NCE10G120

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

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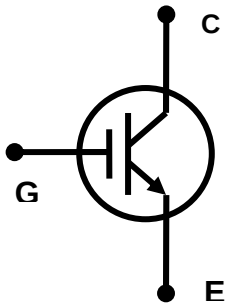


Applications

- 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 rugged-ness. This device is designed for soft switching applications.

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°C	16	A
	Continuous Collector Current @T_C=100°C	10	A
I_{CM}(1)	Pulsed Collector Current	24	A
P_D	Maximum Power Dissipation @T_C=25°C	138	W
T_J	Operating Junction Temperature	-55 to +150	°C
T_{stg}	Storage Temperature Range	-55 to +150	°C
T_L	Maximum Lead Temp. for soldering Purposes, 1/8" from case for 5seconds	260	°C

Notes:

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

Thermal Characteristics

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

Electrical Characteristics of the IGBT T_C=25°C

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
Off Characteristics						
BV_{CES}	Collector to Emitter Breakdown Voltage	V_{GE}=0V, Ic=1mA	1200	-	-	V
I_{CES}	Collector Cut-Off Current	V_{CE}=V_{CES}, V_{GE}=0V	-	-	1	mA
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=10mA, V_{CE}=V_{GE}	4.0	5.5	7.0	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	I_C=10A, V_{GE}=15V T_C=25°C	-	2	2.5	V
		I_C=10A, 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=10A, 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=10A, 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

Typical Performance Characteristics

Figure 1. Typical Output Characteristics

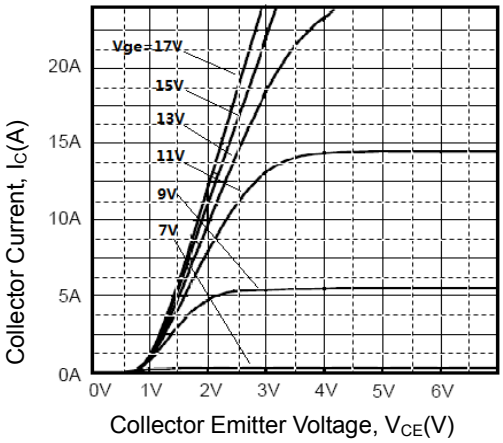


Figure 2. Typical Saturation Voltage Characteristics

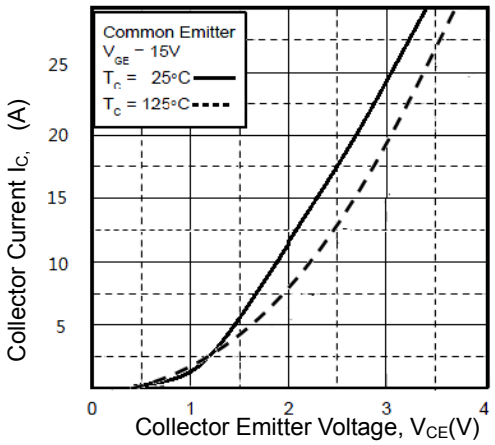


Figure 3. Saturation Voltage vs. Case Temperature at Variant Current Level

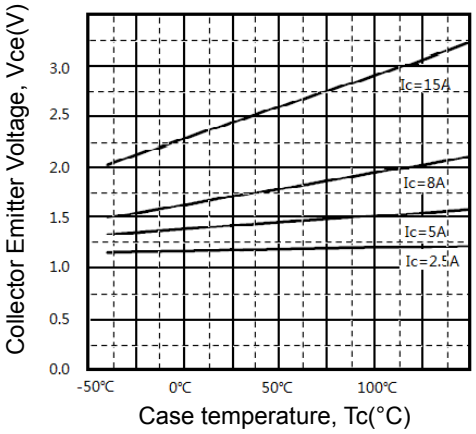


Figure 7. Capacitance Characteristics

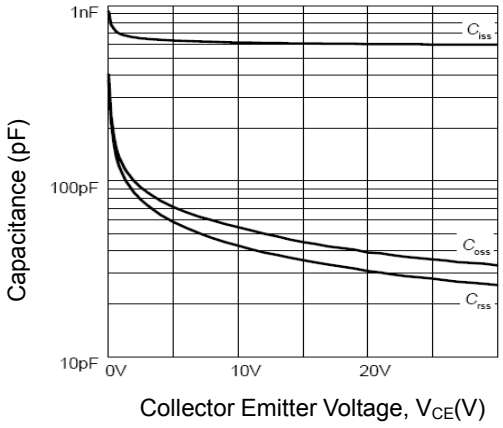


Figure 13. Switching Loss vs. Collector Current

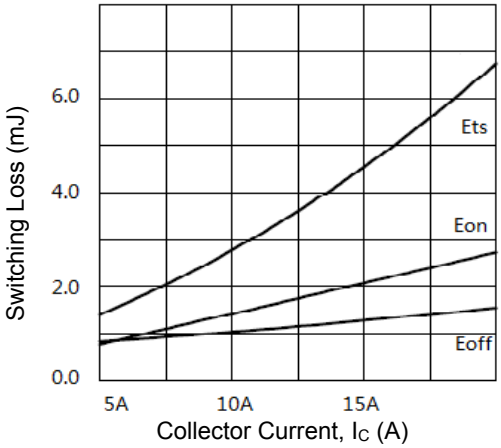
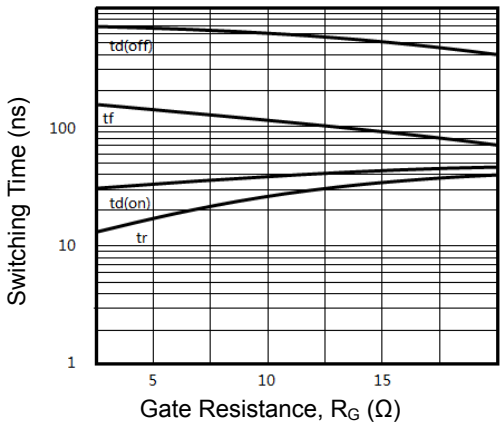


Figure 8. Switching Characteristics vs. Gate Resistance



Typical Performance Characteristics (Continued)

Figure 9. Switching Characteristics vs. Gate Resistance

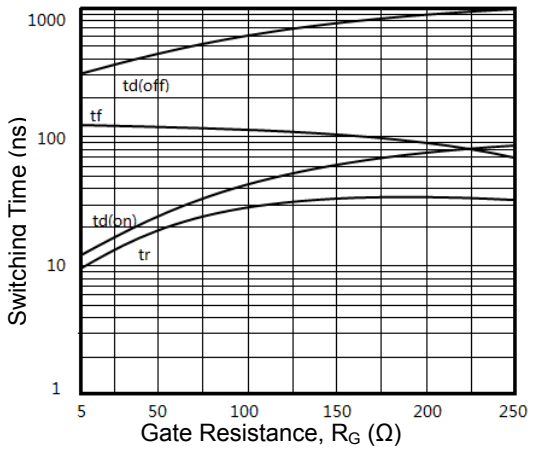


Figure 10. Switching Loss vs. Gate Resistance

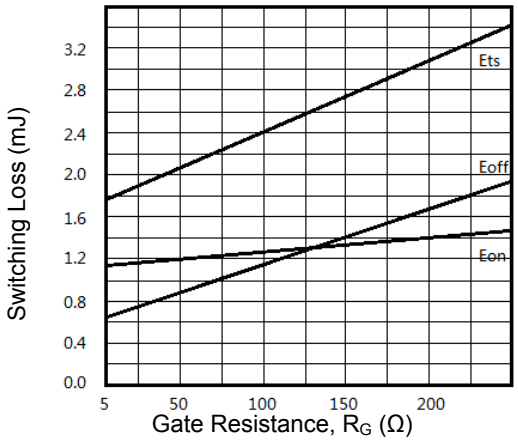


Figure14. Gate Charge Characteristics

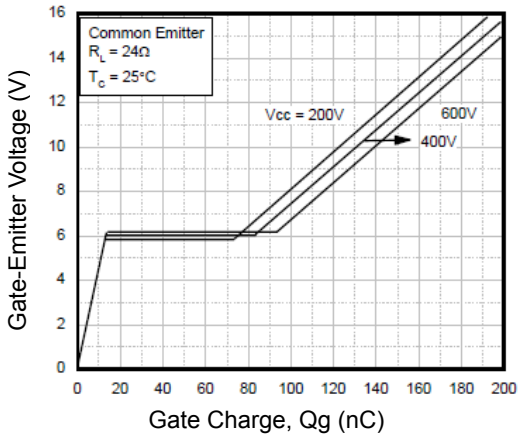


Figure 15. SOA Characteristics

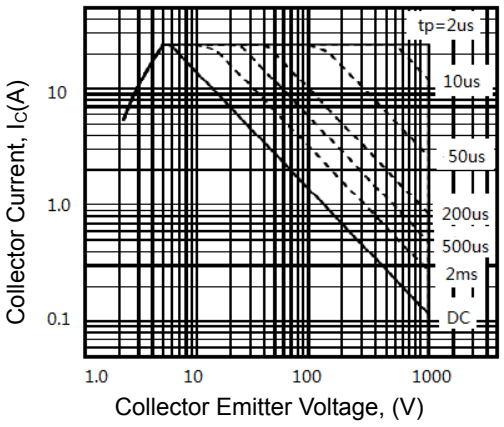
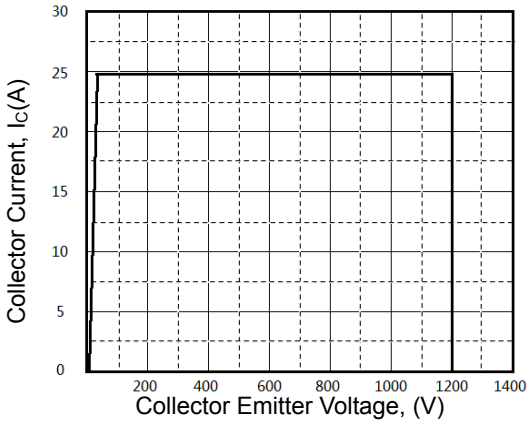
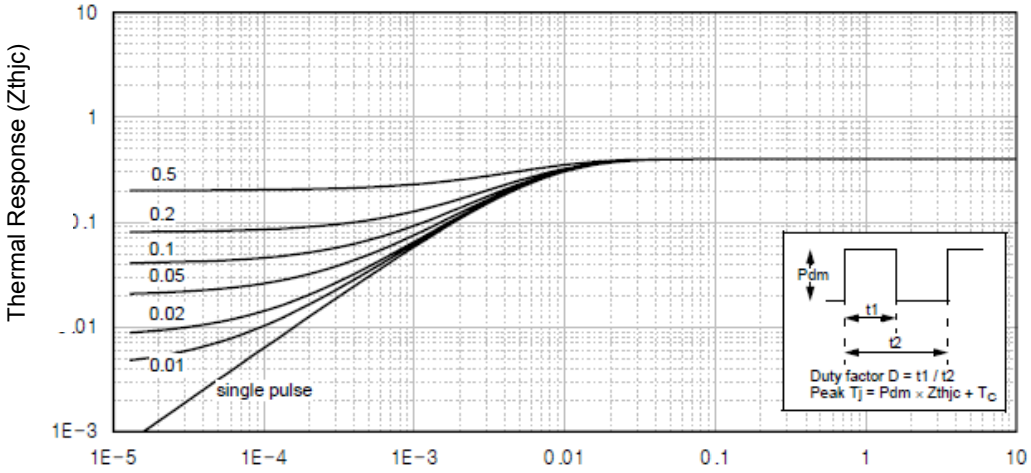


Figure 16. Turn-Off SOA

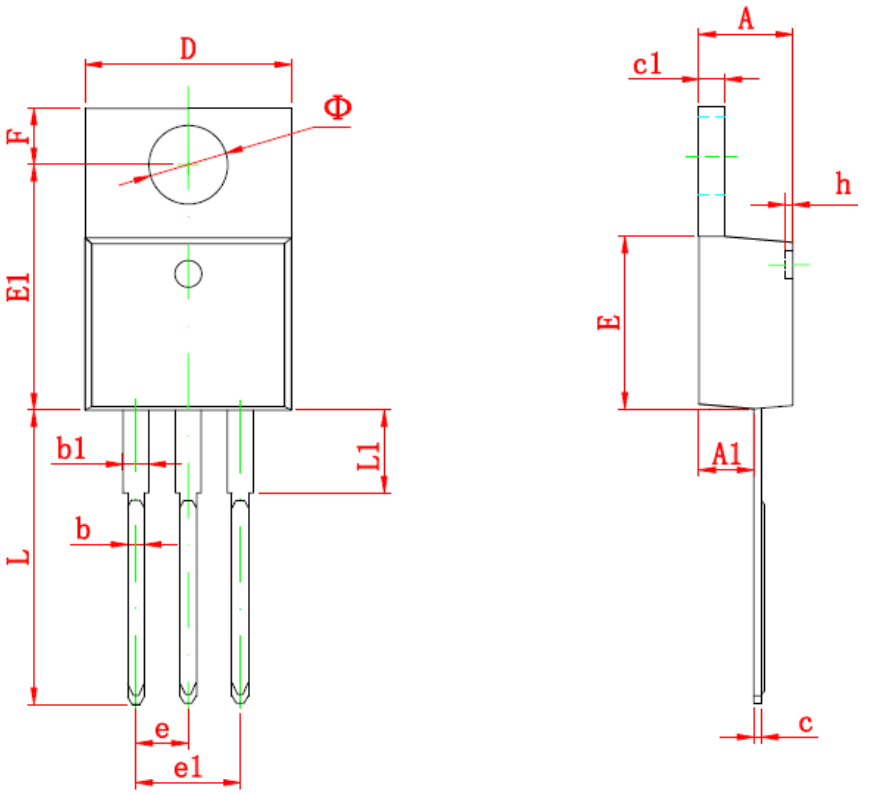


Typical Performance Characteristics (Continued)

Figure 17. Transient Thermal Impedance of IGBT



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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