650V 75A IGBT

■ Applications

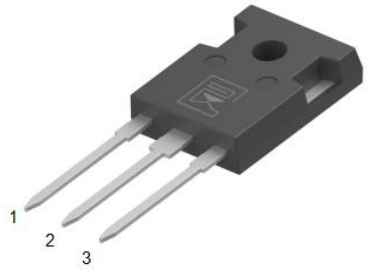
- Industrial UPS
- Industrial SMPS
- Solar converters
- Energy Storage
- Mid to high range switching frequency converters

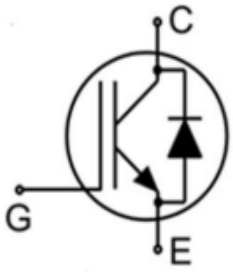
■ Features

- Low switching power loss
- Low switching surge and noise
- Advanced Fieldstop technology
- Short circuit withstand time –10uS
- Maximum junction temperature 150°C
- Qualified according to JEDEC for target applications
- RoHS and Halogen-Free Compliant

■ Product Summary

V_{CES}	650	V
I_C	75	A
$V_{CE(sat),Typ}$@15V	1.6	V





Gate： 1

Collector： 2

Emitter： 3

TO-247L

Marking	Package	Packaging	Min. package quantity
MSLB75N065T3H	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	150 75	A
Pulsed collector current，tp limited by T_{jmax}	$I_{C\ Pulse}$	300	A
Diode forward current，limited by T_{jmax} TC=25℃ TC=100℃	I_F	150 75	A
Diode Pulsed current，tp limited by T_{jmax}	$I_{F\ Pulse}$	280	A
Continuous Gate-emitter voltage	V_{GE}	±20	V
Short circuit withstand time V_{GE}=15V,V_{CC}≤300V，T_j≤150℃	t_{SC}	10	μs
Power Dissipation （TC=25℃）	P_D	416	W
Junction Temperature	T_j	150	℃
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	$R_{\theta JC}$	0.3	℃/W
Diode Maximum Junction-to-Case	$R_{\theta JC}$	0.4	℃/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						
Drain-Source Breakdown Voltage	BV_{CES}	V_{GE}=0V,I_C=250uA	650	-	-	V
Zero gate voltage collector current	I_{CES}	V_{CE}=650V,V_{GE}=0V	-	-	100	uA
Gate-emitter leakage current	I_{GES}	V_{GE}=±20V,V_{CE}=0V	-	-	±400	nA
Gate-emitter threshold voltage	$V_{GE(TH)}$	V_{CE}=V_{GE},I_C=250uA	4	5.2	6	V
Collector-emitter saturation voltage	$V_{CE(sat)}$	V_{GE}=15V,I_C=75A	-	1.6	1.9	V
		Tj=125°C	-	1.9	-	V
Diode forward voltage	V_F	I_F=75A	-	2.2	2.7	V
		Tj=150°C	-	1.8	-	V
Dynamic Characteristics						
Input Capacitance	C_{ies}	V_{CE}=25V,V_{GE}=0V, f=1.0MHz	-	3884	-	pF
Output Capacitance	C_{oes}		-	267	-	pF
Reverse Transfer Capacitance	C_{res}		-	67	-	pF
Integrated gate resistor	R_{Gint}		-	1.4	-	Ω
Total Gate Charge	Q_g	V_{CC}=400V,I_C=75A, V_{GE}=15V	-	180	-	nC
Gate−to−emitter charge	Q_{ge}		-	41	-	nC
Gate−to−collector charge	Q_{gc}		-	78	-	nC
Internal emitter inductance measured 5mm (0.197 in.) from case	L_E		-	13	-	nH

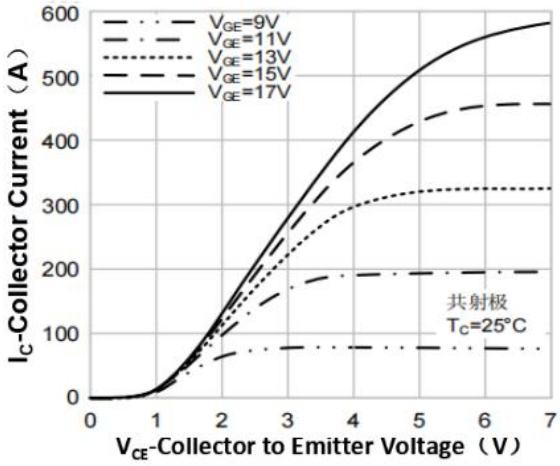
■ Switching Characteristic, Inductive Load, at T_j=25℃

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
IGBT Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	V_{CC}= 400V I_C= 75A V_{GE}= 15V R_G= 10Ω Inductive load	-	55	-	ns
Turn-On Rise Time	t_r		-	40	-	ns
Turn-Off Delay Time	$t_{d(off)}$		-	208	-	ns
Turn-Off Rise Time	t_f		-	89	-	ns
Turn-on energy	E_{on}		-	1.05	-	mJ
Turn-off energy	E_{off}		-	1.72	-	mJ
Diode Characteristics						
Reverse Recovery Time	t_{rr}	V_R=400V,I_F=30A, di/dt=200A/us	-	52	-	ns
Reverse Recovery Charge	Q_{rr}		-	0.21	-	μC
Peak Reverse Recovery Current	I_{rrm}		-	8.2	-	A

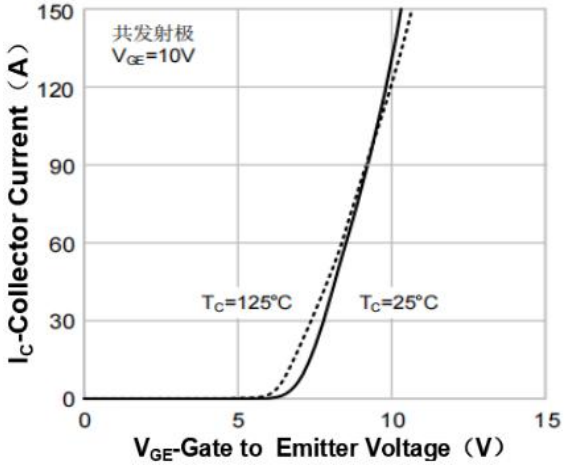
■ Switching Characteristic, Inductive Load, at T_j=125℃

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
IGBT Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	V_{CC}= 400V I_C= 75A V_{GE}= 15V R_G= 10Ω Inductive load	-	50	-	ns
Turn-On Rise Time	t_r		-	41	-	ns
Turn-Off Delay Time	$t_{d(off)}$		-	230	-	ns
Turn-Off Rise Time	t_f		-	115	-	ns
Turn-on energy	E_{on}		-	1.3	-	mJ
Turn-off energy	E_{off}		-	2.5	-	mJ
Diode Characteristics						
Reverse Recovery Time	t_{rr}	V_R=400V,I_F=30A, di/dt=200A/us	-	86	-	ns
Reverse Recovery Charge	Q_{rr}		-	0.55	-	μC
Peak Reverse Recovery Current	I_{rrm}		-	12.8	-	A

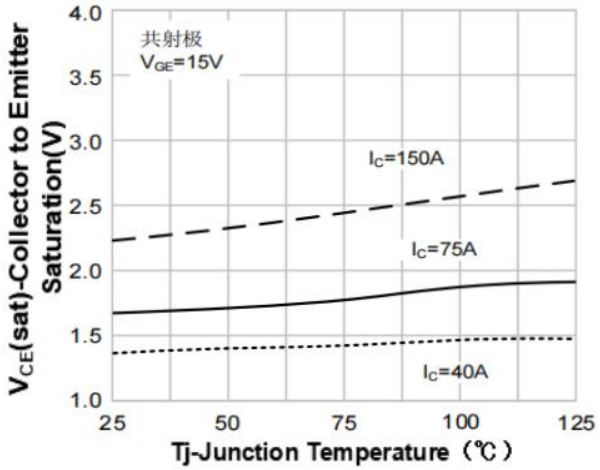
■ Characteristics Curves



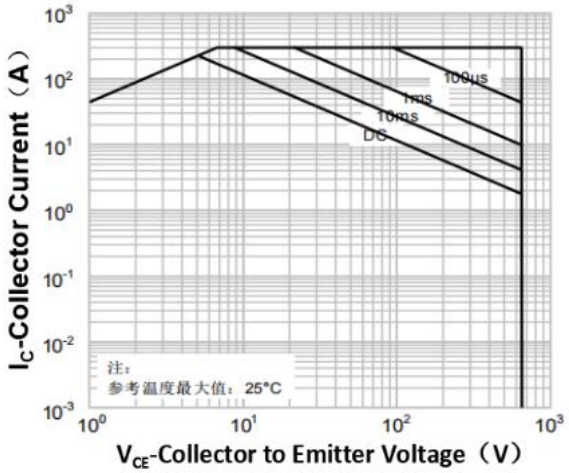
Output Characteritsics



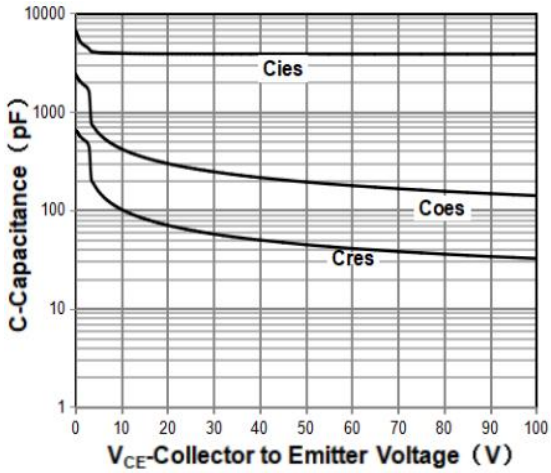
Transfer Characteritsics(V_{GE}=20V)



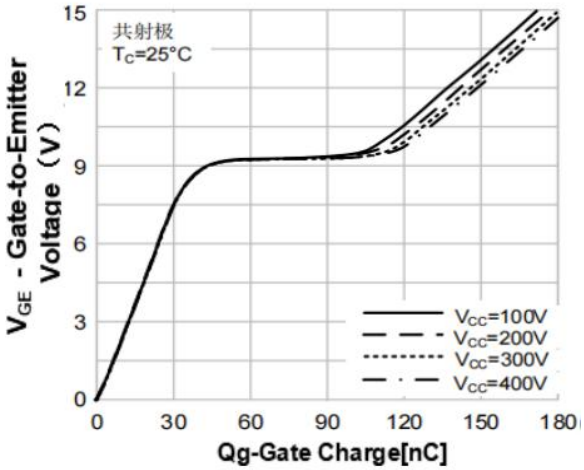
Typical collector-emitter saturation voltage as a function of junction temperature (VGE = 15V)



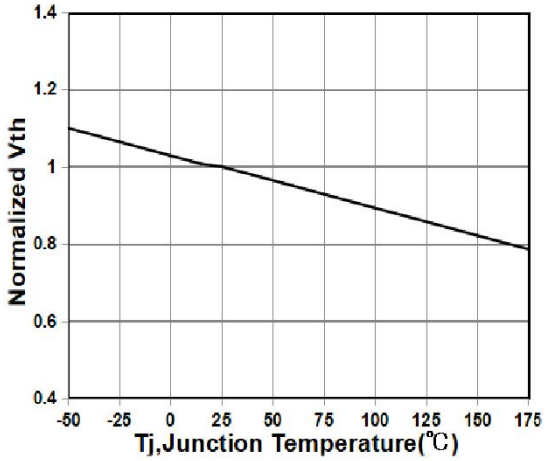
Maximum Safe Operating Area



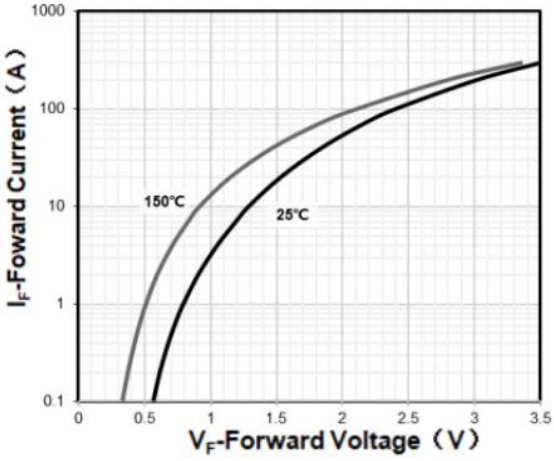
Capacitance



Typical gate charge



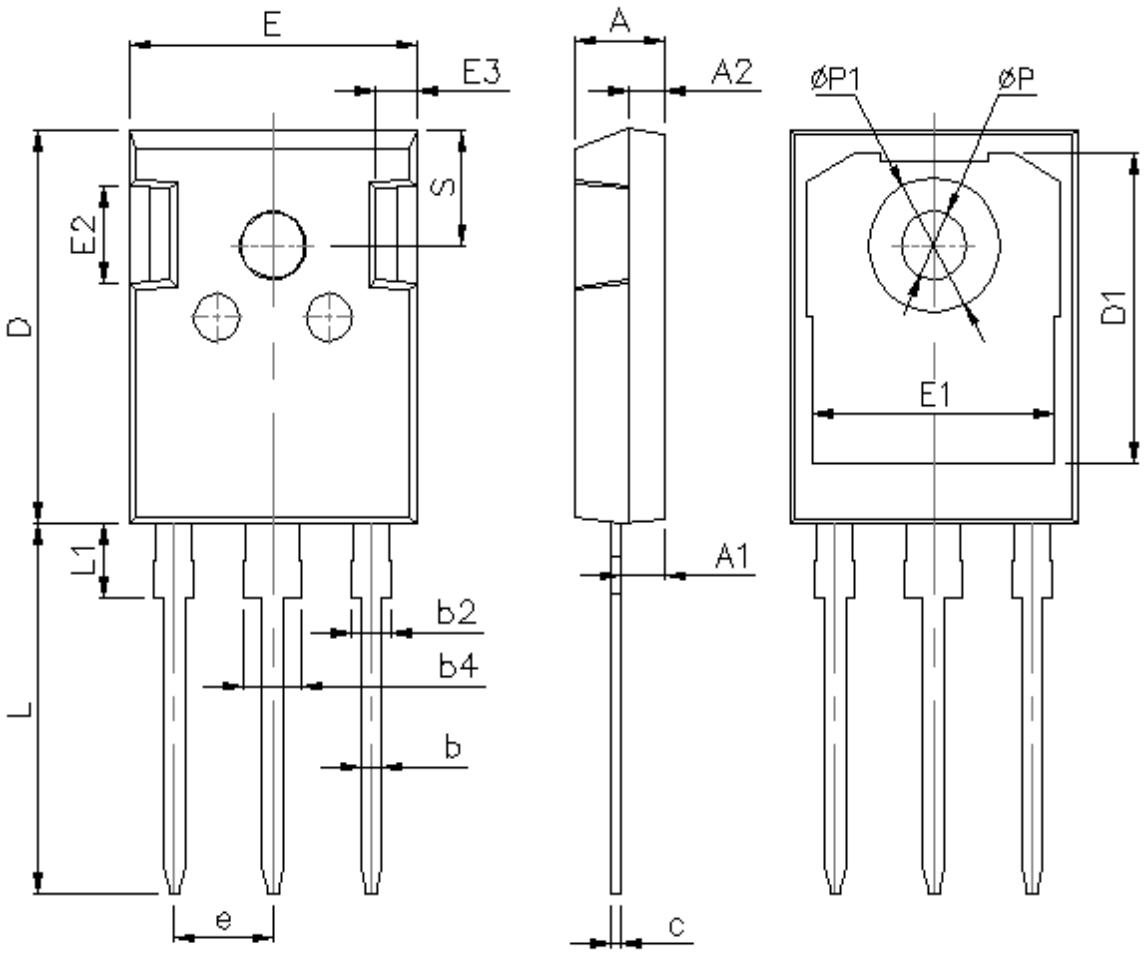
Gate-emitter threshold voltage as a function of junction temperature



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
A	4.80		5.20	E1	13.00		13.60
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	3.75	3.95	4.15
c	0.52		0.68	ΦP	3.40		3.80
D	20.70		21.30	ΦP1	7.00		7.40
D1	16.15		16.95	S	6.04	6.15	6.30
E	15.50		16.10