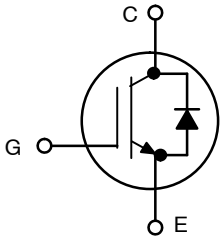
IGBT - Ultra Field Stop

FGH40T120SQDNL4

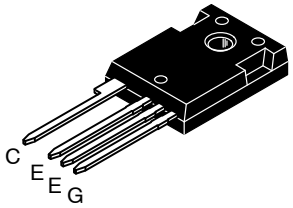
40 A, 1200 V
V_{CEsat} = 1.7 V
E_{off} = 1.1 mJ

This Insulated Gate Bipolar Transistor (IGBT) features a robust and cost effective Ultra Field Stop Trench construction, and provides superior performance in demanding switching applications, offering both low on−state voltage and minimal switching loss. The IGBT is well suited for UPS and solar applications. Incorporated into the device is a soft and fast co−packaged free wheeling diode with a low forward voltage.



Features

- Extremely Efficient Trench with Field Stop Technology
- T_{Jmax} = 175°C
- Soft Fast Reverse Recovery Diode
- Optimized for High Speed Switching
- These are Pb−Free Devices



TO−247−4L
CASE 340CJ

Typical Applications

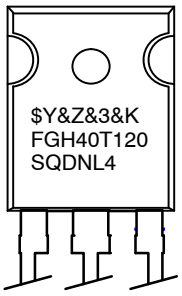
- Solar Inverter
- Uninterruptible Power Inverter Supplies (UPS)
- Welding

ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector−emitter voltage	V_{CES}	1200	V
Collector current @ Tc = 25°C @ Tc = 100°C	I_C	 160 40	A
Pulsed collector current, T_{pulse} limited by T_{Jmax}	I_{CM}	160	A
Diode forward current @ Tc = 25°C @ Tc = 100°C	I_F	 160 40	A
Diode pulsed current, T_{pulse} limited by T_{Jmax}	I_{FM}	160	A
Gate−emitter voltage Transient gate−emitter voltage (T_{pulse} = 5 μs, D < 0.10)	V_{GE}	±20 ±30	V
Power Dissipation @ Tc = 25°C @ Tc = 100°C	P_D	 454 227	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.

MARKING DIAGRAM



&Y	= **onsemi** Logo
&Z	= Assembly Plant Code
&3	= 3−Digit Date Code
&K	= 2−Digit Lot Traceability Code
FGH40T120SQDNL4	= Specific Device Code

ORDERING INFORMATION

Device	Package	Shipping
FGH40T120SQDNL4	TO−247 (Pb−Free)	30 Units / Rail

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THERMAL CHARACTERISTICS

Rating	Symbol	Value	Unit
Thermal resistance junction−to−case, for IGBT	$R_{\theta JC}$	0.33	°C/W
Thermal resistance junction−to−case, for Diode	$R_{\theta JC}$	0.61	°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	$V_{(BR)CES}$	1200 1250*	–	–	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}	– –	1.78 2.3	1.95 –	V
Gate−emitter threshold voltage	V_{GE} = V_{CE}, I_C = 400 μA	$V_{GE(th)}$	4.5	5.5	6.5	V
Collector−emitter cut−off current, gate−emitter short−circuited	V_{GE} = 0 V, V_{CE} = 1200 V V_{GE} = 0 V, V_{CE} = 1200 V, T_J = 175°C	I_{CES}	– –	– 0.6	0.4 –	mA
Gate leakage current, collector−emitter short−circuited	V_{GE} = 20 V , V_{CE} = 0 V	I_{GES}	–	–	200	nA

* Guaranteed by design.

Input capacitance	V_{CE} = 20 V, V_{GE} = 0 V, f = 1 MHz	C_{ies}	–	5000	–	pF
Output capacitance		C_{oes}	–	140	–	
Reverse transfer capacitance		C_{res}	–	80	–	
Gate charge total	V_{CE} = 600 V, I_C = 40 A, V_{GE} = 15 V	Q_g	–	221	–	nC
Gate to emitter charge		Q_{ge}	–	52	–	
Gate to collector charge		Q_{gc}	–	100	–	
SWITCHING CHARACTERISTIC, INDUCTIVE LOAD						
Turn−on delay time	T_J = 25°C V_{CC} = 600 V, I_C = 40 A R_g = 10 Ω V_{GE} = 0 to 15V	$t_{d(on)}$	–	46	–	ns
Rise time		t_r	–	33	–	
Turn−off delay time		$t_{d(off)}$	–	220	–	
Fall time		t_f	–	56	–	
Turn−on switching loss		E_{on}	–	1.4	–	mJ
Turn−off switching loss		E_{off}	–	1.1	–	
Total switching loss		E_{ts}	–	2.5	–	
Turn−on delay time	T_J = 175°C V_{CC} = 600 V, I_C = 40 A R_g = 10 Ω V_{GE} = 0 to 15 V	$t_{d(on)}$	–	47	–	ns
Rise time		t_r	–	33	–	
Turn−off delay time		$t_{d(off)}$	–	240	–	
Fall time		t_f	–	132	–	
Turn−on switching loss		E_{on}	–	2.7	–	mJ
Turn−off switching loss		E_{off}	–	1.8	–	
Total switching loss		E_{ts}	–	4.5	–	
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	– –	3.4 3.1	3.8 –	V
Reverse recovery time	T_J = 25°C I_F = 40 A, V_R = 400 V di_F/dt = 500 A/μs	t_{rr}	–	166	–	ns
Reverse recovery charge		Q_{rr}	–	0.78	–	μc
Reverse recovery current		I_{rrm}	–	9.0	–	A
Reverse recovery time	T_J = 125°C I_F = 40 A, V_R = 400 V di_F/dt = 500 A/μs	t_{rr}	–	390	–	ns
Reverse recovery charge		Q_{rr}	–	4.0	–	μc
Reverse recovery current		I_{rrm}	–	20	–	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.

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TYPICAL CHARACTERISTICS

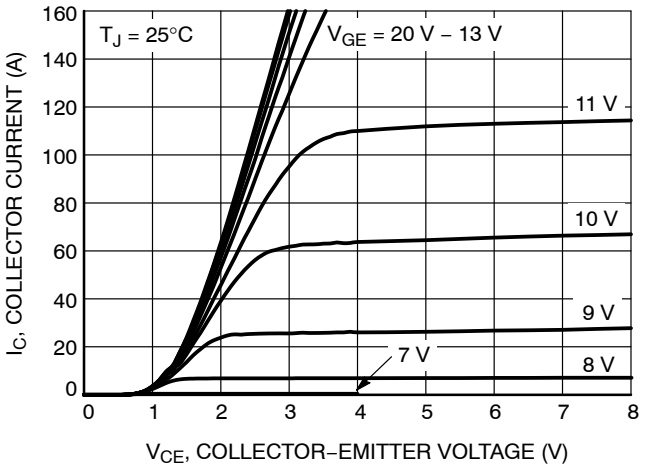


Figure 1. Output Characteristics

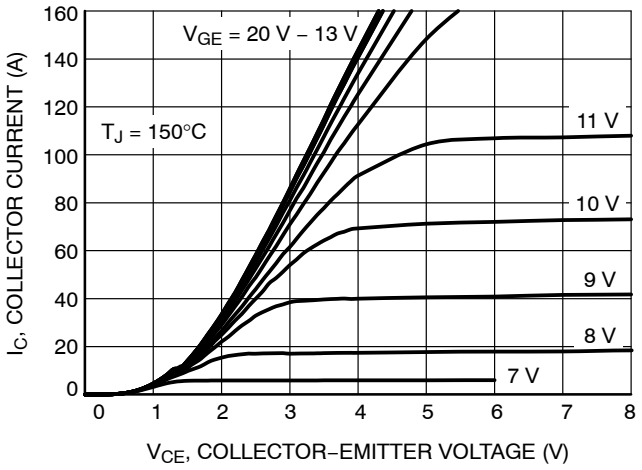


Figure 2. Output Characteristics

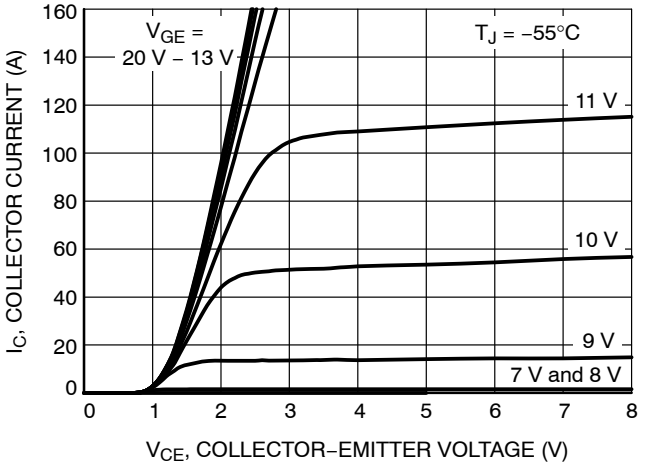


Figure 3. Output Characteristics

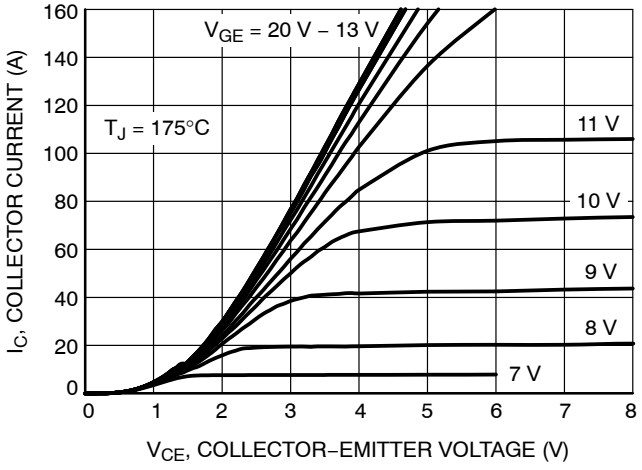


Figure 4. Output Characteristics

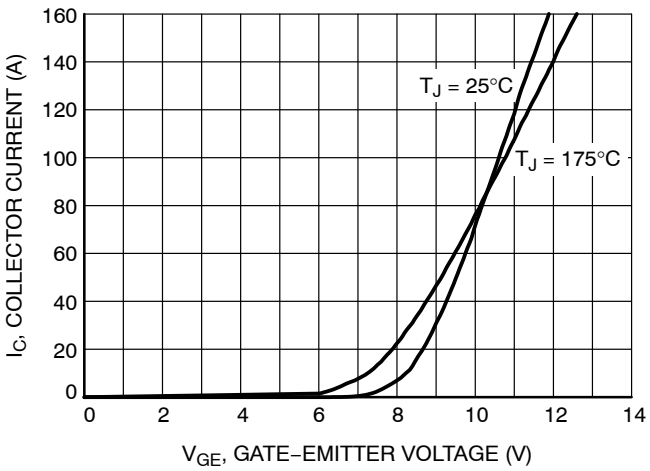


Figure 5. Typical Transfer Characteristics

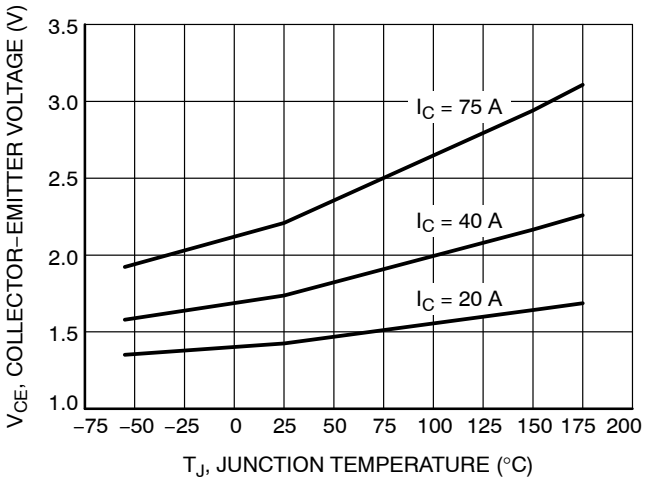


Figure 6. $V_{CE(sat)}$ vs. T_J

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TYPICAL CHARACTERISTICS

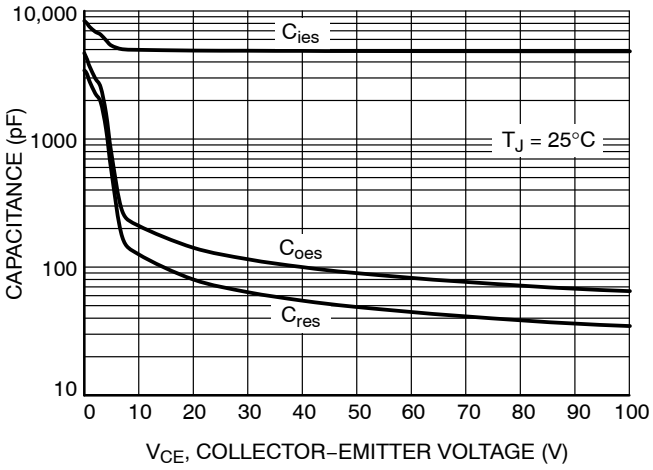


Figure 7. Typical Capacitance

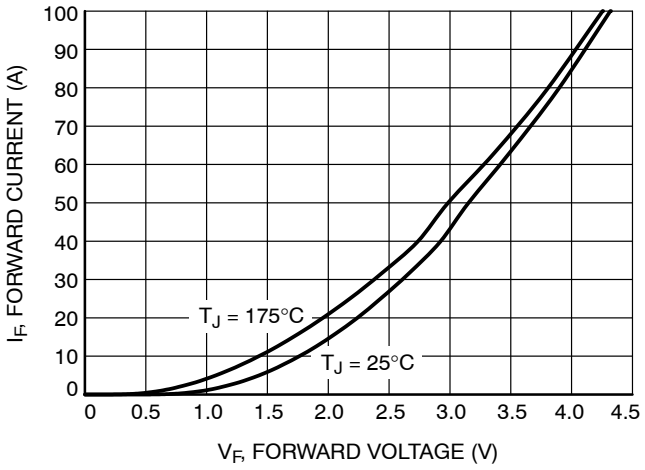


Figure 8. Diode Forward Characteristics

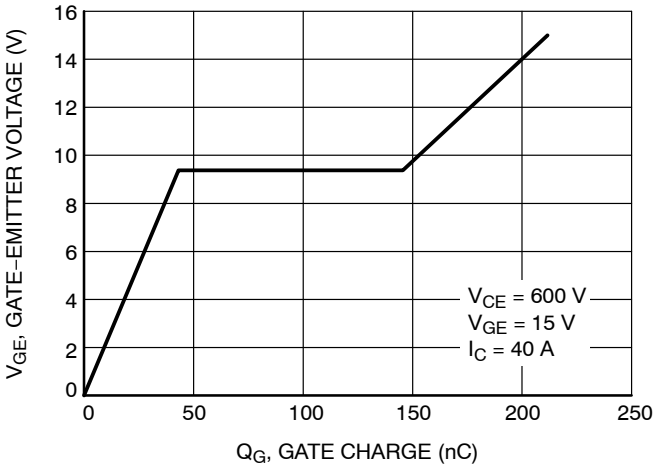


Figure 9. Typical Gate Charge

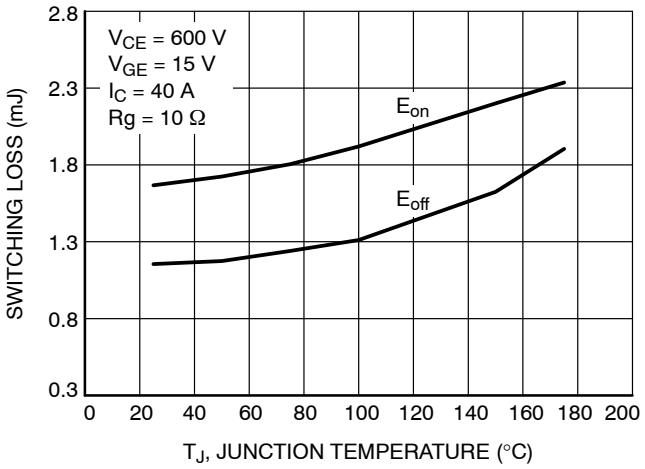


Figure 10. Switching Loss vs. Temperature

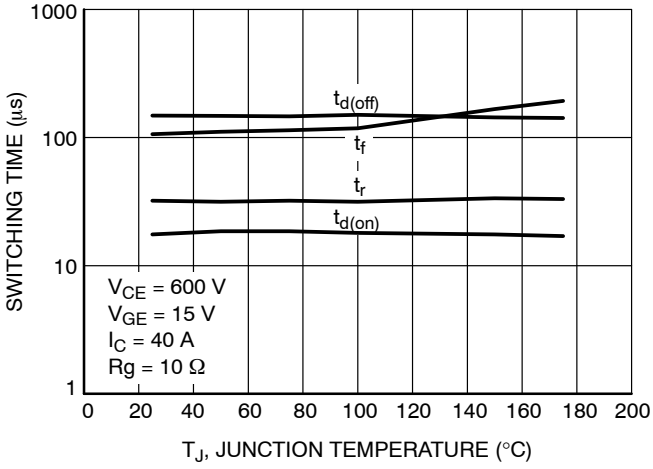


Figure 11. Switching Time vs. Temperature

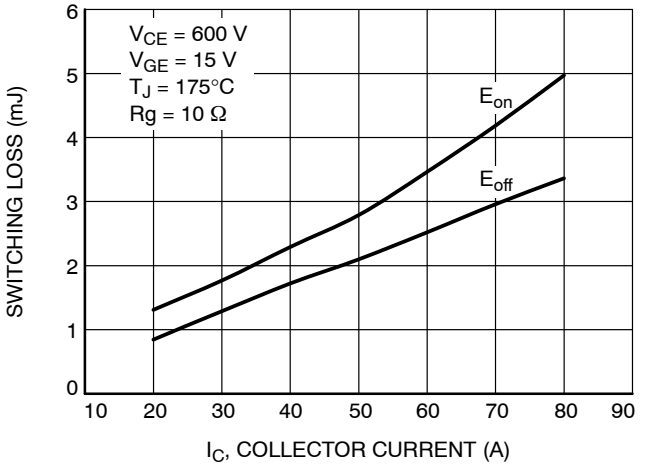


Figure 12. Switching Loss vs. IC

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TYPICAL CHARACTERISTICS

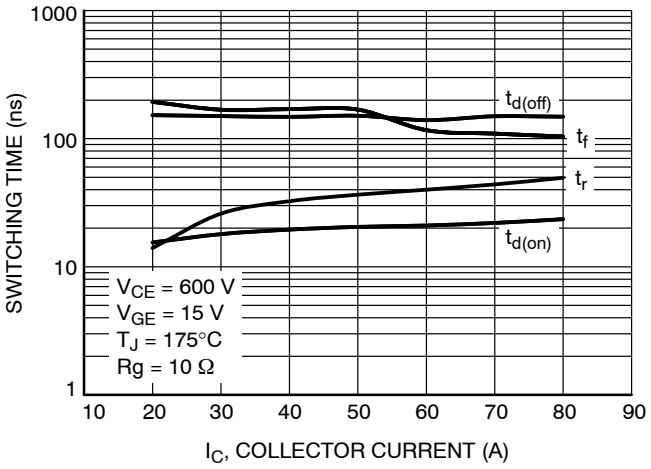


Figure 13. Switching Time vs. IC

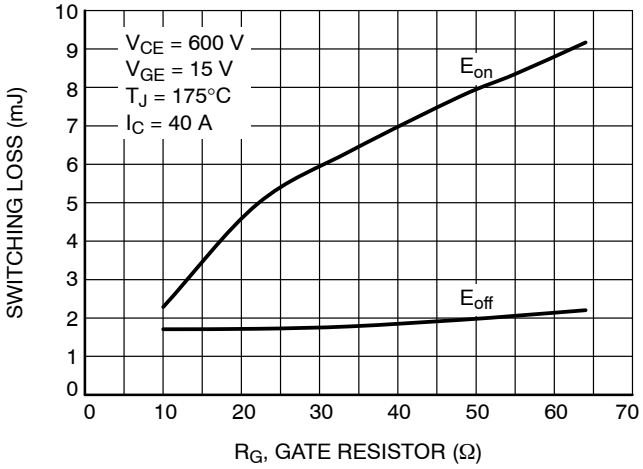


Figure 14. Switching Loss vs. RG

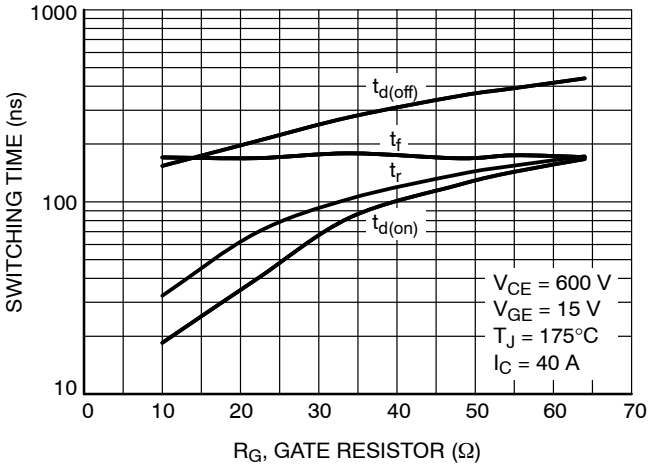


Figure 15. Switching Time vs. RG

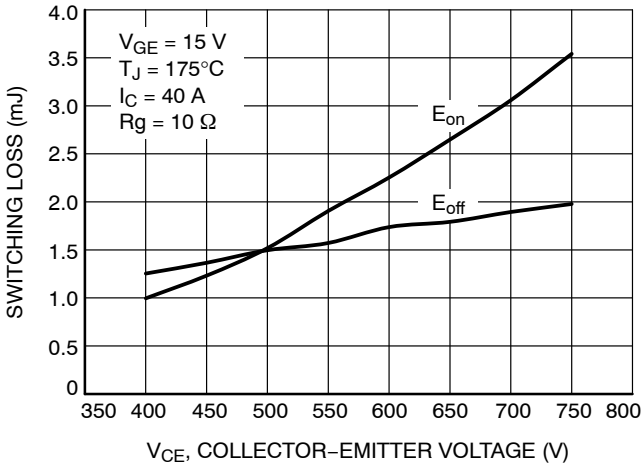


Figure 16. Switching Loss vs. V_{CE}

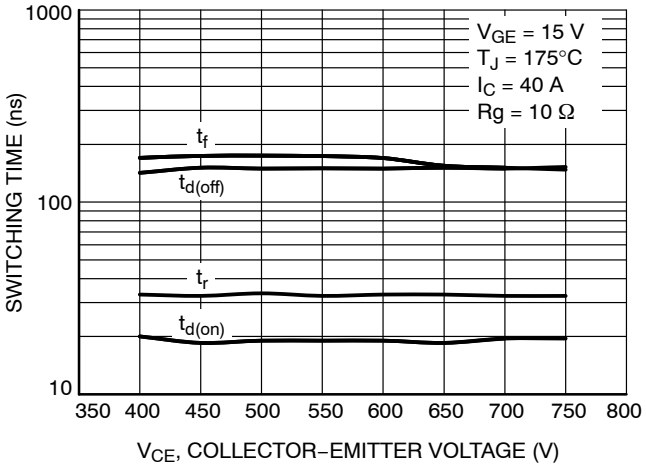


Figure 17. Switching Time vs. V_{CE}

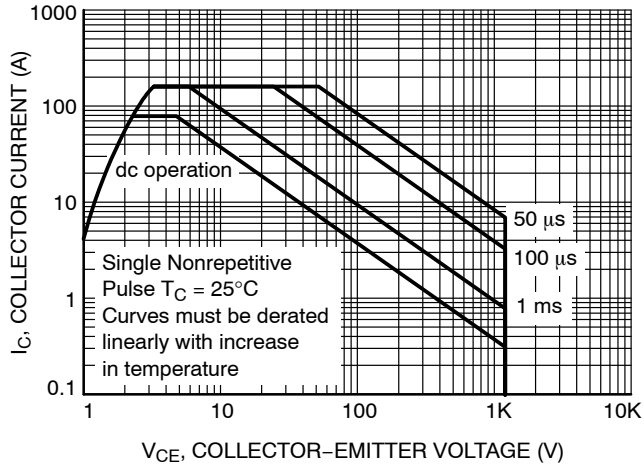


Figure 18. Safe Operating Area

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TYPICAL CHARACTERISTICS

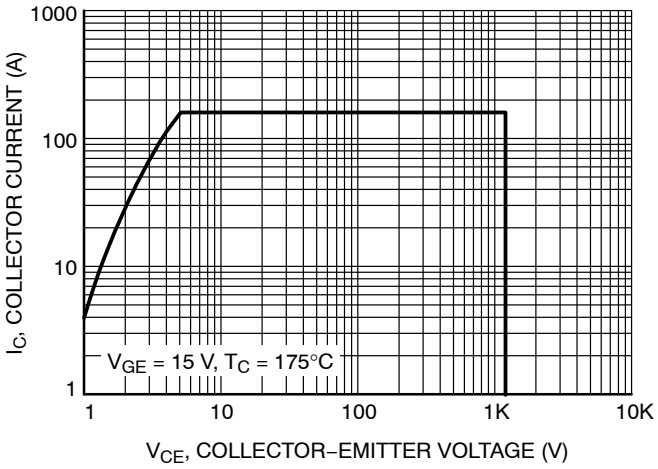


Figure 19. Reverse Bias Safe Operating Area

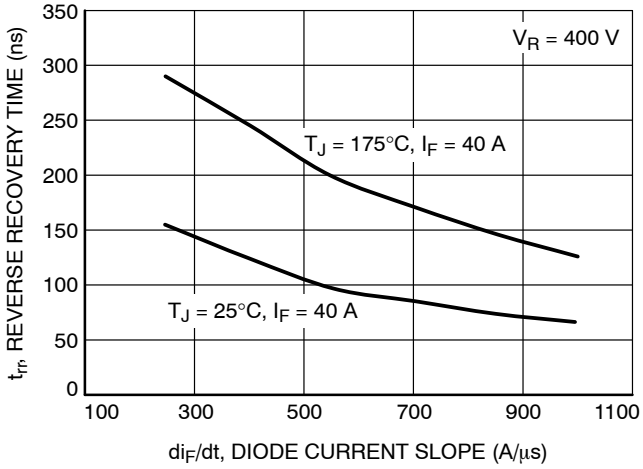


Figure 20. t_{rr} vs. di_F/dt

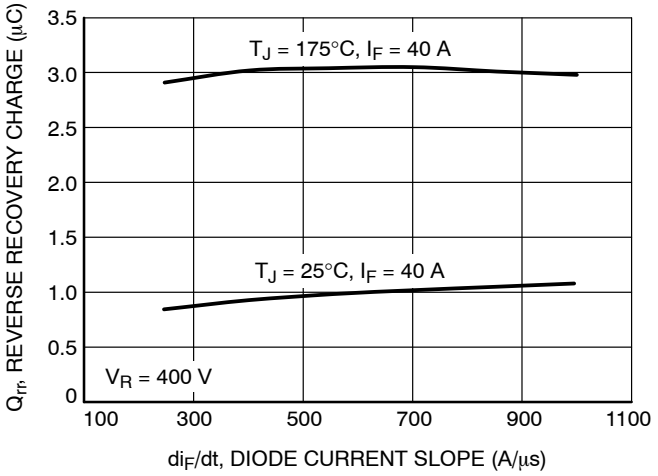


Figure 21. Q_{rr} vs. di_F/dt

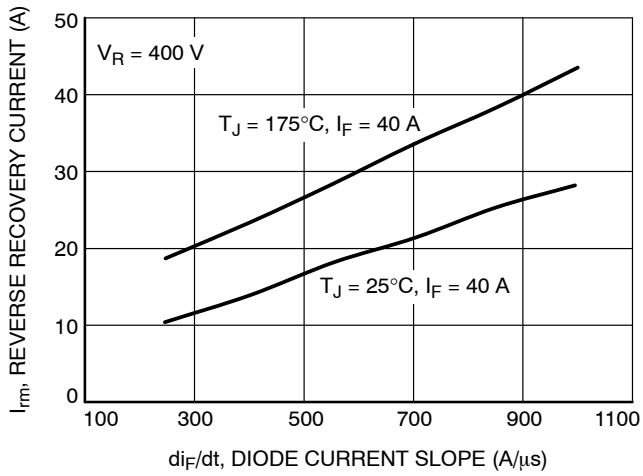


Figure 22. I_{rm} vs. di_F/dt

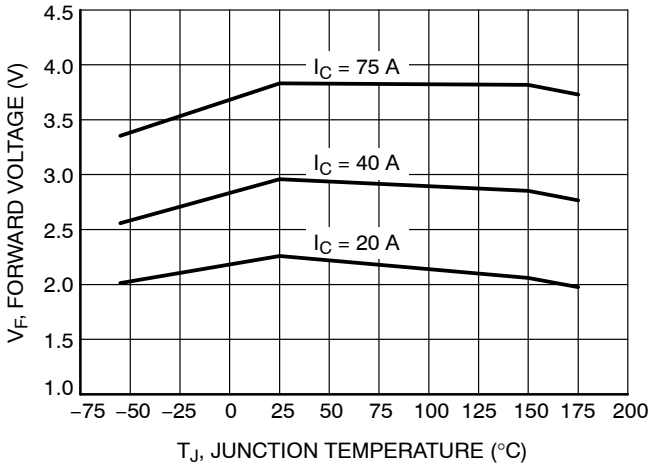


Figure 23. V_F vs. T_J

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TYPICAL CHARACTERISTICS

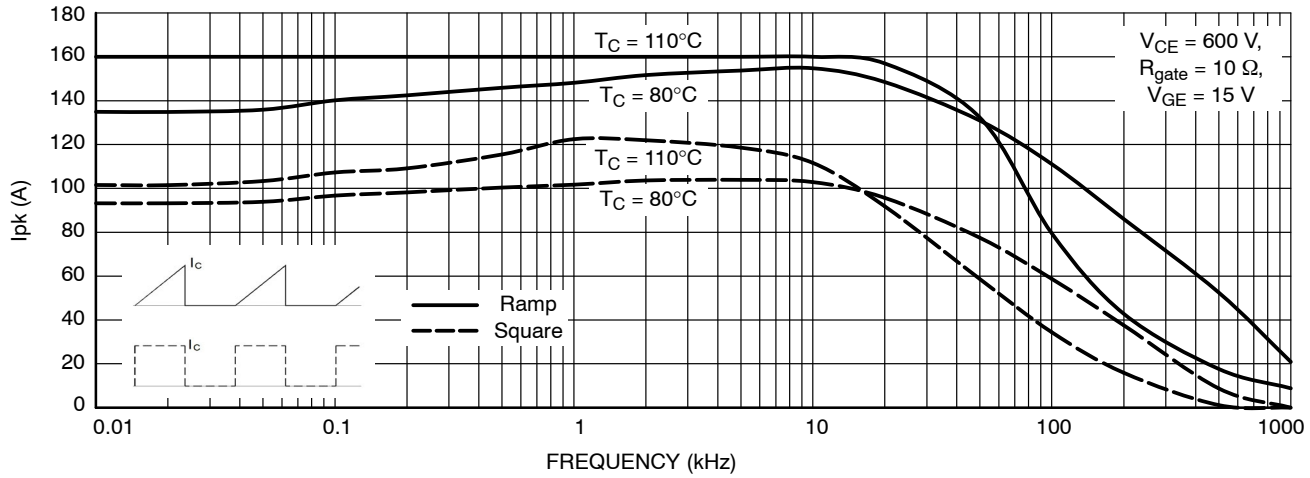


Figure 24. Collector Current vs. Switching Frequency

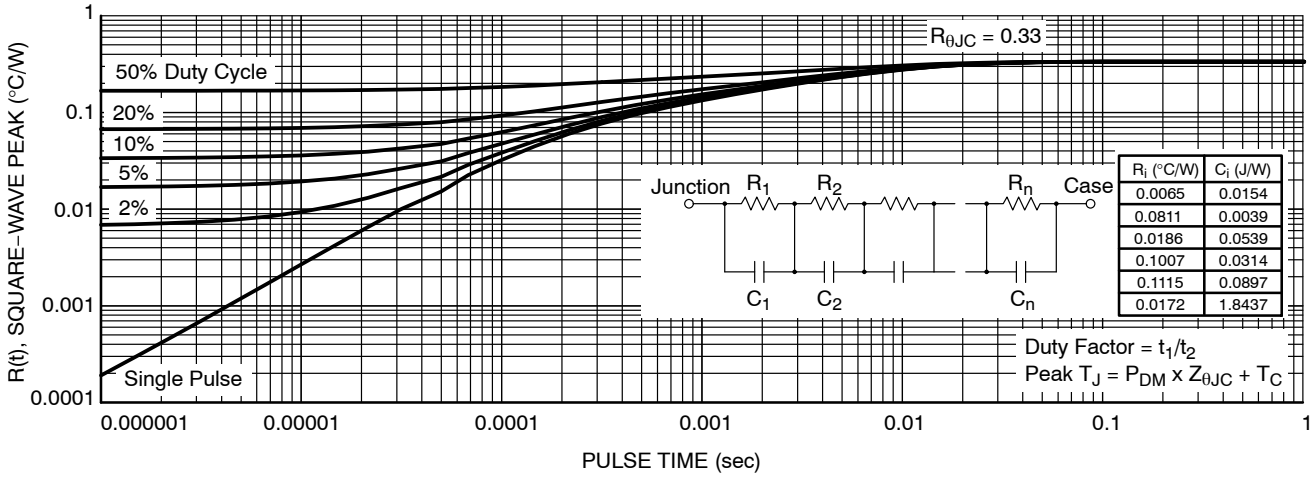


Figure 25. IGBT Transient Thermal Impedance

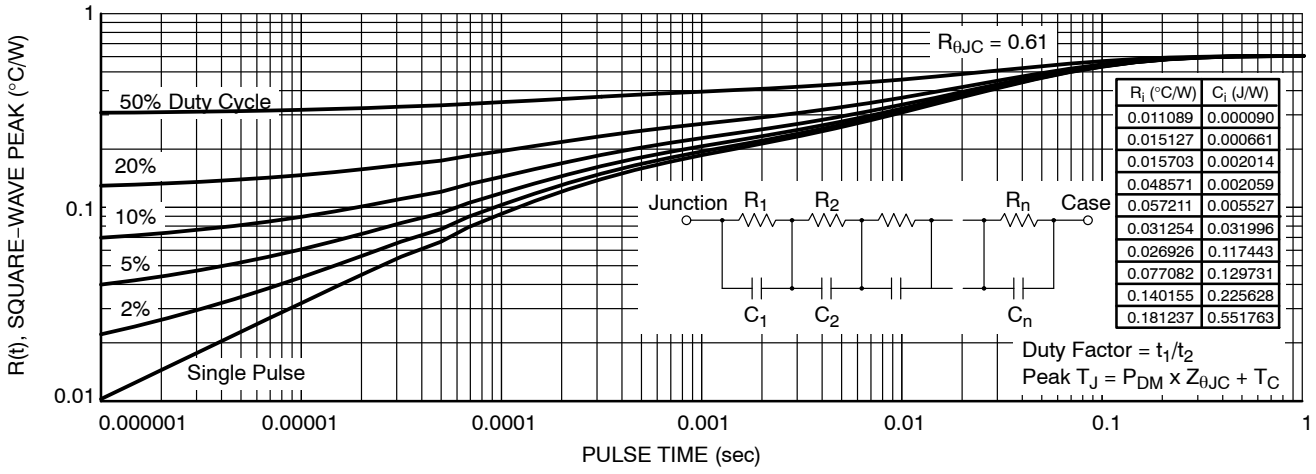


Figure 26. Diode Transient Thermal Impedance

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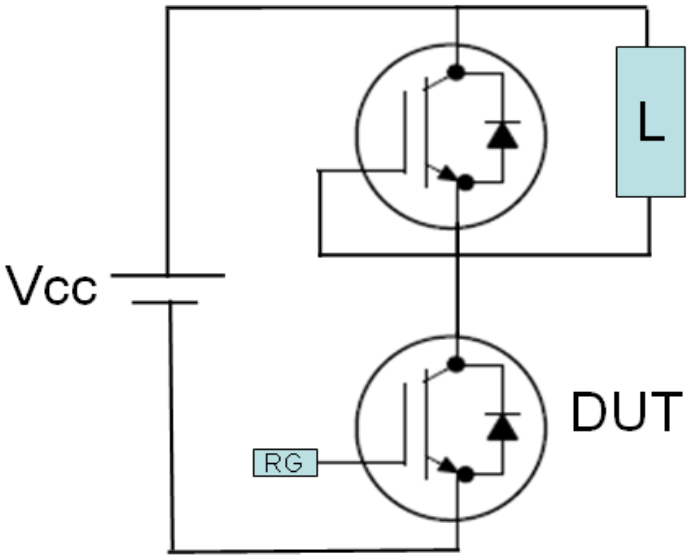


Figure 27. Test Circuit for Switching Characteristics

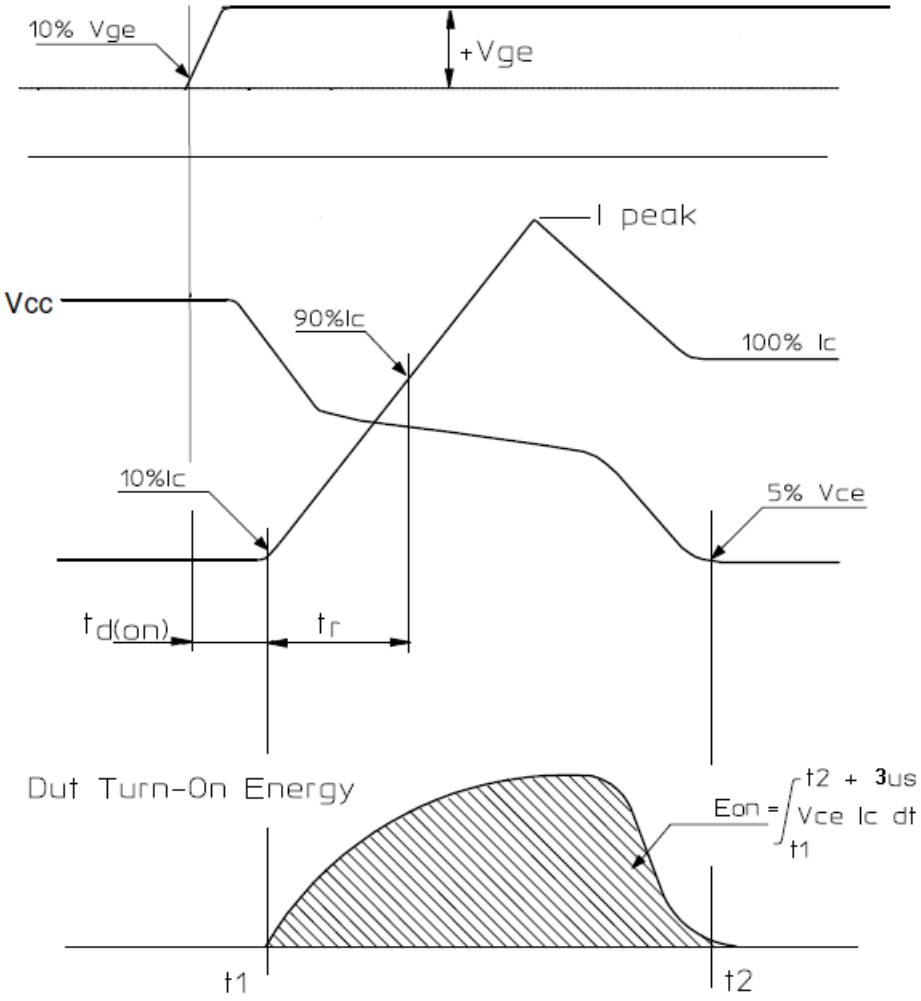


Figure 28. Definition of Turn On Waveform

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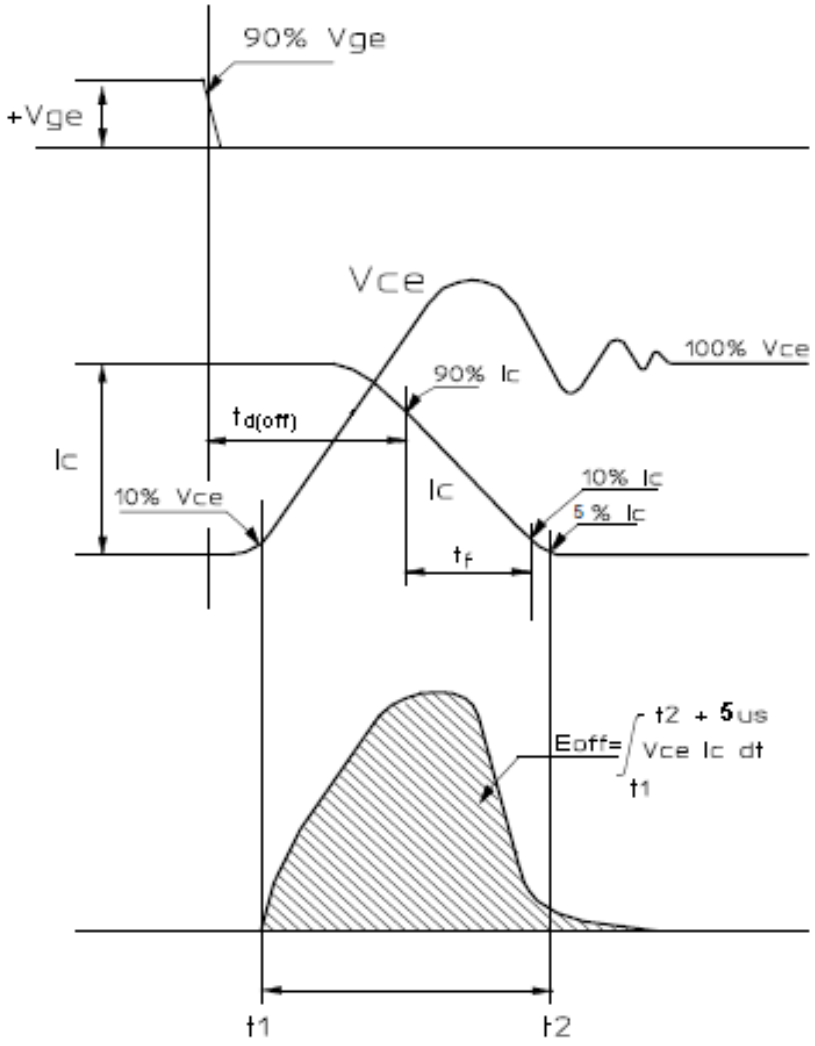
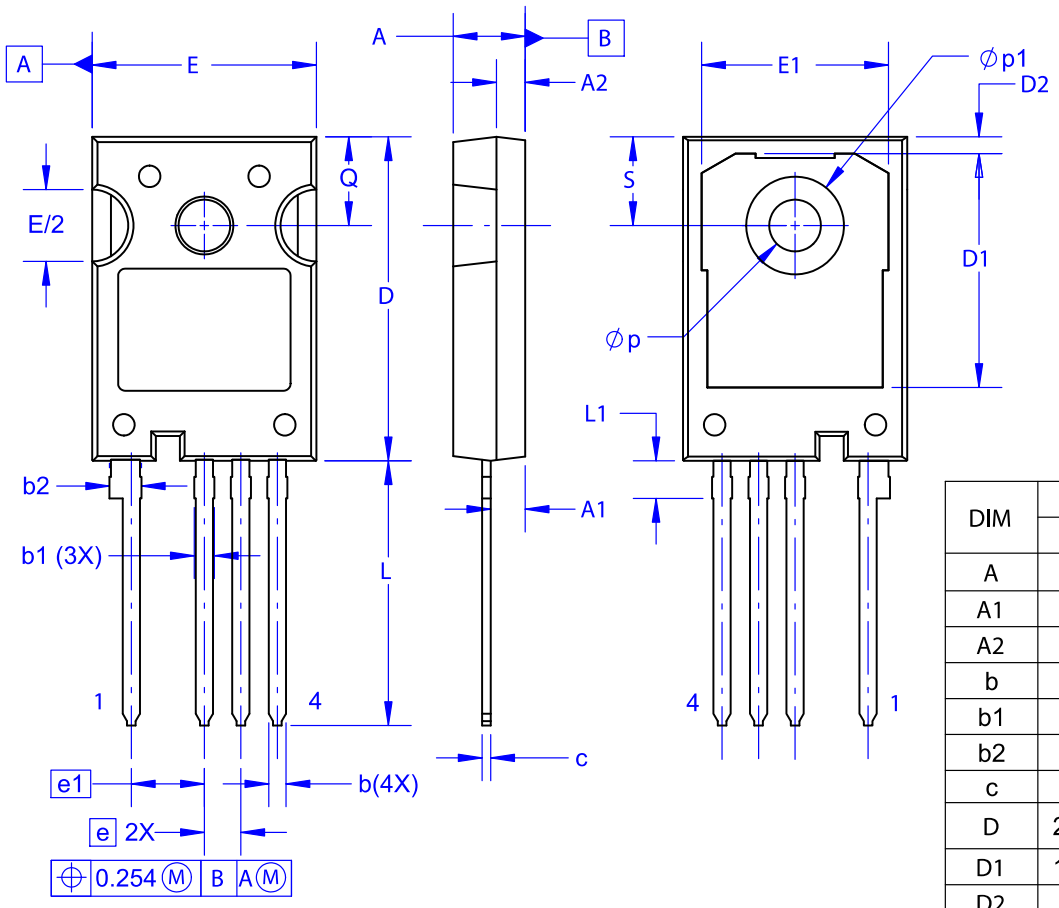


Figure 29. Definition of Turn Off Waveform

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TO−247−4LD
CASE 340CJ
ISSUE A

DATE 16 SEP 2019



NOTES:

A. NO INDUSTRY STANDARD APPLIES TO THIS PACKAGE.
B. DIMENSIONS ARE EXCLUSIVE OF BURRS,MOLD FLASH,AND TIE BAR EXTRUSIONS.
C. ALL DIMENSIONS ARE IN MILLIMETERS.
D. DRAWING CONFORMS TO ASME Y14.5-2009.

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.10	2.40	2.70
A2	1.80	2.00	2.20
b	1.07	1.20	1.33
b1	1.20	1.40	1.60
b2	2.02	2.22	2.42
c	0.50	0.60	0.70
D	22.34	22.54	22.74
D1	16.00	16.25	16.50
D2	0.97	1.17	1.37
e	2.54 BSC		
e1	5.08 BSC		
E	15.40	15.60	15.80
E1	12.80	13.00	13.20
E/2	4.80	5.00	5.20
L	18.22	18.42	18.62
L1	2.42	2.62	2.82
p	3.40	3.60	3.80
p1	6.60	6.80	7.00
Q	5.97	6.17	6.37
S	5.97	6.17	6.37

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Entegreci, Eskişehir merkezli, Türkiye geneline satış yapan bir elektronik komponent mağazasıdır. Entegreler (IC), mikrodenetleyiciler, transistörler, diyotlar, pasif elemanlar, konnektörler, modüller ve geliştirme kartları tek adetten seri üretim adetlerine kadar satılır. Ürün sayfalarında güncel stok durumunu, fiyatı ve datasheet bağlantısını bulabilirsiniz.

Parça koduyla arama

Üretici parça numarasını yazın; stok ve fiyatı hemen görün.

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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

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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.

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