

N-Channel IGBT with FRD.

Pb Rohs

TO-3PN

Pin Definition:

- 1. Gate
- 2. Collector
- 3. Emitter

PRODUCT SUMMARY

V _{CES} (V)	V _{GES} (V)	I _C (A)
1200	±20	25

General Description

The TSG25N120CN using proprietary trench design and advanced NPT technology, the 1200V NPT IGBT offers superior conduction and switching performances, high avalanche ruggedness and easy parallel operation. This device is well suited for the resonant or soft switching application such as induction heating, microwave oven, etc.

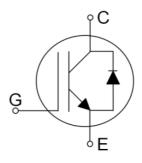
Features

- 1200V NPT Trench Technology
- High Speed Switching
- Low Conduction Loss

Ordering Information

Part No.	Package	Packing		
TSG25N120CN C0	TO-3PN	30pcs / Tube		

Block Diagram



NPT Trench IGBT

Absolute Maximum Rating (T_A=25°C unless otherwise noted)

Parameter		Symbol	Limit	Unit
Collector-Emitter Voltage		V _{CES}	1200	V
Gate-Emitter Voltage		V_{GES}	±20	V
Out the second	T _C =25°C		50	Α
Continuous Current	T _C =100°C	I _C	25	Α
Pulsed Collector Current *		I _{CM}	75	А
Diode Forward Current (T _C =100°C)		l _F	25	А
Diode Pulse Forward Current		I _{FM}	75	Α
Max Power Dissipation	T _J =25°C		312	147
	T _J =100°C	P_{D}	125	W
Operating Junction Temperature		T _J	-55 to +150	°C
Storage Temperature Range		T _{STG}	-55 to +150	°C

^{*} Repetitive rating: Pulse width limited by max. junction temperature



N-Channel IGBT with FRD.



Thermal Performance

Parameter			Limit	Unit
Thermal Resistance - Junction to Case	IGBT	DO	0.4	°C/W
	DIODE	RΘ _{JC}	2.2	
Thermal Resistance - Junction to Ambient		$R\Theta_{JA}$	40	

Electrical Specifications (Tc=25°C unless otherwise noted)

Parameter	Conditions	Symbol	Min	Тур	Max	Unit	
Static							
Collector-Emitter Breakdown Voltage	$V_{GE} = 0V$, $I_C = 1mA$	BV _{CES}	1200			V	
Zero Gate Voltage Collector Current	$V_{CE} = 1200V, V_{GE} = 0V$	I _{CES}			1	mA	
Gate-Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$	I _{GES}			±250	nA	
Gate-Emitter Threshold Voltage	$V_{GE} = V_{CE}$, $I_C = 25mA$	$V_{GE(TH)}$	3.0	5.0	7.0	V	
Collector Emitter Seturation Voltage	$V_{GE} = 15V, I_{C} = 25A, T_{J} = 25^{\circ}C$	V _{CE(SAT)}		1.9	2.5	V	
Collector-Emitter Saturation Voltage	$V_{GE} = 15V, I_{C} = 25A, T_{J} = 125^{\circ}C$	V _{CE(SAT)}		2.2		V	
Dynamic							
Input Capacitance		C _{IES}		4000			
Output Capacitance	$V_{CE} = 30V, V_{GE} = 0V,$ f = 1.0MHz	C _{OES}		105		pF	
Reverse Transfer Capacitance	= 1.0 V Z	C _{RES}		72			
Switching							
Turn-On Delay Time		t _{d(on)}		57			
Rise Time		t _r		65		nS	
Turn-Off Delay Time	$V_{CC} = 600V, I_C = 25A,$	$t_{d(off)}$		240			
Fall Time	$R_G = 10\Omega, V_{GE} = 15V$	t _f		86	160		
Turn-On Switching Loss	Inductive Load, T _J =25°C	E _{on}		4.15	6.22		
Turn-Off Switching Loss		E _{off}		0.87	1.31	mJ	
Total Switching Loss		E _{ts}		5.02	7.53		
Turn-On Delay Time		t _{d(on)}		41			
Rise Time		t _r		57			
Turn-Off Delay Time	$V_{CC} = 600V, I_C = 25A,$	t _{d(off)}		265		nS	
Fall Time	$R_{G} = 10\Omega, V_{GE} = 15V$	t _f		168			
Turn-On Switching Loss	Inductive Load, T _J =125°C	E _{on}		4.46	6.69		
Turn-Off Switching Loss		E _{off}		1.74	2.61	mJ	
Total Switching Loss		E _{ts}		6.2	9.3		
Total Gate Charge	V 000V I 05A	Q_g		170	255		
Gate-Emitter Charge	$V_{CC} = 600V, I_C = 25A,$	Q_ge		27	41	nC	
Gate-Collector Charge	$V_{GE} = 15V$	Q_{gc}		60	90		



N-Channel IGBT with FRD.



Electrical Specifications of the DIODE (Tc=25°C unless otherwise noted)

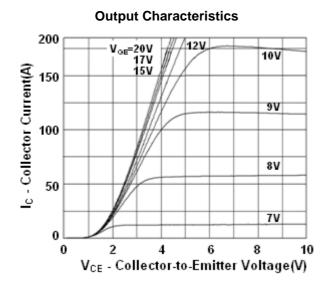
Parameter	Conditions		Symbol	Min	Тур	Max	Unit
Diode Forward Voltage	. 054	T _J =25°C	V_{FM}		2.0	2.5	٧
	$I_F = 25A$,	T _J =125°C			2.18		٧
Reverse Recovery Time		T _J =25°C	t _{fr}		300	480	ns
		T _J =125°C			360		
Reverse Recovery Current	$I_F = 25A,$ $dI/dt = 200A/us$	T _J =25°C	l _{fr}		27	41	A
		T _J =125°C			31		
Reverse Recovery Charge		T _J =25°C	Q_{fr}		4000	6000	nC
		T _J =125°C			5580		



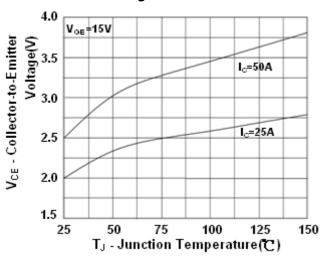
N-Channel IGBT with FRD.



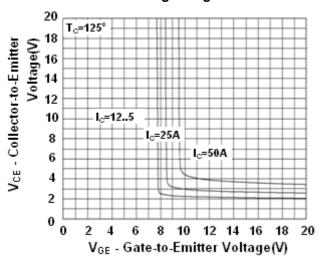
Electrical Characteristics Curve (Tc = 25°C, unless otherwise noted)



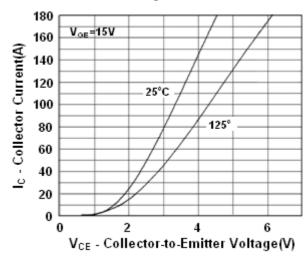
Saturation voltage vs. collector current



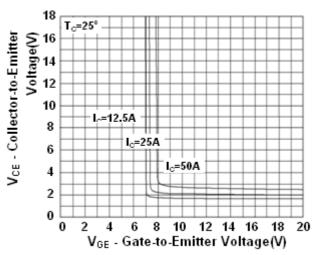
Saturation voltage vs. gate bias



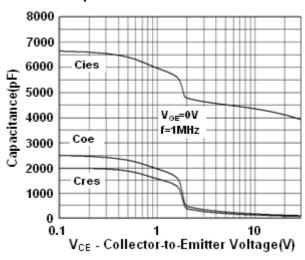
Saturation voltage characteristics



Saturation voltage vs. gate bias



Capacitance characteristics



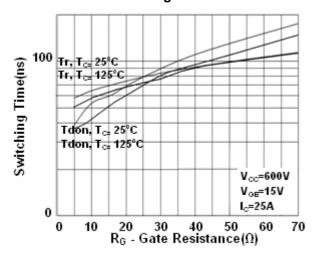


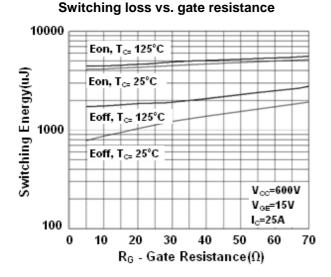
N-Channel IGBT with FRD.



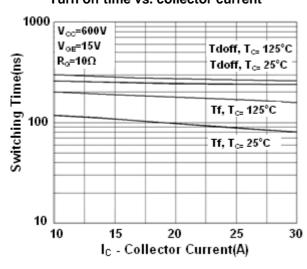
Electrical Characteristics Curve (Ta = 25°C, unless otherwise noted)

Turn on time vs. gate resistance

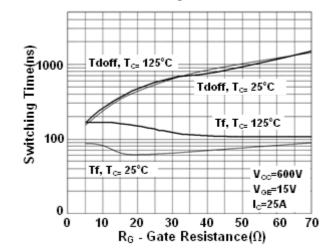




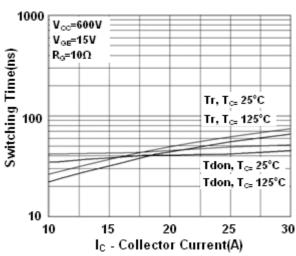
Turn off time vs. collector current



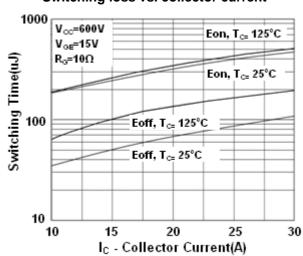
Turn off time vs. gate resistance



Turn on time vs. collector current



Switching loss vs. collector current



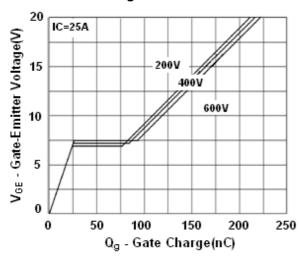


N-Channel IGBT with FRD.

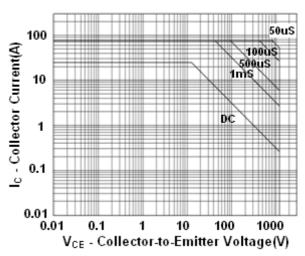


Electrical Characteristics Curve (Tc = 25°C, unless otherwise noted)

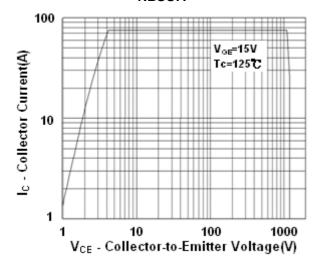
Gate charge characteristics



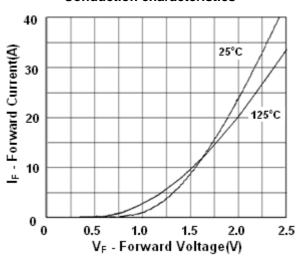
SOA Characteristics



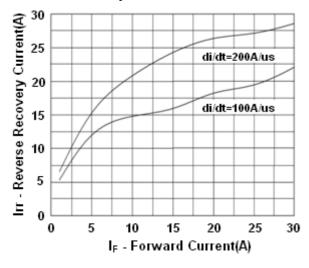
RBSOA



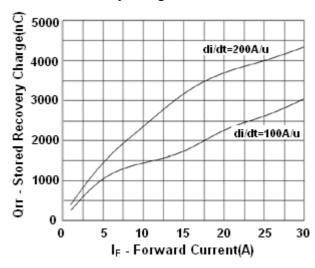
Conduction characteristics



Reverse recovery current vs. forward current



Stored recovery charge vs. forward current



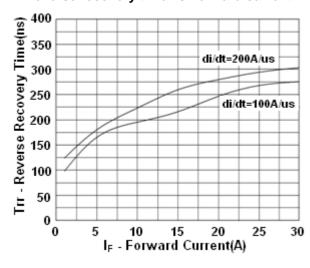


N-Channel IGBT with FRD.

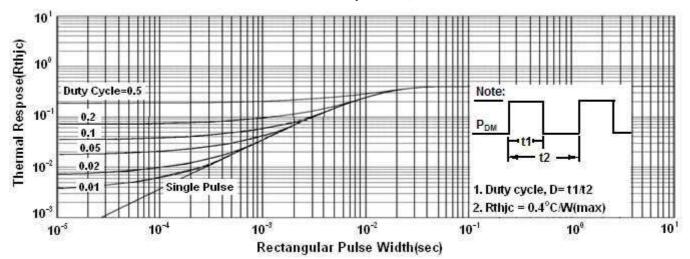


Electrical Characteristics Curve (Ta = 25°C, unless otherwise noted)

Reverse recovery time vs. forward current



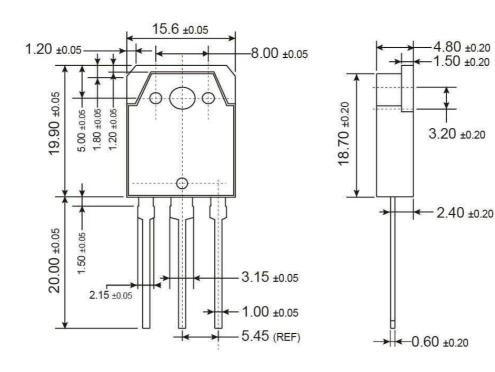
Normalized Thermal Transient Impedance, Junction-to-Ambient





N-Channel IGBT with FRD.

TO-3PN Mechanical Drawing



Unit: Millimeters



TSG25N120CN N-Channel IGBT with FRD.

Notice

Specifications of the products displayed herein are subject to change without notice. TSC or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, to any intellectual property rights is granted by this document. Except as provided in TSC's terms and conditions of sale for such products, TSC assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of TSC products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify TSC for any damages resulting from such improper use or sale.