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Green

DGTD65T15H2TF

650V FIELD STOP IGBT IN ITO220AB

Description

The DGTD65T15H2TF is produced using advanced Field Stop Trench IGBT Technology, which provides high performance, excellent quality, and high ruggedness.

Applications

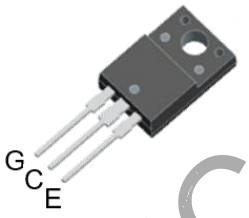
- Motor drives

Features

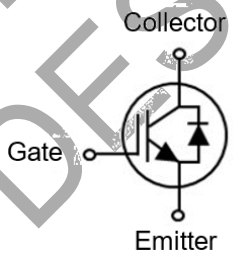
- High Ruggedness for Motor Control
- $V_{CE(sat)}$ Positive Temperature Coefficient
- Very Soft, Fast Recovery Anti-Parallel Diode
- Low EMI
- Maximum Junction Temperature +175°C
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative.**
  https://www.diodes.com/quality/product-definitions/

Mechanical Data

- Package: ITO220AB
- Package Material: Molded Plastic. "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Terminals: Finish—Matte Tin Plated Leads. Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 1.9 grams (Approximate)



ITO220AB (Type MC)



Device Symbol

Ordering Information (Note 4)

Orderable Part Number	Package	Marking	Packing	
			Qty.	Carrier
DGTD65T15H2TF	ITO220AB (Type MC)	DGTD65T15H2	1000	Box in Tubes (Note 5)

Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.
5. 50 devices per tube.

Marking Information



= Manufacturer's Marking
DGTD65T15H2 = Product Type Marking Code
YY = Year (ex: 26 = 2026)
LLLLL = Lot Code
WW = Week (01 to 53)

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Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Collector-Emitter Voltage		V_{CE}	650	V
DC Collector Current, Limited by T_{jmax}	T_C = 25°C	I_C	30	A
	T_C = 100°C		15	A
Pulsed Collector Current, t_p Limited by T_{jmax}		I_{Cpuls}	60	A
Diode Forward Current Limited by T_{jmax}	T_C = 25°C	I_F	30	A
	T_C = 100°C		15	A
Diode Pulsed Current, t_p Limited by T_{jmax}		I_{Fpuls}	60	A
Gate-Emitter Voltage		V_{GE}	±20	V
Short-Circuit Withstand Time $V_{CC} \leq$ 360V, V_{GE} = 15V, T_j = 150°C		t_{SC}	5	µs

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

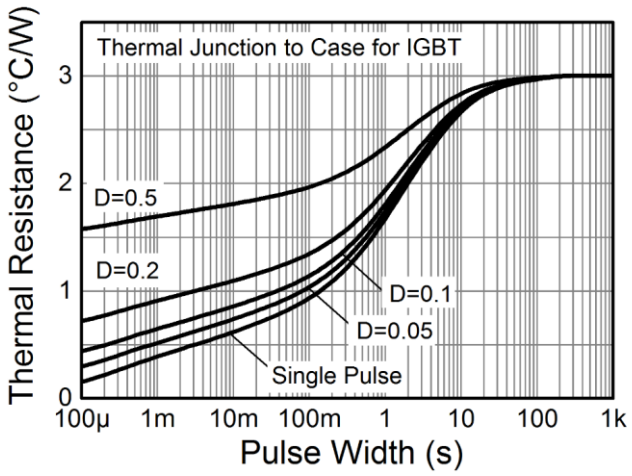
Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor (Note 7)	T_C = 25°C	P_D	48	W
	T_C = 100°C		24	
Thermal Resistance, Junction to Ambient (Note 6)		$R_{\theta JA}$	62	°C/W
Thermal Resistance, Junction to Case for IBGT (Note 7)		$R_{\theta JC}$	3.0	
Thermal Resistance, Junction to Case for Diode (Note 7)		$R_{\theta JC}$	5.0	
Operating Temperature		T_j	-40 to 175	°C
Storage Temperature Range		T_{STG}	-55 to 150	

Notes: 6. For a device mounted in a socket in still air conditions. Collector lead length 10mm.
7. For a device mounted on a Force Cooled Aluminium Heatsink 80mm x 80mm x 60mm.

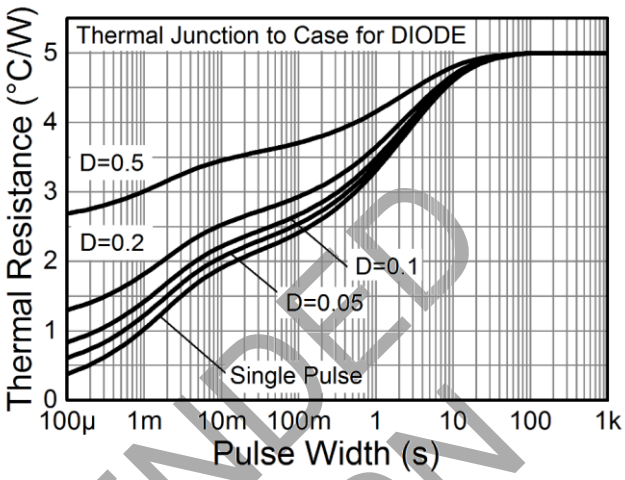
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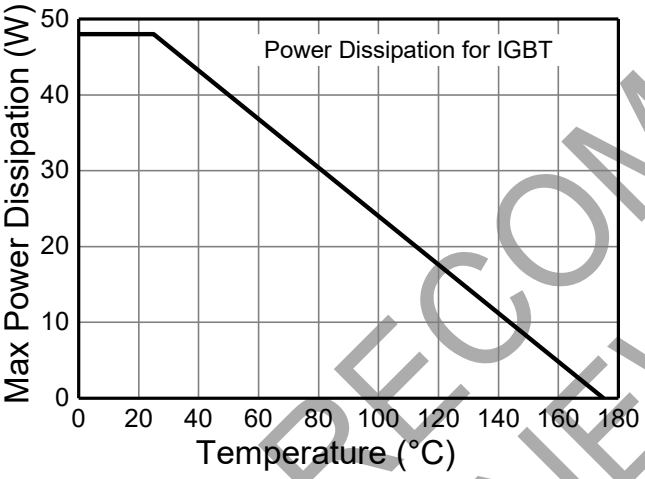
Thermal Characteristics and Derating Information



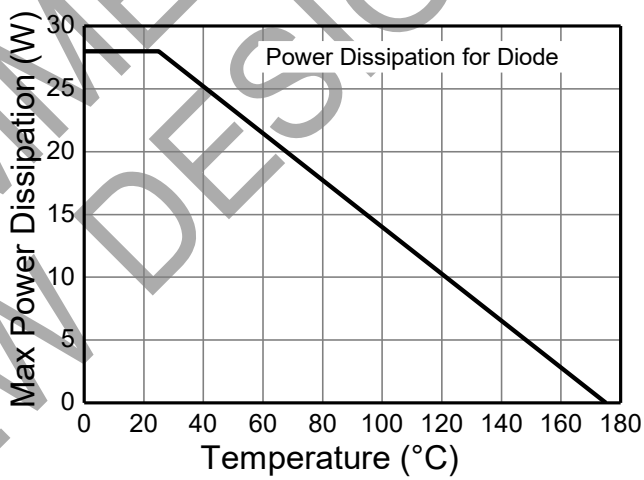
Transient Thermal Impedance



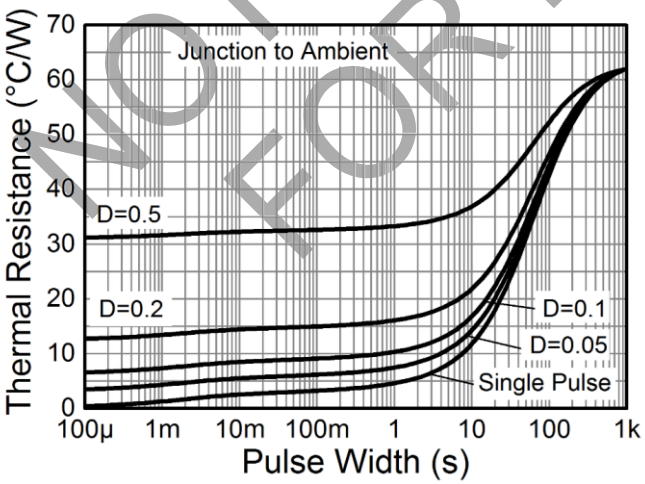
Transient Thermal Impedance



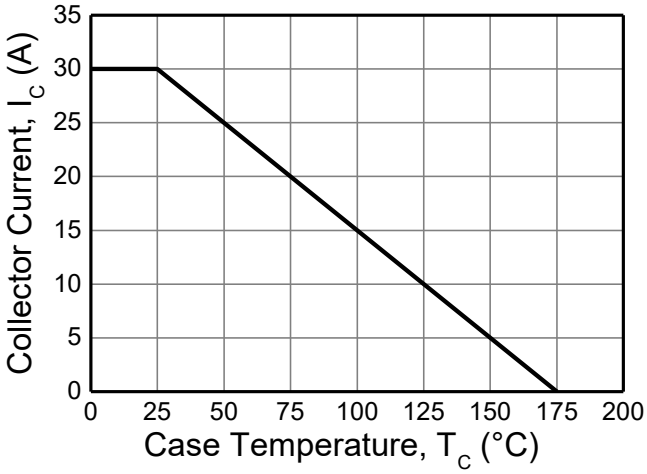
Derating Curve



Derating Curve



Transient Thermal Impedance



Case Temperature-Collector Current

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Electrical Characteristics (@T_J = +25°C, unless otherwise specified.)

Parameter		Symbol	Min	Typ	Max	Unit	Condition
STATIC CHARACTERISTICS							
Collector-Emitter Breakdown Voltage		BV_{CES}	650	—	—	V	I_C = 2mA, V_{GE} = 0V
Collector-Emitter Saturation Voltage	T_j = 25°C	$V_{CE(sat)}$	—	1.65	2.00	V	I_C = 15A, V_{GE} = 15V
	T_j = 175°C		—	1.90	—		
Diode Forward Voltage	T_j = 25°C	V_F	—	1.85	2.30	V	V_{GE} = 0V, I_F = 15A
	T_j = 175°C		—	1.95	—		
Gate-Emitter Threshold Voltage		$V_{GE(th)}$	4.5	5.5	6.5	V	V_{CE} = V_{GE}, I_C = 0.5mA
Zero Gate Voltage Collector Current		I_{CES}	—	—	20	μA	V_{CE} = 650V, V_{GE} = 0V, T_j = 25°C
Gate-Emitter Leakage Current		I_{GES}	—	—	±100	nA	V_{GE} = 20V, V_{CE} = 0V
DYNAMIC CHARACTERISTICS							
Total Gate Charge		Q_g	—	61	—	nC	V_{CE} = 520V, I_C = 15A, V_{GE} = 15V
Gate-Emitter Charge		Q_{ge}	—	11	—		
Gate-Collector Charge		Q_{gc}	—	35	—		
Input Capacitance		C_{ies}	—	1129	—	pF	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz
Reverse Transfer Capacitance		C_{res}	—	57	—		
Output Capacitance		C_{oes}	—	31	—		
SWITCHING CHARACTERISTICS							
Turn-On Delay Time		$t_{d(on)}$	—	19	—	ns	V_{GE} = 15V, V_{CC} = 400V, I_C = 15A, R_G = 10Ω, Inductive Load, T_j = 25°C
Rise Time		t_r	—	27	—		
Turn-Off Delay Time		$t_{d(off)}$	—	128	—		
Fall Time		t_f	—	32	—		
Turn-On Switching Energy		E_{on}	—	270	—	μJ	
Turn-Off Switching Energy		E_{off}	—	86	—		
Total Switching Energy		E_{ts}	—	356	—		
Turn-On Delay Time		$t_{d(on)}$	—	17	—	ns	V_{GE} = 15V, V_{CC} = 400V, I_C = 15A, R_G = 10Ω, Inductive Load, T_j = 175°C
Rise Time		t_r	—	29	—		
Turn-Off Delay Time		$t_{d(off)}$	—	150	—		
Fall Time		t_f	—	130	—		
Turn-On Switching Energy		E_{on}	—	342	—	μJ	
Turn-Off Switching Energy		E_{off}	—	288	—		
Total Switching Energy		E_{ts}	—	630	—		
Reverse-Recovery Time		t_{rr}	—	150	—	ns	I_F = 15A, di_F/dt = 200A/μs, T_j = 25°C
Reverse-Recovery Current		I_{rr}	—	5.2	—	A	
Reverse-Recovery Charge		Q_{rr}	—	390	—	nC	
Reverse-Recovery Time		t_{rr}	—	207	—	ns	I_F = 15A, di_F/dt = 200A/μs, T_j = 175°C
Reverse-Recovery Current		I_{rr}	—	6.1	—	A	
Reverse-Recovery Charge		Q_{rr}	—	631	—	nC	

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Typical Performance Characteristics (@T_A = +25°C, unless otherwise specified.)

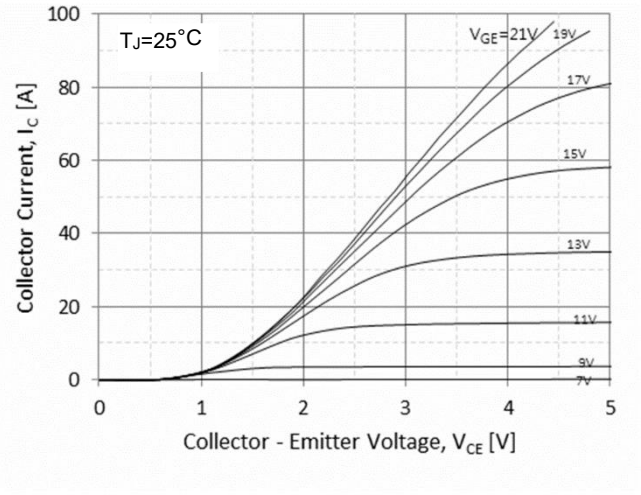


Fig.1 Typical Output Characteristics(T_J=25℃)

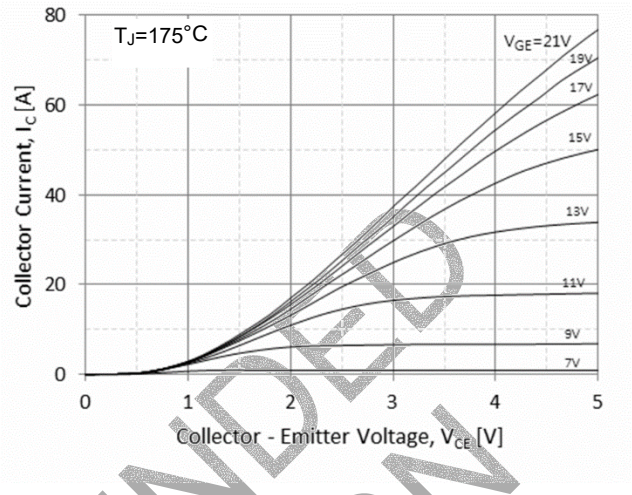


Fig.2 Typical Output Characteristics(T_J=175℃)

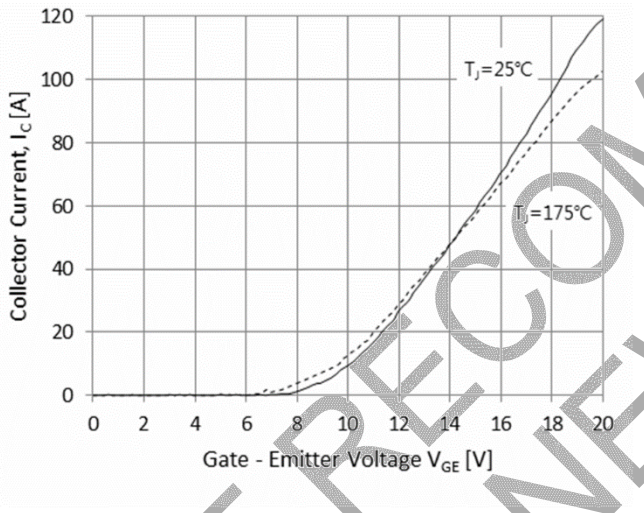


Fig.3 Typical Transfer Characteristics

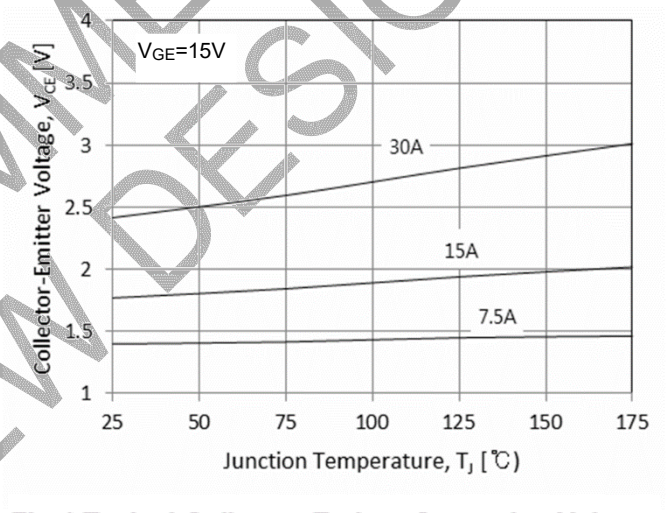


Fig.4 Typical Collector-Emitter Saturation Voltage -Junction Temperature

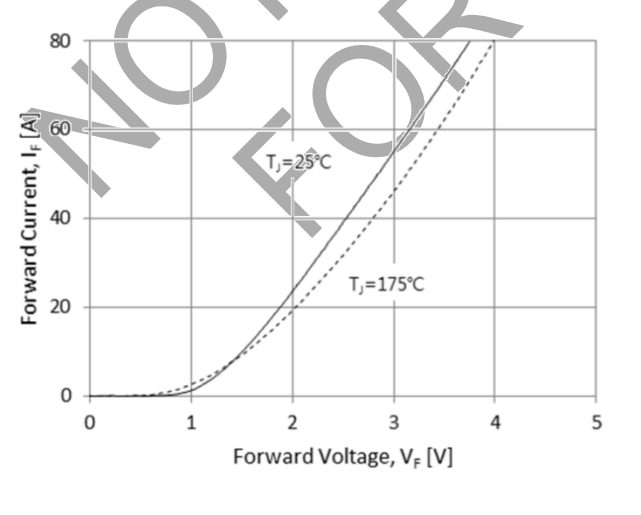


Fig.5 Diode Forward Characteristics

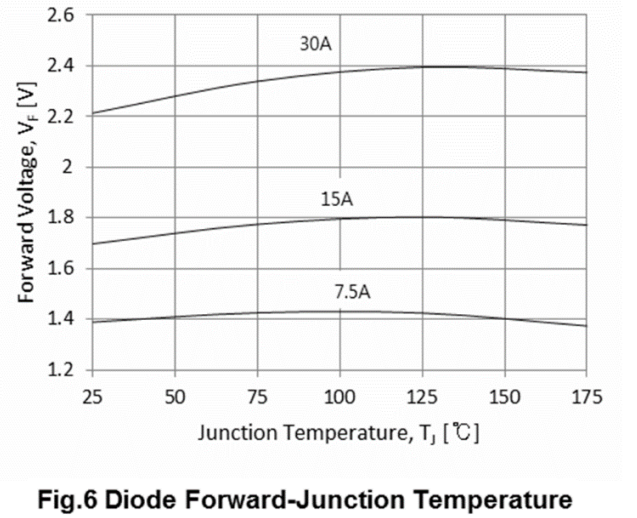


Fig.6 Diode Forward-Junction Temperature

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Typical Performance Characteristics (@T_A = +25°C, unless otherwise specified.) (continued)

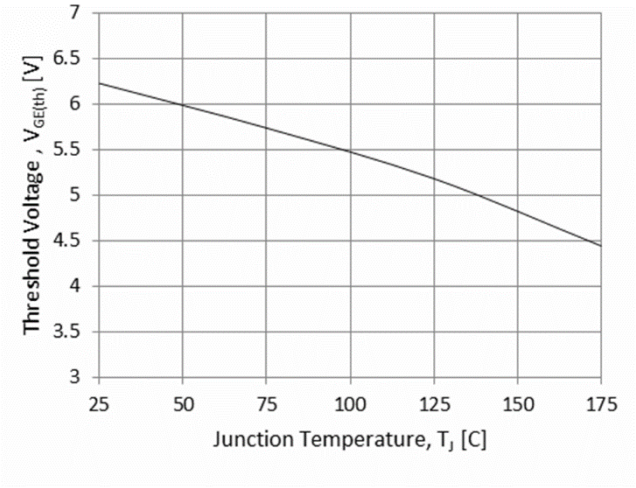


Fig.7 Threshold Voltage-Junction Temperature

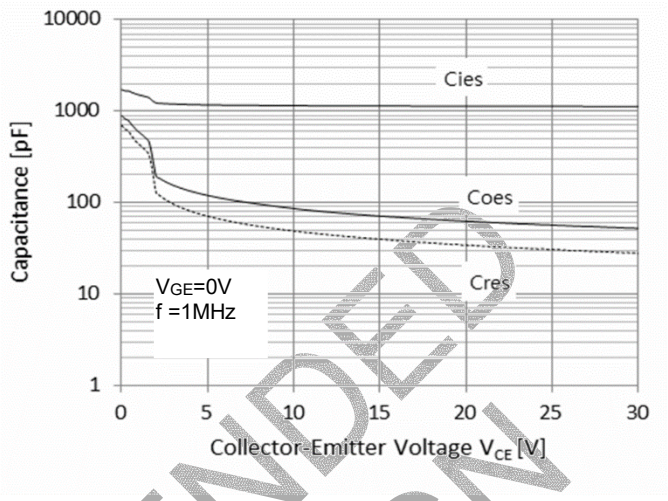


Fig.8 Typical Capacitance

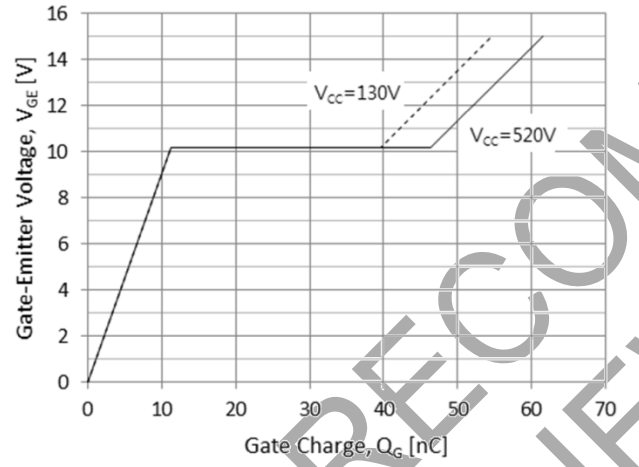


Fig.9 Typical Gate Charge

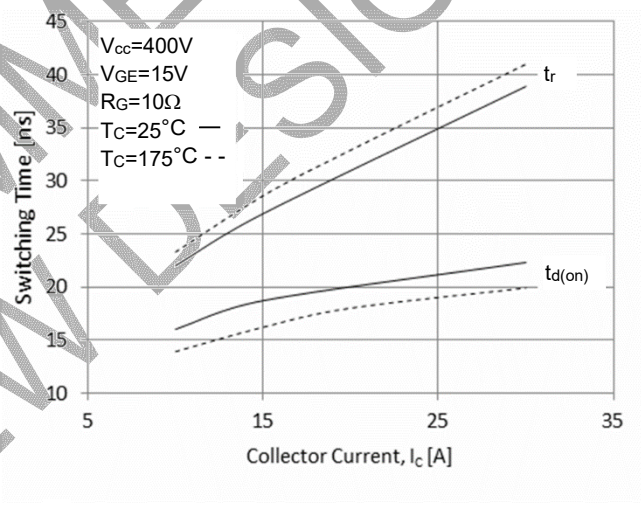


Fig.10 Typical Turn on-Collector Current

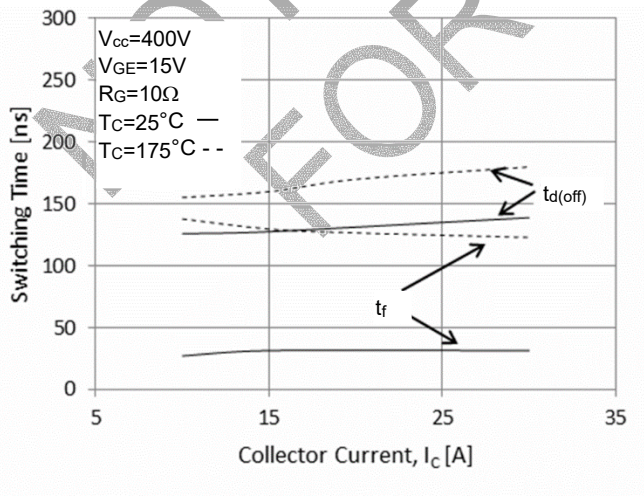


Fig.11 Typical Turn off-Collector Current

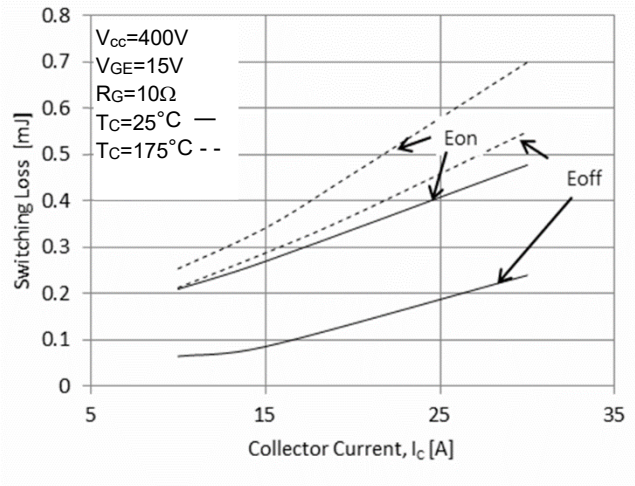


Fig.12 Switching Loss-Collector Current

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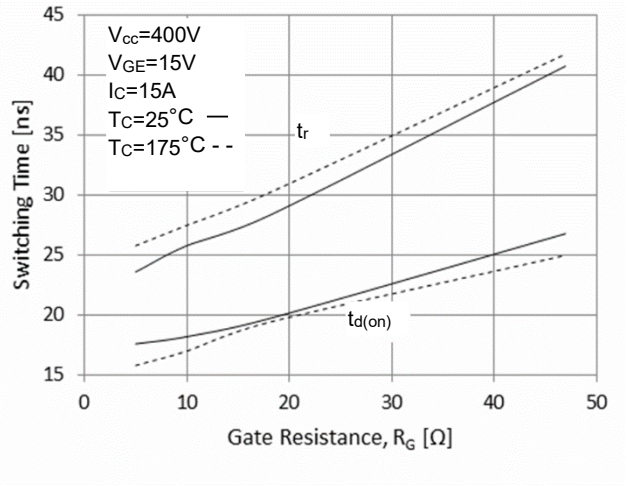


Fig.13 Turn on Characteristics-Gate Resistance

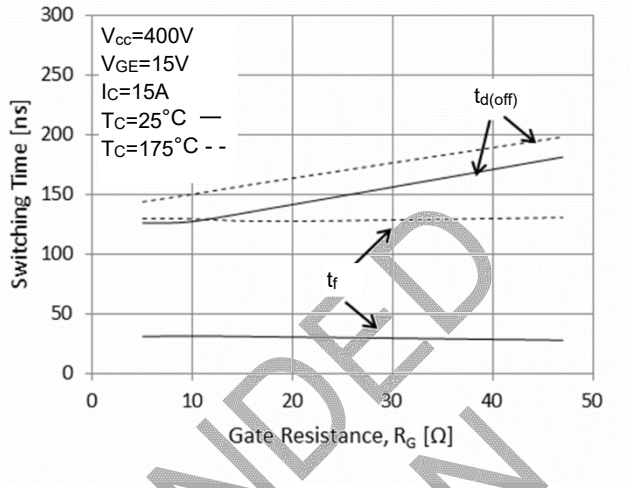


Fig.14 Turn off Characteristics-Gate Resistance

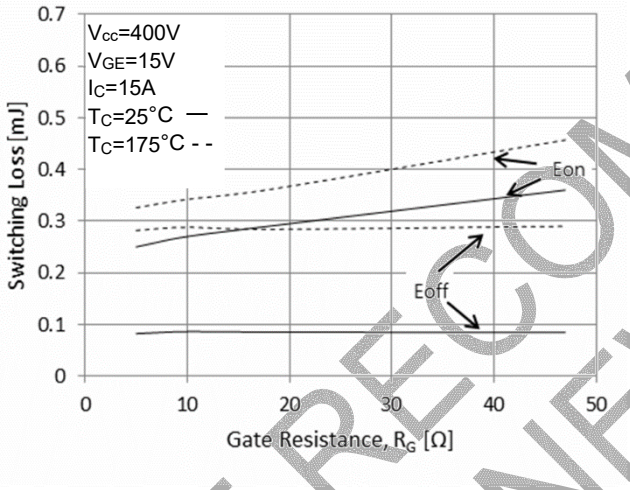


Fig.15 Switching Loss-Gate Resistance

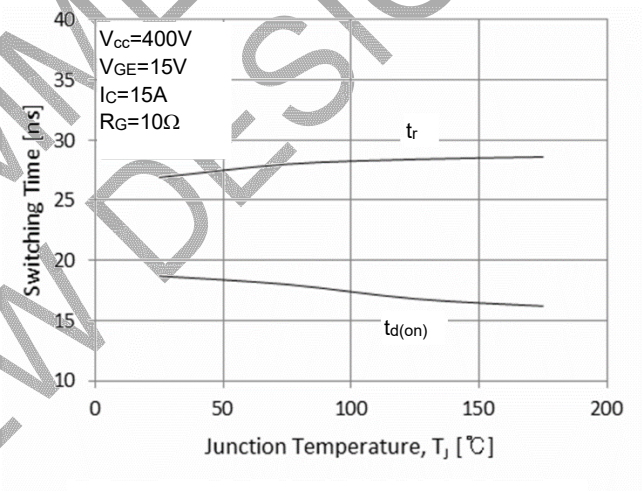


Fig.16 Turn on Characteristics-Junction Temperature

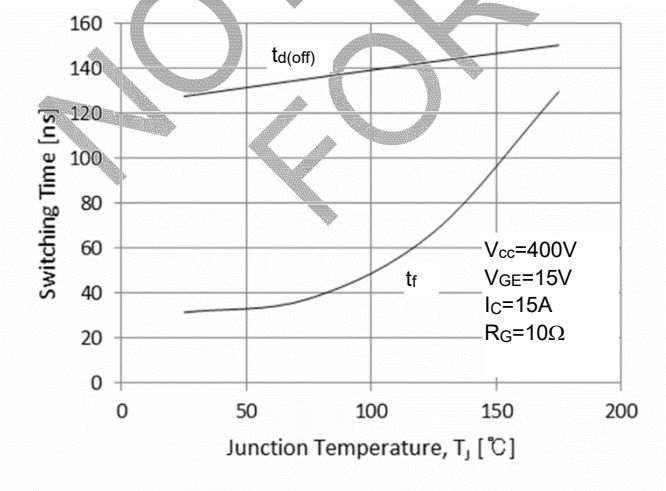


Fig.17 Turn off Characteristics-Junction Temperature

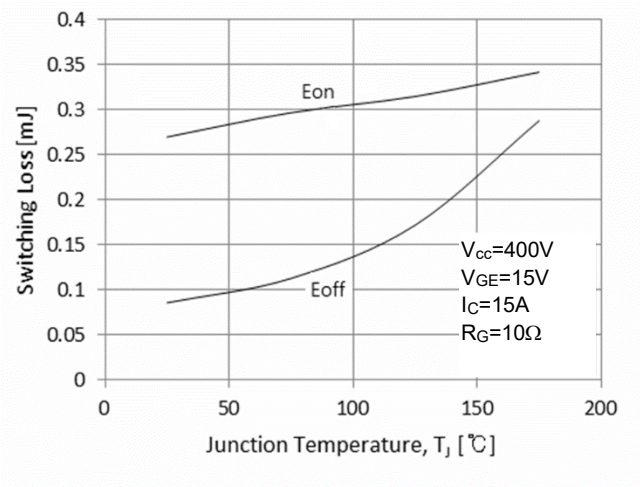


Fig.18 Switching Loss-Junction Temperature

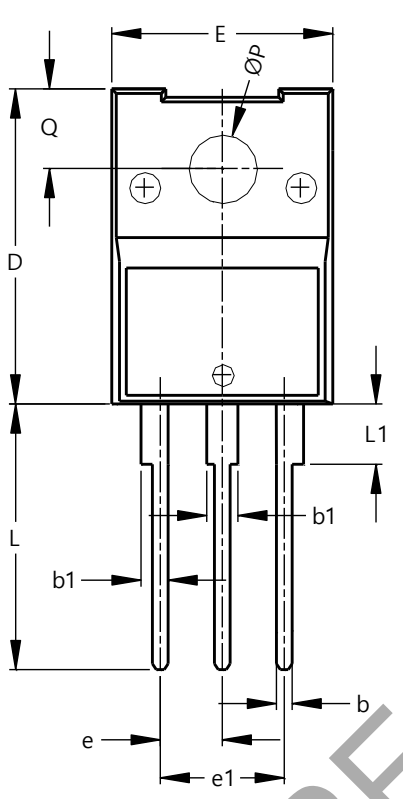
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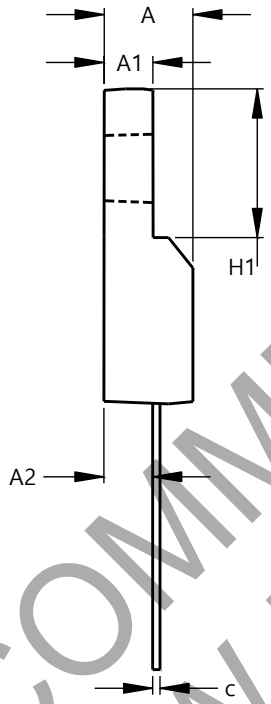
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Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

ITO220AB (Type MC)





ITO220AB (Type MC)			
Dim	**Min**	**Max**	**Typ**
A	4.30	4.80	--
A1	2.50	3.10	--
A2	2.30	2.90	--
b	0.50	1.00	--
b1	0.95	1.70	--
c	0.40	0.80	--
D	14.50	16.40	--
H1	6.20	7.20	--
E	9.60	10.40	--
e	--	--	2.54
e1	--	--	5.08
L	12.20	14.20	--
L1	2.90	4.70	--
P	3.00	3.40	--
Q	2.40	3.50	--
All Dimensions in mm			

Note: For high-voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device terminals and PCB tracking.

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