NGTB40N60L2WG

IGBT

This Insulated Gate Bipolar Transistor (IGBT) features a robust and cost effective Field Stop (FS) Trench construction, and provides superior performance in demanding switching applications, offering both low on state voltage and minimal switching loss.

Features

- Extremely Efficient Trench with Field Stop Technology
- T_{Jmax} = 175°C
- Soft Fast Reverse Recovery Diode
- Optimized for Low V_{CEsat}
- 5 μs Short−Circuit Capability
- This is a Pb−Free Device

Typical Applications

- Motor Drive Inverters
- Industrial Switching
- Welding

ABSOLUTE MAXIMUM RATINGS

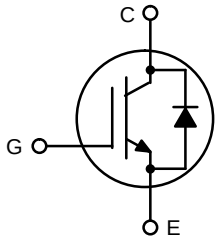
Rating	Symbol	Value	Unit
Collector−emitter voltage	V_{CES}	600	V
Collector current @ Tc = 25°C @ Tc = 100°C	I_C	 80 40	A
Diode Forward Current @ Tc = 25°C @ Tc = 100°C	I_F	 80 40	A
Diode Pulsed Current T_{PULSE} Limited by T_J Max	I_{FM}	160	A
Pulsed collector current, T_{pulse} limited by T_{Jmax}	I_{CM}	160	A
Short−circuit withstand time V_{GE} = 15 V, V_{CE} = 400 V, $T_J \le$ +150°C	t_{SC}	5	μs
Gate−emitter voltage	V_{GE}	±20	V
Transient gate−emitter voltage (T_{PULSE} = 5 μs, D < 0.10)		±30	V
Power Dissipation @ Tc = 25°C @ Tc = 100°C	P_D	 417 208	W
Operating junction temperature range	T_J	−55 to +175	°C
Storage temperature range	T_{stg}	−55 to +175	°C
Lead temperature for soldering, 1/8” from case for 5 seconds	T_{SLD}	260	°C

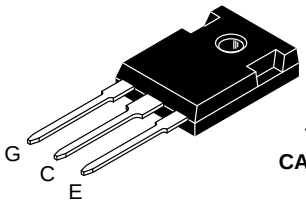
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

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40 A, 600 V
V_{CEsat} = 1.65 V
E_{OFF} = 0.28 mJ





TO−247
CASE 340AL

MARKING DIAGRAM



A = Assembly Location
Y = Year
WW = Work Week
G = Pb−Free Package

ORDERING INFORMATION

Device	Package	Shipping
NGTB40N60L2WG	TO−247 (Pb−Free)	30 Units / Rail

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THERMAL CHARACTERISTICS

Rating	Symbol	Value	Unit
Thermal resistance junction−to−case, for IGBT	$R_{\theta JC}$	0.36	°C/W
Thermal resistance junction−to−case, for Diode	$R_{\theta JC}$	1.00	°C/W
Thermal resistance junction−to−ambient	$R_{\theta JA}$	40	°C/W

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise specified)

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
STATIC CHARACTERISTIC						
Collector−emitter breakdown voltage, gate−emitter short−circuited	V_{GE} = 0 V, I_C = 500 μA	$V_{(BR)CES}$	600	−	−	V
Collector−emitter saturation voltage	V_{GE} = 15 V, I_C = 40 A V_{GE} = 15 V, I_C = 40 A, T_J = 175°C	V_{CEsat}	− −	1.65 1.90	1.90 −	V
Gate−emitter threshold voltage	V_{GE} = V_{CE}, I_C = 350 μA	$V_{GE(th)}$	4.5	5.8	6.5	V
Collector−emitter cut−off current, gate−emitter short−circuited	V_{GE} = 0 V, V_{CE} = 600 V V_{GE} = 0 V, V_{CE} = 600 V, T_J = 175°C	I_{CES}	− −	− 5.0	0.5 −	mA
Gate leakage current, collector−emitter short−circuited	V_{GE} = 20 V , V_{CE} = 0 V	I_{GES}	−	−	200	nA
DYNAMIC CHARACTERISTIC						
Input capacitance	V_{CE} = 20 V, V_{GE} = 0 V, f = 1 MHz	C_{ies}	−	5286	−	pF
Output capacitance		C_{oes}	−	213	−	
Reverse transfer capacitance		C_{res}	−	147	−	
Gate charge total	V_{CE} = 480 V, I_C = 40 A, V_{GE} = 15 V	Q_g	−	228	−	nC
Gate to emitter charge		Q_{ge}	−	50	−	
Gate to collector charge		Q_{gc}	−	115	−	
SWITCHING CHARACTERISTIC, INDUCTIVE LOAD						
Turn−on delay time	T_J = 25°C V_{CC} = 400 V, I_C = 40 A R_g = 10 Ω V_{GE} = 0 V/ 15 V	$t_{d(on)}$	−	98	−	ns
Rise time		t_r	−	42	−	
Turn−off delay time		$t_{d(off)}$	−	213	−	
Fall time		t_f	−	60	−	
Turn−on switching loss		E_{on}	−	1.17	−	mJ
Turn−off switching loss		E_{off}	−	0.28	−	
Total switching loss		E_{ts}	−	1.45	−	
Turn−on delay time	T_J = 150°C V_{CC} = 400 V, I_C = 40 A R_g = 10 Ω V_{GE} = 0 V/ 15 V	$t_{d(on)}$	−	98	−	ns
Rise time		t_r	−	44	−	
Turn−off delay time		$t_{d(off)}$	−	220	−	
Fall time		t_f	−	88	−	
Turn−on switching loss		E_{on}	−	1.45	−	mJ
Turn−off switching loss		E_{off}	−	0.68	−	
Total switching loss		E_{ts}	−	2.13	−	
DIODE CHARACTERISTIC						
Forward voltage	V_{GE} = 0 V, I_F = 40 A V_{GE} = 0 V, I_F = 40 A, T_J = 175°C	V_F	− −	2.40 2.58	3.00 −	V
Reverse recovery time	T_J = 25°C I_F = 40 A, V_R = 200 V di_F/dt = 200 A/μs	t_{rr}	−	73	−	ns
Reverse recovery charge		Q_{rr}	−	282	−	nC
Reverse recovery current		I_{rrm}	−	6.7	−	A
Reverse recovery time	T_J = 175°C I_F = 40 A, V_R = 200 V di_F/dt = 200 A/μs	t_{rr}	−	160	−	ns
Reverse recovery charge		Q_{rr}	−	912	−	nC
Reverse recovery current		I_{rrm}	−	8.6	−	A

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

TYPICAL CHARACTERISTICS

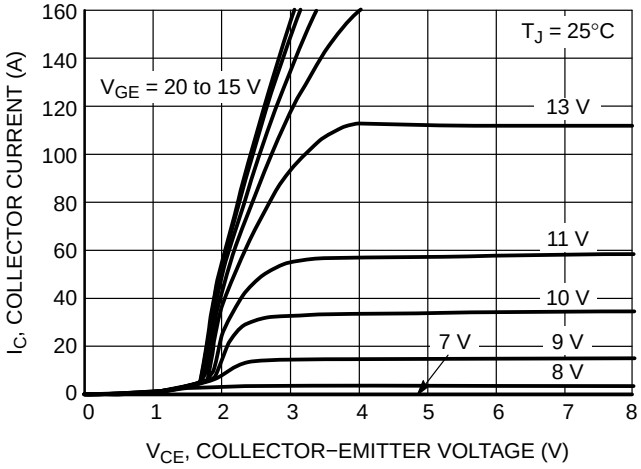


Figure 1. Output Characteristics

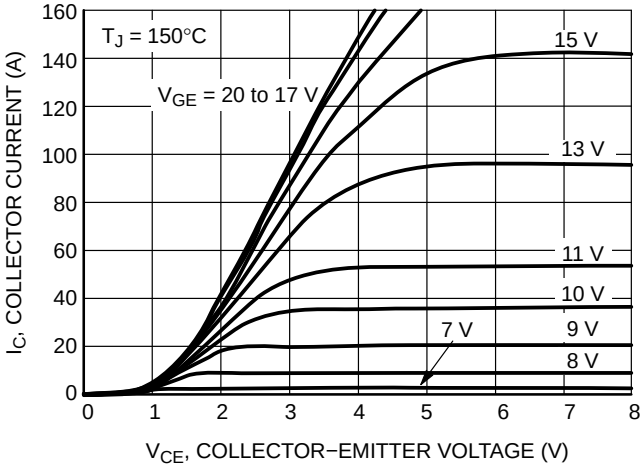


Figure 2. Output Characteristics

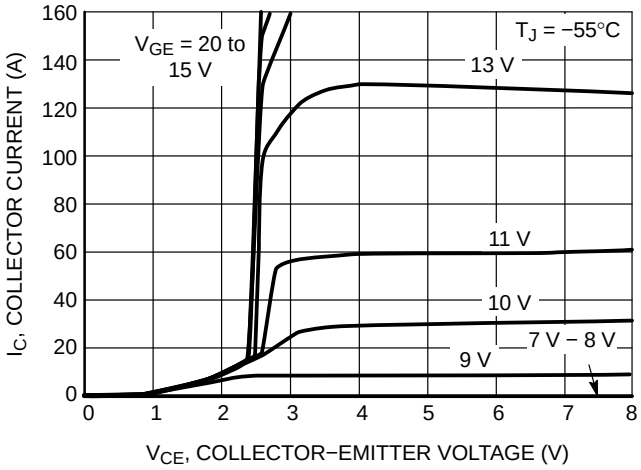


Figure 3. Output Characteristics

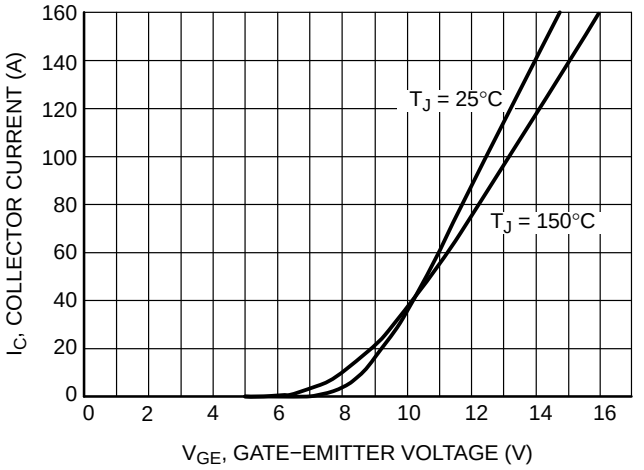


Figure 4. Typical Transfer Characteristics

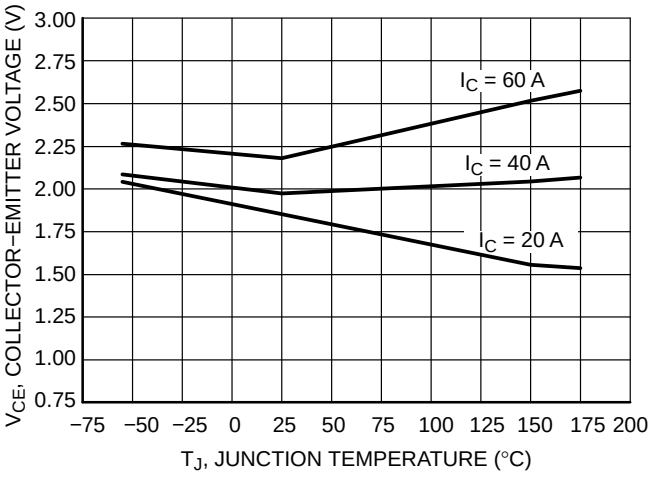


Figure 5. $V_{CE(sat)}$ vs. T_J

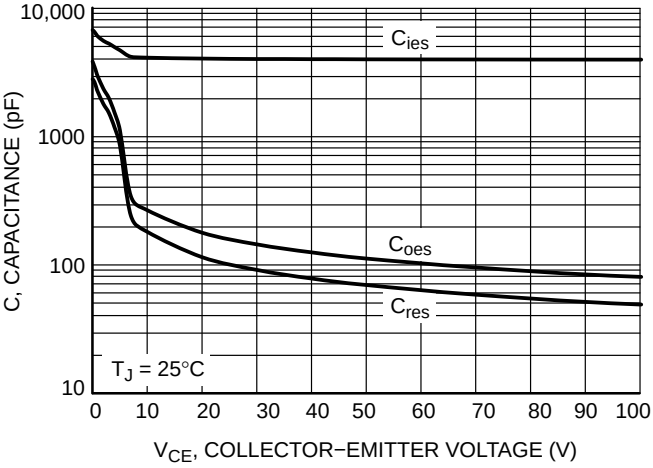


Figure 6. Typical Capacitance

TYPICAL CHARACTERISTICS

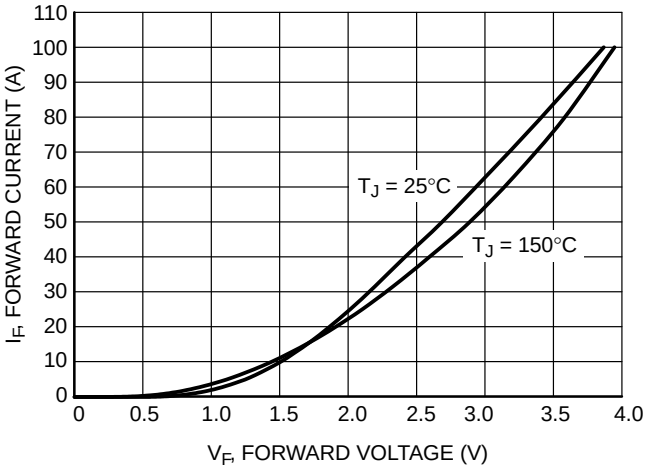


Figure 7. Diode Forward Characteristics

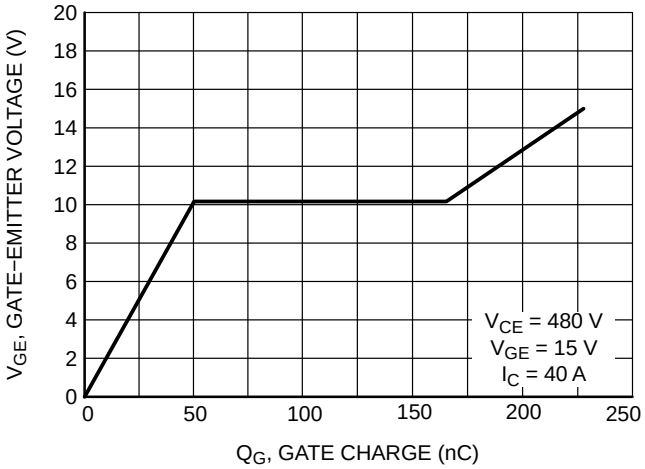


Figure 8. Typical Gate Charge

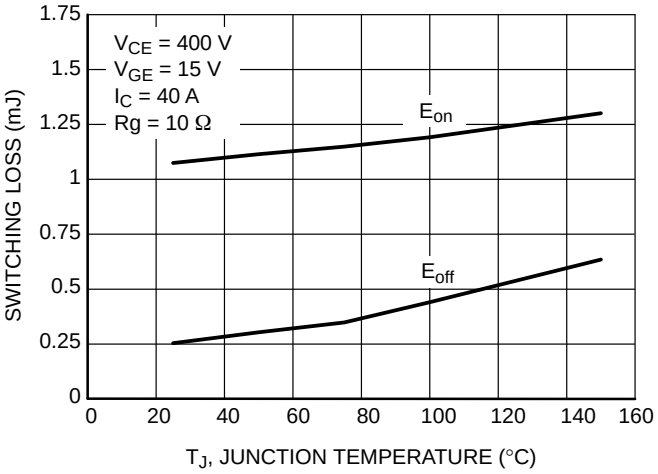


Figure 9. Switching Loss vs. Temperature

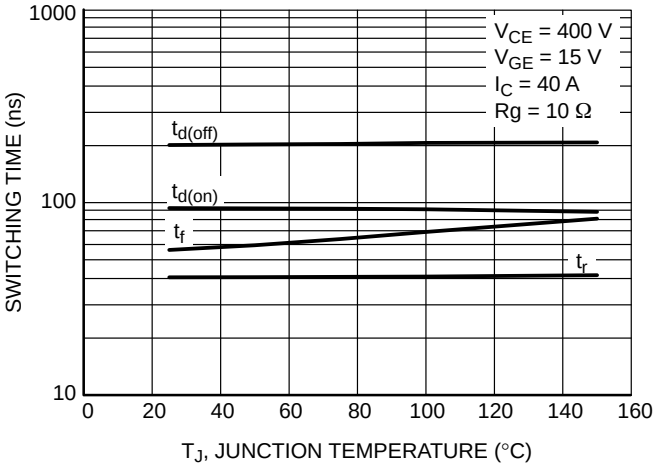


Figure 10. Switching Time vs. Temperature

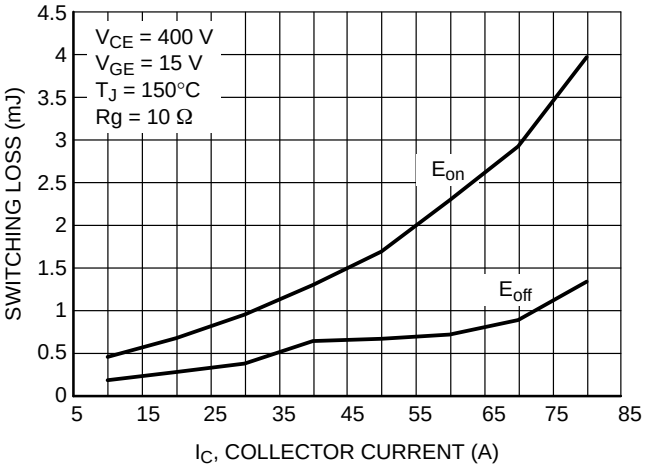


Figure 11. Switching Loss vs. I_C

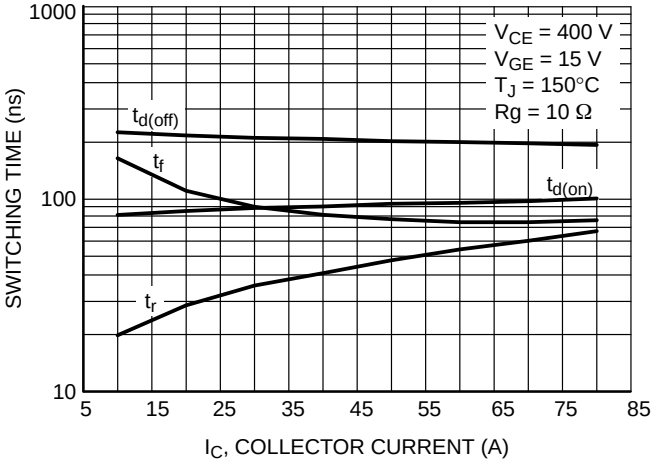


Figure 12. Switching Time vs. I_C

TYPICAL CHARACTERISTICS

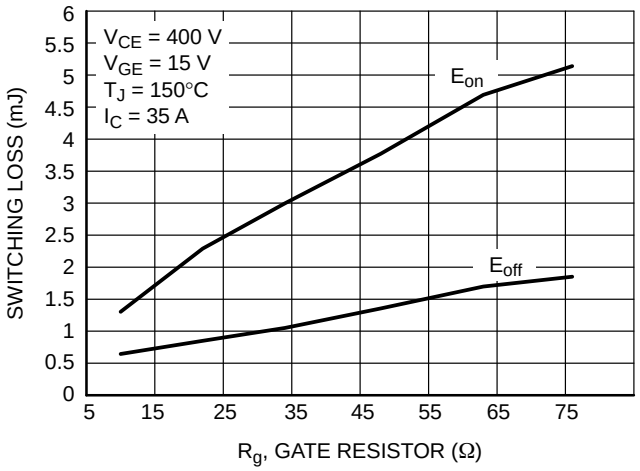


Figure 13. Switching Loss vs. R_g

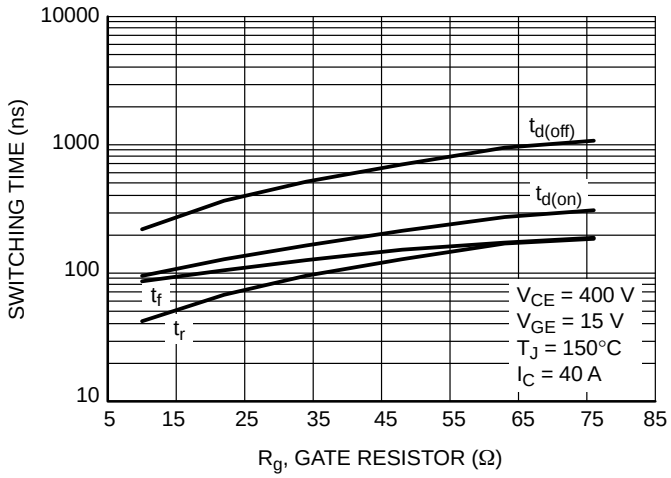


Figure 14. Switching Time vs. R_g

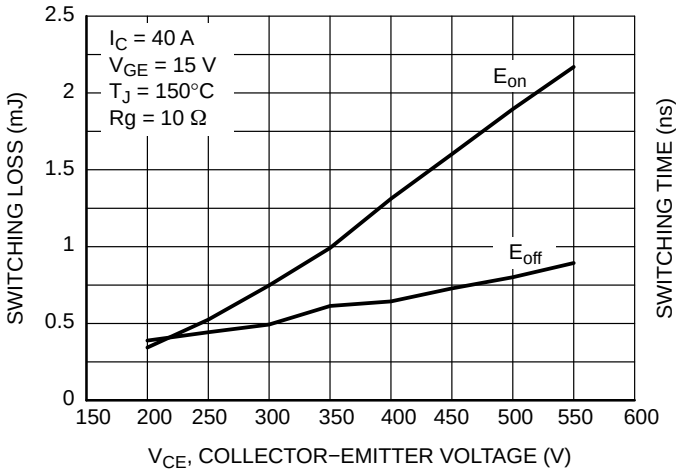


Figure 15. Switching Loss vs. V_{CE}

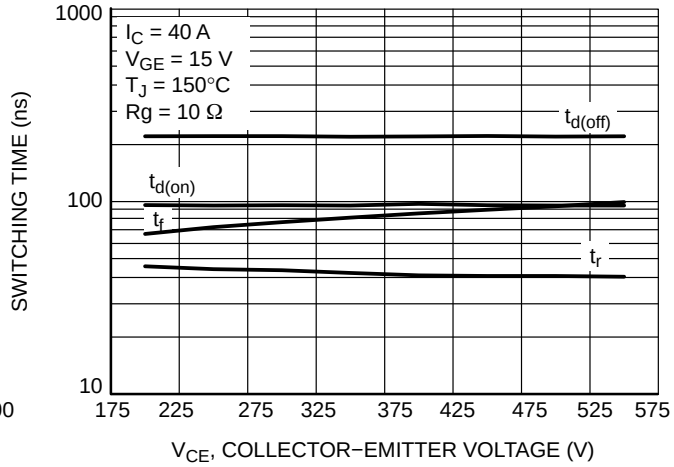


Figure 16. Switching Time vs. V_{CE}

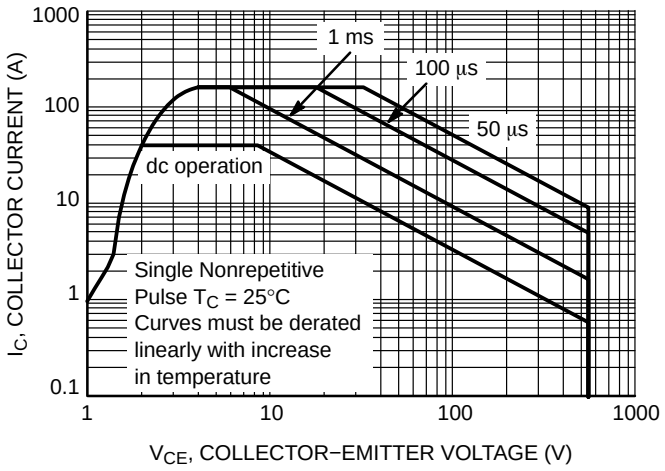


Figure 17. Safe Operating Area

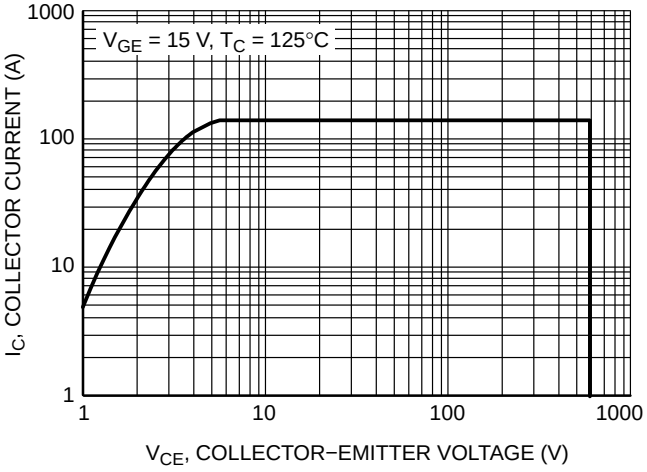


Figure 18. Reverse Bias Safe Operating Area

TYPICAL CHARACTERISTICS

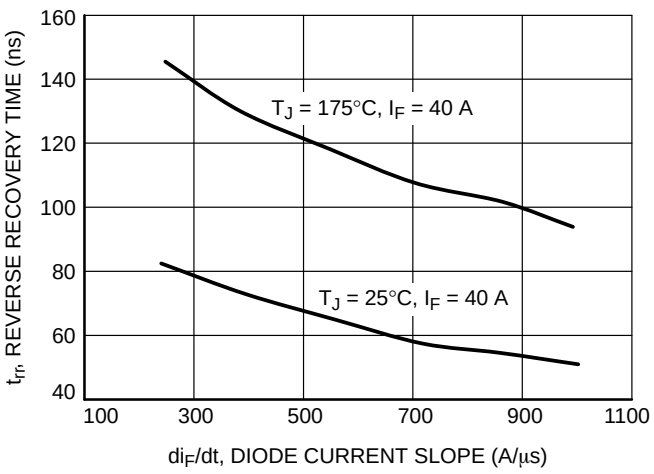


Figure 19. t_{rr} vs. di_F/dt (V_R = 400 V)

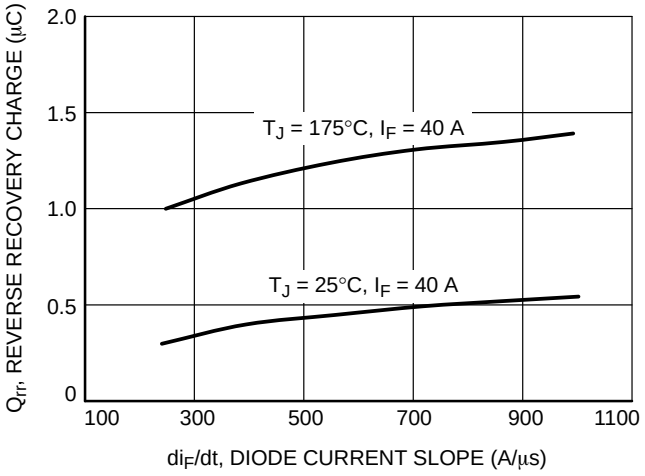


Figure 20. Q_{rr} vs. di_F/dt (V_R = 400 V)

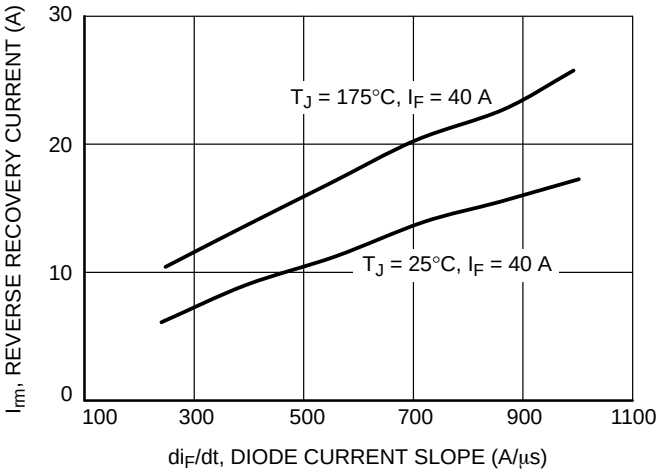


Figure 21. I_{rm} vs. di_F/dt (V_R = 400 V)

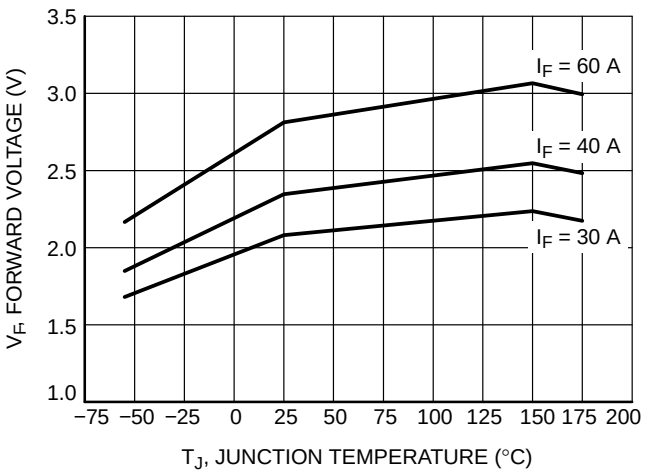


Figure 22. V_F vs. T_J

TYPICAL CHARACTERISTICS

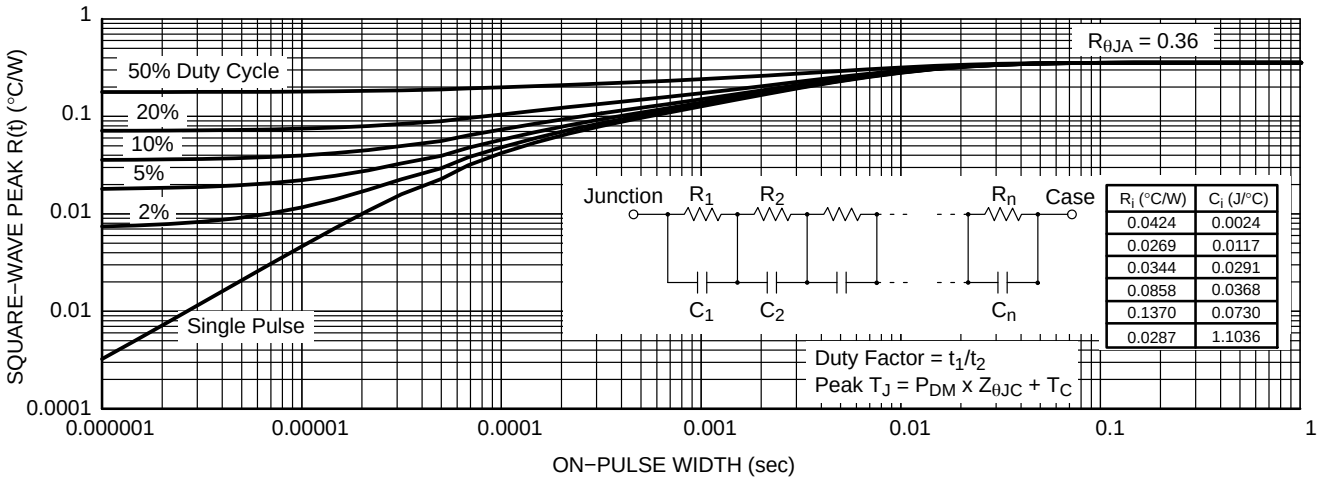


Figure 23. IGBT Die Self−heating Square−wave Duty Cycle Transient Thermal Response

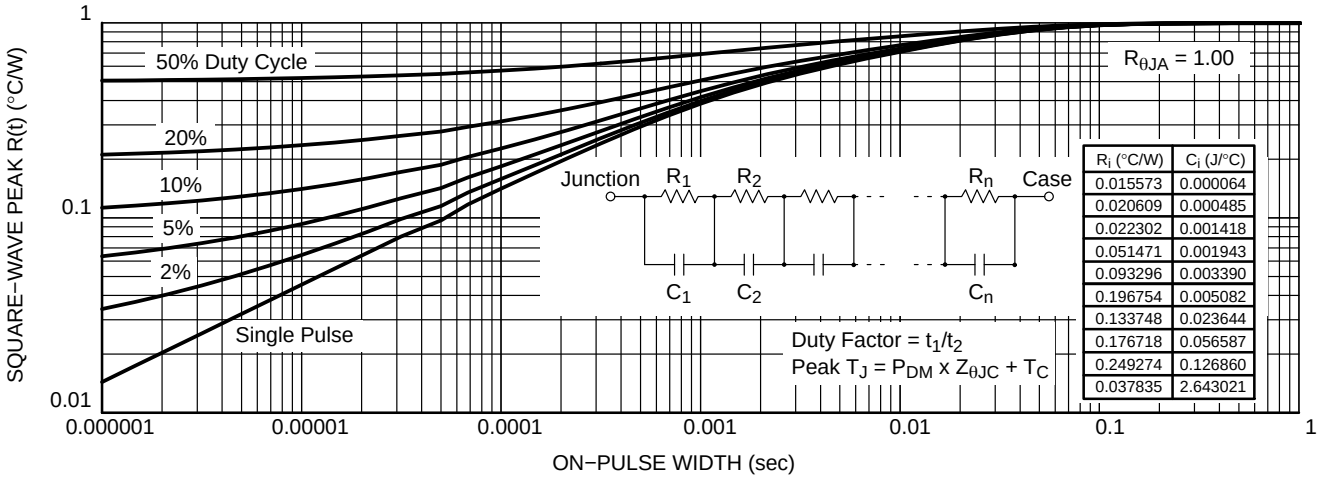
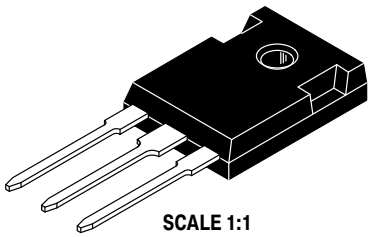


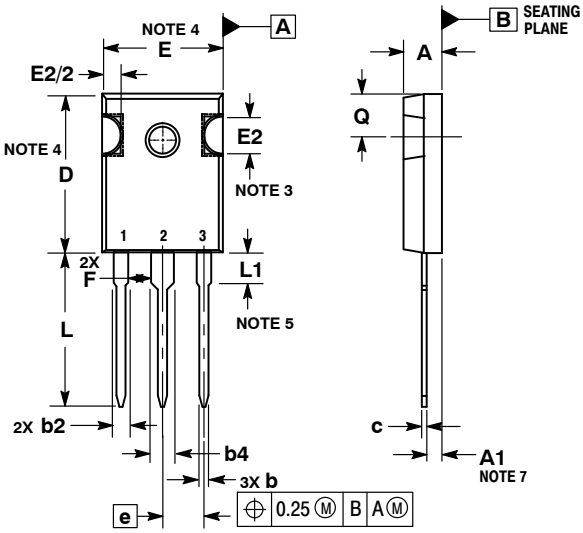
Figure 24. Diode Die Self−heating Square−wave Duty Cycle Transient Thermal Response

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ISSUE D

DATE 17 MAR 2017



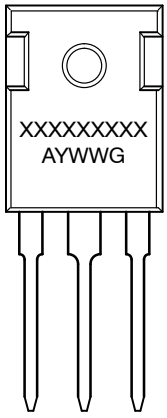
SCALE 1:1



NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. SLOT REQUIRED, NOTCH MAY BE ROUNDED.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.13 PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTERMOST EXTREME OF THE PLASTIC BODY.
5. LEAD FINISH IS UNCONTROLLED IN THE REGION DEFINED BY L1.
6. ∅P SHALL HAVE A MAXIMUM DRAFT ANGLE OF 1.5° TO THE TOP OF THE PART WITH A MAXIMUM DIAMETER OF 3.91.
7. DIMENSION A1 TO BE MEASURED IN THE REGION DEFINED BY L1.

	MILLIMETERS	
DIM	MIN	MAX
A	4.70	5.30
A1	2.20	2.60
b	1.07	1.33
b2	1.65	2.35
b4	2.60	3.40
c	0.45	0.68
D	20.80	21.34
E	15.50	16.25
E2	4.32	5.49
e	5.45 BSC	
F	2.655	---
L	19.80	20.80
L1	3.81	4.32
P	3.55	3.65
Q	5.40	6.20
S	6.15 BSC	

GENERIC MARKING DIAGRAM*



XXXXX = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
G = Pb−Free Package

*This information is generic. Please refer to device data sheet for actual part marking.
Pb−Free indicator, “G” or microdot “ ▪”, may or may not be present.

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DESCRIPTION:	TO−247	PAGE 1 OF 1

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Parça koduyla arama

Üretici parça numarasını yazın; stok ve fiyatı hemen görün.

www.entegreci.com

Ürün kategorileri

Entegreden kapasitöre tüm elektronik komponent kategorileri.

Kategorilere göz atın

Üreticiler

Aradığınız üreticinin ürünlerini tek sayfada inceleyin.

Üreticileri görün

Toplu alım ve teklif

Listede olmayan ya da yüksek adetli parçalar için teklif isteyin.

Teklif isteyin

www.entegreci.com | **destek@entegreci.com** | **0850 305 90 34**

Entegreci is an online electronic components store based in Türkiye. Search by manufacturer part number to see stock, prices and datasheets for integrated circuits, microcontrollers, transistors, passive components and connectors, or request a quote for parts that are not listed.

Bu sayfa Entegreci tarafından eklenmiştir. Belgenin önceki sayfaları asıl yayıncısına aittir ve içeriği değiştirilmemiştir; en güncel sürüm için belgenin yayıncısına başvurun.