MSLB50N065J2H

650V 50A IGBT

Applications

- Inverter
- Welding converters
- Power Factor Correction（PFC）
- Uninterruptible Power Supply（UPS）
- Converters with high switching frequency

Product Summary

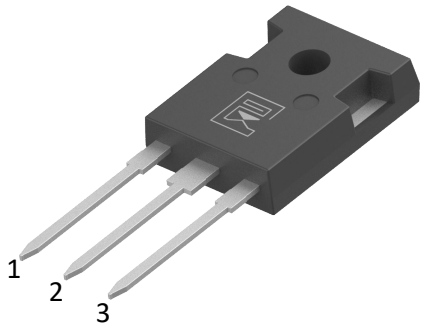
V_{CES}	650	V
I_C	50	A
$V_{CE(sat),Typ}$@15V	1.8	V

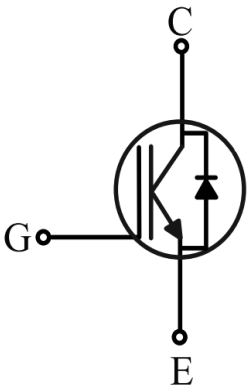
Features

- Low $V_{CE(sat)}$
- High speed switching
- Short circuit withstand time – 3uS
- High ruggedness, temperature stable
- Positive temperature coefficient in $V_{CE(sat)}$
- Enhanced avalanche capability

RoHS Pb Lead-free HF

TO-247L





Gate：1

Collector：2

Emitter：3

Package Marking and Ordering Information

Ordering code	Marking	Package	Packaging	Min. package quantity
MSLB50N065J2H	MSLB50N065J2H	TO-247L	Tube	450

Absolute Maximum Ratings（Tc=25℃ unless otherwise noted)

Parameter	Symbol	Ratings	Unit
Collector-emitter Voltage	V_{CES}	650	V
DC collector current，limited by T_{jmax} TC=25℃ TC=100℃	I_C	 80 50	A
Pulsed collector current，tp limited by T_{jmax}	$I_{C\ Pulse}$	150	A
Diode forward current，limited by T_{jmax} TC=25℃ TC=100℃	I_F	 80 50	A
Diode Pulsed current，tp limited by T_{jmax}	$I_{F\ Pulse}$	140	A
Continuous Gate-emitter voltage	V_{GE}	±20	V
Short circuit withstand time V_{GE}=15V,V_{CC}≤400V，T_j≤150℃	t_{SC}	3	μs
Power Dissipation （TC=25℃）	P_D	272	W
Junction Temperature	T_j	175	℃
Storage Temperature	T_{STG}	-55-150	℃

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Thermal Characteristics

Parameter	Symbol	Max	Unit
IGBT Maximum Junction-to-Case	$R_{\theta JC}$	0.55	℃/W
Diode Maximum Junction-to-Case	$R_{\theta JC}$	0.85	℃/W
Maximum Junction-to-Ambient	$R_{\theta JA}$	40	℃/W

Note：This transistor is sensitive to electrostatic discharge and should be handled with care.

Electrical Characteristics（Tc=25℃ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Collector-emitter Breakdown Voltage	BV_{CES}	V_{GE}=0V,I_C=200uA	650	-	-	V
Zero gate voltage collector current	I_{CES}	V_{CE}=650V,V_{GE}=0V	-	-	5	uA
Gate-emitter leakage current	I_{GES}	V_{GE}=±20V,V_{CE}=0V	-	-	±100	nA
Gate-emitter threshold voltage	$V_{GE(TH)}$	V_{CE}=V_{GE},I_C=250uA	4.0	4.7	6.0	V
Collector-emitter saturation voltage	$V_{CE(sat)}$	V_{GE}=15V,I_C=50A	-	1.8	2.1	V
		Tj=150°C	-	2.4	-	V
Diode forward voltage	V_F	I_F=50A	-	1.5	1.8	V
		Tj=150°C	-	1.2	-	V
Dynamic Characteristics						
Input Capacitance	C_{ies}	V_{CE}=25V,V_{GE}=0V, f=1.0MHz	-	2750	-	pF
Output Capacitance	C_{oes}		-	180	-	pF
Reverse Transfer Capacitance	C_{res}		-	63	-	pF
Integrated gate resistor	R_{Gint}		-	3.7	-	Ω
Total Gate Charge	Q_g	V_{CC}=400V,I_C=50A, V_{GE}=15V	-	105	-	nC
Gate−to−emitter charge	Q_{ge}		-	15	-	nC
Gate−to−collector charge	Q_{gc}		-	45	-	nC
Internal emitter inductance measured 5mm (0.197 in.) from case	L_E		-	13	-	nH

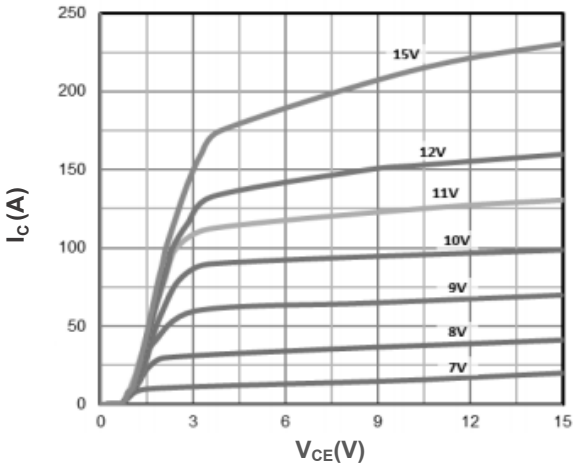
Switching Characteristic, Inductive Load, at T_j=25℃

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
IGBT Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	V_{CC}= 400V I_C= 50A V_{GE}= 15V R_G= 8.2Ω Inductive load	-	24	-	ns
Turn-On Rise Time	t_r		-	28	-	ns
Turn-Off Delay Time	$t_{d(off)}$		-	117	-	ns
Turn-Off Fall Time	t_f		-	32	-	ns
Turn-on energy	E_{on}		-	1.05	-	mJ
Turn-off energy	E_{off}		-	0.45	-	mJ
Diode Characteristics						
Reverse Recovery Time	t_{rr}	V_R=400V,I_F=20A, di/dt=200A/us	-	75	-	ns
Reverse Recovery Charge	Q_{rr}		-	0.23	-	uC
Peak Reverse Recovery Current	I_{rrm}		-	6	-	A

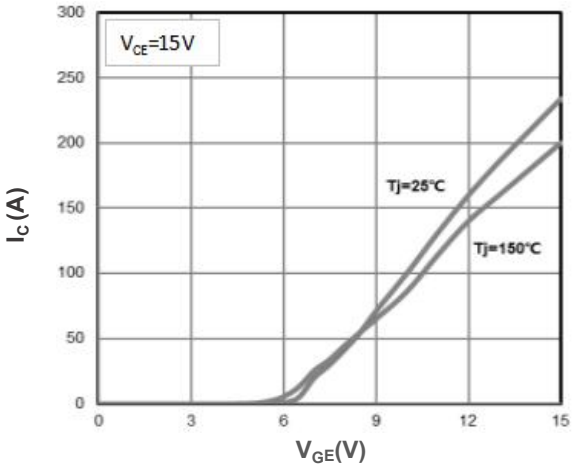
Switching Characteristic, Inductive Load, at T_j=150℃

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
IGBT Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	V_{CC}= 400V I_C= 50A V_{GE}= 15V R_G= 8.2Ω Inductive load	-	24	-	ns
Turn-On Rise Time	t_r		-	30	-	ns
Turn-Off Delay Time	$t_{d(off)}$		-	125	-	ns
Turn-Off Fall Time	t_f		-	37	-	ns
Turn-on energy	E_{on}		-	1.21	-	mJ
Turn-off energy	E_{off}		-	0.55	-	mJ
Diode Characteristics						
Reverse Recovery Time	t_{rr}	V_R=400V,I_F=20A, di/dt=200A/us	-	100	-	ns
Reverse Recovery Charge	Q_{rr}		-	0.6	-	uC
Peak Reverse Recovery Current	I_{rrm}		-	12	-	A

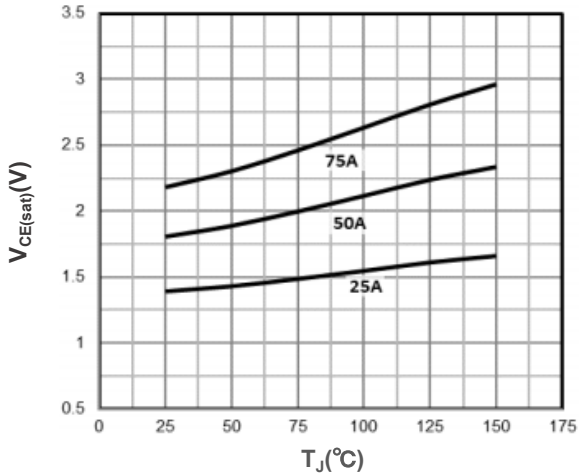
Characteristics Curves



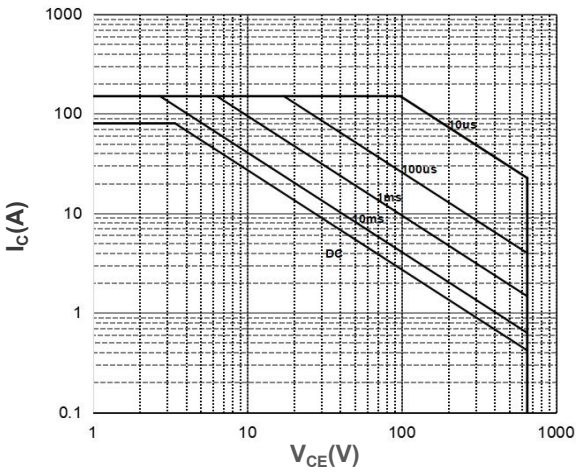
Output Characteritsics



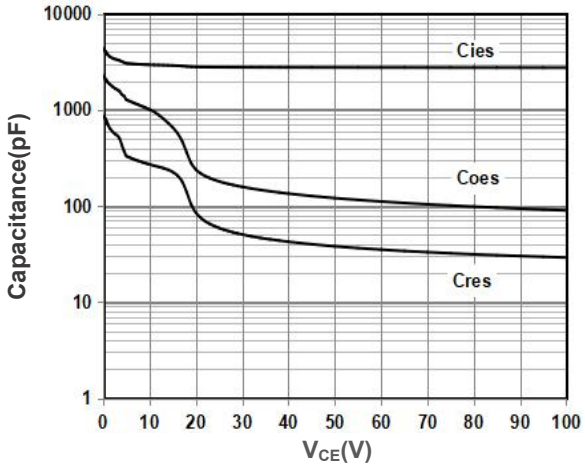
Transfer Characteritsics



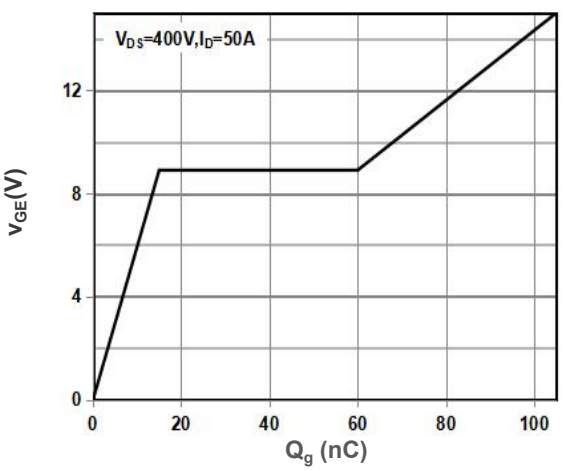
"Typical collector-emitter saturation voltage as a function of junction temperature " (VGE=15V)



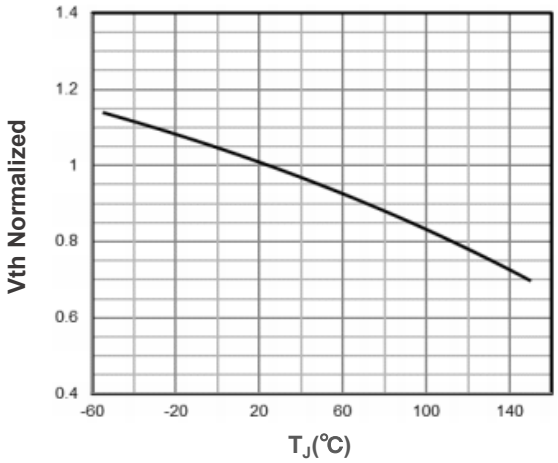
Maximum Safe Operating Area(Ta=25℃)



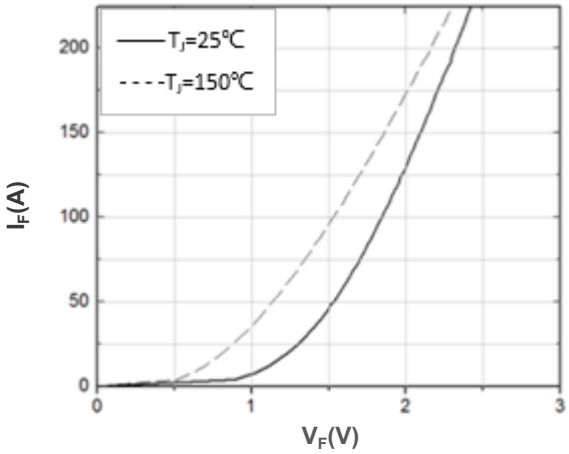
Capacitance



Typical gate charge



Gate-emitter threshold voltage as a function of junction temperature



Typ. diode forward current as a function of forward voltage

Note： The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

TO-247L Package Dimensions

Unit：mm

Symbol	Min	Nom	Max	Symbol	Min	Nom	Max
A1	2.20	2.40	2.60	E2	5.00		5.50
A2	1.85		2.15	E3	1.90		2.60
b	1.07		1.33	e		5.44	
b2	1.90		2.16	L	19.30		19.90
b4	2.90		3.20	L1	3.95	4.15	4.35
c	0.52		0.68	ΦP	3.40		3.80
D	20.70	20.80	21.30	ΦP1	7.00		7.40
D1	16.15		16.95	S	6.04	6.15	6.30
E	15.50	15.60	16.10