LGM400HF65S4T1A

650V/400A 2 in one-package

FEATURES

Preliminary Data
VCES = 650V
IC nom = 400A / ICRM = 800A

- V_{CEsat} with positive temperature coefficient
- Low Vcesat
- Low switching losses
- Low inductance case
- Isolated copper baseplate using DBC technology

APPLICATION

- Welding Machine
- UPS
- Motor Drives

Equivalent Circuit Schematic

IGBT, Inverter

Maximum Rated Values

Collector-emitter voltage	Tvj = 25 ℃	V_{CES}	650	V
Continuous DC collector current	Tc = 70 ℃, Tvj max = 175 ℃	I_C	400	A
Repetitive peak collector current	t_P = 1 ms	I_{CRM}	800	A
Total power dissipation	TC = 25 ℃, Tvj max = 175 ℃	P_{tot}	1154	W
Gate-emitter peak voltage		V_{GES}	±20	V

Characteristic Values

Collector-emitter saturation voltage	I_C = 400A, V_{GE} = 15 V Tvj = 25 ℃	V_{CEsat}		1.55		V
Gate threshold voltage	I_C = 1.5 mA, V_{CE} = V_{GE} Tvj = 25 ℃	V_{GEth}		5.8		V
Gate charge	V_{GE} = -15 / 15 V	Q_G		4.2		µC
Input capacitance	f = 1 MHz, Tvj = 25 ℃, V_{CE} = 25 V, V_{GE} = 0 V	C_{ies}		24		nF
Reverse transfer capacitance		C_{res}		0.81		nF
Collector-emitter cut-off current	V_{CE} = 1200 V, V_{GE} = 0 V, Tvj = 25 ℃	I_{CES}			1.0	mA
Gate-emitter leakage current	V_{CE} = 0 V, V_{GE} = 20 V, Tvj = 25 ℃	I_{GES}			400	nA
Turn-on delay time, inductive load	I_C = 400A, V_{CE} = 300 V V_{GE} = -15 / 15 V RG = 22Ω Di/dt on =1000A/us Dv/dt off =2900A/us Tvj = 25 ℃	$t_{d\ on}$		0.58		µs
Rise time, inductive load		t_r		0.35		µs
Turn-off delay time, inductive load		$t_{d\ off}$		1.17		µs
Fall time, inductive load		t_f		0.13		µs
Turn-on energy loss per pulse		E_{on}		20.55		mJ
Turn-off energy loss per pulse		E_{off}		26.8		mJ
Thermal resistance, junction to case	per IGBT	RthJC			0.13	K/W
Thermal resistance, case to heatsink	per IGBT λ_{Paste}=1 W/(m·K) /λ_{grease}=1 W/(m K)	RthCH		0.03		K/W
Temperature under switching conditions		T474.94				

Diode, Inverter
Maximum Rated Values

Repetitive peak reverse voltage	Tvj = 25 ℃	V_{RRM}	650	V
Continuous DC forward current		I_F	400	A
Repetitive peak forward current	t_P = 1 ms	I_{FRM}	800	A

Characteristic Values

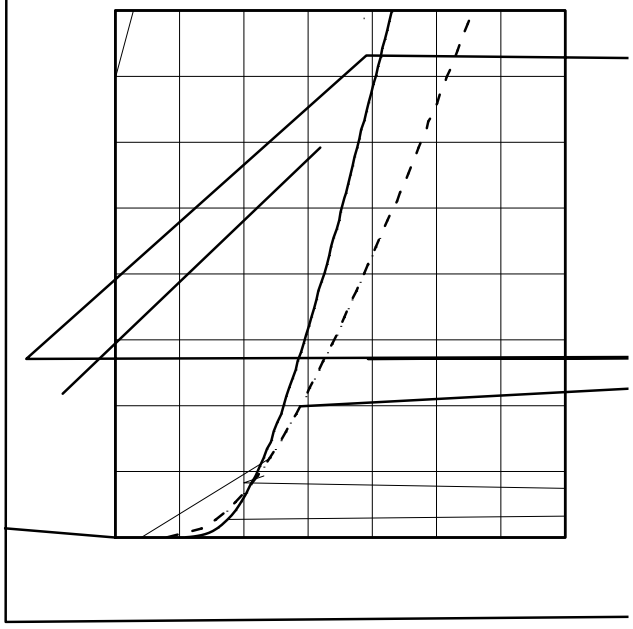
Forward voltage	I_F = 400 A, V_{GE} = 0 V Tvj = 25 ℃	V_F		1.76		V
Peak reverse recovery current	I_F = 400 A, V_R = 300 V, VGE = -15 V RG = 22Ω Tvj = 25 ℃	I_{RR}		107		A
Recovered charge		Q_{RR}		7		µC
Reverse recovery energy		E_{rec}		1.01		mJ
Thermal resistance, junction to case	per diode	R_{thJC}			0.2	K/W
Thermal resistance, case to heatsink	per diode I_{Paste} = 1 W/(m K) / I_{grease} = 1 W/(m K)	R_{thCH}		0.06		K/W
Temperature under switching conditions		$T_{vj\ op}$	-40		150	℃

Module
Maximum Rated Values

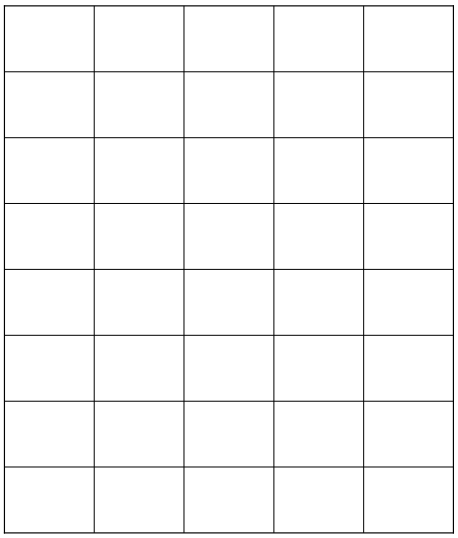
Isolation test voltage	RMS, f = 50 Hz, t = 1 min.	V_{ISOL}	2.5	kV

Internal isolation

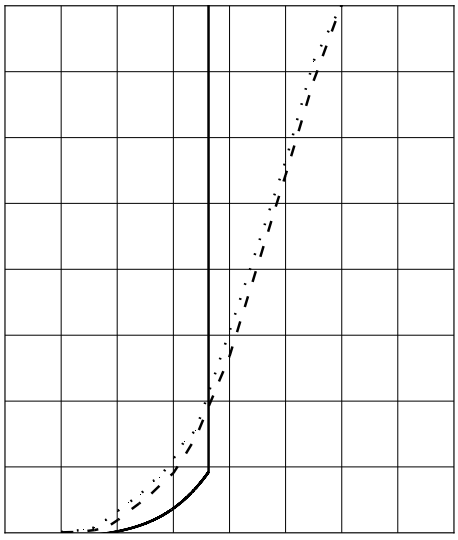
$I_C=f(V_{CE})$
$V_{GE}=15V$



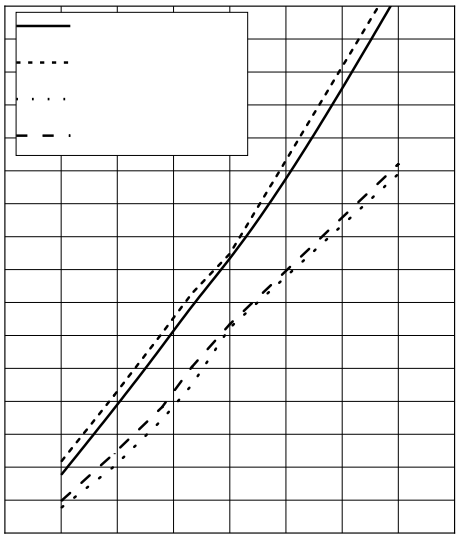
$I_C=f(V_{CE})$
$T_J=150$



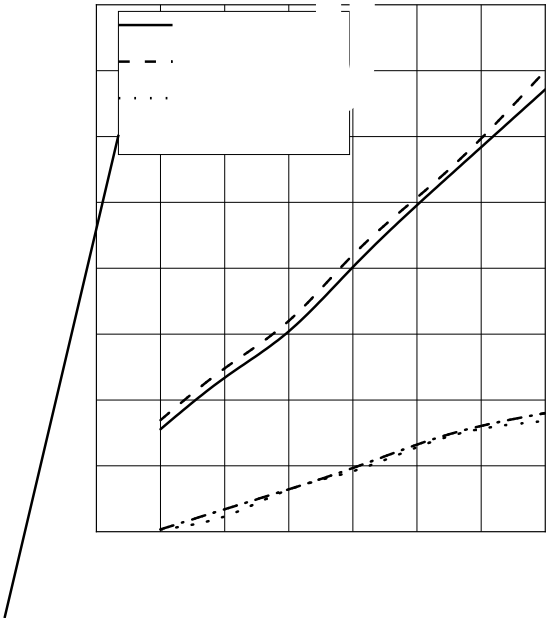
$I_C=f(V_{CE})$
$V_{GE}=20V$



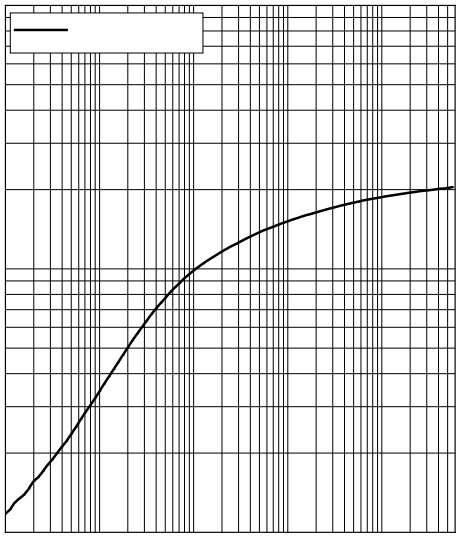
$E_{on}=f(I_C)$, $E_{off}=f(I_C)$
$V_{GE}=\pm15V, R_{Gon}=20\Omega, R_{Goff}=20\Omega, V_{CE}=400V$



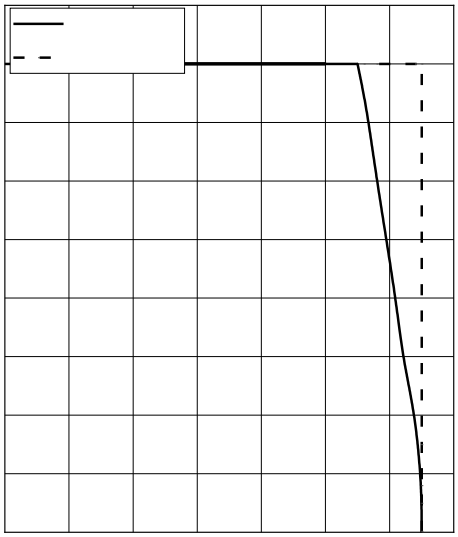
$E_{on}=f(R_G)$, $E_{off}=f(R_G)$
$V_{GE}=\pm15V, I_C=400A,$



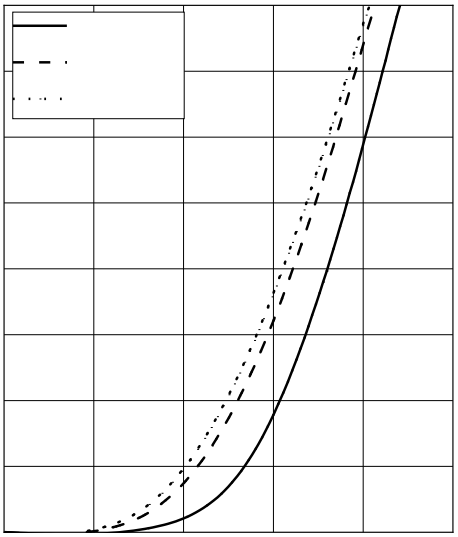
$Z_{thJC}=f(t)$



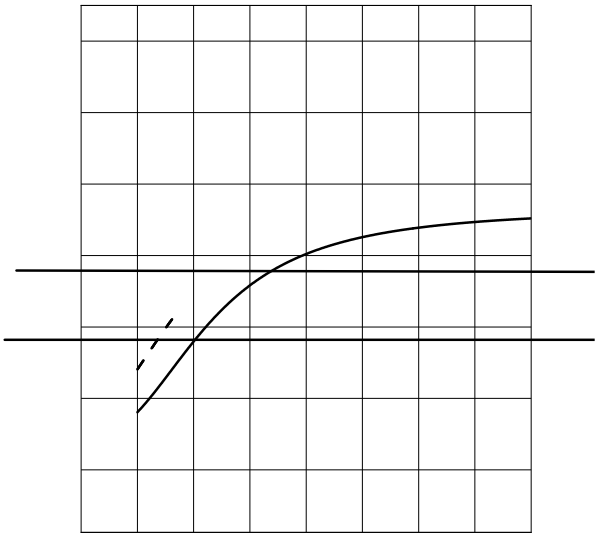
$I_C=f(V_{CE})$,
$V_{GE}=\pm15V, R_{Goff}=20\Omega, T_J=150$



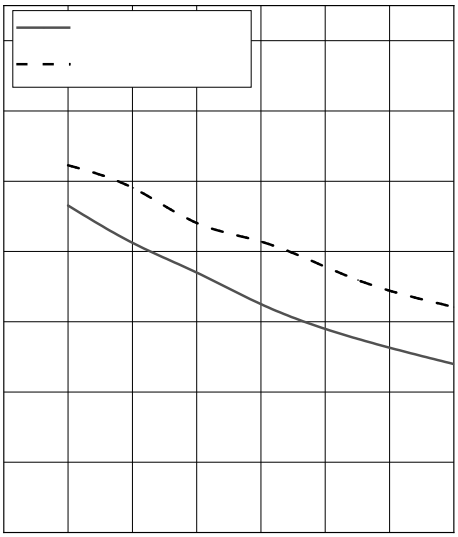
$I_F=f(V_F)$



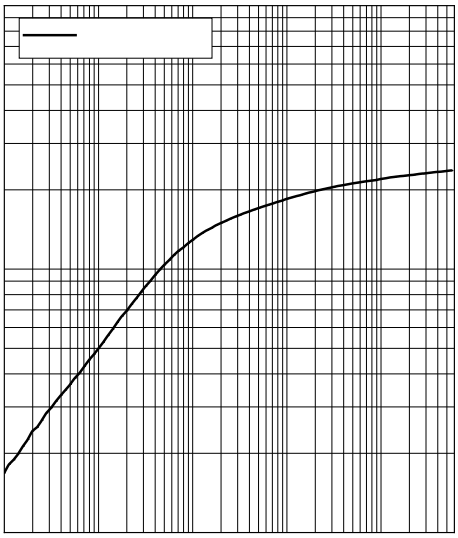
$E_{rec}=f(I_F)$
$R_{Gon}=20\Omega, V_{CE}=400V$



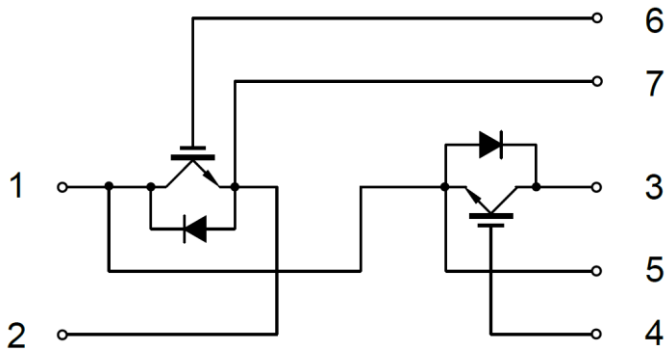
$E_{rec}=f(R_G)$
$I_F=400A, V_{CE}=400V$



$Z_{thJC}=f(t)$



Circuit diagram



Package outlines (mm)