650V 75A IGBT

■ Applications

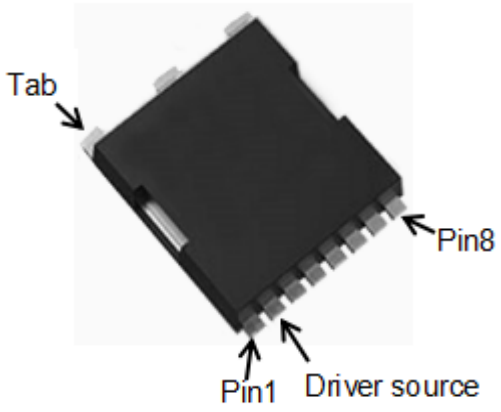
- Industrial UPS
- Welding machine
- Solar converters
- Energy Storage
- Mid to high range switching frequency converters

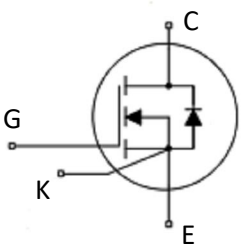
■ Features

- Low switching power loss
- Low switching surge and noise
- Advanced Fieldstop technology
- Low EMI
- Maximum junction temperature 175°C
- Short circuit withstand time – 5uS
- 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	1.8	V





TOLL

Gate： Pin1

Collector： Tab

Emitter： Pin3~8

Driver Source：Pin2

Marking	Package	Packaging	Min. package quantity
MTB75N065J2S	TOLL	Tape & Reel	2000

■ 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	90 75	A
Pulsed collector current，tp limited by T_{jmax}	$I_{C\ Pulse}$	225	A
Diode forward current，limited by T_{jmax} Tc=25℃ Tc=150℃	I_F	55 20	A
Diode Pulsed current，tp limited by T_{jmax}	$I_{F\ Pulse}$	160	A
Continuous Gate-emitter voltage	V_{GE}	±20	V
Power Dissipation （Tc=25℃）	P_D	400	W
Short circuit withstand time V_{GE}=15V,V_{CC}≤400V，T_j≤150℃	t_{SC}	5	μs
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	$R_{\theta JC}$	0.38	℃/W
Diode Maximum Junction-to-Case	$R_{\theta JC}$	0.45	℃/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	-	-	20	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	5	6	V
Collector-emitter saturation voltage	$V_{CE(sat)}$	V_{GE}=15V,I_C=75A	-	1.8	2.1	V
		Tj=175°C	-	2.3	-	V
Diode forward voltage	V_F	I_F=30A	-	1.65	2.3	V
		Tj=175°C	-	2.2	-	V
Dynamic Characteristics						
Input Capacitance	C_{ies}	V_{CE}=25V,V_{GE}=0V, f=500KHz	-	4.55	-	nF
Output Capacitance	C_{oes}		-	240	-	pF
Reverse Transfer Capacitance	C_{res}		-	70	-	pF
Integrated gate resistor	R_{Gint}		-	3.2	-	Ω
Total Gate Charge	Q_g	V_{CC}=400V,I_C=25A, V_{GE}=15V	-	160	-	nC
Gate−to−emitter charge	Q_{ge}		-	20	-	nC
Gate−to−collector charge	Q_{gc}		-	65	-	nC
Internal emitter inductance measured 5mm (0.197 in.) from case	L_E		-	2	-	nH

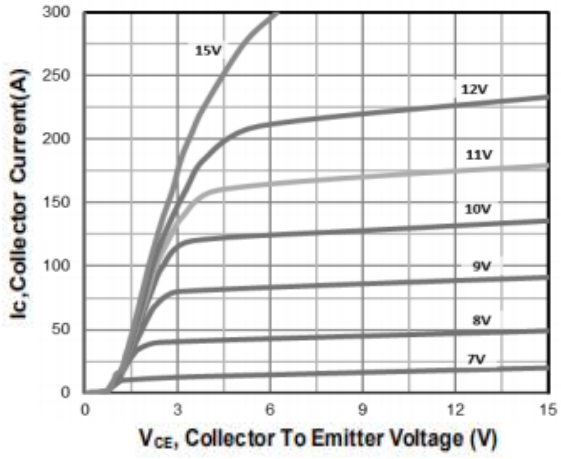
■ Switching Characteristic, Inductive Load, at T_j=25℃

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	-	60	-	ns
Turn-On Rise Time	t_r		-	40	-	ns
Turn-Off Delay Time	$t_{d(off)}$		-	180	-	ns
Turn-Off Fall Time	t_f		-	32	-	ns
Turn-on energy	E_{on}		-	0.95	-	mJ
Turn-off energy	E_{off}		-	0.48	-	mJ
Diode Characteristics						
Reverse Recovery Time	t_{rr}	V_R=400V,I_F=30A, di/dt=1000A/us	-	30	-	ns
Reverse Recovery Charge	Q_{rr}		-	0.27	-	μC
Peak Reverse Recovery Current	I_{rrm}		-	18	-	A

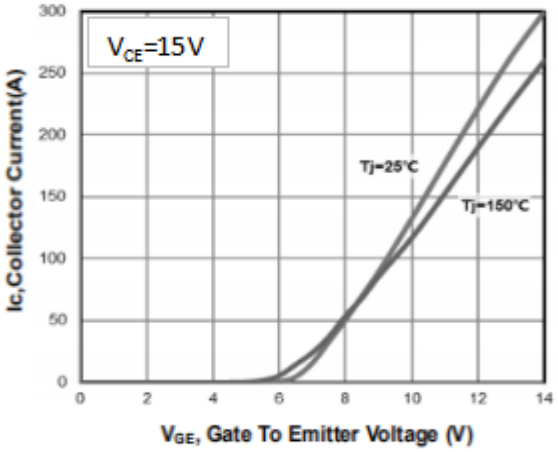
■ Switching Characteristic, Inductive Load, at T_j=150℃

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
IGBT Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	V_{CC}= 400V I_C= 75A V_{GE}= 15V R_G= 10Ω Inductive load	-	62	-	ns
Turn-On Rise Time	t_r		-	48	-	ns
Turn-Off Delay Time	$t_{d(off)}$		-	193	-	ns
Turn-Off Fall Time	t_f		-	75	-	ns
Turn-on energy	E_{on}		-	1.45	-	mJ
Turn-off energy	E_{off}		-	0.72	-	mJ
Diode Characteristics						
Reverse Recovery Time	t_{rr}	V_R=400V,I_F=30A, di/dt=1000A/us	-	40	-	ns
Reverse Recovery Charge	Q_{rr}		-	0.5	-	μC
Peak Reverse Recovery Current	I_{rrm}		-	25	-	A

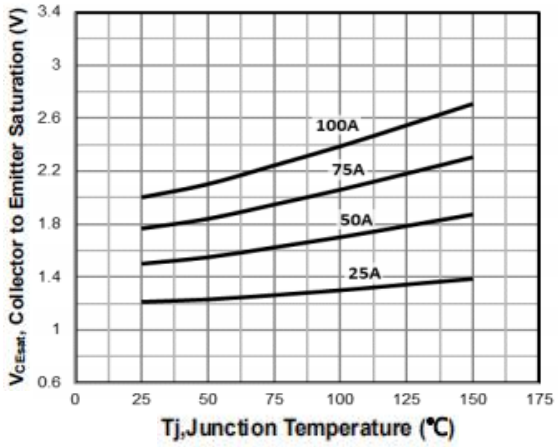
■ Characteristics Curves



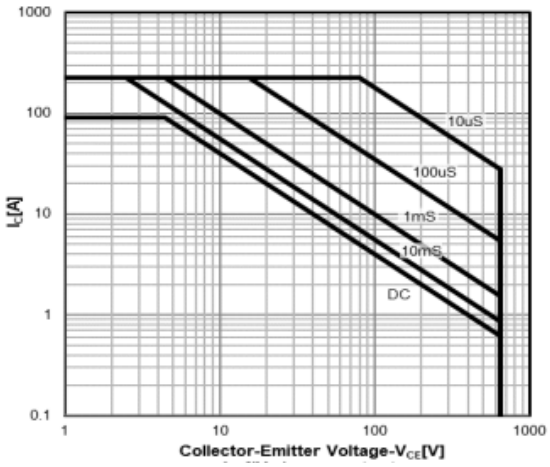
Output Characteritsics



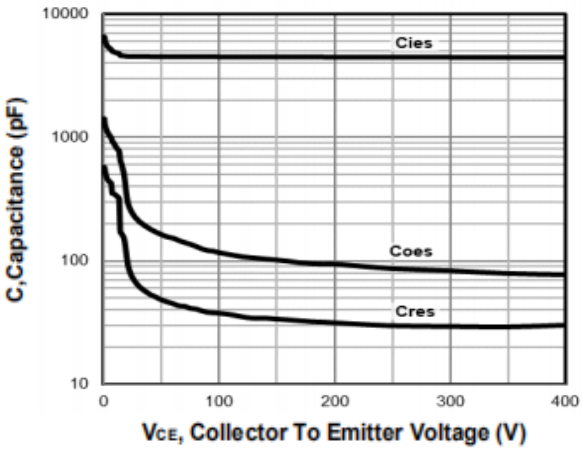
Transfer Characteritsics



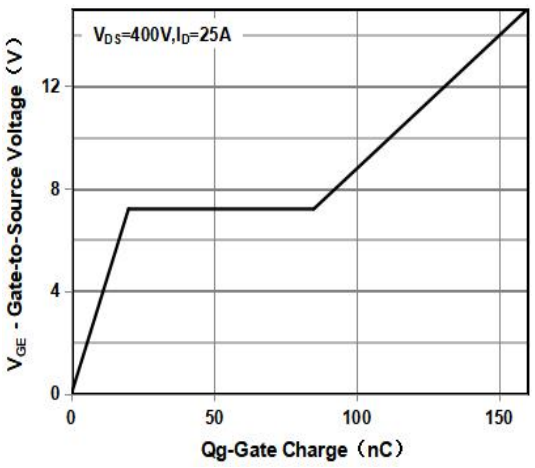
Typical collector-emitter saturation voltage as a function of junction temperature (VGE = 15V)



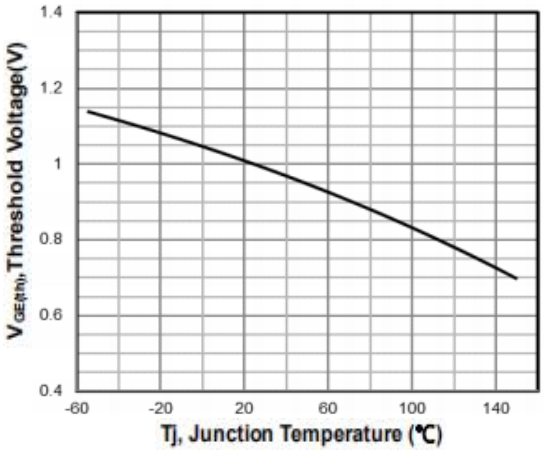
Safe operating area



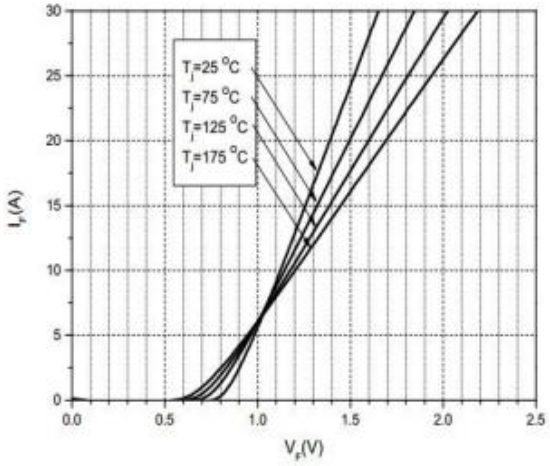
Capacitance



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.

■ TOLL Package Dimensions

Unit：mm

Symbol	Min	Nom	Max	Symbol	Min	Nom	Max
A	2.25	2.3	2.35	e1		1.225	
A1	1.75	1.8	1.85	E	9.85	9.9	9.95
b	0.65	0.7	0.75	E1	8	8.1	8.2
b1	9.75	9.8	9.85	H	11.6	11.7	11.8
b2	0.7	0.75	0.8	H1		6.95	
c	0.45	0.5	0.55	K		3.1	
D	10.35	10.4	10.45	L	1.55	1.65	1.75
D1	11	11.1	11.2	L1	0.65	0.7	0.75
D2	3.25	3.3	3.35	L2	0.5	0.6	0.7
D4	4.5	4.55	4.6	Q		6.75	
e		1.2		θ		10°