IKY75N120CH3XKSA1

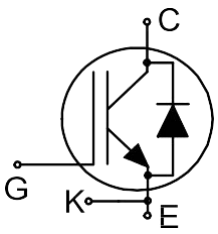
Insulated Gate Bipolar Transistor

Features

- High Current Capability
- Low Saturation Voltage V_{CEsat}
- Low Switching Losses
- Copacked with Fast Recovery Diode

Benefits

- Low Conduction Loss for a High Efficiency
- Rugged Transient Reliability
- Low EMI



Applications

- UPS
- EV-Charging
- String Solar Inverter
- Energy Storage Inverter

Table 1 Key Performance and Package Parameters

Type	V_{CE}	I_C	V_{CEsat} T_{vj} = 25°C I_C = 75A	V_F T_{vj} = 25°C I_F = 75A	Package	Packing
IGBT	1200V	75A	1.91V	1.80V	TO-247P-4L	30PCS

Table 2 Absolute Maximum Ratings

(T_{vj} = 25°C unless otherwise noted)

Parameters	Symbol	Conditions	Values	Unit
Collector emitter voltage	V_{CE}	T_{vj} = 25 °C	1200	V
DC collector current*1	I_C	T_C = 25 °C	100	A
		T_C = 100 °C	75	A
Pulsed collector current*2	I_{CM}	T_C = 25 °C	300	A
Maximum Diode forward current*1	I_F	T_C = 25 °C	100	A
		T_C = 100 °C	75	A
Diode pulsed current*2	I_{FM}	T_C = 25 °C	300	A
Gate source voltage	V_{GE}	T_{vj} = 25 °C	±20	V
Transient gate-emitter Voltage (tp ≤ 10µs, D < 0.010)	V_{GE}		±25	V
Power dissipation	P_{tot}	T_C = 25 °C	930	W
		T_C = 100 °C	460	
Operating junction temperature range	T_{vj}	-40 to +175		℃
Storage temperature range	T_{stg}	-55 to +150		

Notes:

1. The max Collector current rating is limited by maximum junction temperature
2. Pulse width limited by maximum junction temperature

Table 3 Thermal Resistance

Parameters	Symbol	Conditions	Values	Unit
IGBT thermal resistance junction - case	R_{thJC}	IGBT	0.16	K/W
Diode thermal resistance junction - case	R_{thJC}	Diode	0.33	K/W
Thermal resistance junction - ambient	R_{thJA}		40	K/W

Table 4 Static Characteristics

Parameters	Symbol	Conditions	Min	Typ	Max	Unit
Collector-emitter voltage	$V_{(BR)CES}$	T_{vj} = 25 °C	1200	-	-	V
Collector-emitter saturation voltage	V_{CEsat}	V_{GE} = 15 V, I_C =75 A T_{vj} = 25 °C	-	1.91	2.35	V
		V_{GE} = 15 V, I_C =75 A T_{vj} = 175 °C	-	2.79	-	
Diode forward voltage	V_F	V_{GE} = 0 V, I_C =75 A T_{vj} = 25 °C	-	1.80	2.35	V
		V_{GE} = 0 V, I_C =75 A T_{vj} = 175 °C	-	1.62	-	
Gate-emitter threshold voltage	V_{GEth}	V_{CE} = V_{GE}, I_C = 2.6 mA T_{vj} = 25 °C	5.1	5.9	6.6	V
Zero gate voltage collector current	I_{CES}	V_{CE} = 1200 V, V_{GE} = 0 V T_{vj} = 25 °C	-	-	40	μA
Gate-emitter leakage current	I_{GES}	V_{GE} = ±20 V, V_{CE} = 0 V	-	-	±100	nA

Table 5 Dynamic Characteristics

Parameters	Symbol	Conditions	Min	Typ	Max	Unit
Input capacitance	C_{ies}	V_{CE} = 25 V V_{GE} = 0 V f = 1MHz	-	9883	-	pF
Output capacitance	C_{oes}		-	274	-	
Reverse transfer capacitance	C_{res}		-	65	-	
Gate input resistance	R_G	f = 1MHz	-	0.4	-	Ω
Gate charge	Q_g	V_{CE} = 600 V I_C = 75A V_{GE} = 0 V to 15 V	-	307	-	nC
Gate to emitter charge	Q_{ge}		-	103	-	
Gate to collector charge	Q_{gc}		-	113	-	

Table 6 Switching Characteristics

Parameters	Symbol	Conditions	Min	Typ	Max	Unit
Turn-on delay time	$t_{d(on)}$	T_{vj} = 25 ℃ ; V_{CC} = 600 V, I_C = 75 A; V_{GE} = 0 / 15 V; R_g(on) = 5.1 Ω; R_g(off) = 5.1 Ω;	-	63	-	ns
Rise time	t_r		-	29	-	
Turn-off delay time	$t_{d(off)}$		-	188	-	
Fall time	t_f		-	96	-	
Turn-on energy	E_{on}		-	3.9	-	mJ
Turn-off energy	E_{off}		-	3.0	-	
Total switching energy	E_{ts}		-	6.9	-	
Turn-on delay time	$t_{d(on)}$	T_{vj} = 175 ℃ ; V_{CC} = 600 V, I_C = 75 A; V_{GE} = 0 / 15 V; R_g(on) = 5.1 Ω; R_g(off) = 5.1 Ω;	-	48	-	ns
Rise time	t_r		-	27	-	
Turn-off delay time	$t_{d(off)}$		-	262	-	
Fall time	t_f		-	170	-	
Turn-on energy	E_{on}		-	5.38	-	mJ
Turn-off energy	E_{off}		-	4.72	-	
Total switching energy	E_{ts}		-	10.1	-	

Table 7 Diode Recovery Characteristics

Parameters	Symbol	Conditions	Min	Typ	Max	Unit
Reverse recovery time	t_{rr}	T_{vj} = 25 ℃ ; V_R = 600 V, I_F = 75 A; R_g(on) = 5.1 Ω; R_g(off) = 5.1 Ω; di/dt = 2600 A/us;	-	366	-	ns
Reverse recovery charge	Q_{rr}		-	7.15	-	μC
Peak reverse recovery current	I_{rrm}		-	57	-	A
Reverse recovery energy	E_{rec}		-	3.10	-	mJ
Reverse recovery time	t_{rr}	T_{vj} = 175 ℃ ; V_R = 600 V, I_F = 75 A; R_g(on) = 5.1 Ω; R_g(off) = 5.1 Ω; di/dt = 2600 A/us;	-	511	-	ns
Reverse recovery charge	Q_{rr}		-	18.88	-	μC
Peak reverse recovery current	I_{rrm}		-	122	-	A
Reverse recovery energy	E_{rec}		-	8.44	-	mJ

Electrical Characteristics Diagrams

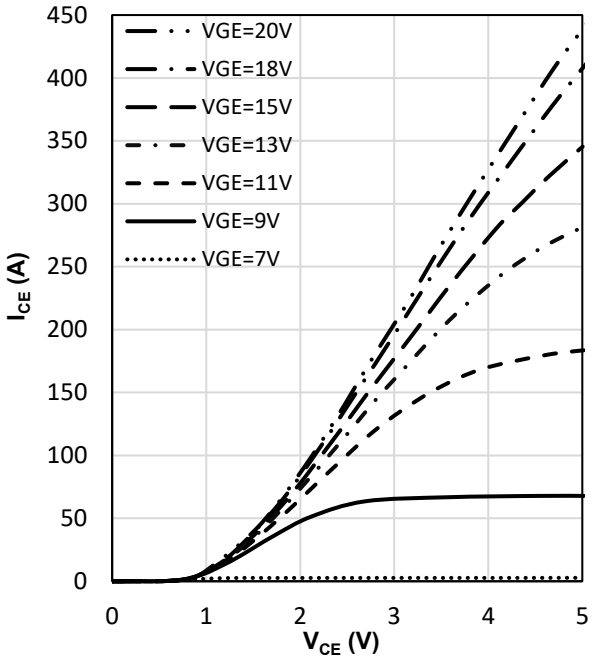


Fig.1 Typical Output Characteristics (25°C)

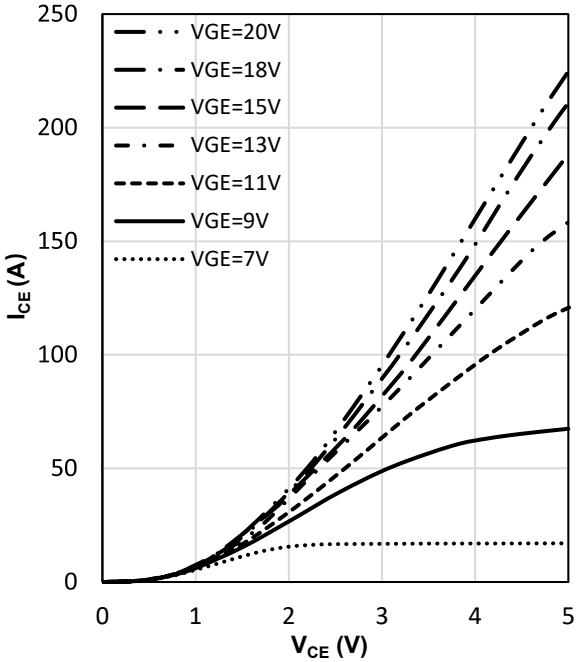


Fig.2 Typical Output Characteristics (175°C)

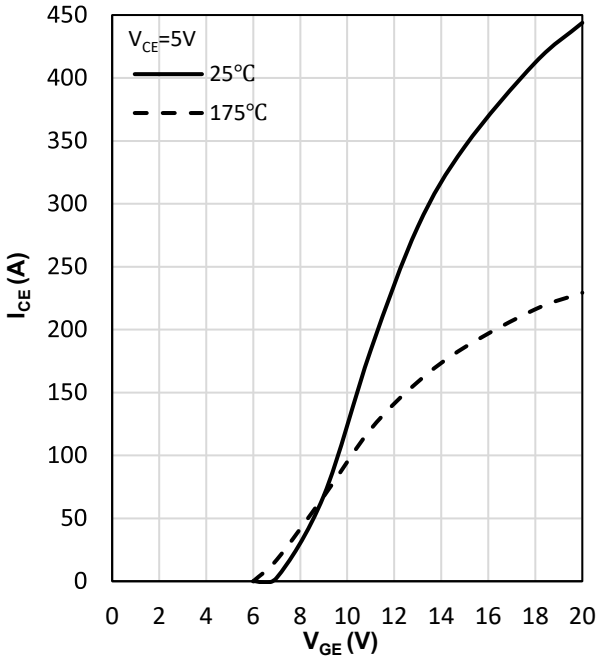


Fig.3 Typical Transfer Characteristics

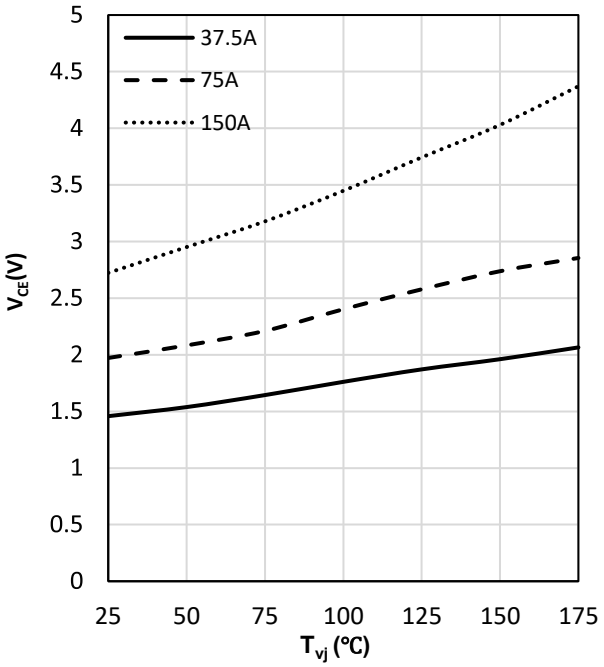


Fig.4 Typical Saturation Voltage

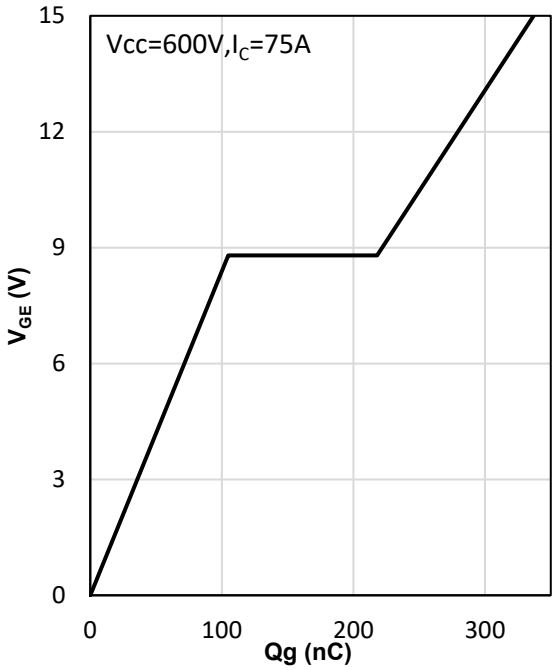


Fig.5 Gate Charge Characteristics

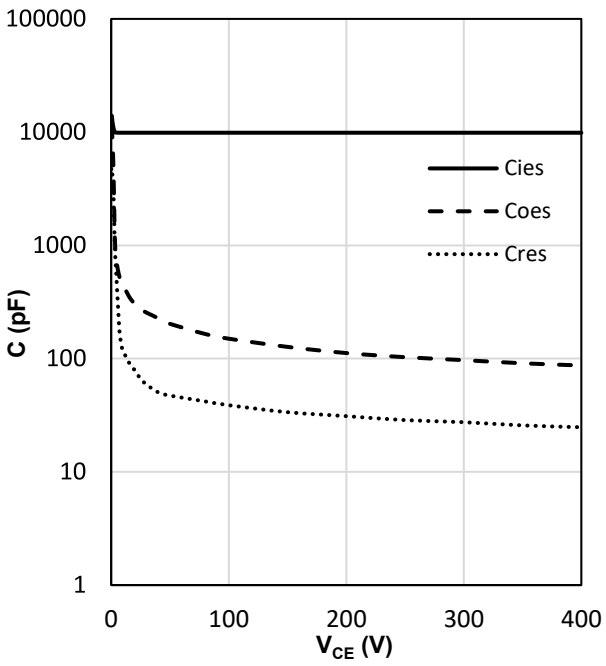


Fig.6 Typical Capacitance

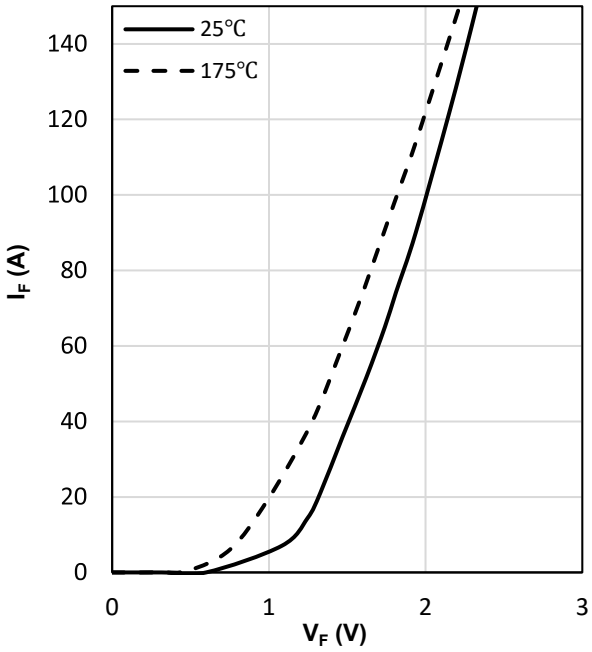


Fig.7 Typical Diode V_F vs. I_F Characteristic

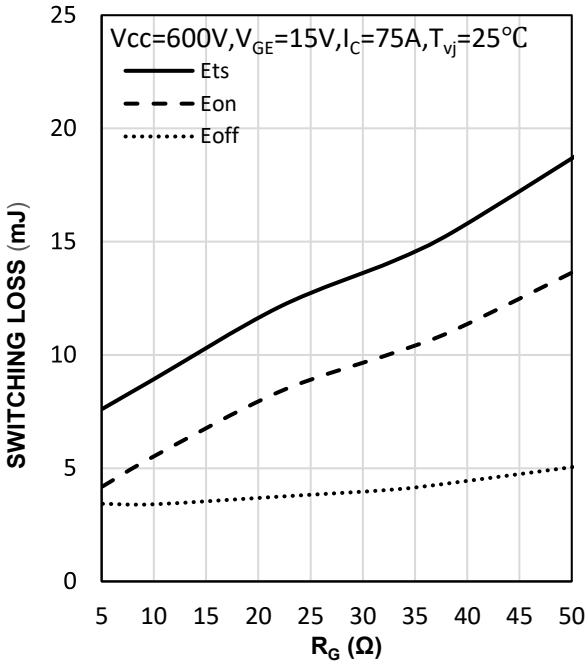


Fig.8 Switching Loss vs.Gate Resistance(25°C)

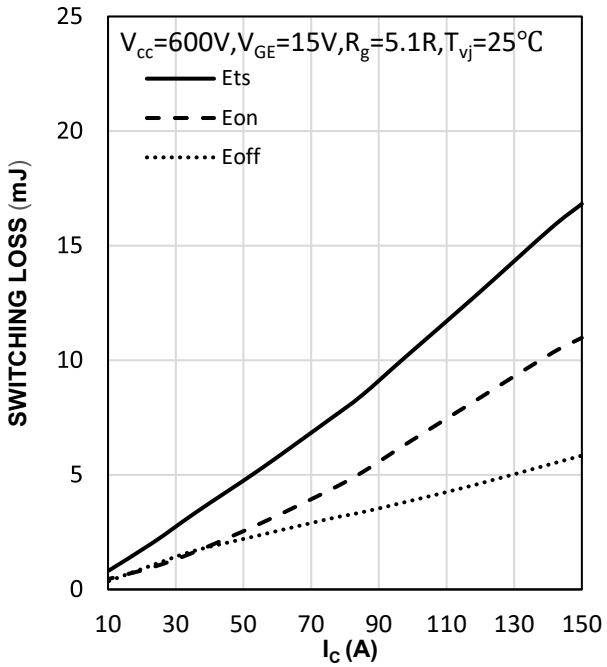


Fig.9 Switching Loss vs.Collector Current(25°C)

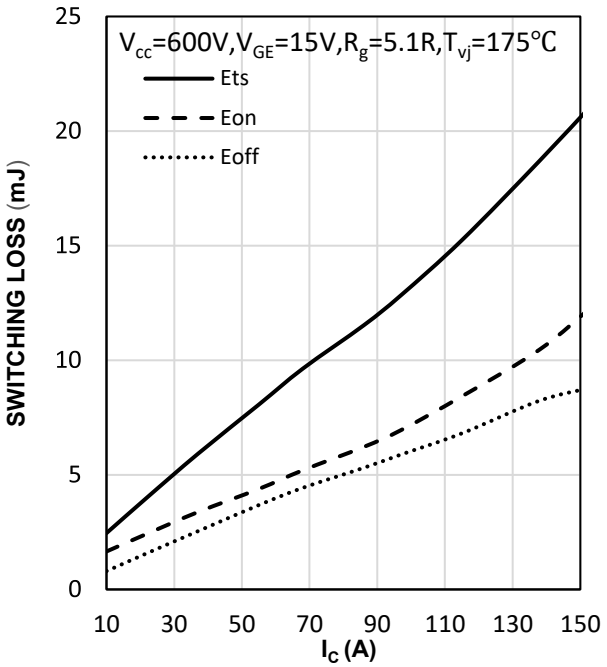


Fig.10 Switching Loss vs.Collector Current(175°C)

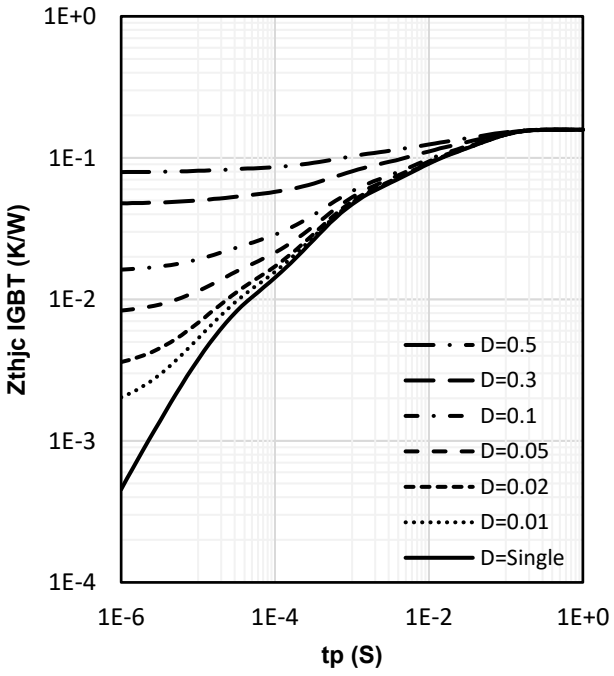


Fig.11 Thermal Characteristics (IGBT)

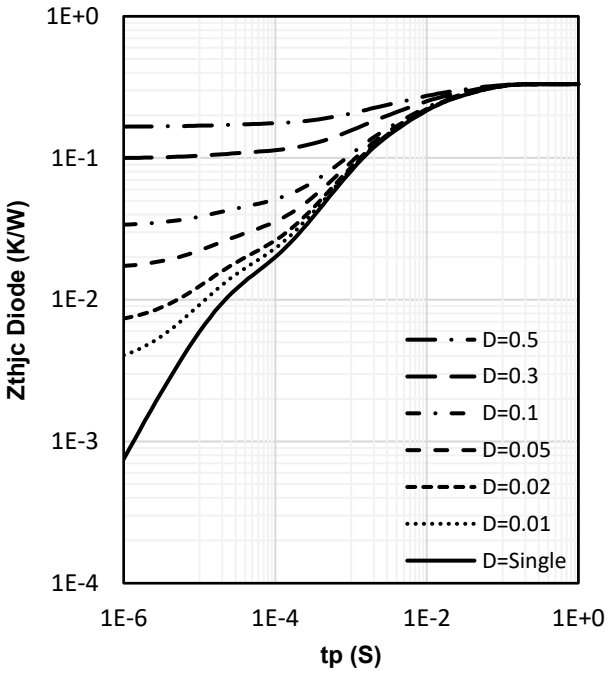
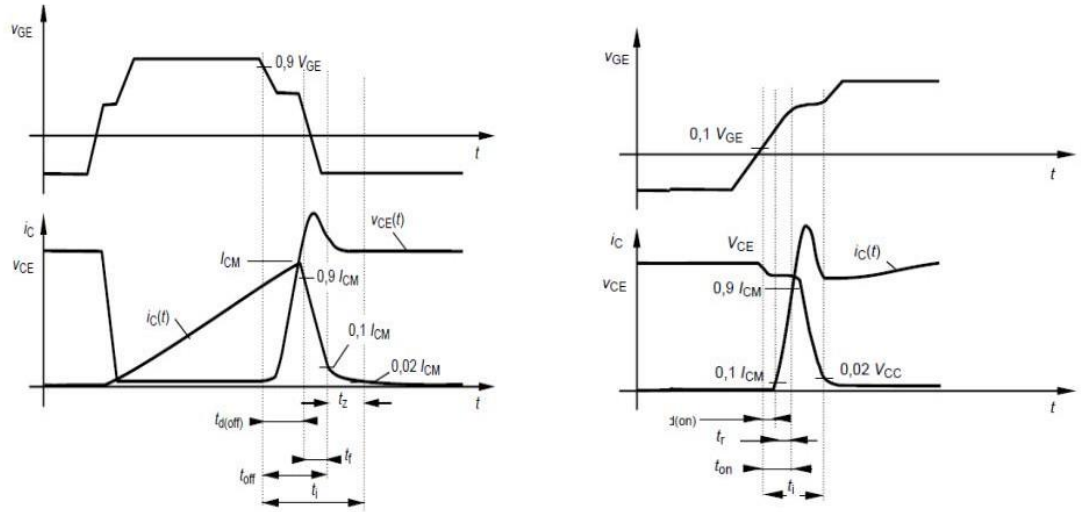
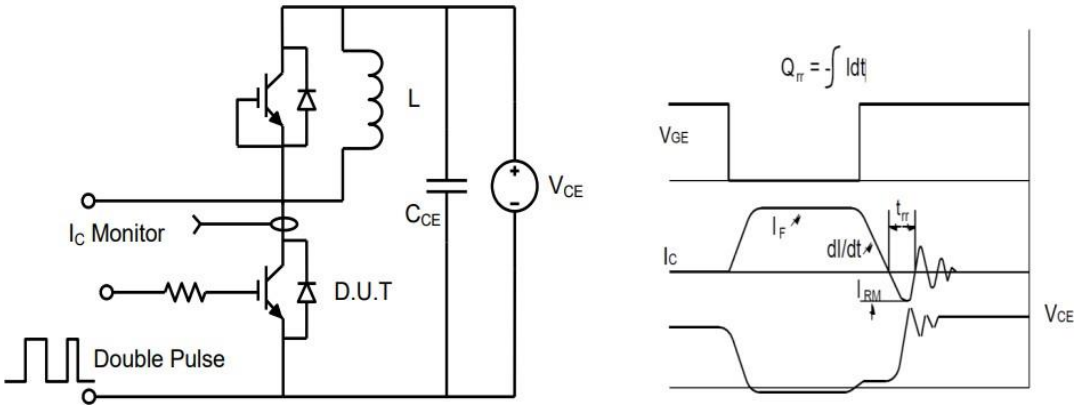


Fig.12 Thermal Characteristics (Diode)

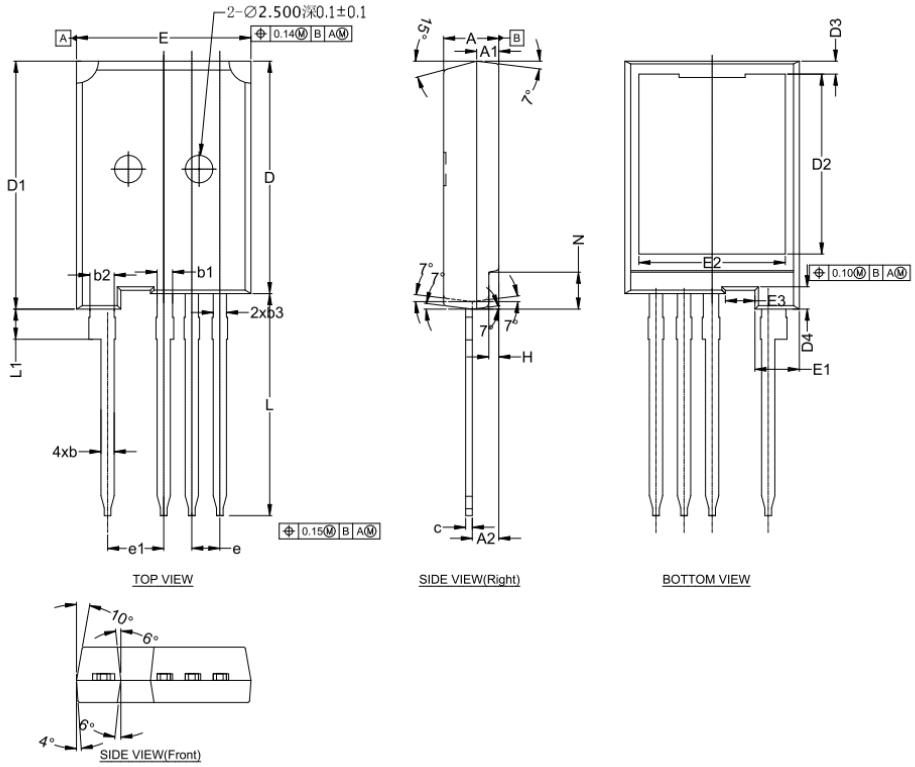
Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline



DIM / SYMBOL	MIN.	NOM.	MAX.
A	4.900	5.000	5.100
A1	1.940	2.040	2.140
A2	2.310	2.400	2.510
b	1.160	1.200	1.290
b1	1.360	1.400	1.490
b2	2.160	2.200	2.290
b3	1.160	1.200	1.390
c	0.590	0.600	0.700
D	20.900	21.000	21.100
D1	22.300	22.400	22.500
D2	15.950	16.250	16.550
D3	0.970	1.170	1.370
D4	1.900	2.000	2.100
E	15.700	15.800	15.900
E1	3.900	4.000	4.100
E2	13.100	13.259	13.500
E3	2.580	2.680	2.780
e	2.540 BSC.		
e1	5.080 BSC.		
L	19.800	20.000	20.100
L1	2.550	2.722	2.850
H	0.800	0.900	1.000
N	3.240	3.340	3.440

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5-1994
2. ALL DIMENSIONS ARE IN MILLIMETERS, ANGLES ARE IN DEGREE.
3. SURFACE ROUGHNESS:0.8-1.2

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