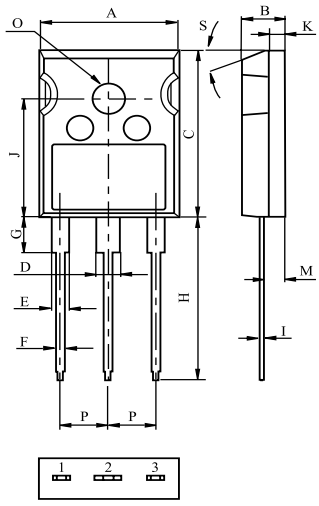
General Description

Din-Tek Field Stop Trench IGBTs offer low switching losses, high energy efficiency and short circuit ruggedness.
It is designed for applications such as motor control, uninterrupted power supplies(UPS), general inverters.

FEATURES

- High speed switching
- High ruggedness, temperature stable behavior
- Short Circuit Withstand Times 10us
- Extremely enhanced avalanche capability



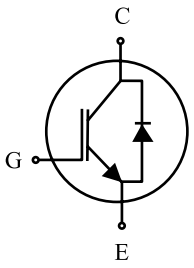
DIM	MILLIMETERS
A	15.90 ± 0.30
B	5.00 ± 0.20
C	20.85 ± 0.30
D	3.00 ± 0.20
E	2.00 ± 0.20
F	1.20 ± 0.20
G	Max. 4.50
H	20.10 ± 0.70
I	0.60 ± 0.02
J	14.70 ± 0.20
K	2.00 ± 0.10
M	2.40 ± 0.20
O	ϕ3.60 ± 0.30
P	5.45 ± 0.30
Q	ϕ3.60 ± 0.20
R	ϕ7.19 ± 0.10
S	20°

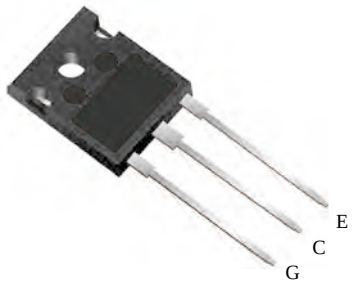
TO-247

MAXIMUM RATING (Ta=25℃)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector-Emitter Voltage		V_{CES}	600	V
Gate-Emitter Voltage		V_{GES}	±20	V
Collector Current	@Tc=25℃	I_C	100	A
	@Tc=100℃		50	A
Pulsed Collector Current		I_{CM}*	150	A
Diode Continuous Forward Current	@Tc=100℃	I_F	50	A
Diode Maximum Forward Current		I_{FM}	100	A
Maximum Power Dissipation	@Tc=25℃	P_D	277	W
	@Tc=100℃		111	W
Maximum Junction Temperature		T_j	150	℃
Storage Temperature Range		T_{stg}	-55 to + 150	℃

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





THERMAL CHARACTERISTIC

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Junction to Case (IGBT)	R_{thJC}	0.45	℃/W
Thermal Resistance, Junction to Case (DIODE)	R_{thJC}	1.0	℃/W
Thermal Resistance, Junction to Ambient	R_{thJA}	40	℃/W

ELECTRICAL CHARACTERISTICS (Ta=25℃)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Static						
Collector-Emitter Breakdown Voltage	BV_{CES}	V_{GE}=0V , I_C=250 μA	600	-	-	V
Collector Cut-off Current	I_{CES}	V_{GE}=0V, V_{CE}=600V	-	-	250	μA
Gate Leakage Current	I_{GES}	V_{CE}=0V, V_{GE}=±20V	-	-	±100	nA
Gate Threshold Voltage	$V_{GE(th)}$	V_{GE}=V_{CE}, I_C=5mA	4.5	5.5	7	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE}=15V, I_C=50A	-	1.65	2.1	V
		V_{GE}=15V, I_C=100A	-	2.25	-	V
		V_{GE}=15V, I_C=50A, T_C = 125℃	-	1.9	-	V
Dynamic						
Total Gate Charge	Q_g	V_{CC}=300V, V_{GE}=15V, I_C= 50A	-	200	-	nC
Gate-Emitter Charge	Q_{ge}		-	30	-	nC
Gate-Collector Charge	Q_{gc}		-	100	-	nC
Turn-On Delay Time	$t_{d(on)}$	V_{CC}=300V, I_C=50A, V_{GE}=15V,R_G=10Ω Inductive Load, T_C = 25℃ (Note 1)	-	60	-	ns
Rise Time	t_r		-	45	-	ns
Turn-Off Delay Time	$t_{d(off)}$		-	250	-	ns
Fall Time	t_f		-	40	-	ns
Turn-On Switching Loss	E_{on}		-	1.25	1.65	mJ
Turn-Off Switching Loss	E_{off}		-	0.95	1.25	mJ
Total Switching Loss	E_{ts}		-	2.2	2.9	mJ
Turn-On Delay Time	$t_{d(on)}$	V_{CC}=300V, I_C=50A, V_{GE}=15V, R_G=10Ω Inductive Load, T_C = 125℃ (Note 1)	-	60	-	ns
Rise Time	t_r		-	50	-	ns
Turn-Off Delay Time	$t_{d(off)}$		-	260	-	ns
Fall Time	t_f		-	50	-	ns
Turn-On Switching Loss	E_{on}		-	1.25	-	mJ
Turn-Off Switching Loss	E_{off}		-	1.15	-	mJ
Total Switching Loss	E_{ts}		-	2.4	-	mJ
Input Capacitance	C_{ies}	V_{CE}=30V, V_{GE}=0V, f=1MHz	-	4000	5200	pF
Ouput Capacitance	C_{oes}		-	250	-	pF
Reverse Transfer Capacitance	C_{res}		-	150	-	pF
Short Circuit Withstand Time	t_{sc}	V_{CC}=300V, V_{GE}=15V, T_C=100℃	10	-	-	μs

Note 1 : Energy loss include tail current and diode reverse recovery.

ELECTRICAL CHARACTERISTIC OF DIODE

CHARACTERISTIC	SYMBOL	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Diode Forward Voltage	V_F	I_F = 50A	T_C=25°C	-	1.8	2.5	V
			T_C=125°C	-	1.9	-	
Diode Reverse Recovery Time	t_{rr}	V_{CC}=300V, I_F = 50A di/dt = 600A/ μs	T_C=25°C	-	100	-	ns
			T_C=125°C	-	175	-	
Diode Peak Reverse Recovery Current	I_{rr}		T_C=25°C	-	19	-	A
			T_C=125°C	-	22	-	
Diode Reverse Recovery Charge	Q_{rr}		T_C=25°C	-	1.1	-	μC
			T_C=125°C	-	2.3	-	

Fig 1. Saturation Voltage Characteristics

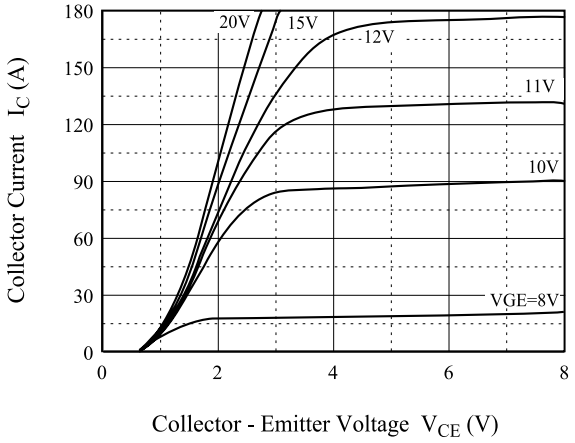


Fig 2. Saturation Voltage Characteristics

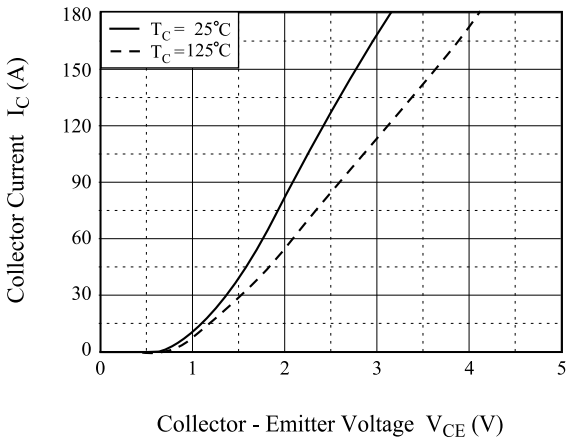


Fig 3. Saturation Voltage vs. Case Temperature

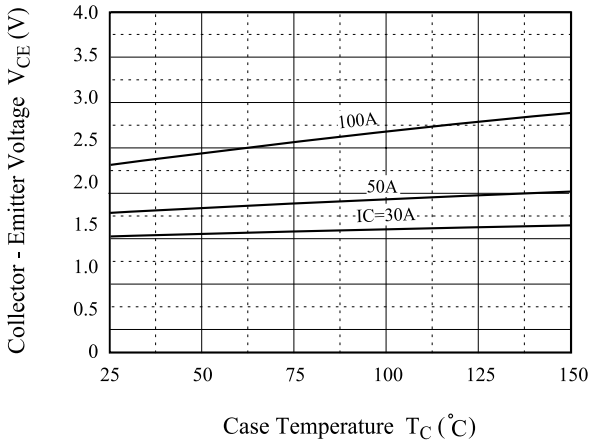


Fig 4. Saturation Voltage vs. V_{GE}

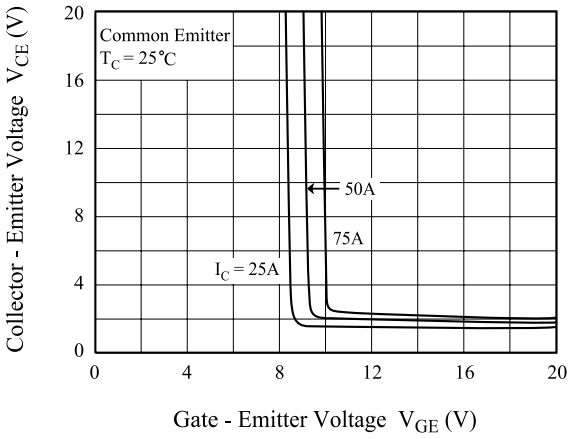


Fig 5. Saturation Voltage vs. V_{GE}

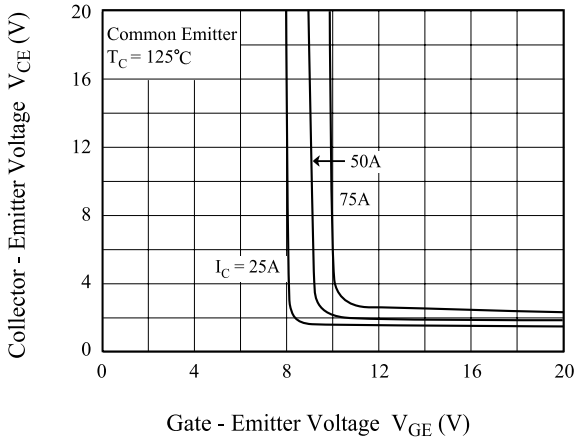


Fig 6. Capacitance Characteristics

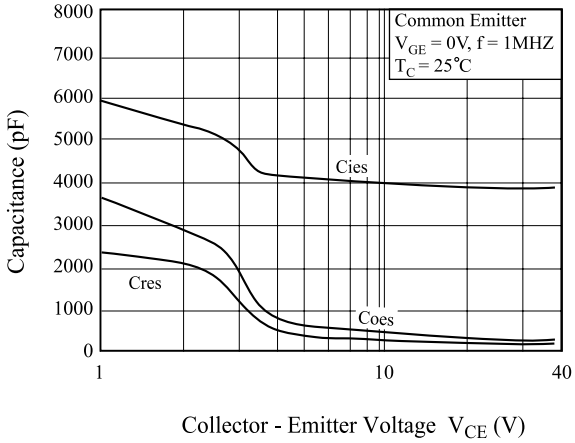


Fig 7. Turn-On Characteristics vs. Gate Resistance

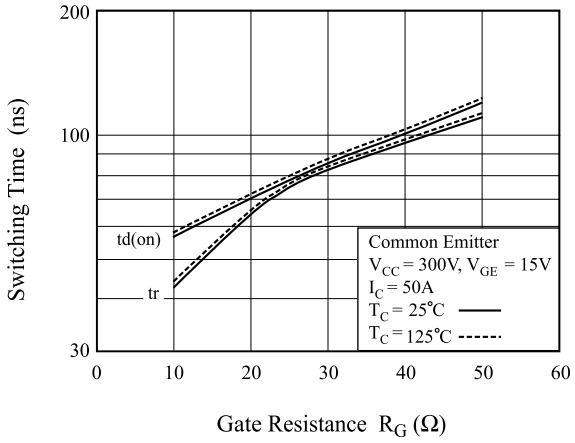


Fig 8. Turn-Off Characteristics vs. Gate Resistance

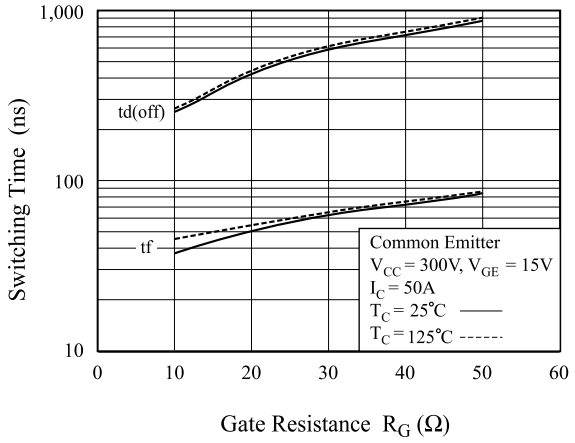


Fig 9. Switching Loss vs. Gate Resistance

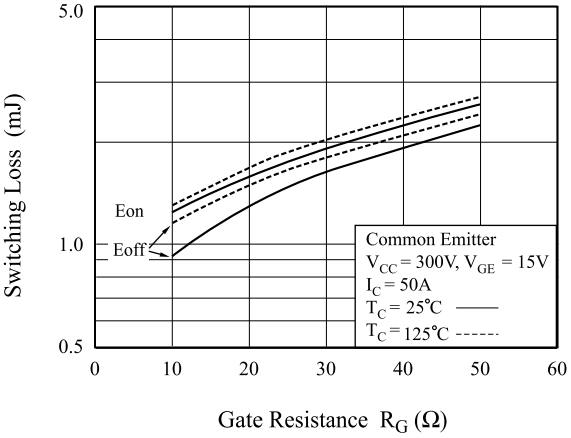


Fig 10. Turn-On Characteristics vs. Collector Current

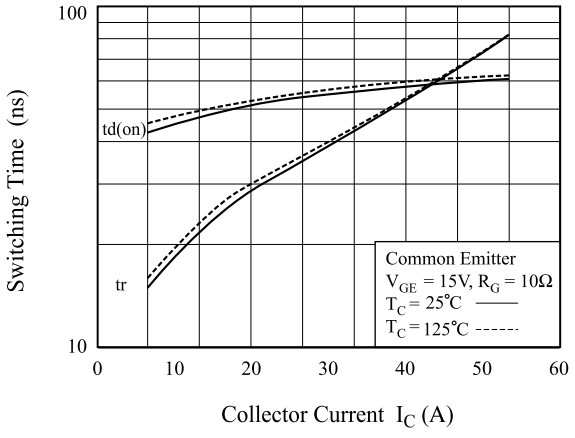


Fig 11. Turn-Off Characteristics vs. Collector Current

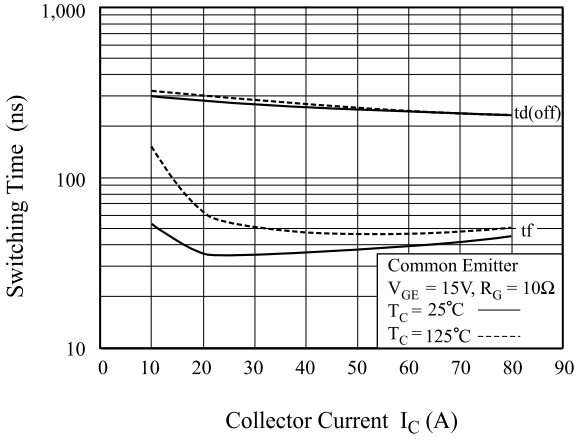


Fig 12. Switching Loss vs. Collector Current

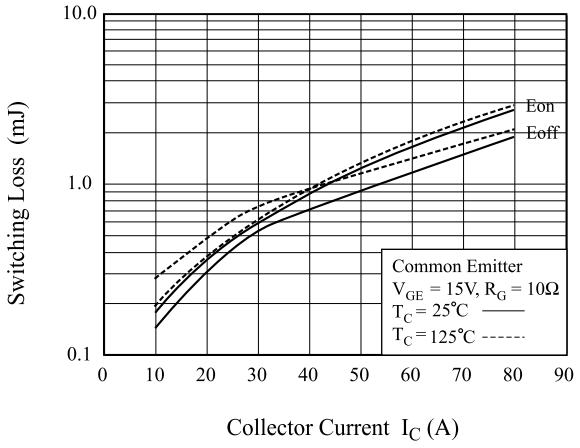


Fig 13. Gate Charge Characteristics

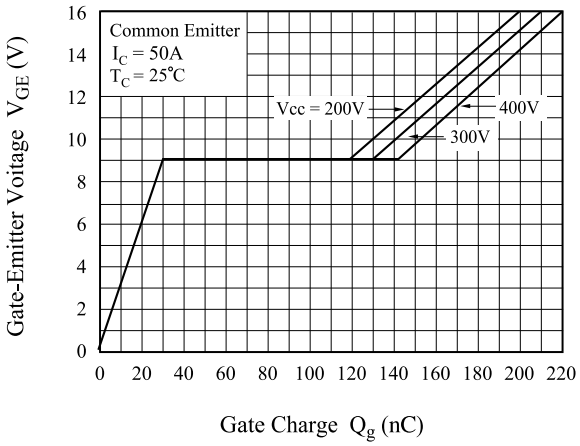


Fig 14. SOA Characteristics

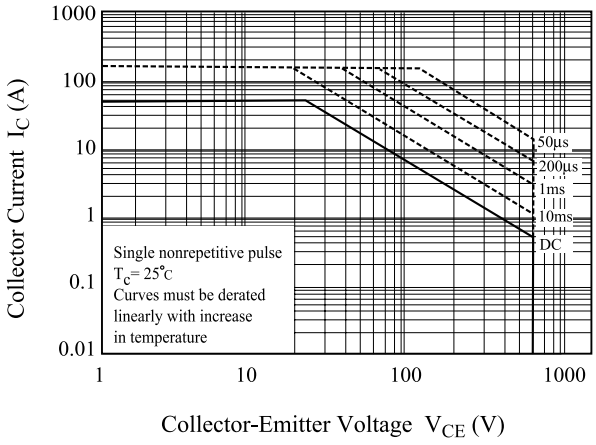


Fig 15. Turn-Off SOA

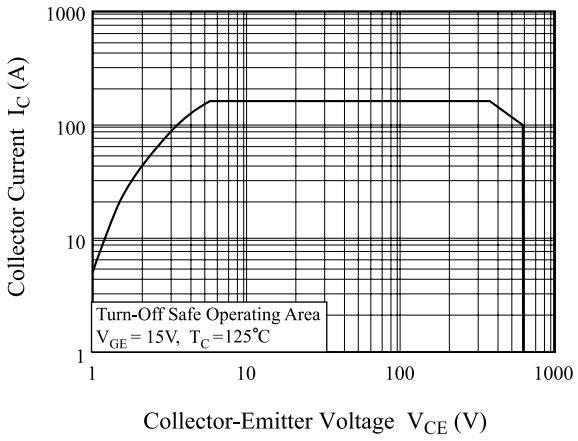


Fig 16. Transient Thermal Impedance of IGBT

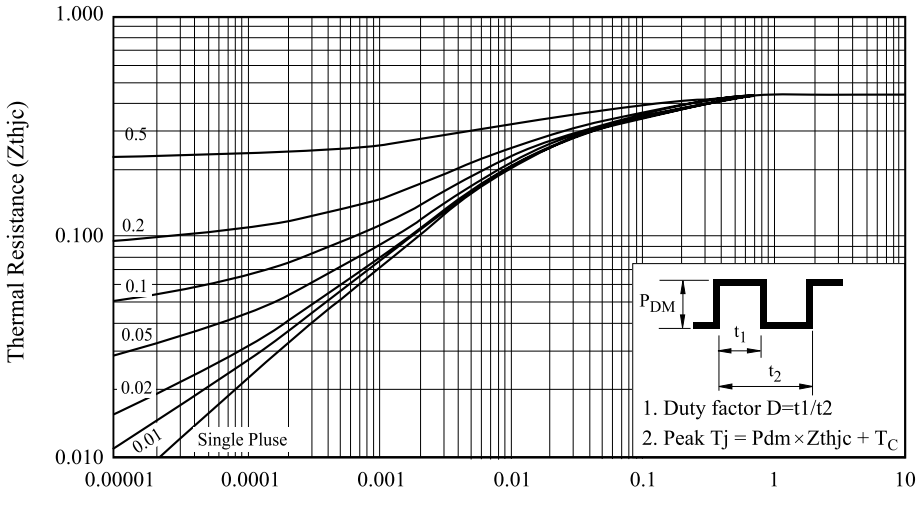


Fig 18. Forward Characteristics

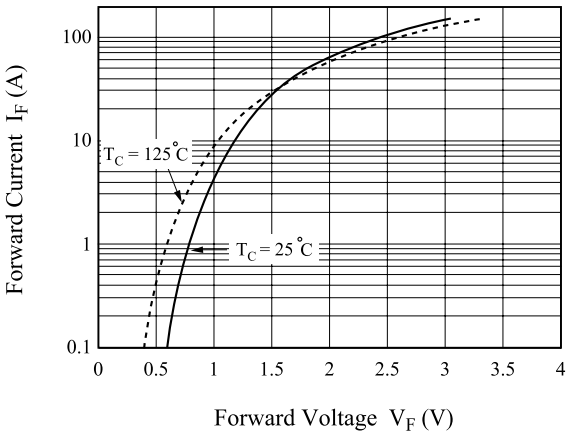


Fig 19. Reverse Recovery Current

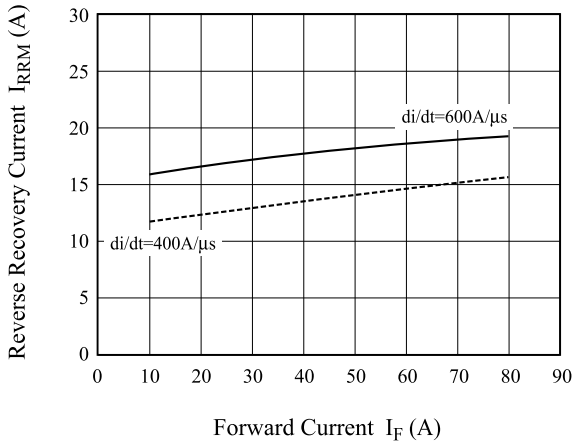


Fig 20. Reverse Recovery Time

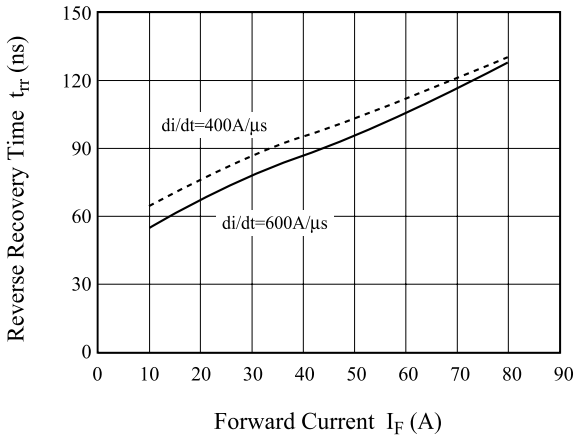


Fig 21. Switching Test Circuit

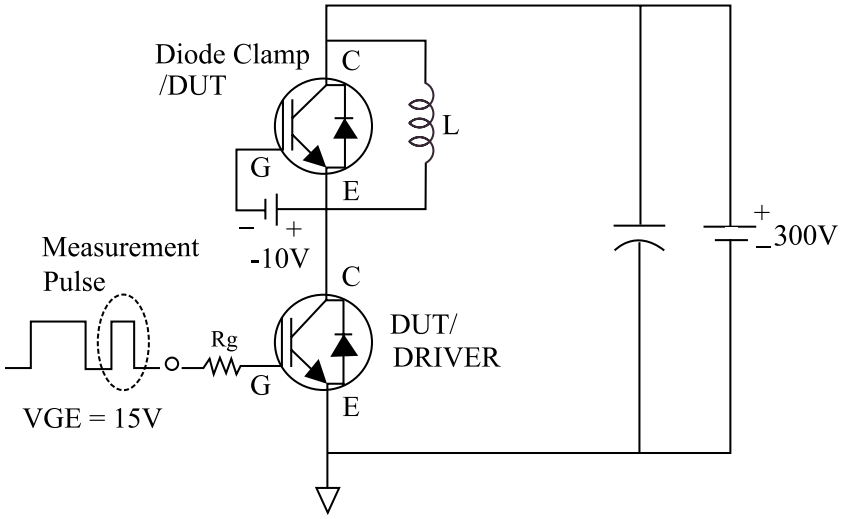
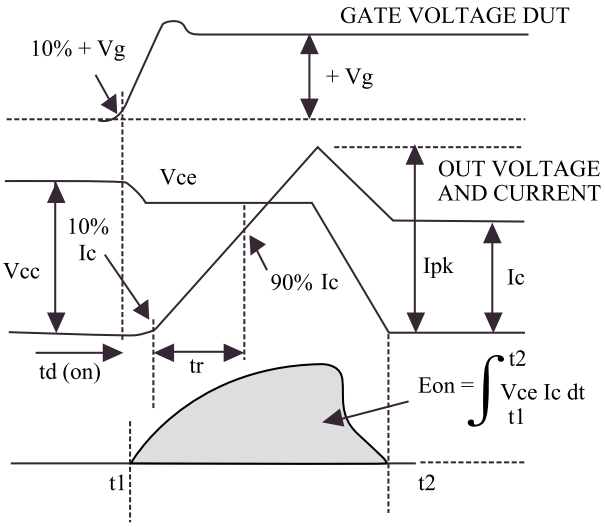


Fig 22. Definition Switching Time & Loss



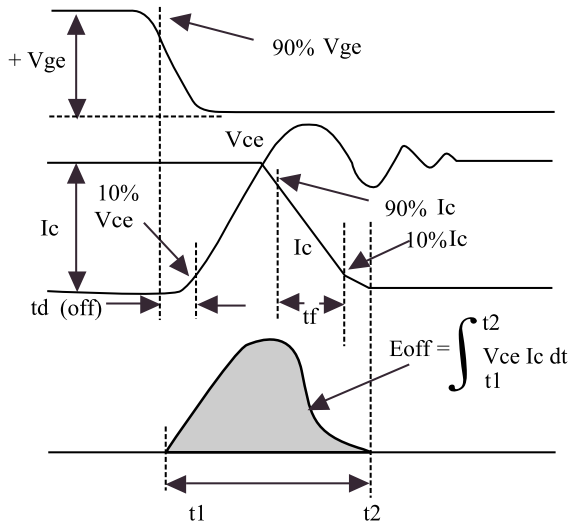
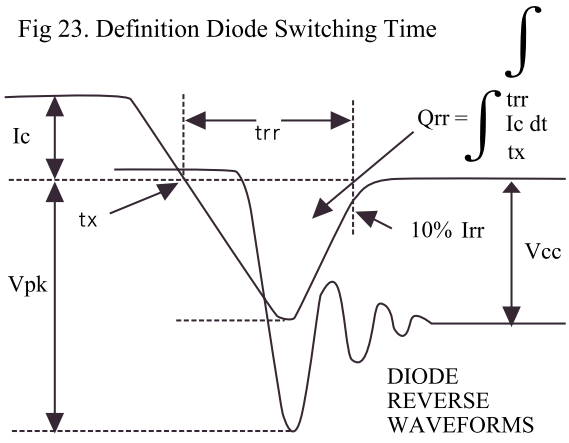
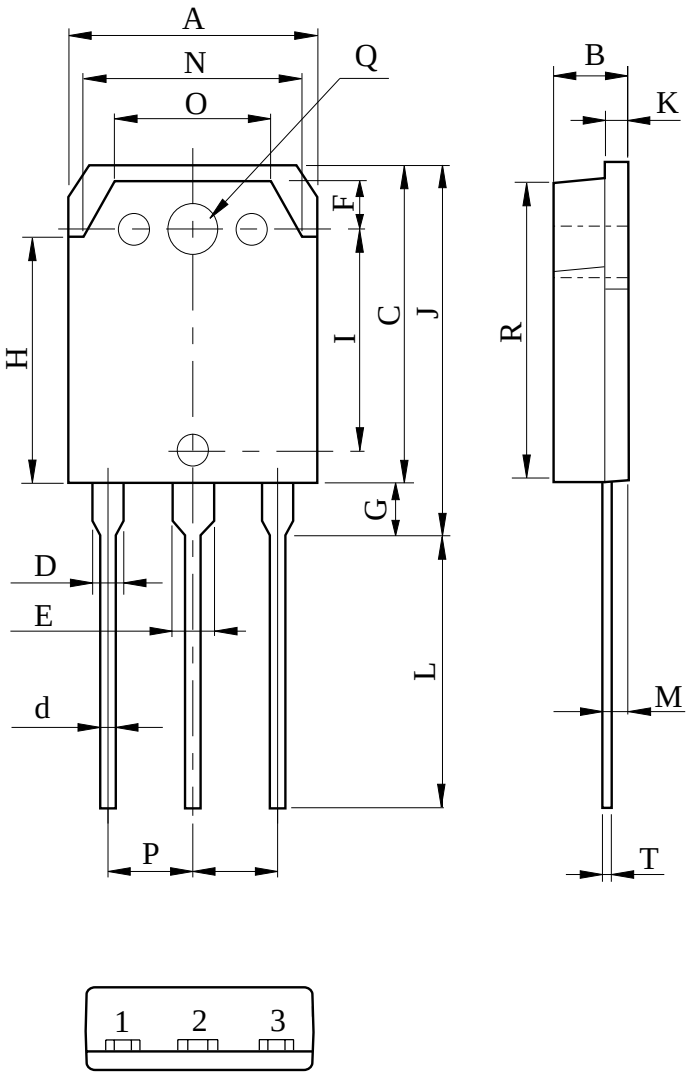


Fig 23. Definition Diode Switching Time



TO-3P (High Voltage)



DIM	MILLIMETERS
A	15.60±0.20
B	4.80±0.20
C	19.90±0.20
D	2.00±0.20
d	1.00±0.20
E	3.00±0.20
F	3.80±0.20
G	3.50±0.20
H	13.90±0.20
I	12.76±0.20
J	23.40±0.20
K	1.5+0.15-0.05
L	16.50±0.30
M	1.40±0.20
O	9.60±0.20
P	5.45±0.30
Q	ϕ 3.20±0.10
R	18.70±0.20
T	0.60+0.15-0.05

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Din-Tek Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Din-Tek"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Din-Tek makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Din-Tek disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Din-Tek's knowledge of typical requirements that are often placed on Din-Tek products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Din-Tek's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Din-Tek products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Din-Tek product could result in personal injury or death. Customers using or selling Din-Tek products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Din-Tek personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Din-Tek. Product names and markings noted herein may be trademarks of their respective owners.

Material Category Policy

Din-Tek Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.

Please note that some Din-Tek documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.

Din-Tek Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Din-Tek documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.