

# N-CHANNEL ENHANCEMENT MODE VERTICAL IGBT

## ZCN0545A

ISSUE 2 – MAY 94

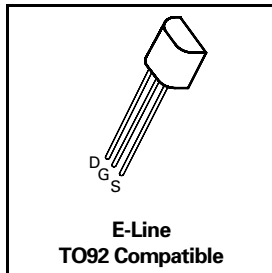
This IGBT combines the high input impedance of the DMOSFET with the high current density of the BJT.

### FEATURES

- \* Extremely low on state voltage
- \* No need to derate for higher temperatures
- \* Excellent temperature immunity
- \* High input impedance
- \* Reverse blocking characteristic which is Independent of gate bias
- \* Low input capacitance
- \* Characterised for logic level drive

### APPLICATIONS

- \* Fluorescent lamp driver
- \* Automotive load drivers
- \* High voltage DC-DC converters
- \* Darlington replacement
- \* Telecoms hook switch and earth recall switch



### ABSOLUTE MAXIMUM RATINGS (at $T_{amb}=25^{\circ}\text{C}$ unless otherwise stated)

PARAMETER	SYMBOL	VALUE	UNIT	
Forward Drain-Source Voltage	$V_{DS}$	450	V	
Reverse Drain Source Voltage	$V_{SD}$	30	V	
Continuous Drain Current	$I_D$	0.32	A	
Practical Continuous Drain Current*	$I_{DP}$	0.37	A	
Pulsed Drain Current	@ $T_{amb}=25^{\circ}\text{C}$	$I_{DMR}$	2	A
	@ $T_{amb}=125^{\circ}\text{C}$	$I_{DM}$	1	A
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V	
Power Dissipation at $T_{amb}=25^{\circ}\text{C}$	$P_{tot}$	0.6	W	
Practical Power Dissipation*	$P_{DP}$	0.8	W	
Operating and Storage Temperature Range	$T_j; T_{stg}$	-55 to +125	$^{\circ}\text{C}$	

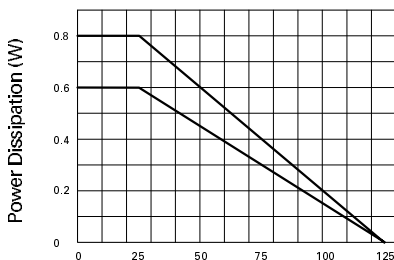
\* With the device mounted in a typical manner on a P.C.B. with at least 1 sq. inch of copper.

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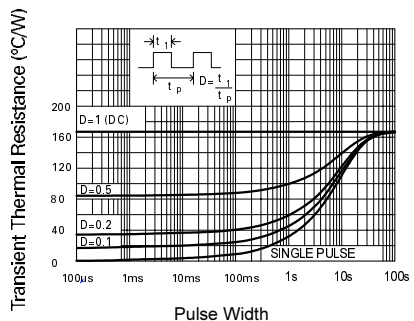
## ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated).

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Forward Drain-Source Breakdown Voltage	$V_{DSS}$	450			V	$V_{GS}=0\text{V}$
Reverse Drain-Source Breakdown Voltage (4)	$V_{SD}$	30			V	$I_D=1\text{mA}$
Gate-Source Threshold Voltage	$V_{GS(th)}$	1		3	V	$I_D=1\text{mA}$ , $V_{DS}=V_{GS}$
Gate-Body Leakage	$I_{GSS}$			20	nA	$V_{GS}=\pm 20\text{V}$ , $V_{DS}=0\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$			10 400	$\mu\text{A}$ $\mu\text{A}$	$V_{DS}=\text{max. rating}$ , $V_{GS}=0$ $V_{DS}=0.8 \times \text{max. rating}$ , $V_{GS}=0\text{V}$ , $T=125^{\circ}\text{C}$ (2)
Drain Source Saturation Voltage (1)	$V_{DS(SAT)}$			3 3	V V	$I_D=500\text{mA}$ , $V_{GS}=10\text{V}$ $I_D=250\text{mA}$ , $V_{GS}=5\text{V}$
Static Drain-Source On-State Resistance (1)	$R_{DS(on)}$			6	$\Omega$	$V_{GS}=10\text{V}$ , $I_D=0.5\text{A}$
Input Capacitance (2)	$C_{iss}$			90	pF	$V_{DS}=25\text{V}$ , $V_{GS}=0\text{V}$ , $f=1\text{MHz}$
Common Source Output Capacitance (2)	$C_{oss}$			12	pF	
Reverse Transfer Capacitance (2)	$C_{rss}$			6	pF	
Switching Times (2)(3)	$t_{on}$			150	ns	$V_{DD}=25\text{V}$ , $V_{GEN}=10\text{V}$ $I_D=1\text{A}$ , $R_{GS}=50\Omega$
	$t_{off}$		200	300	ns	

- (1) Measured under pulsed conditions. Width=300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$  (2) Sample test.  
 (3) Switching times measured with 50 $\Omega$  source impedance and <5ns rise time on a pulse generator  
 (4) One minute maximum duration. Exceeds common international automotive reverse battery test specifications



Derating Curve



Transient Thermal Resistance

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## TYPICAL CHARACTERISTICS

