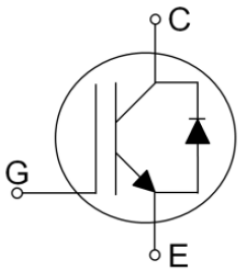
HM25N135FT

1350V /25A Trench Field Stop IGBT

H&M-Semi Field Stop Trench IGBTs offer low switching losses, high energy efficiency and high avalanche ruggedness for soft switching applications such as inductive heating, microwave oven, etc.

V_{CE}	**1350**	**V**
I_C	**25**	**A**
$V_{CE(SAT)}$ I_C=25A	**2.0**	**V**



FEATURES

- High breakdown voltage to 1350V for improved reliability
- Trench-Stop Technology offering :
  - High speed switching
  - High ruggedness, temperature stable
  - Low V_{CEsat}
  - Easy parallel switching capability due to positive temperature coefficient in V_{CEsat}
- Soft current turn-off waveforms
- Enhanced avalanche capability



APPLICATION

- Inductive cooking
- Inverterized microwave ovens
- Resonant converters
- Soft switching applications

Product	Package	Packaging
HM25N135FT	TO247	Tube

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-Emitter Breakdown Voltage	V_{CE}	1350	V
DC collector current, limited by T_{jmax} T_C = 25°C T_C = 100°C	I_C	50 25	A
Diode Forward current, limited by T_{jmax} T_C = 25°C T_C = 100°C	I_F	50 25	A
Continuous Gate-emitter voltage	V_{GE}	±20	V
Transient Gate-emitter voltage	V_{GE}	±30	V
Turn off safe operating area V_{CE} ≤1350V, T_j ≤ 150°C	-	75	A
Pulsed collector current, V_{GE}= 15V, t_p limited by T_{jmax}	I_{CM}	75	A
Power dissipation , Tj=25℃	Ptot	260	W
Operating junction temperature	T_j	-40...+150	°C
Storage temperature	T_s	-55...+150	°C
Soldering temperature, wave soldering 1.6mm (0.063in.) from case for 10s	-	260	°C

Thermal Resistance

Parameter	Symbol	Max. Value	Unit
IGBT thermal resistance, junction - case	R_{θ}(j-c)	0.48	K/W
Diode thermal resistance, junction - case	R_{θ}(j-c)	1.2	K/W
Thermal resistance, junction - ambient	R_{θ}(j-a)	40	K/W

Electrical Characteristics of the IGBT（T_j= 25℃ unless otherwise specified）：

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Static						
Collector-Emitter breakdown voltage	BV_{CES}	V_{GE}=0V , I_C=1mA	1350	1450	-	V
		V_{GE}=0V , I_C=10mA	1350	1450	-	V
Gate threshold voltage	$V_{GE(th)}$	V_{GE}=V_{CE}, I_C=250μA	5.1	5.8	6.4	V
Collector-Emitter Saturation voltage	$V_{CE(sat)}$	V_{GE}=15V, I_C=25A T_j = 25°C T_j = 150°C	 - -	 2.0 2.5	 2.5 -	V
Zero gate voltage collector current	I_{CES}	V_{CE} = 1350V, V_{GE} = 0V T_j = 25°C T_j = 150°C	 - -	 <1 -	 100 1000	μA
Gate-emitter leakage current	I_{GES}	V_{CE} = 0V, V_{GE} = ±20V	-	-	100	nA
Transconductance	g_{fs}	V_{CE}=20V, I_C=25A	-	13	-	S

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Dynamic						
Input capacitance	C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz	-	2500	-	pF
Output capacitance	C_{oes}		-	70	-	
Reverse transfer capacitance	C_{res}		-	50	-	
Gate charge	Q_G	V_{CC} = 640V, I_C = 25A, V_{GE} = 15V	-	135	-	nC

Switching Characteristic, Inductive Load

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Dynamic , at T_j = 25° C						
Turn-off delay time	$td_{(off)}$	V_{CC} = 600V, I_C = 25A, V_{GE} = 0/15V, R_g=10Ω	-	180	-	ns
Fall time	t_f		-	40	-	ns
Turn-off energy	E_{off}		-	0.32	-	mJ
Dynamic , at T_j = 150° C						
Turn-off delay time	$td_{(off)}$	V_{CC} = 600V, I_C = 25A, V_{GE} = 0/15V, R_g=10Ω	-	220	-	ns
Fall time	t_f		-	90	-	ns
Turn-off energy	E_{off}		-	0.65	-	mJ

Electrical Characteristics of the DIODE（T_j= 25℃ unless otherwise specified）

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Dynamic						
Diode Forward Voltage	V_{FM}	I_F = 25A	-	2.3	-	V
Reverse Recovery Time	T_{rr}	I_F= 25A, di/dt= 200A/μs	-	460	-	ns
Reverse Recovery Current	I_{rr}		-	17	-	A
Reverse Recovery Charge	Q_{rr}		-	3600	-	nC

Fig. 1 FBSOA characteristics

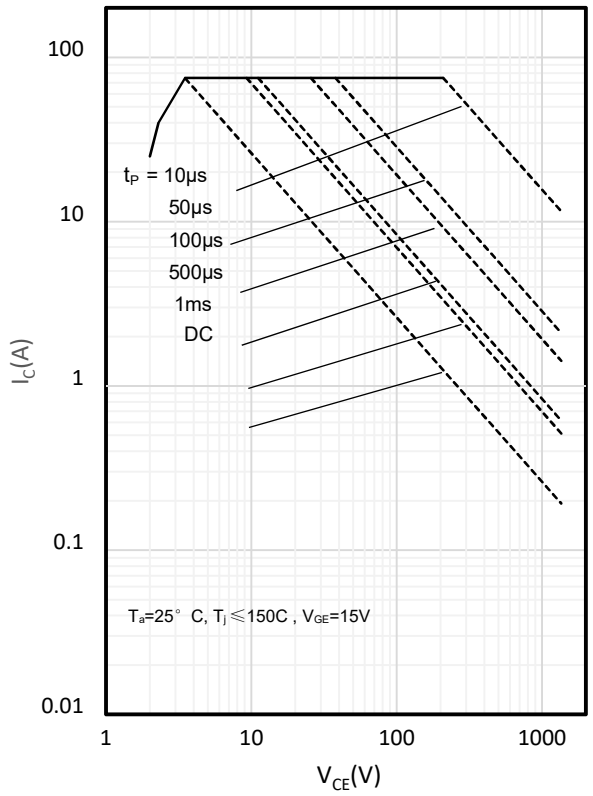


Fig. 2 Load Current vs. Frequency

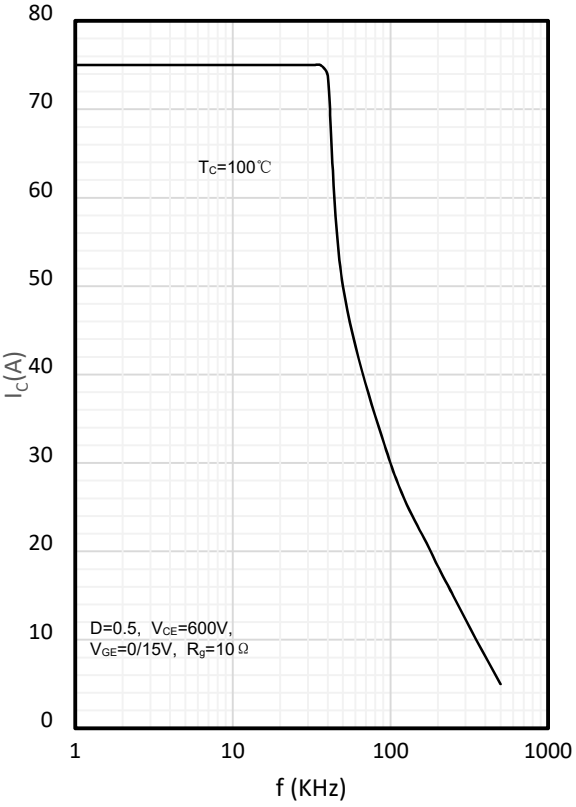


Fig. 3 Output characteristics

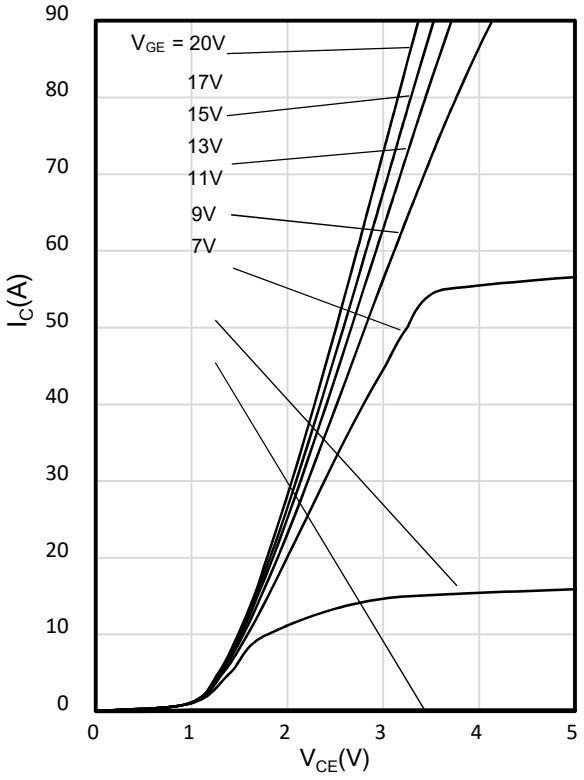


Fig. 4 Saturation voltage characteristics

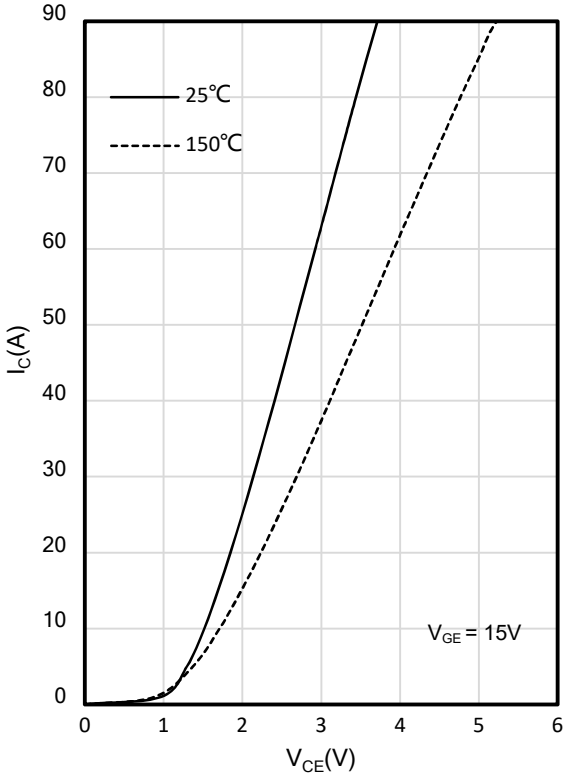


Fig. 5 Typical Saturation Voltage vs.Junction Temperature

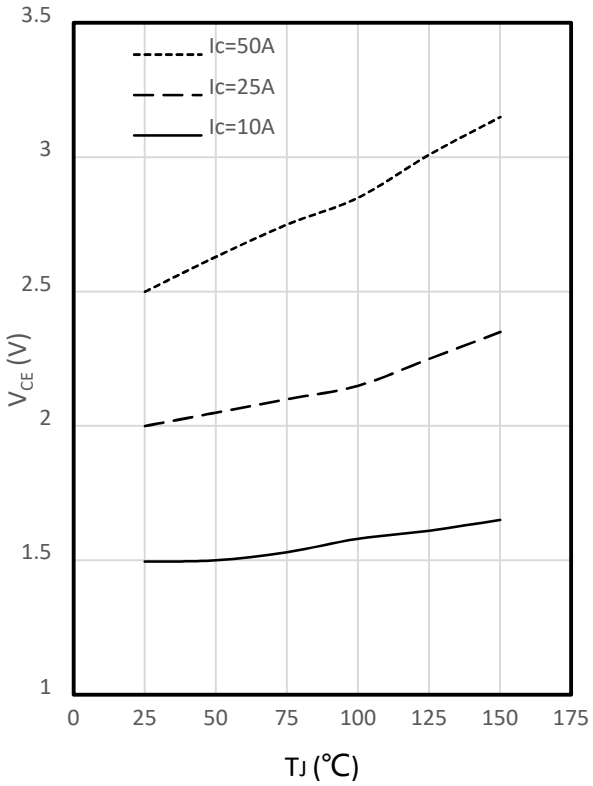


Fig. 6 Power dissipation as a function of T_C

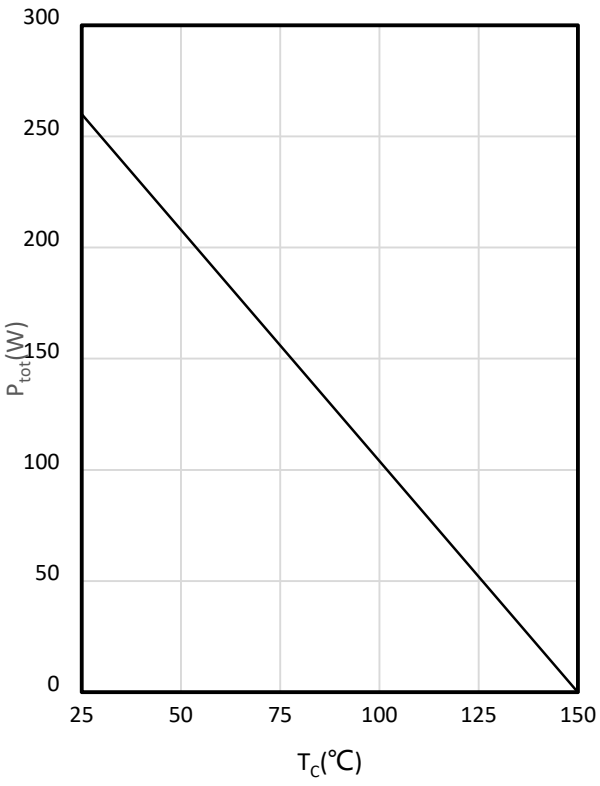


Fig. 7 collector current as a function of T_C

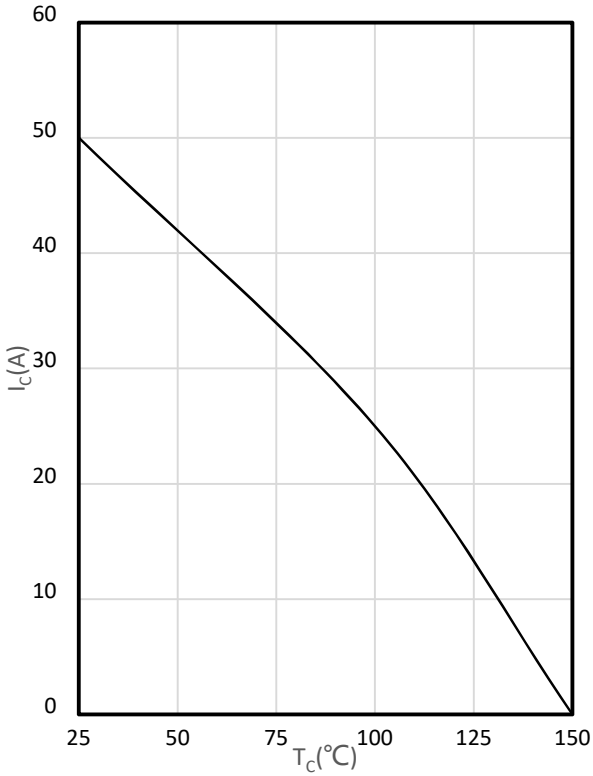


Fig. 8 Turn-off time vs. gate resistor

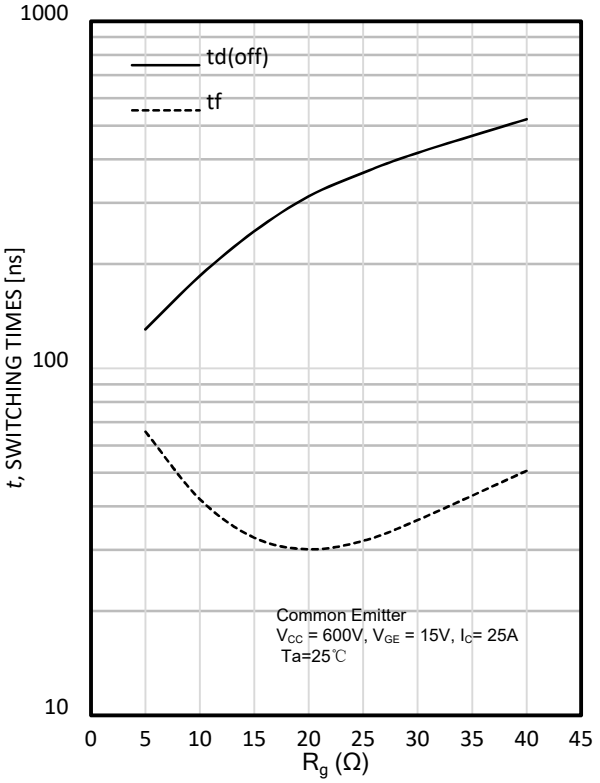


Fig. 9 Switching loss vs. gate resistor

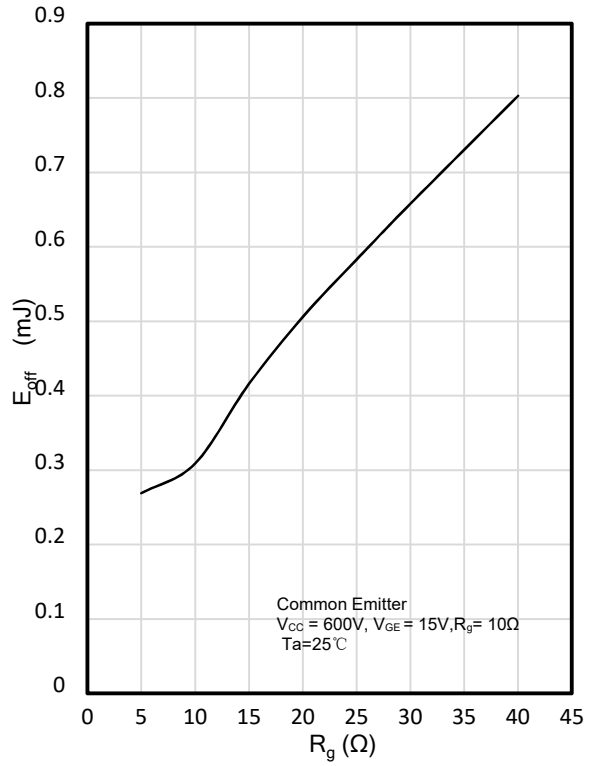


Fig. 10 Turn-off time vs. collector current

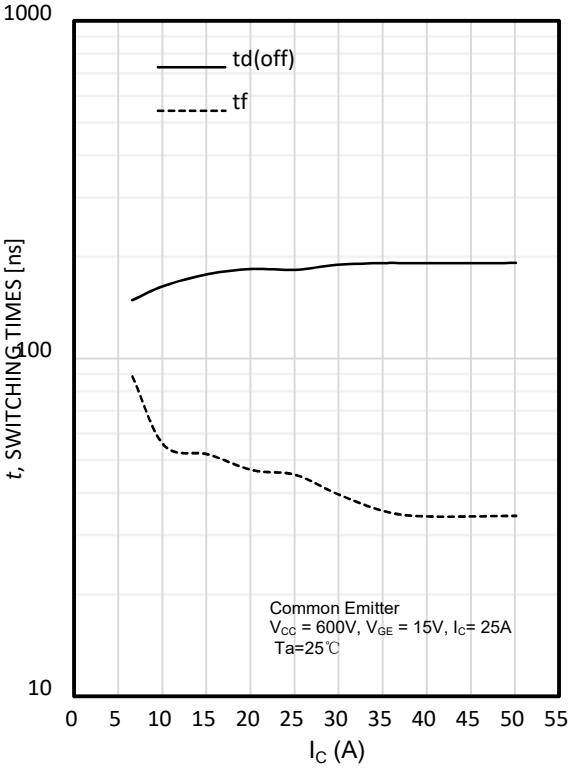


Fig. 11 Switching loss vs. collector current

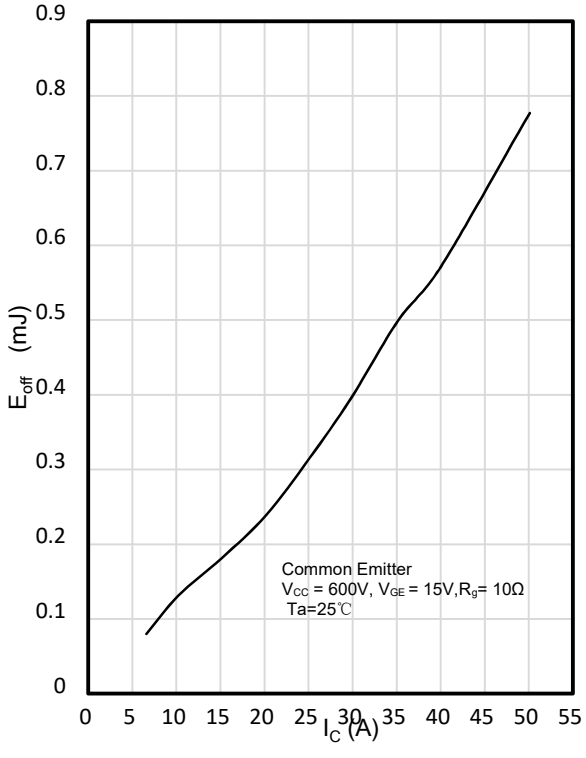


Fig. 12 Gate charge characteristics

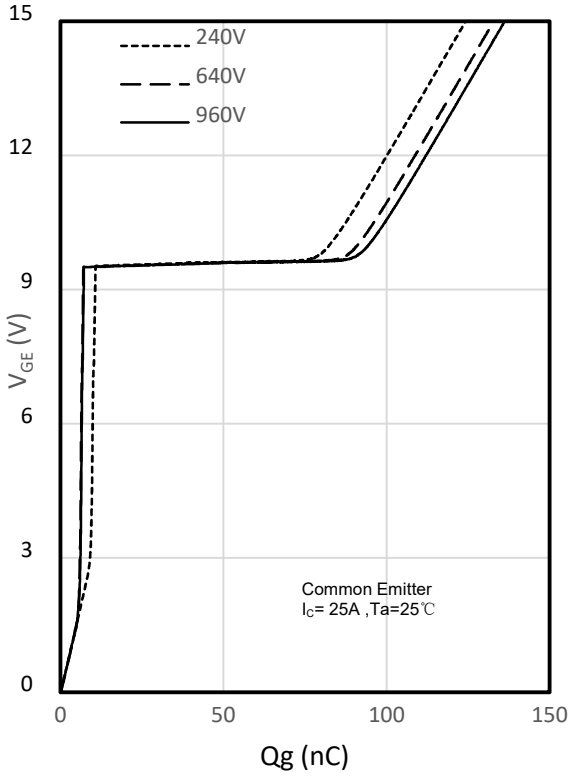


Fig. 13 Capacitance characteristics

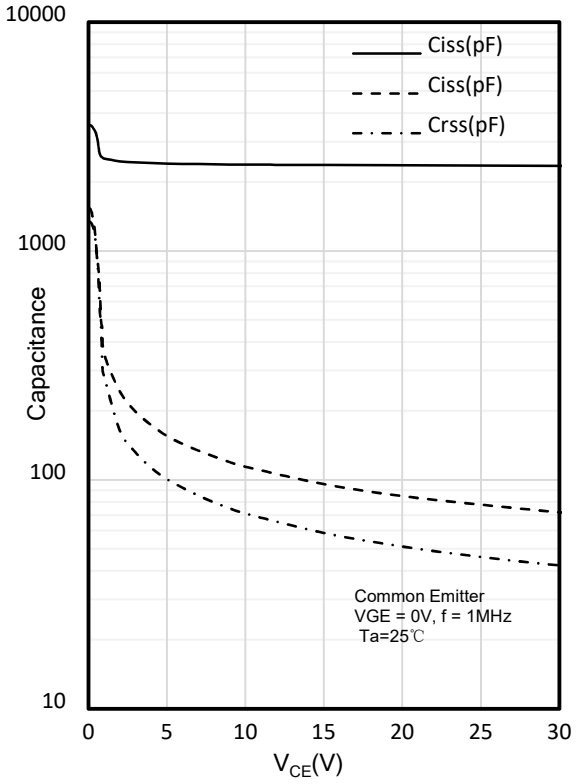


Fig. 14 Typical Diode Forward Characteristics

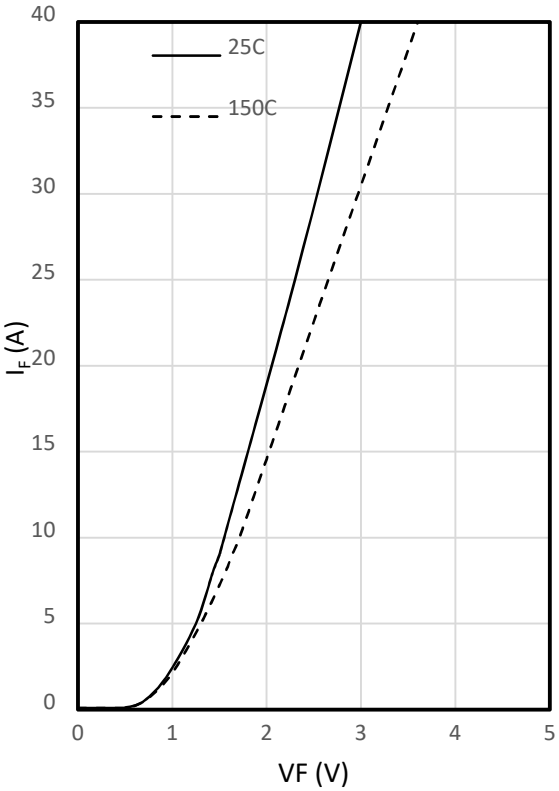
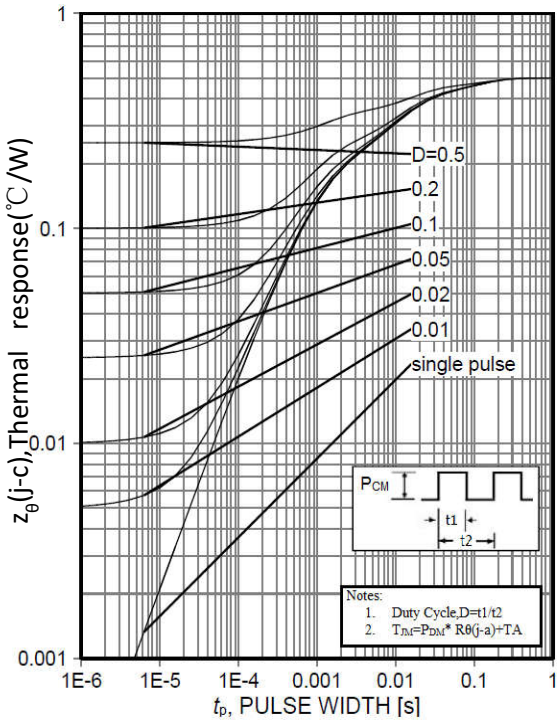
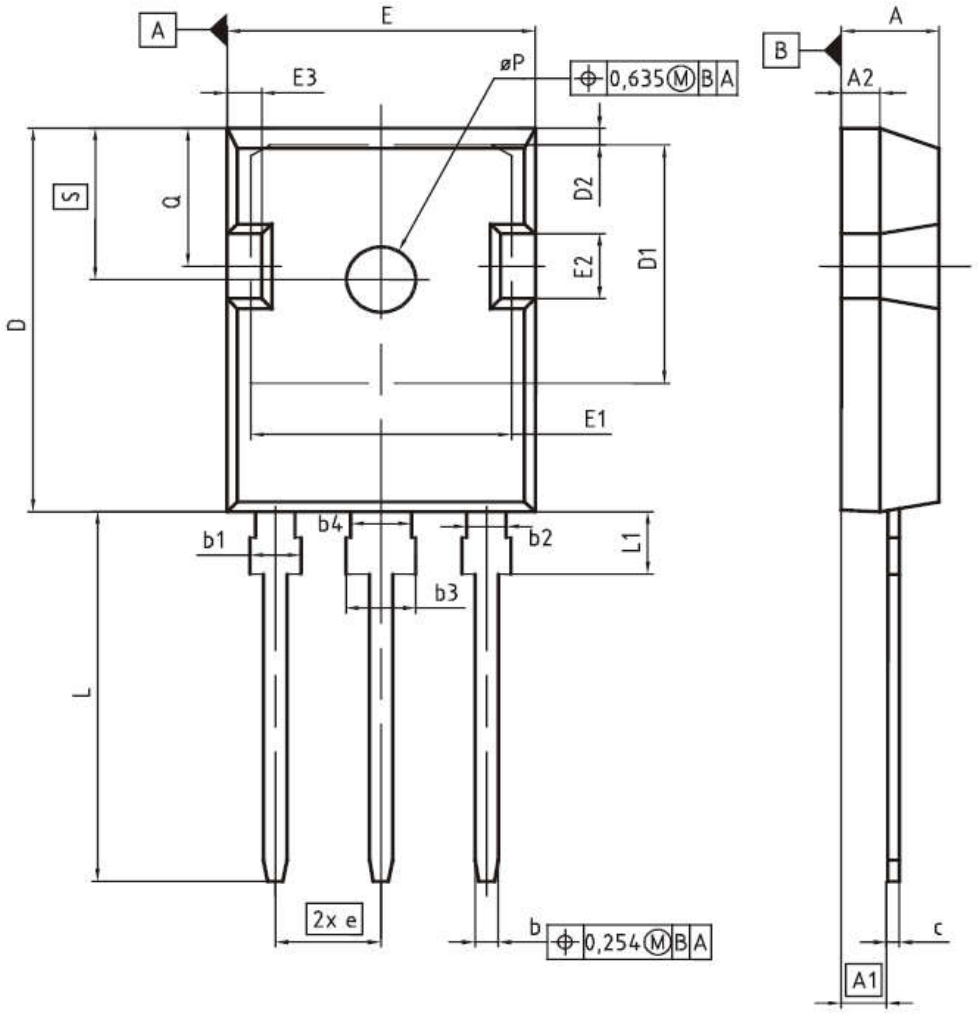


Fig. 15 IGBT Transient Thermal Impedance



PG-TO247-3



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.83	5.21	0.190	0.205
A1	2.27	2.54	0.089	0.100
A2	1.85	2.16	0.073	0.085
b	1.07	1.33	0.042	0.052
b1	1.90	2.41	0.075	0.095
b2	1.90	2.16	0.075	0.085
b3	2.87	3.38	0.113	0.133
b4	2.87	3.13	0.113	0.123
c	0.55	0.68	0.022	0.027
D	20.80	21.10	0.819	0.831
D1	16.25	17.65	0.640	0.695
D2	0.95	1.35	0.037	0.053
E	15.70	16.13	0.618	0.635
E1	13.10	14.15	0.516	0.557
E2	3.68	5.10	0.145	0.201
E3	1.00	2.60	0.039	0.102
e	5.44 (BSC)		0.214 (BSC)	
N	3		3	
L	19.80	20.32	0.780	0.800
L1	4.10	4.47	0.161	0.176
øP	3.50	3.70	0.138	0.146
Q	5.49	6.00	0.216	0.236
S	6.04	6.30	0.238	0.248