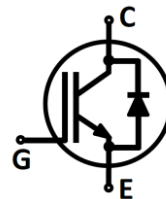


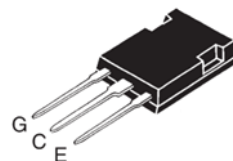
Features

- Easy parallel switching capability due to positive temperature coefficient in V_{CEsat}
- Low V_{CEsat} , fast switching
- High ruggedness, good thermal stability
- Very tight parameter distribution



Applications

- Motor drives
- Main inverter
- PTC heater



Parameter	Symbol	Value	Unit
Collector-emitter voltage	V_{CE}	750	V
DC collector current, limited by T_{vjmax} $T_C=25^{\circ}C$ $T_C=100^{\circ}C$	I_C	200 200	A
Pulsed collector current, t_p limited by $T_{vjmax}^{1)}$	I_{Cpuls}	600	
Diode forward current, limited by T_{vjmax} $T_C=25^{\circ}C$ $T_C=100^{\circ}C$	I_F	200 200	
Diode pulsed current, t_p limited by $T_{vjmax}^{1)}$	I_{Fpuls}	600	
Gate-emitter voltage	V_{GE}	± 20	V
Transient Gate-emitter voltage ($t_p \leq 10\mu s, D < 0.01$)		± 30	
Short circuit withstand time $V_{GE}=15V, V_{CC} \leq 470V, T_{vj}=25^{\circ}C$ Allowed number of short circuits < 1000 Time between short circuits: $\geq 1.0s$	t_{SC}	5	μs
Power dissipation $T_C=25^{\circ}C$	P_{tot}	1071	W
Power dissipation $T_C=100^{\circ}C$		535	
Operating junction temperature	T_{vj}	-40~175	$^{\circ}C$
Storage temperature	T_{stg}	-55~150	
Soldering temperature, wave soldering 1.6mm (0.063in.) from case for 10s		260	
Mounting torque, M3 screw Maximum of mounting processes: 3	M	0.6	Nm

¹⁾ Defined by design. Not subject to production test.

Thermal Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
IGBT thermal resistance, junction-case	R_{thJC}	-	-	0.14	K/W
Diode thermal resistance, junction-case	R_{thJCD}	-	-	0.26	
Thermal Resistance, junction-ambient	R_{thJA}	-	-	40	

Electrical Characteristics (at $T_{vj}=25^{\circ}\text{C}$, unless otherwise specified)

Static Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-emitter breakdown voltage	$V_{(BR)CES}$	$V_{GE}=0V, I_C=0.25mA$	750	-	-	V
Collector-emitter saturation voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=200A$ $T_{vj}=25^{\circ}\text{C}$	-	1.5	1.7	
		$T_{vj}=150^{\circ}\text{C}$	-	1.71	-	
		$T_{vj}=175^{\circ}\text{C}$	-	1.75	-	
G-E threshold voltage	$V_{GE(th)}$	$I_C=2.6mA, V_{CE}=V_{GE}$	5.0	5.8	6.5	
C-E leakage current	I_{CES}	$V_{CE}=750V, V_{GE}=0V$ $T_{vj}=25^{\circ}\text{C}$	-	-	0.01	mA
		$T_{vj}=175^{\circ}\text{C}$	-	-	4.0	
G-E leakage current	I_{GES}	$V_{CE}=0V, V_{GE}=20V$	-	-	250	nA

Dynamic Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Input capacitance	C_{iss}	$V_{CE}=25V,$ $V_{GE}=0V,$ $f=100KHz$	-	17855	-	pF
Output capacitance	C_{oss}		-	608	-	
Reverse transfer capacitance	C_{rss}		-	122	-	
Gate charge	Q_G	$V_{CC}=600V,$ $I_C=200A,$ $V_{GE}=15V$	-	tbd	-	nC
Short circuit collector current	$I_{C(SC)}$	$V_{GE}=15V,$ $V_{CC}\leq 470V, t_{SC}\leq 5\mu s,$ $T_{vj}=25^{\circ}\text{C}$	-	950	-	A

IGBT Switching Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Turn-on delay time	$t_{d(on)}$	$T_{vj}=25^{\circ}\text{C}$, $V_{CC}=470\text{V}$, $I_C=200\text{A}$, $V_{GE}=-8/15\text{V}$, $R_G=5\Omega$, Inductive load	-	202	-	ns
Rise time	t_r		-	109	-	
Turn-off delay time	$t_{d(off)}$		-	365	-	
Fall time	t_f		-	70	-	
Turn-on energy	E_{on}		-	19.4	-	mJ
Turn-off energy	E_{off}		-	10.6	-	
Total switching energy	E_{ts}		-	30.0	-	
Turn-on delay time	$t_{d(on)}$	$T_{vj}=175^{\circ}\text{C}$, $V_{CC}=470\text{V}$, $I_C=200\text{A}$, $V_{GE}=-8/15\text{V}$, $R_G=5\Omega$, Inductive load	-	214	-	ns
Rise time	t_r		-	173	-	
Turn-off delay time	$t_{d(off)}$		-	422	-	
Fall time	t_f		-	93	-	
Turn-on energy	E_{on}		-	34.9	-	mJ
Turn-off energy	E_{off}		-	13.5	-	
Total switching energy	E_{ts}		-	48.4	-	

Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Diode forward voltage	V_F	$V_{GE}=0\text{V}$, $I_F=200\text{A}$ $T_{vj}=25^{\circ}\text{C}$	-	1.65	-	V
		$T_{vj}=150^{\circ}\text{C}$	-	1.83	-	
		$T_{vj}=175^{\circ}\text{C}$	-	1.85	-	
Diode reverse recovery time	t_{rr}	$T_{vj}=25^{\circ}\text{C}$, $V_R=470\text{V}$, $I_F=200\text{A}$, $di_F/dt=1810\text{A}/\mu\text{s}$	-	435	-	ns
Diode reverse recovery charge	Q_{rr}		-	9.4	-	μC
Diode peak reverse recovery current	I_{rrm}		-	41	-	A
Diode reverse recovery time	t_{rr}	$T_{vj}=175^{\circ}\text{C}$, $V_R=470\text{V}$, $I_F=200\text{A}$, $di_F/dt=1250\text{A}/\mu\text{s}$	-	541	-	ns
Diode reverse recovery charge	Q_{rr}		-	17.4	-	μC
Diode peak reverse recovery current	I_{rrm}		-	47	-	A

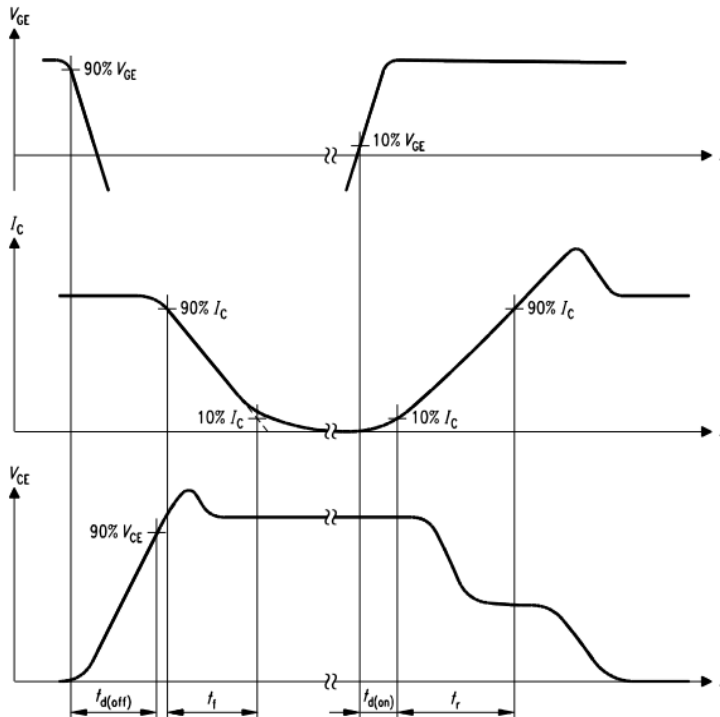


Figure A. Definition of switching times

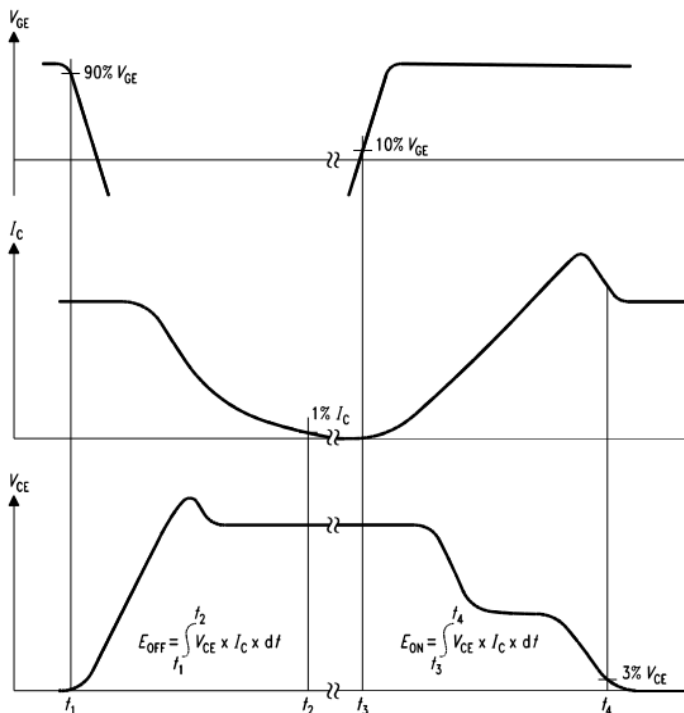


Figure B. Definition of switching losses

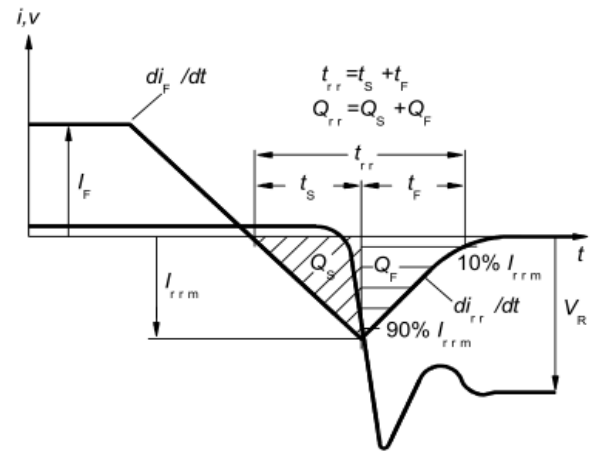


Figure C. Definition of diodes switching characteristics

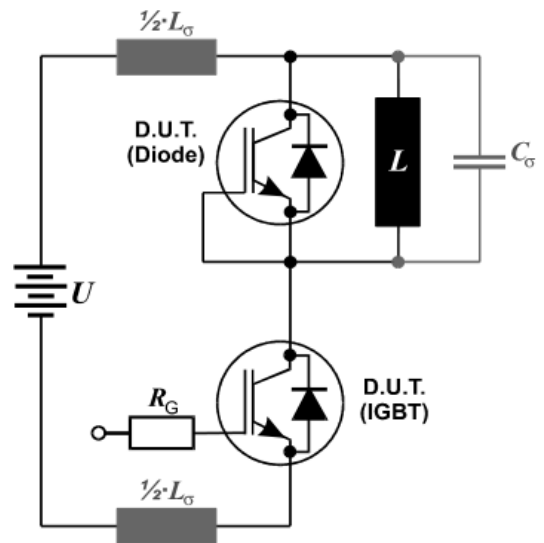
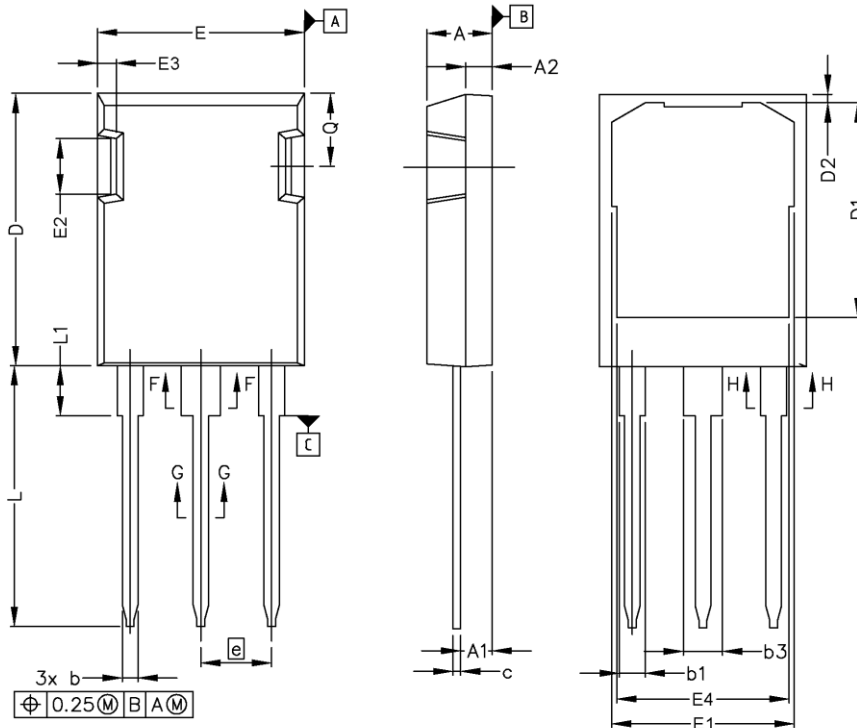


Figure D. Switching test circuit

TO-247-3L Plus



SYMBOL	MIN	MAX
A	4.83	5.21
A1	2.29	2.54
A2	1.91	2.16
b'	1.07	1.28
b	1.07	1.33
b1	1.91	2.41
b2	1.91	2.16
b3	2.87	3.38
b4	2.87	3.13
c'	0.55	0.65
c	0.55	0.68
D	20.80	21.10
D1	16.25	17.65
D2	0.50	0.80
E	15.75	16.13
E1	13.10	14.15
E2	3.68	5.10
E3	1.00	1.90
E4	12.38	13.43
c	5.44 BSC	
N	3	
L	19.81	20.32
L1	3.70	4.00
Q	5.49	6.00

NOTE:
1. ALL METAL SURFACES, TIN PLATED, EXCEPT AREA OF CUT
2. DIMENSIONING & TOLERANCING CONFIRM TO ASME Y14.5M-1994
3. ALL DIMENSIONS ARE IN MILLIMETERS.
ANGLES ARE IN DEGREES.
4. THIS DRAWING WILL MEET ALL DIMENSIONS REQUIREMENT OF JEDEC outlines TO-247 AD.

- 1 - GATE
- 2 - DRAIN (COLLECTOR)
- 3 - SOURCE (EMITTER)
- 4 - DRAIN (COLLECTOR)

