

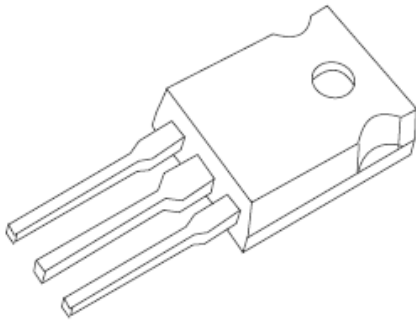
### Features

- ◆ECMOS's Proprietary Trench IGTO Technology
- ◆Extremely Low  $V_{CE,sat}$
- ◆Very Low  $E_{TS}$
- ◆Integrated SuperBallast™ Technology for Safe, Simple Paralleling
- ◆Square Turn-Off SOA >4x Rated Current
- ◆Low turnoff voltage spike

### Applications

- ◆UPS and Solar Inverters
- ◆Induction Heating
- ◆Motor Control
- ◆Power Factor Correction

### Product Summary



Current (A)	Voltage (V)	$V_{CE,sat}$ (V)	Package	Marking
45	600	1.2	TO247	

### Absolute Maximum Ratings

Stresses above those specified under Absolute Maximum Ratings may cause permanent damage to the device and/or affect device reliability. These are stress ratings only; functional operation of the device at these or any other conditions outside those indicated in the Specification Table is not implied.

Absolute maximum ratings apply individually only, not in combination. Unless otherwise specified, all voltages are referenced to GND.

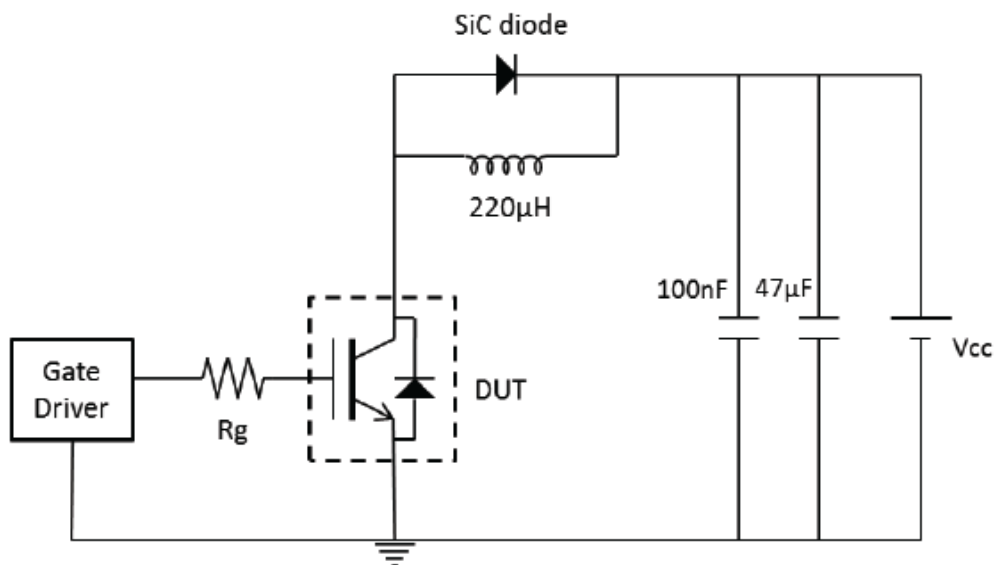
Symbol	Parameter	Min	Typ	Max	Unit
$V_{CE}$	Collector-to-Emitter Voltage			600	V
$I_{CE}$	DC Collector Current				
	TC = 25°C			90	A
	TC = 100°C			45	A
$V_{GE}$	Gate-to-Emitter Voltage	-20		20	V
$T_J$	Operating Junction Temperature	-40		150	°C
$T_{STG}$	Storage Temperature	-55		150	°C

### Electrical Specifications

Typical values are at  $T_J=25^{\circ}\text{C}$ , unless otherwise specified. All limits at temperature extremes are guaranteed via correlation using standard statistical quality control (SQC).

Symbol	Parameter	Min	Typ	Max	Unit
$V_{BR,CES}$	Collector-to-Emitter Breakdown Voltage				
	$V_{GE}=0\text{V}, I_C=250\mu\text{A}$	600.0			V
$V_{CE,SAT}$	Collector-to-Emitter Saturation Voltage				
	$I_C=30\text{A}, V_{GE}=15\text{V}$		1.38		V
	$I_C=30\text{A}, V_{GE}=15\text{V}, T_J=150^{\circ}\text{C}$		1.2		V
	$I_C=50\text{A}, V_{GE}=15\text{V}$		1.73		V
$V_{GE}$	Gate Threshold Voltage				
	$V_{CE}=V_{GE}, I_C=250\mu\text{A}$		3.8	5.4	V
$I_{CES}$	Collector Leakage Current				
	$V_{GE}=0\text{V}, V_{CE}=600\text{V}$		0.3	30.0	$\mu\text{A}$
	$V_{GE}=0\text{V}, V_{CE}=600\text{V}, T_J=150^{\circ}\text{C}$		3000.0		$\mu\text{A}$
$I_{CES}$	Gate Leakage Current				
	$V_{GE}=20\text{V}, V_{CE}=0\text{V}$			300.0	nA
$C_{IES}$	Gate Emitter Capacitance				
	$V_{GE}=0\text{V}, V_{CE}=25\text{V}, f=1\text{MHz}$		5250.0		pF
$C_{OES}$	Output Capacitance				
	$V_{GE}=0\text{V}, V_{CE}=25\text{V}, f=1\text{MHz}$		33.0		pF
$C_{RES}$	Reverse Transfer Capacitance				
	$V_{GE}=0\text{V}, V_{CE}=25\text{V}, f=1\text{MHz}$		27.0		pF

### Inductive Load Test Circuit



**Switching Characteristics**I<sub>C</sub>=30A, V<sub>CC</sub>=400V, V<sub>GE</sub>=15V, V<sub>CC</sub>=400V, R<sub>G</sub>=6Ω, Energy includes tail.

Symbol	Parameter	Min	Typ	Max	Unit
t <sub>d,ON</sub>	Turn-on Delay Time		42.0		ns
t <sub>r</sub>	Turn-on Rise Time		43.0		ns
t <sub>d,OFF</sub>	Turn-off Delay Time		156.0		ns
t <sub>f</sub>	Turn-off Fall Time		85.0		ns
E <sub>ON</sub>	Turn-on Switching Loss		0.39		mJ
E <sub>OFF</sub>	Turn-off Switching Loss		0.54		mJ
E <sub>TS</sub>	Total Switching Loss		0.93		mJ

T<sub>J</sub>=100°C, I<sub>C</sub>=30A, V<sub>CC</sub>=400V, V<sub>GE</sub>=15V, V<sub>CC</sub>=400V, R<sub>G</sub>=6Ω, Energy includes tail.

Symbol	Parameter	Min	Typ	Max	Unit
t <sub>d,ON</sub>	Turn-on Delay Time		42.0		ns
t <sub>r</sub>	Turn-on Rise Time		42.0		ns
t <sub>d,OFF</sub>	Turn-off Delay Time		237.0		ns
t <sub>f</sub>	Turn-off Fall Time		132.0		ns
E <sub>ON</sub>	Turn-on Switching Loss		0.39		mJ
E <sub>OFF</sub>	Turn-off Switching Loss		1.17		mJ
E <sub>TS</sub>	Total Switching Loss		1.56		mJ

T<sub>J</sub>=150°C, I<sub>C</sub>=30A, V<sub>CC</sub>=400V, V<sub>GE</sub>=15V, V<sub>CC</sub>=400V, R<sub>G</sub>=6Ω, Energy includes tail.

Symbol	Parameter	Min	Typ	Max	Unit
t <sub>d,ON</sub>	Turn-on Delay Time		44.0		ns
t <sub>r</sub>	Turn-on Rise Time		43.0		ns
t <sub>d,OFF</sub>	Turn-off Delay Time		340.0		ns
t <sub>f</sub>	Turn-off Fall Time		220.0		ns
E <sub>ON</sub>	Turn-on Switching Loss		0.36		mJ
E <sub>OFF</sub>	Turn-off Switching Loss		1.95		mJ
E <sub>TS</sub>	Total Switching Loss		2.31		mJ

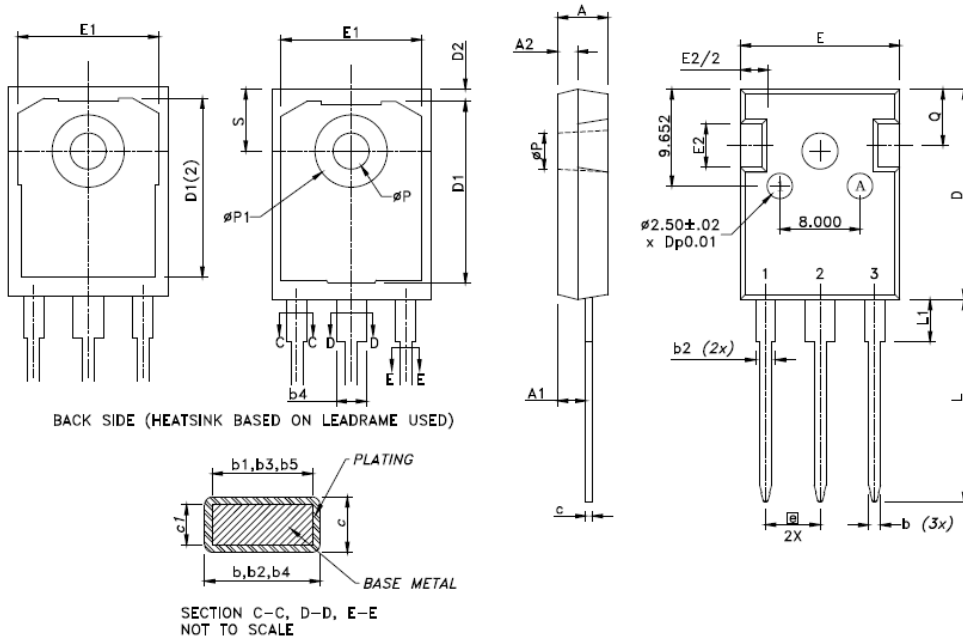
T<sub>J</sub>=100°C, I<sub>C</sub>=30A, V<sub>CC</sub>=400V, V<sub>GE</sub>=15V/-8V, V<sub>CC</sub>=400V, R<sub>G</sub>=6Ω, Energy includes tail.

Symbol	Parameter	Min	Typ	Max	Unit
t <sub>d,ON</sub>	Turn-on Delay Time		40.0		ns
t <sub>r</sub>	Turn-on Rise Time		43.0		ns
t <sub>d,OFF</sub>	Turn-off Delay Time		174.0		ns
t <sub>f</sub>	Turn-off Fall Time		88.0		ns
E <sub>ON</sub>	Turn-on Switching Loss		0.36		mJ
E <sub>OFF</sub>	Turn-off Switching Loss		0.84		mJ
E <sub>TS</sub>	Total Switching Loss		1.2		mJ

### Pin Configuration

Pin Number	Description
1	Gate
2	Collector
3	Emitter

### Package Drawing



AREA	MIN	NOM	MAX
A	4.902	5.029	5.156
A1	2.253	2.380	2.507
A2	1.854	1.981	2.108
D	20.828	20.955	21.082
E	15.773	15.900	16.027
E2	4.191	4.318	4.445
E2/2	2.096	2.159	2.223
e	5.436 BSC		
L	20.066	20.193	20.320
L1	3.937	4.191	4.445
øP	3.556	3.607	3.658
Q	5.486	5.613	5.740
S	6.045	6.172	6.299
b	0.991	-	1.397
b1	0.991	1.199	1.346
b2	1.651	-	2.387
b3	1.651	1.999	2.336
b4	2.591	-	3.429
b5	2.591	3.000	3.378
c	0.381	0.635	0.889
c1	0.381	0.610	0.838
D1	17.200	17.285	17.370
D1(2)	17.082	17.167	17.252
D2	1.067	1.194	1.321
E1	13.894	14.021	14.148
øP1	7.061	7.188	7.315

- NOTES:
1. DIMENSIONS ARE IN MILLIMETERS
  2. DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.127 MM PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTERMOST EXTREME OF THE PLASTIC BODY.
  3. øP TO HAVE A MAXIMUM DRAFT ANGLE OF 1.5° TO THE TOP OF THE PART WITH A MAXIMUM HOLE DIAMETER OF 0.154"