汕头华汕电子器件有限公司

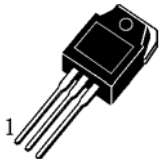
N-Channel Enhancement Insulated Gate Bipolar Transistor

HGH25N120A

Applications

- Induction heating and Microwave oven
- Soft switching applications

TO-3P



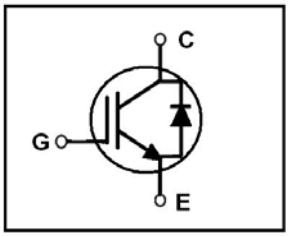
1—Gate, G
2—Collector, C
3—Emitter, E

Features

- Low saturation voltage, Vce(on)(typ)=2.1V@Vge=15V
- High input impedance
- Field stop trench technology offer superior conduction and switching performances,
- High speed switching

Absolute Maximum Ratings

Symbol	Description	Ratings	Units
V_{CES}	Collector to Emitter Voltage	1200	V
V_{GES}	Gate to Emitter Voltage	±30	V
I_C	Collector Current (TC = 25℃)	50	A
	Collector Current (TC = 100℃)	25	A
I_{CM} (1)	Pulsed Collector Current	80	A
I_F	Diode continuous Forward current (TC = 100℃)	15	A
P_D	Maximum Power Dissipation (TC = 25℃)	200	W
	Maximum Power Dissipation (TC = 100℃)	80	W
T_J	Operating Junction Temperature	-55～+150	℃
T_{stg}	Storage Temperature Range	-55～+150	℃
T_L	Maximum Lead Temp. for soldering Purposes, 1/8" from case for 5 seconds	300	℃



Notes: 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$(IGBT)	Thermal Resistance, Junction to Case		0.44	℃/W
$R_{\theta JC}$(Diode)	Thermal Resistance, Junction to Case		2.24	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient		40	℃/W

Electrical Characteristics of the IGBT (Tc＝25℃,unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
Off Characteristics						
BV_{CES}	Collector to Emitter Breakdown Voltage	VGE = 0V, IC = 250μA	1200			V
I_{CES}	Collector Cut-Off Current	VCE = 1200V, VGE = 0V			250	μA
I_{GES}	G-E Leakage Current	VGE = ±30V, VCE = 0V			±250	nA
On Characteristics						
$V_{GE(th)}$	G-E Threshold Voltage	IC = 250μA, VCE = VGE	3.0		6.5	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	IC = 20A, VGE = 15V; TC = 25℃		2.1	2.7	V
Dynamic Characteristics						
C_{ies}	Input Capacitance	VCE = 25V, VGE = 0V, f= 100KHz		840		pF
C_{oes}	Output Capacitance			130		pF
C_{res}	Reverse Transfer Capacitance			50		pF
Switching Characteristics						
td(on)	Turn-On Delay Time	VCC = 600V, IC = 20A, RG = 28Ω, VGE = 15V, Inductive Load, TC = 25℃		40		ns
tr	Rise Time			70		ns
td(off)	Turn-Off Delay Time			80		ns
tf	Fall Time			350		ns
Eon	Turn-On Switching Loss			0.9		mJ
Eoff	Turn-Off Switching Loss			2.2		mJ
Ets	Total Switching Loss			3.1		mJ
Qg	Total Gate Charge	VCE = 600V, IC = 20A, VGE = 15V		186	230	nC
Qge	Gate to Emitter Charge			15	20	nC
Qgc	Gate to Collector Charge			79	110	nC

Electrical Characteristics of the Diode (TC = 25℃ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{FM}	Diode Forward Voltage	IF = 15A		1.7	2.7	V
trr	Diode Reverse Recovery Time	IES =15A, dI/dt =200A/μs		210	330	ns
I_{rr}	Diode peak Reverse Recovery Current			27	40	A
Q_{rr}	Diode Reverse Recovery Charge			2.8	6.6	μC

Typical Performance Characteristics

Figure 1. Typical Output Characteristics

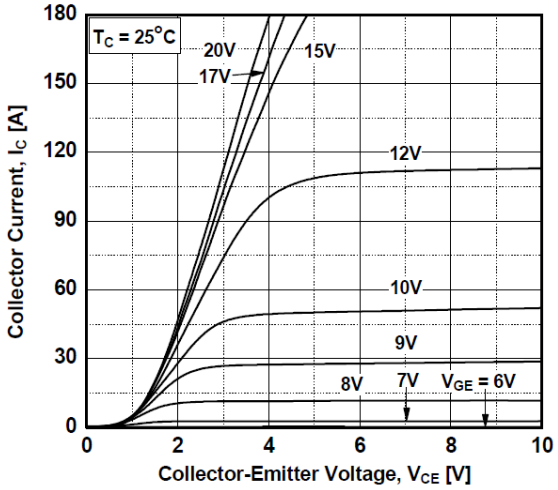


Figure 2. Typical Output Characteristics

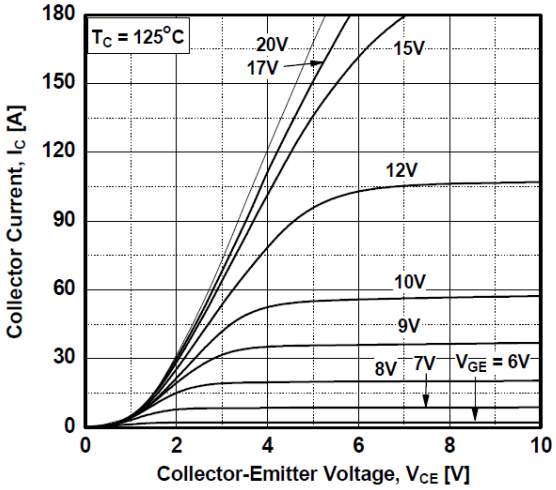


Figure 3. Typical Saturation Voltage Characteristics

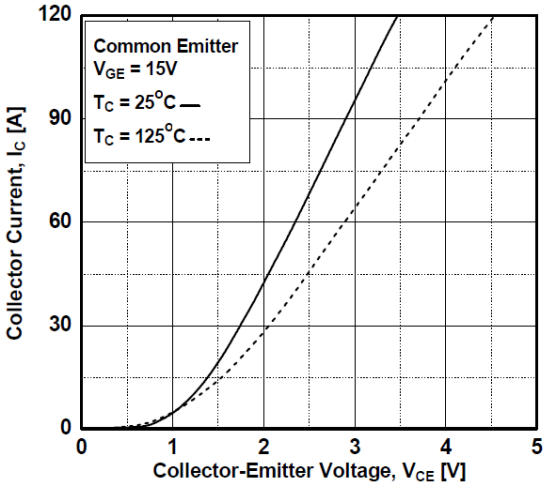


Figure 4. Transfer Characteristics

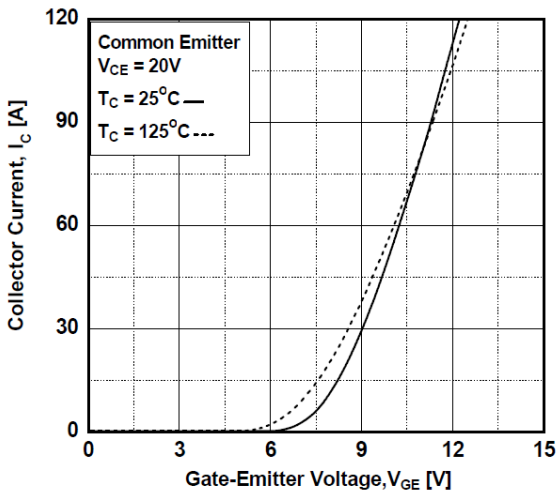


Figure 5. Saturation Voltage vs. Case Temperature at Variant Current Level

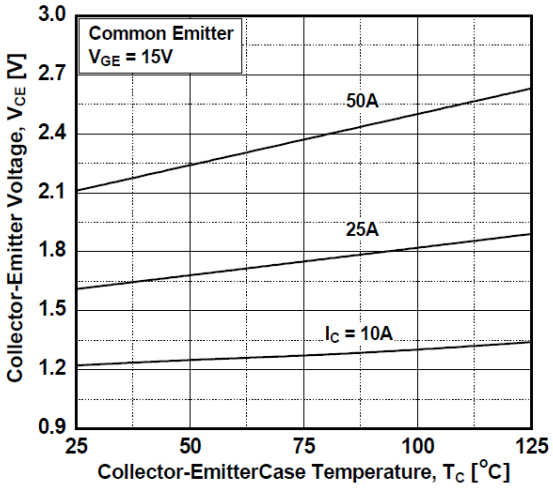
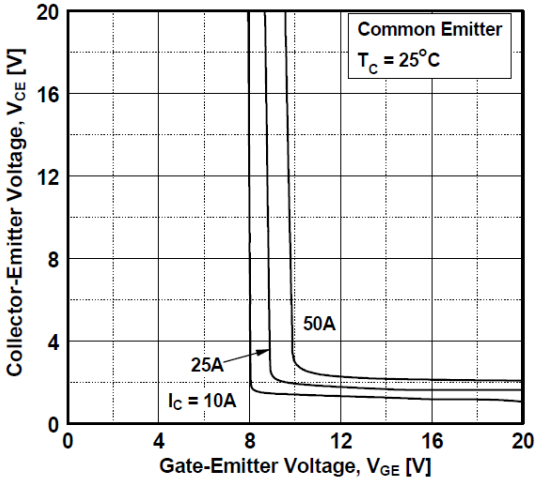


Figure 6. Saturation Voltage vs. V_{GE}



Typical Performance Characteristics

Figure 7. Saturation Voltage vs. V_{GE}

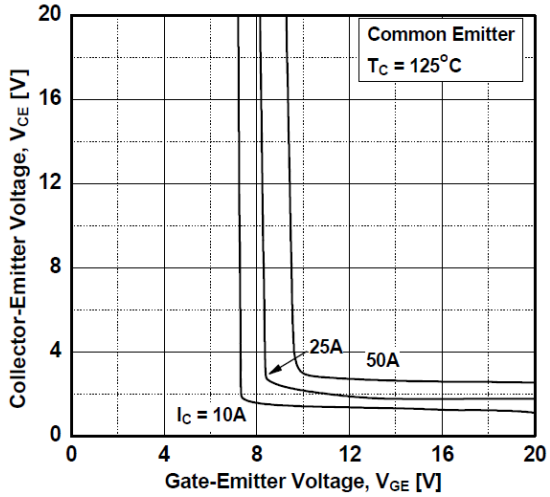


Figure 8. Capacitance Characteristics

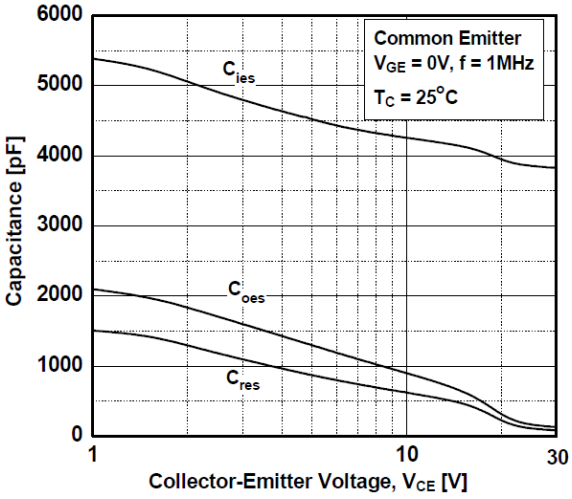


Figure 9. Gate charge Characteristics

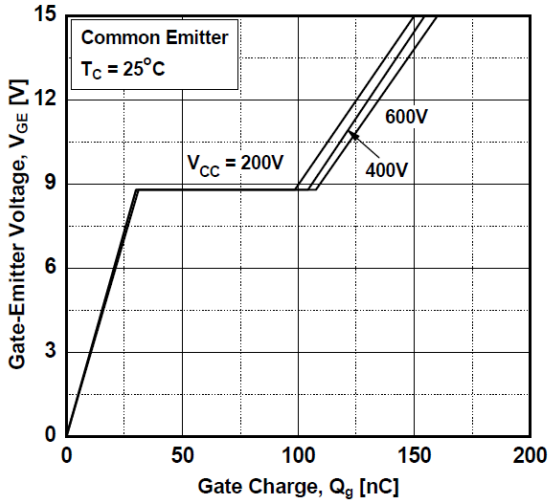


Figure 10. SOA Characteristics

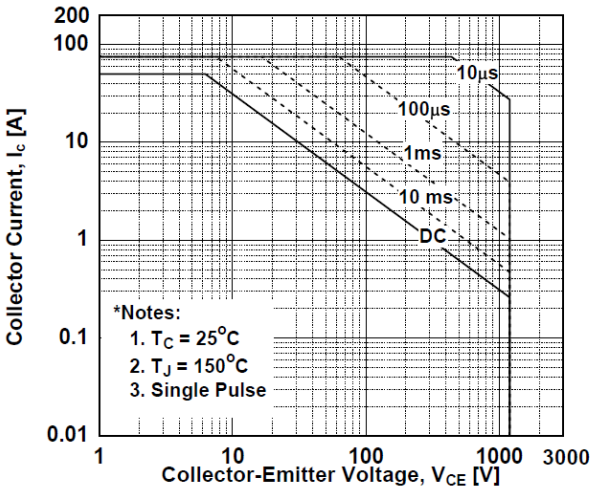


Figure 11. Turn-on Characteristics vs. Gate Resistance

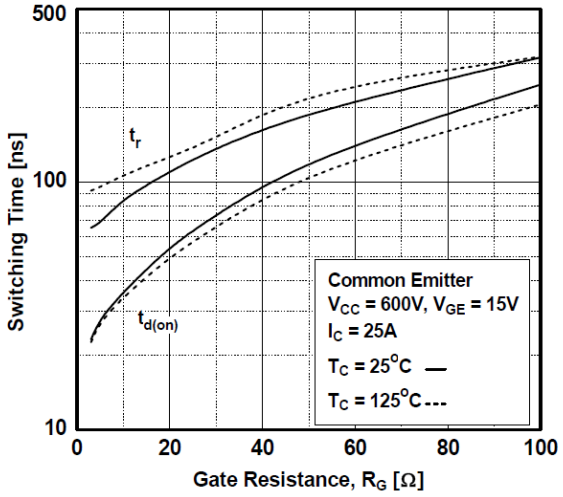
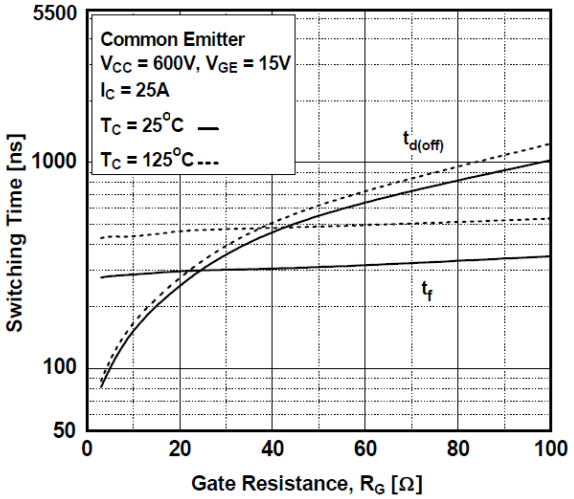


Figure 12. Turn-off Characteristics vs. Gate Resistance



Typical Performance Characteristics

Figure 13. Turn-on Characteristics vs. Collector Current

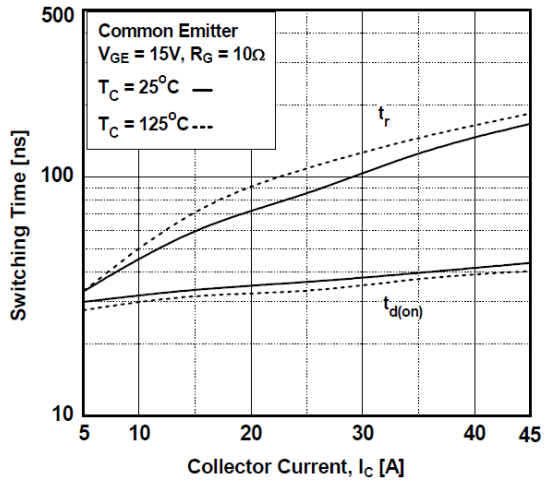


Figure 14. Turn-off Characteristics vs. Collector Current

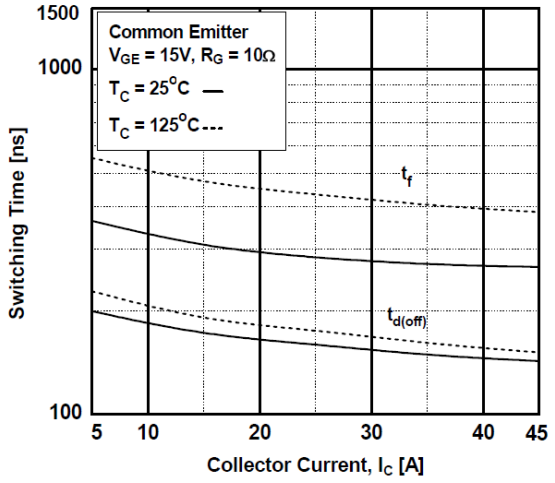


Figure 15. Switching Loss vs. Gate Resistance

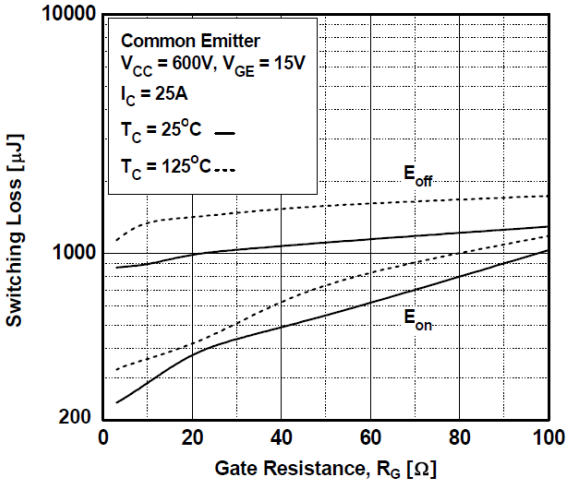


Figure 16. Switching Loss vs. Collector Current

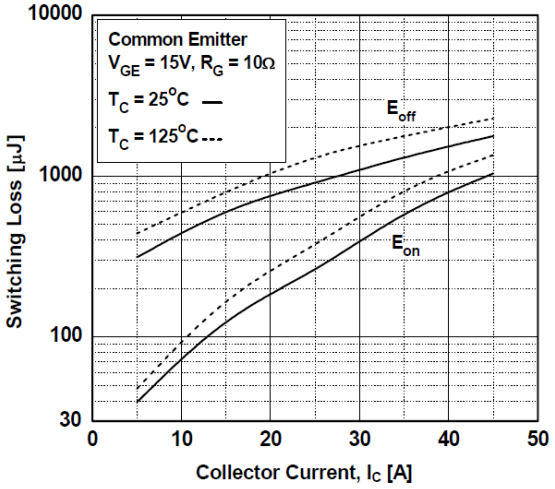


Figure 17. Turn off Switching SOA Characteristics

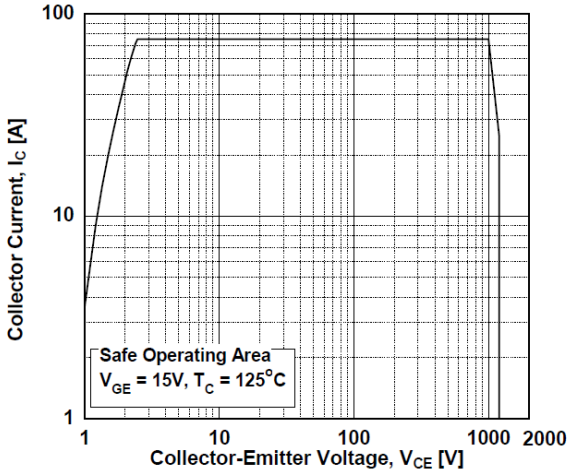
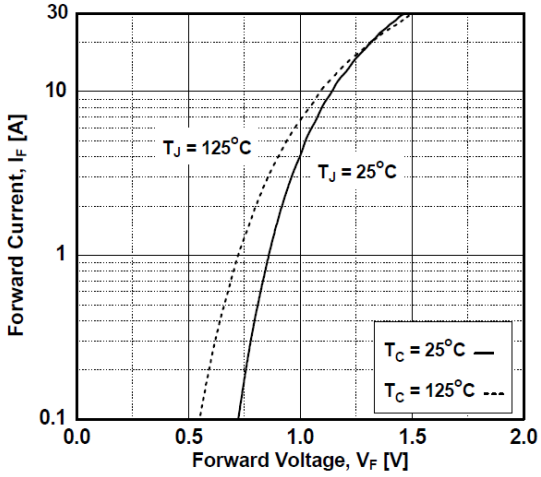


Figure 18. Forward Characteristics



Typical Performance Characteristics

Figure 19. Reverse Recovery Current

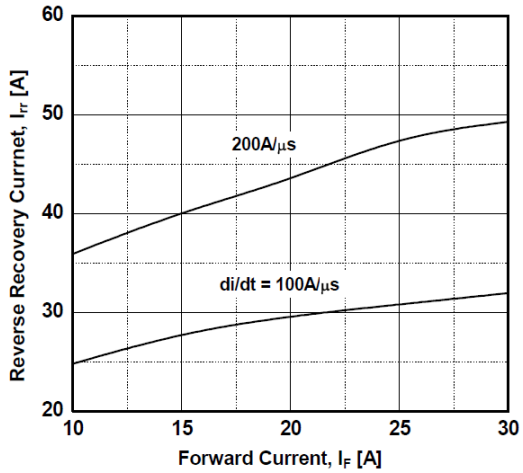


Figure 20. Stored Charge

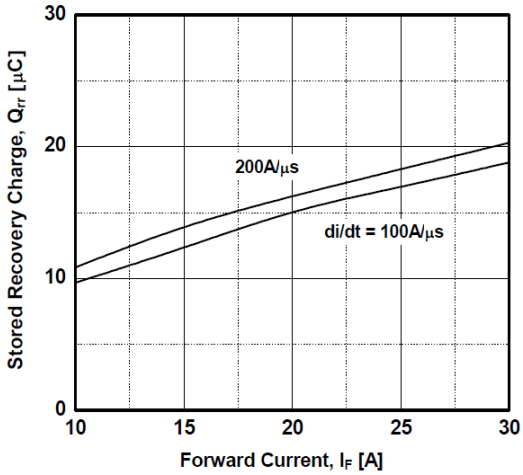


Figure 21. Reverse Recovery Time

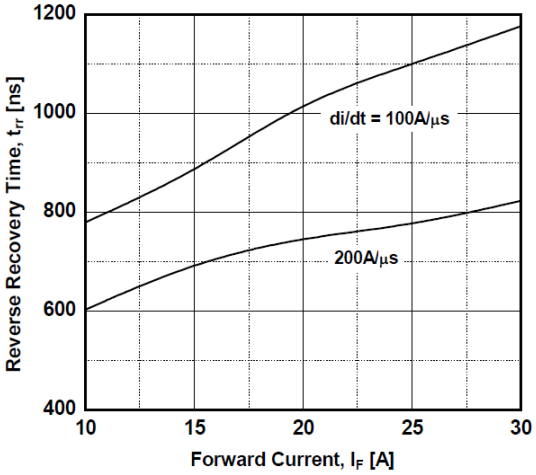


Figure 22. Transient Thermal Impedance of IGBT