switching applications

General Description

Using advanced Trench NPT technology, NCE's 1200V IGBTs offers superior conduction and switching performances, and easy parallel operation with exceptional avalanche ruggedness. This device is designed for soft switching applications.



G C E



Absolute Maximum Ratings

Symbol	Description	Ratings	Units
V_{CES}	Collector to Emitter Voltage	1200	V
V_{GES}	Gate to Emitter Voltage	+/-25	V
I_C	Continuous Collector Current @ $T_C=25^{\circ}C$	16	A
	Continuous Collector Current @ $T_C=100^{\circ}C$	10	A
$I_{CM}(1)$	Pulsed Collector Current	24	A
P_D	Maximum Power Dissipation @ $T_C=25^{\circ}C$	138	W
T_J	Operating Junction Temperature	-55 to +150	$^{\circ}C$
T_{stg}	Storage Temperature Range	-55 to +150	$^{\circ}C$
T_L	Maximum Lead Temp. for soldering Purposes, 1/8" from case for 5seconds	260	$^{\circ}C$

Notes:

1. Repetitive rating, Pulse width limited by max. junction temperature



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Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	-	0.9	$^{\circ}\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient		62	

Electrical Characteristics of the IGBT $T_C=25^{\circ}\text{C}$

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
Off Characteristics						
BV _{CES}	Collector to Emitter Breakdown Voltage	V _{GE} =0V, I _c =250uA	1200	-	-	V
I _{CES}	Collector Cut-Off Current	V _{CE} =V _{CES} , V _{GE} =0V	-	-	250	uA
I _{GES}	G-E Leakage Current	V _{GE} =V _{GES} , V _{CE} =0V	-	-	+/-250	nA
On Characteristics						
V _{GE(th)}	G-E Threshold Voltage	I _C =20mA, V _{CE} =V _{GE}	4.0	-	7.0	V
V _{CE(sat)}	Collector to Emitter Saturation Voltage	I _C =20A, V _{GE} =15V T _C =25°C	-	2	2.5	V
		I _C =20A, V _{GE} =15V T _C =125°C	-	2.15	-	V
Dynamic Characteristics						
C _{ies}	Input Capacitance	V _{CE} =30V, V _{GE} =0V, f=1MHz	-	606	-	pF
C _{oes}	Output Capacitance		-	48	-	pF
C _{res}	Reverse Transfer Capacitance		-	29	-	pF
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{CC} =600V, I _C =20A, R _G =10Ω, V _{GE} =15V, Resistive Load, T _C =25°C	-	45	-	ns
t _r	Rise Time		-	20	-	ns
t _{d(off)}	Turn-Off Delay Time		-	520	-	ns
t _f	Fall Time		-	80	-	ns
E _{on}	Turn-On Switching Loss		-	0.68	-	mJ
E _{off}	Turn-Off Switching Loss		-	0.78	-	mJ
E _{ts}	Total Switching Loss		-	1.46	-	mJ
t _{d(on)}	Turn-On Delay Time	V _{CC} =600V, I _C =20A, R _G =10Ω, V _{GE} =15V, Resistive Load, T _C =125°C		45		ns
t _r	Rise Time			24		ns
t _{d(off)}	Turn-Off Delay Time			592		ns
t _f	Fall Time			177		ns
E _{on}	Turn-On Switching Loss			0.83		mJ
E _{off}	Turn-Off Switching Loss			1.19		mJ
E _{ts}	Total Switching Loss			2.02		mJ

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Typical Performance Characteristics

Figure 1. Typical Output Characteristics

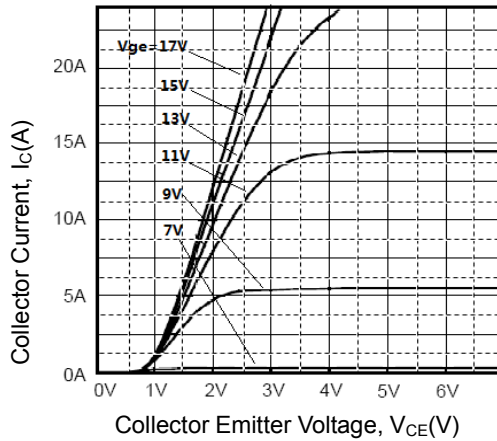


Figure 2. Typical Saturation Voltage Characteristics

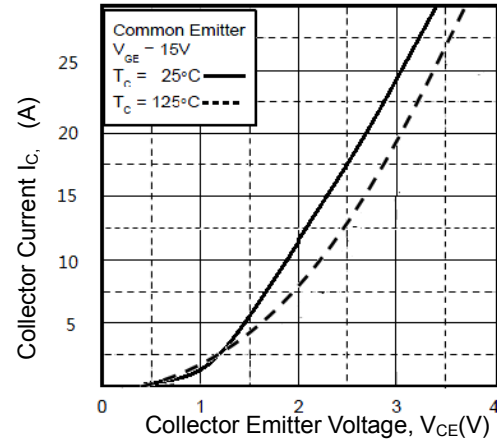


Figure 3. Saturation Voltage vs. Case Temperature at Variant Current Level

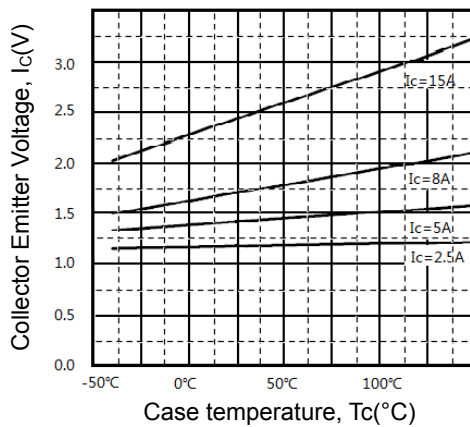


Figure 7. Capacitance Characteristics

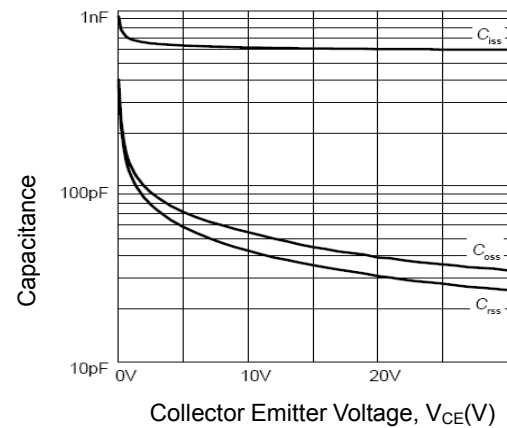


Figure 13. Switching Loss vs. Collector Current

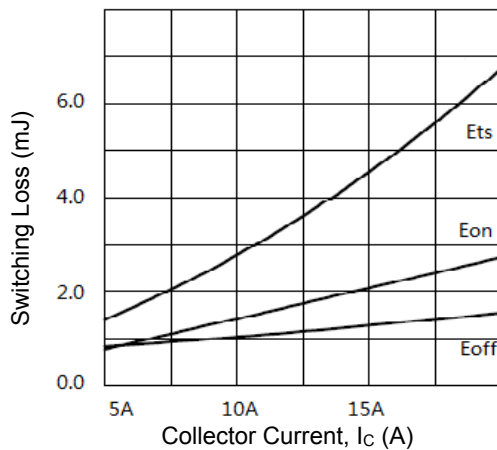
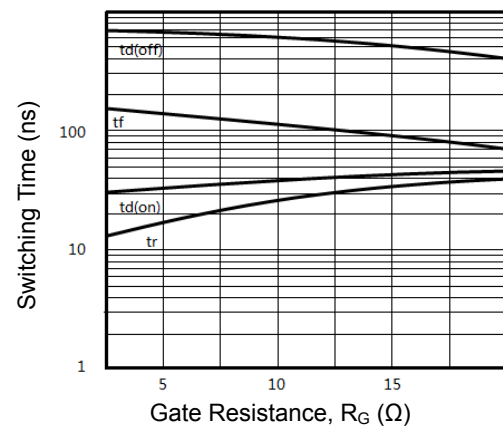


Figure 8. Switching Characteristics vs. Gate Resistance



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Typical Performance Characteristics (Continued)

Figure 9. Switching Characteristics vs. Gate Resistance

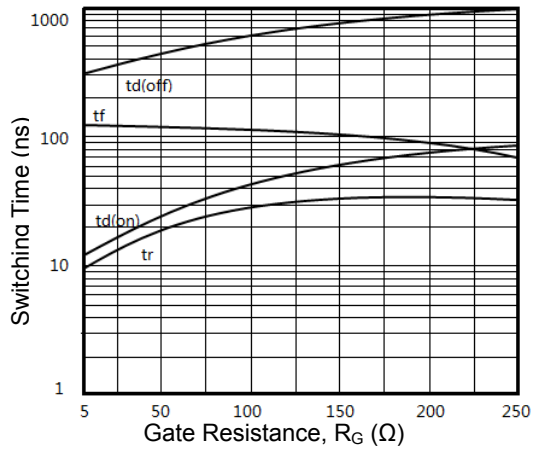


Figure 10. Switching Loss vs. Gate Resistance

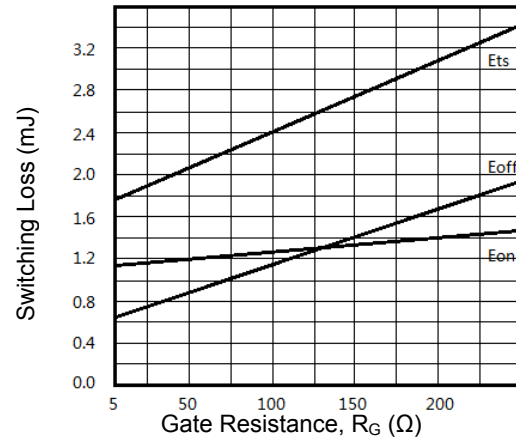


Figure14. Gate Charge Characteristics

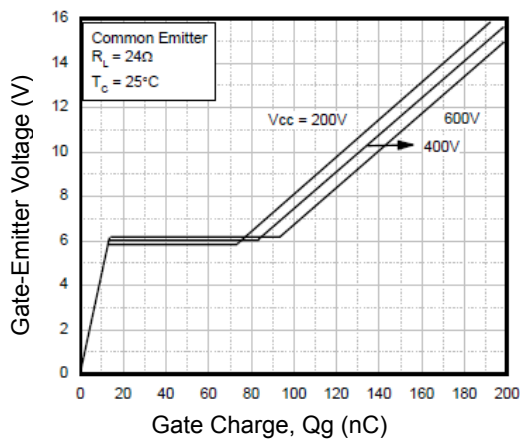


Figure 15. SOA Characteristics

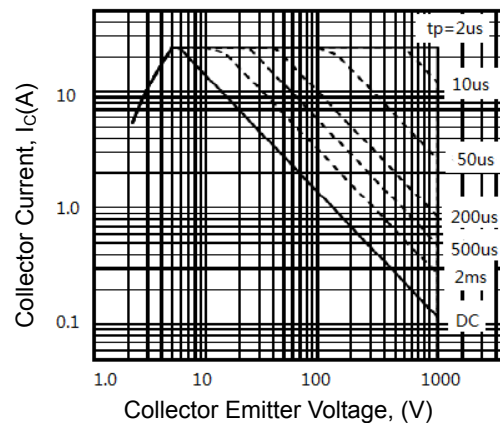
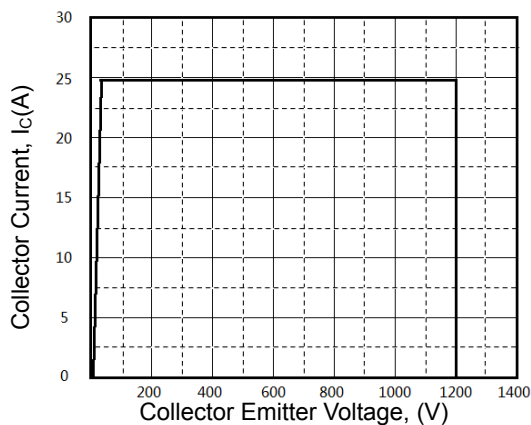
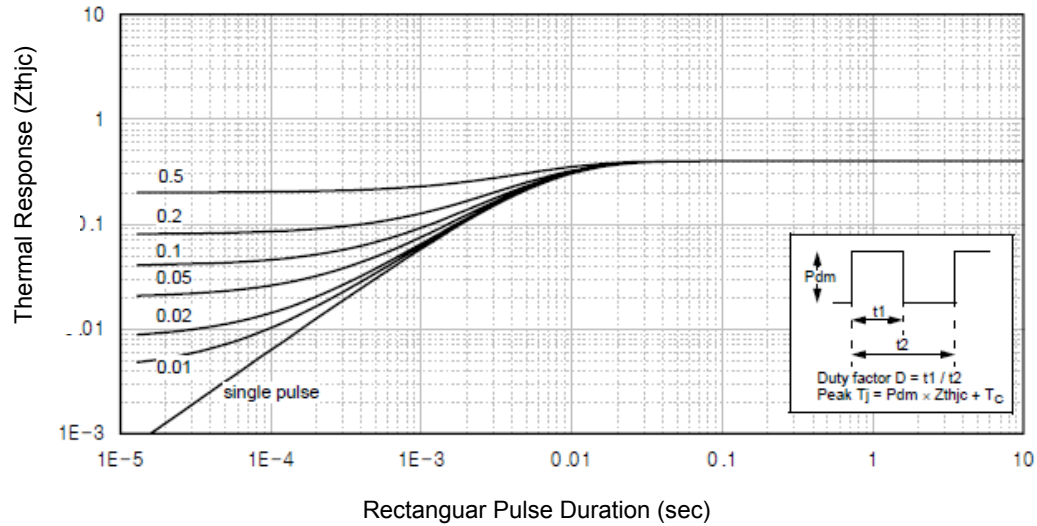


Figure 16. Turn-Off SOA



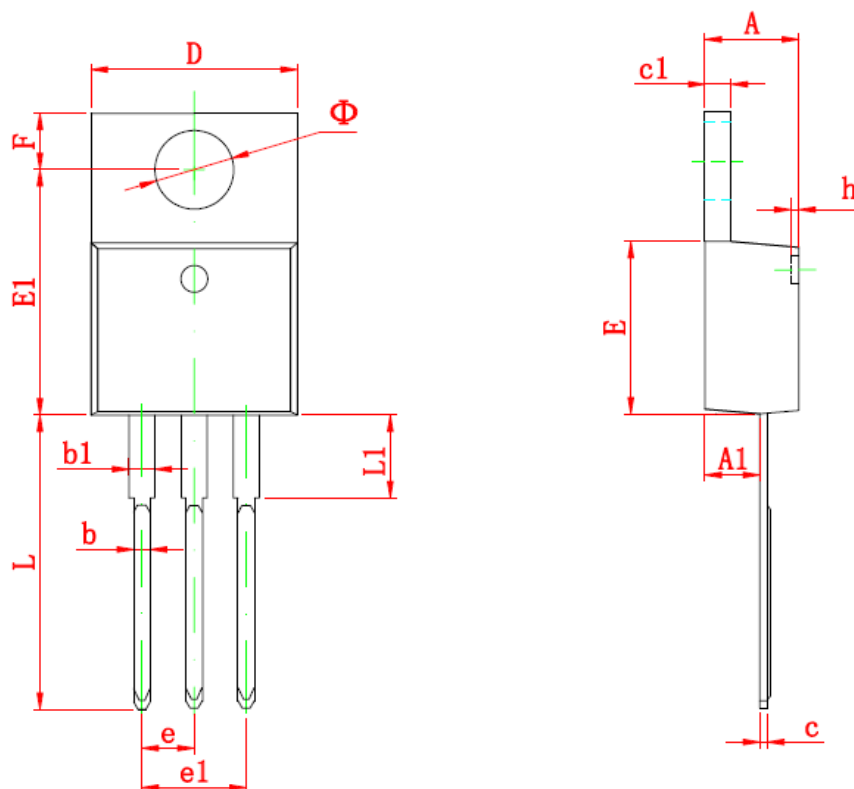
Typical Performance Characteristics (Continued)

Figure 17. Transient Thermal Impedance of IGBT



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Mechanical Dimensions (continued)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
E1	12.060	12.460	0.475	0.491
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
h	0.000	0.300	0.000	0.012
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
Φ	3.735	3.935	0.147	0.155



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