

**POWER
SEMICONDUCTOR
MODULE**



2013 New

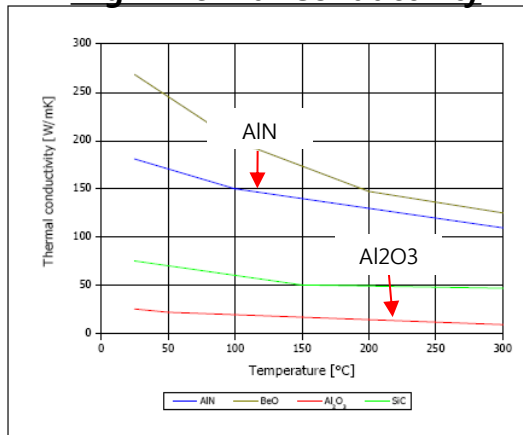
 2 pack IGBT Module

Chip Technology & Features

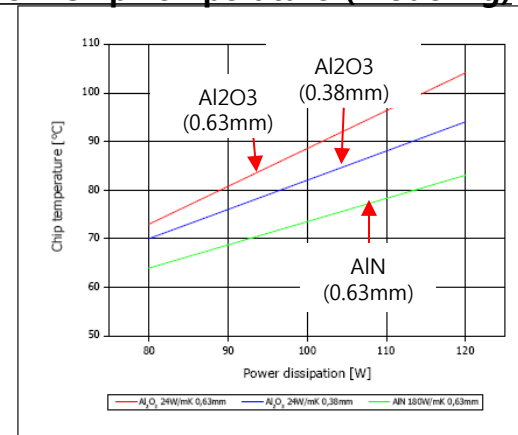
Device	Chip tech	DBC	Ratings	Single 1-pack	Dual 2-pack	Chopper	Cross reference
'01' series	ABB SPT+ Planar/ Field stop (CAL Diode)	AL2O3	1200V		O		Semikron→128D Infineon→DLC
'02' series	IR Fast Planar / NPT (Emcon Diode)	AL2O3	600V 1200V		O		Semikron→063D, 123D Infineon→DLC, 12KS4 Mitsubishi→24NFH
'03' series	Infineon IGBT3 Trench / Field stop (Emcon Diode)	ALN	600V 1200V 1700V	O	O		Semikron→066D, 126D Infineon→KE3, KT3 Mitsubishi→ F, NF
'04' series	IR Fast Trench / Field stop (Emcon/CAL Diode)	AL2O3	600V 1200V		O	O	Semikron→T4, V Infineon→ KS4, RT4 Mitsubishi→ F,NF,NFH Fuji → U,V
'07' series	Infineon IGBT4 Trench / Field stop (CAL Diode)	ALN	1200V	O	O	O	Semikron→T4 Infineon→RT4

Features of **ALN** DBC

High Thermal Conductivity



Low Chip Temperature (Modeling)



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New IGBT Module

2 Pack
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❖ LS IS's New IGBT Module (04 series)
; New Trench gate/Field Stop IGBT technology is applied

- ✓ *Strengthen the Break down Voltage (RBSOA)*
- ✓ *Low Conduction Loss & Low Switching Loss*
- ✓ *Fast switching performance by decreasing $t_{D(OFF)}$*
- ✓ *Low Q_G value*

***Low Loss
Performance***



***Energy
Saving***

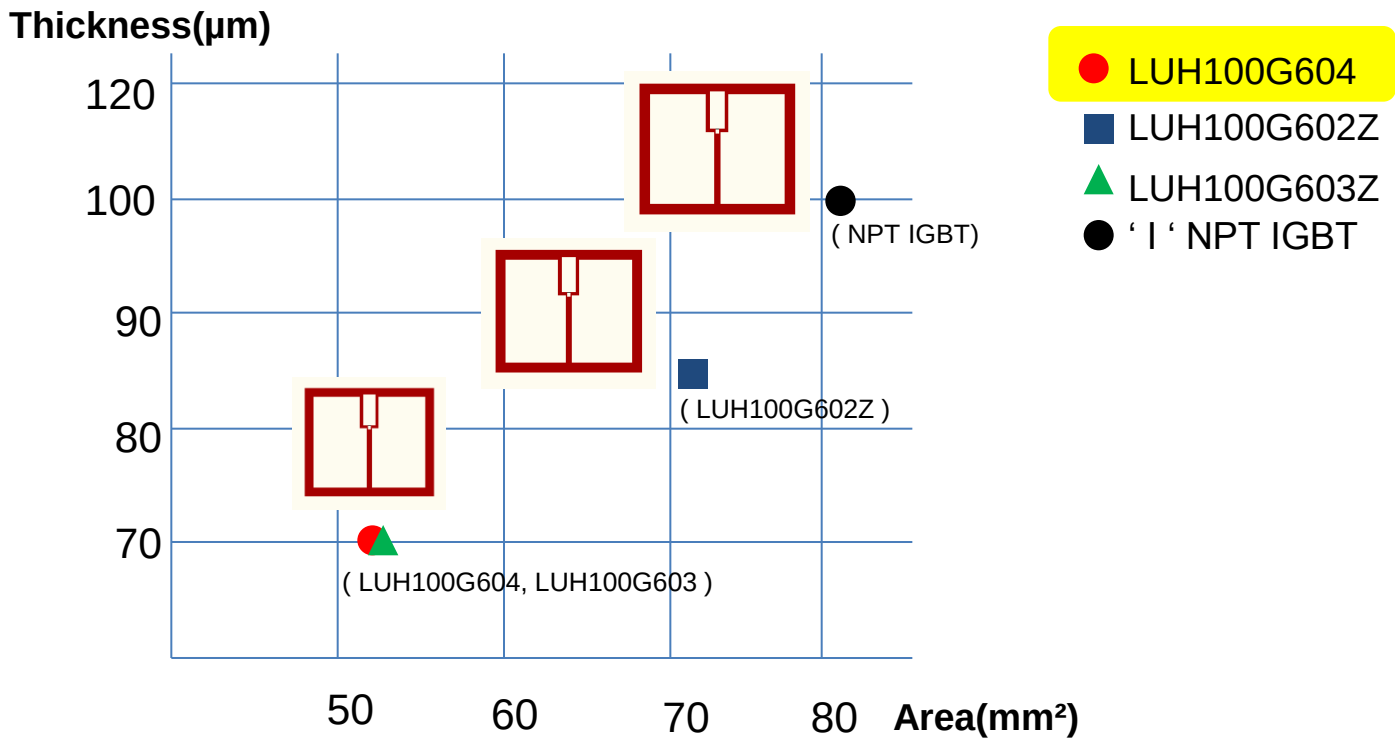
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NEW IGBT Module : '04' series

IGBT chip size

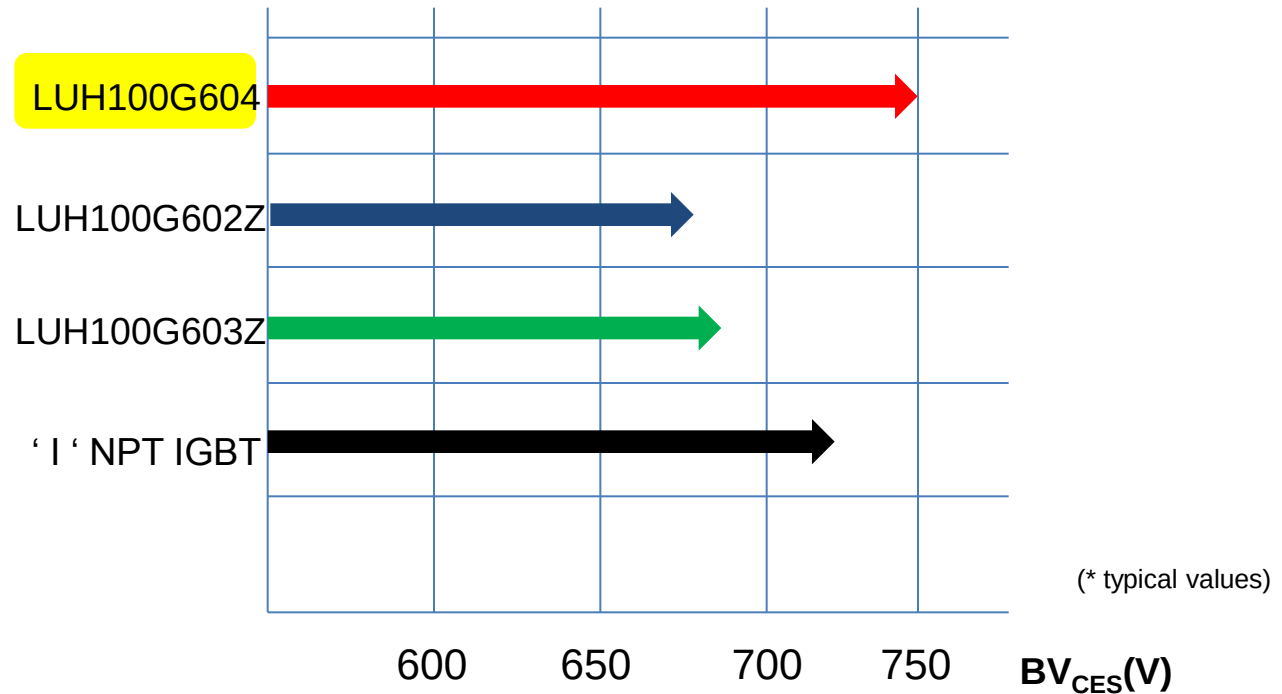


NEW IGBT Module : '04' series

BVCES @ TC=25K

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✓ *Strengthen the Break down Voltage*



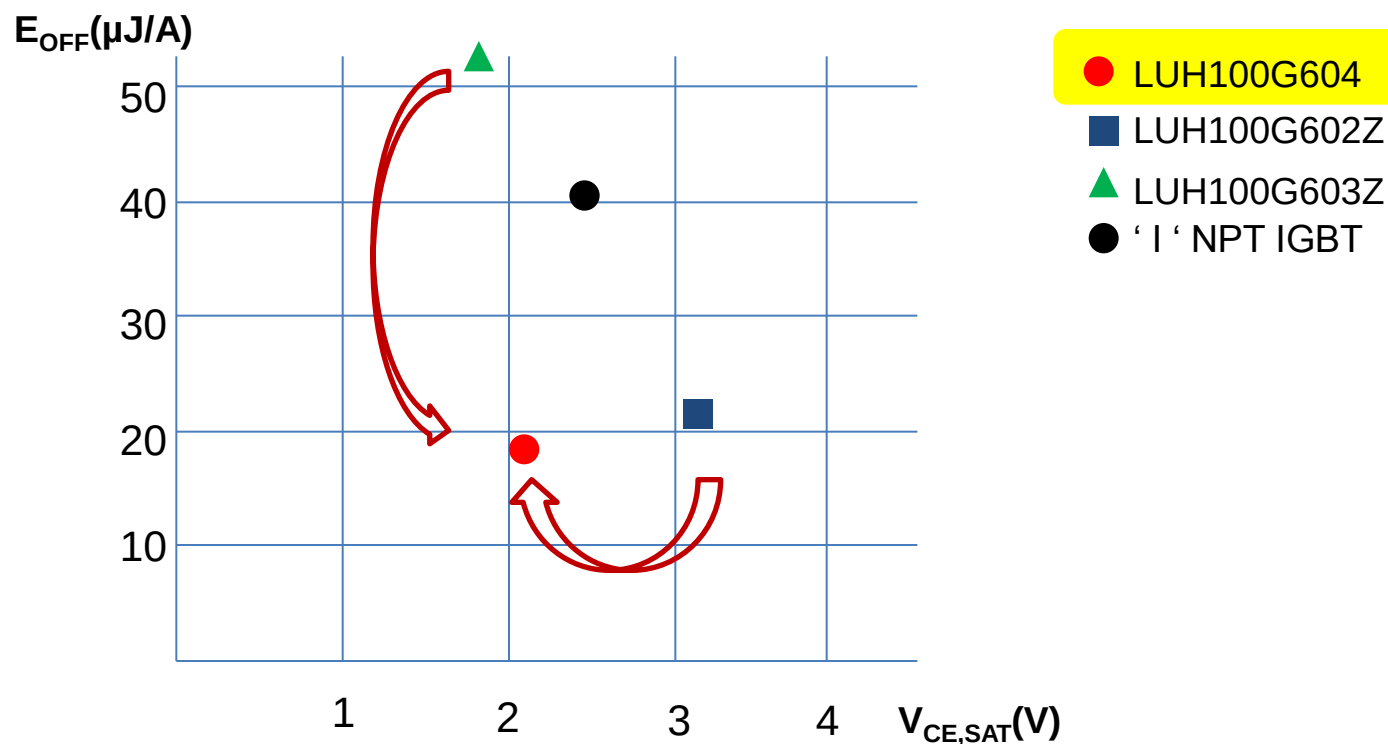
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NEW IGBT Module : '04' series

Trade off curve (E_{OFF} vs. $V_{CE,SAT}$ @ $T_C=125K$) 600V

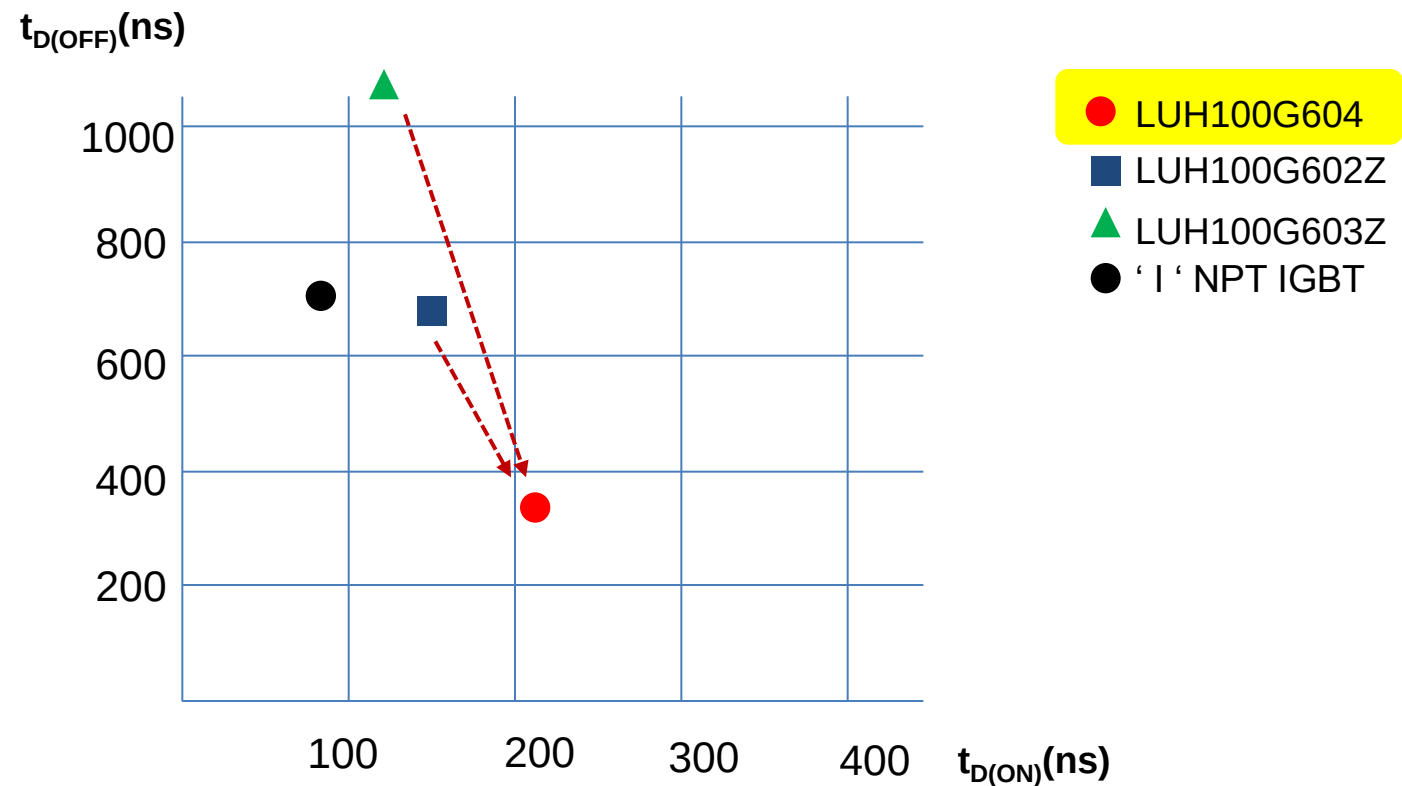
✓ Low Conduction Loss & Low Switching Loss



NEW IGBT Module : '04' series

$t_{D(ON)}$ vs. $t_{D(OFF)}$ 600V

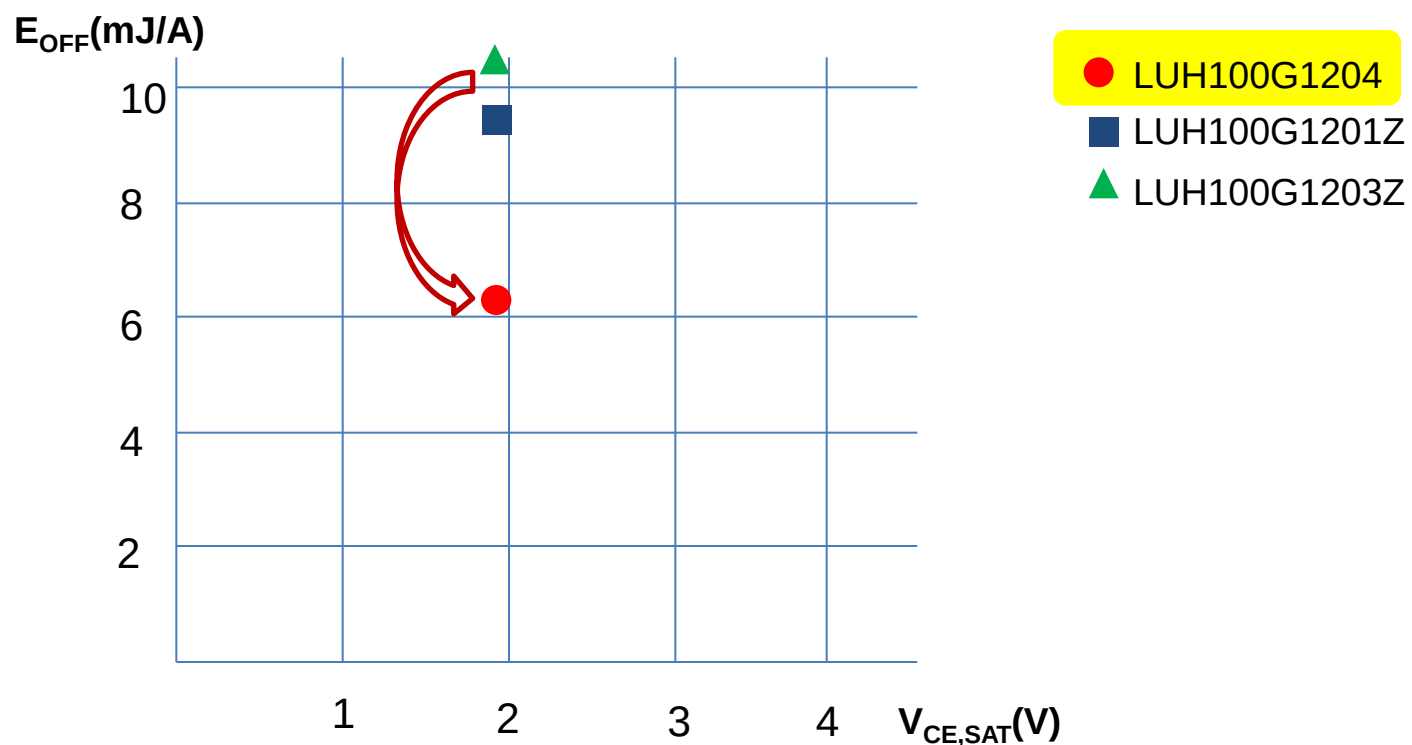
✓ Fast switching performance by decreasing $t_{D(OFF)}$



NEW IGBT Module : '04' series

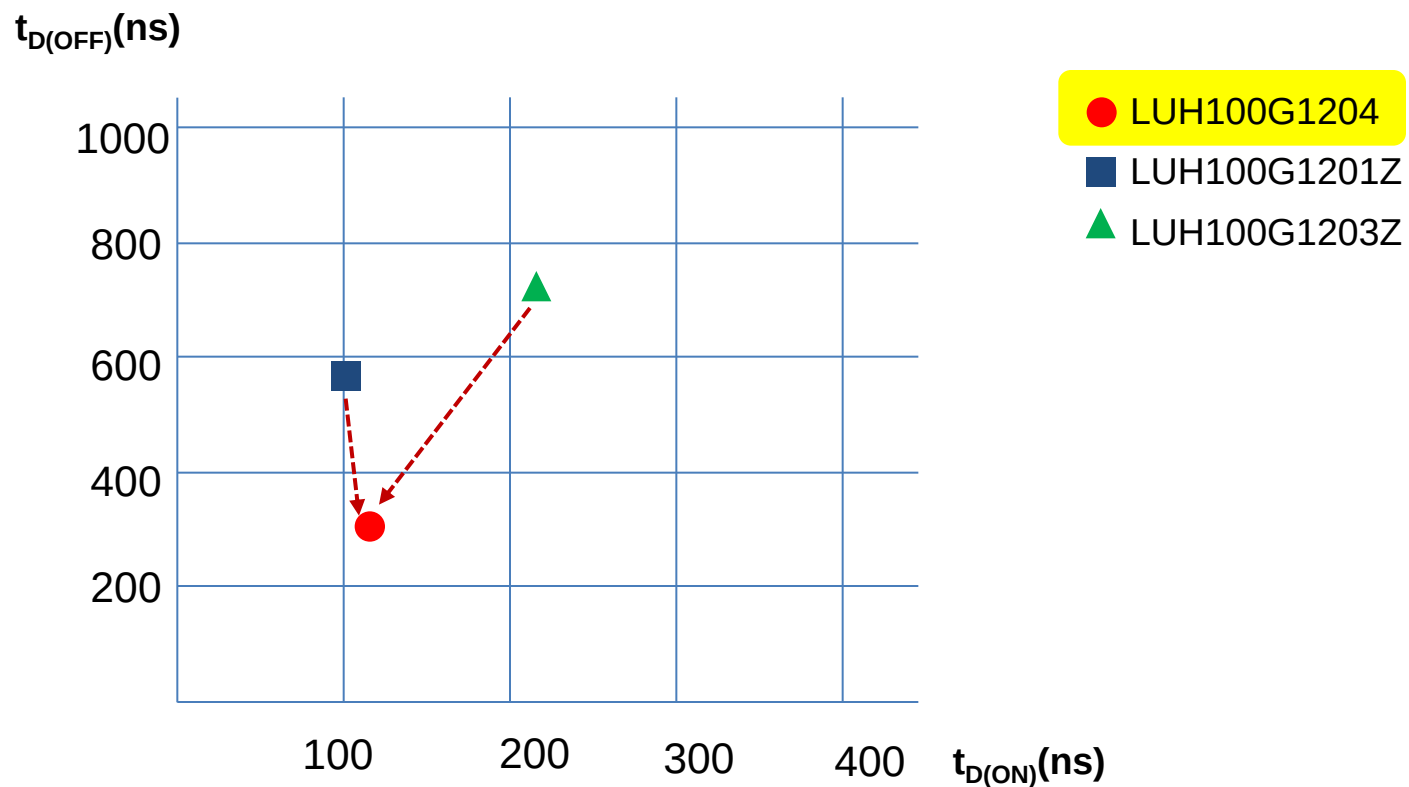
Trade off curve (E_{OFF} vs. $V_{CE,SAT}$ @ $T_C=125K$)1200V

✓ *Low Conduction Loss & Low Switching Loss*



$t_{D(ON)}$ vs. $t_{D(OFF)}$ 1200V

✓ *Fast switching performance by decreasing $t_{D(OFF)}$*



NEW IGBT Module : '04' series

Low Gate charge value (Q_G)

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Device	Qg [nC]	Qge [nC]	Qgc [nC]	Vplateu [V]
LUH100G604	205	80	85	12
LUH100G602Z	400	100	170	8.5
LUH100G603Z	930	100	500	9.8
BSM100GB60DLC	380	50	220	10.3
CM100DY-12H	295	75	145	10.7
2MBI100N-060	380	50	200	8.6
LUH100G1201Z	620	80	400	11
LUH100G1203Z	545	90	290	10.2
LUH100G1204	530	120	270	10.7

NEW IGBT Module : '04' series

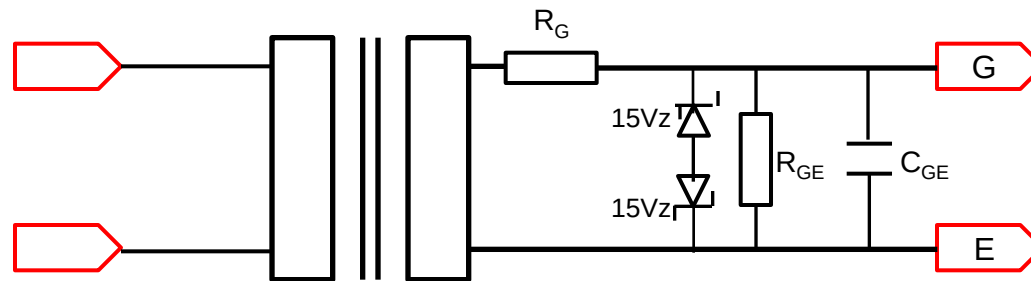
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Gate drive & protection suggestion(pulse transformer)

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➤ Recommendation of Gate drive condition



Pulse Transformer

602 / 1202 series

RATINGS		LS PART NO.	PKG. size	R_G	C_{GE}	R_{GE}
600V	75A	LUH75G602Z	SUSPM1(34mm)	10ohm	10nF(103)	100ohm (or 4.7kohm) (High & Low Side 의 gate 신호가 반전 되어 동시에 들어오는 조건일 경우는 4.7kohm 적용) 반전-15~-+15V 혹은 off시 음전압존재시
	100A	LUH100G602Z	SUSPM1(34mm)	10ohm	10nF(103)	
	150A	LVH150G602Z	SUSPM2(48mm)	7.5ohm	10nF(103)	
	200A	LVH200G602Z	SUSPM2(48mm)	7.5ohm	10nF(103)	
1200V	75A	LUH75G1202Z	SUSPM1(34mm)	5.6ohm	10nF(103)	
	100A	LUH100G1202Z	SUSPM1(34mm)	5.6ohm	10nF(103)	
	150A	LWH150G1202	SUSPM3(62mm)	3.9ohm	10nF(103)	
	200A	LWH200G1202	SUSPM3(62mm)	3.9ohm	10nF(103)	

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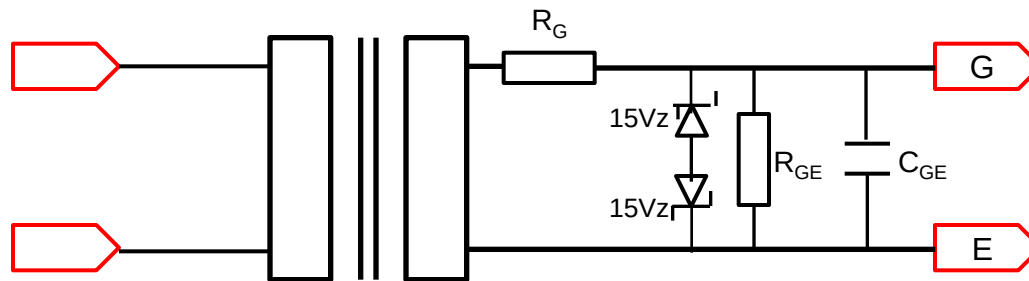


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Gate drive & protection suggestion(pulse transformer)

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Module

➤ Recommendation of Gate drive condition



Pulse Transformer

603 / 1201 series

RATINGS		LS PART NO.	PKG. size	R_G	C_{GE}	R_{GE}
600V	100A	LUH100G603Z	SUSPM1(34mm)	10ohm	10nF(103)	100ohm (or 4.7kohm) (High & Low Side 의 gate 신호가 반전 되어 동시에 들어오는 조건일 경우는 4.7kohm 적용) 반전-15~+15V 혹은 off시 음전압존재시
	150A	LUH150G603Z	SUSPM1(34mm)	10ohm	10nF(103)	
	200A	LUH200G603Z	SUSPM1(34mm)	10ohm	10nF(103)	
	300A	LVH300G603Z	SUSPM2(48mm)	7.5ohm	10nF(103)	
	400A	LVH400G603Z	SUSPM2(48mm)	7.5ohm	10nF(103)	
1200V	50A	LUH50G1201Z	SUSPM1(34mm)	6.2ohm	10nF(103)	
	75A	LUH75G1201Z	SUSPM1(34mm)	6.2ohm	10nF(103)	
	100A	LUH100G1201Z	SUSPM1(34mm)	6.2ohm	10nF(103)	
	150A	LVH150G1201Z	SUSPM2(48mm)	6.2ohm	10nF(103)	

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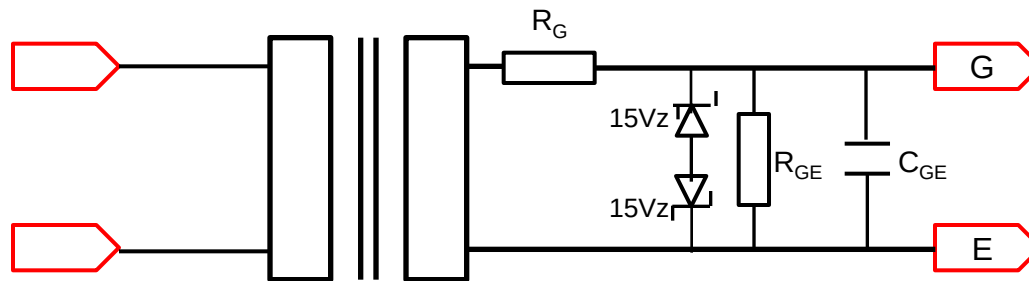


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Gate drive & protection suggestion(pulse transformer)

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➤ Recommendation of Gate drive condition



Pulse Transformer

604 series

RATINGS		LS PART NO.	PKG. size	R_G	C_{GE}	R_{GE}
650V	75A	LUH75G604	SUSPM1(34mm)	10ohm	10nF(103)	100ohm (or 4.7kohm) (High & Low Side 의 gate 신호가 반전 되어 동시에 들어오는 조건일 경우는 4.7kohm 적용) 반전-15~-+15V 혹은 off시 음전압존재시
	100A	LUH100G604	SUSPM1(34mm)	10ohm	10nF(103)	
	150A	LUH150G604	SUSPM1(34mm)	8.2ohm	10nF(103)	
	200A	LUH200G604	SUSPM1(34mm)	6.2ohm	10nF(103)	
	300A	LVH300G604	SUSPM2(48mm)	5.6ohm	10nF(103)	
		LWH300G604	SUSPM3(62mm)	5.6ohm	10nF(103)	
	400A	LVH400G604	SUSPM2(48mm)	4.3ohm	10nF(103)	
		LWH400G604	SUSPM3(62mm)	4.3ohm	10nF(103)	

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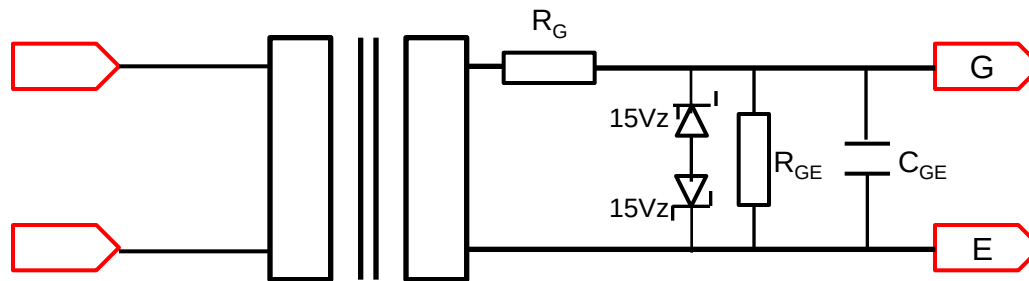


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Gate drive & protection suggestion(pulse transformer)

2 Pack
IGBT
Module

➤ Recommendation of Gate drive condition



Pulse Transformer

1204 series

RATINGS		LS PART NO.	PKG. size	R_G	C1 & C2	ZD
650V	75A	LUH75G604	SUSPM1(34mm)	18ohm	220uF	4.7Vz
	100A	LUH100G604	SUSPM1(34mm)	20ohm	220uF	4.7Vz
	150A	LUH150G604	SUSPM1(34mm)	8ohm	220uF	4.7Vz
	200A	LUH200G604	SUSPM1(34mm)	8ohm	220uF	4.7Vz
	300A	LVH300G604	SUSPM2(48mm)	4.7ohm	220uF	4.7Vz
		LWH300G604	SUSPM3(62mm)	4.7ohm	220uF	4.7Vz
	400A	LVH400G604	SUSPM2(48mm)	4.3ohm	220uF	4.7Vz
		LWH400G604	SUSPM3(62mm)	4.3ohm	220uF	4.7Vz

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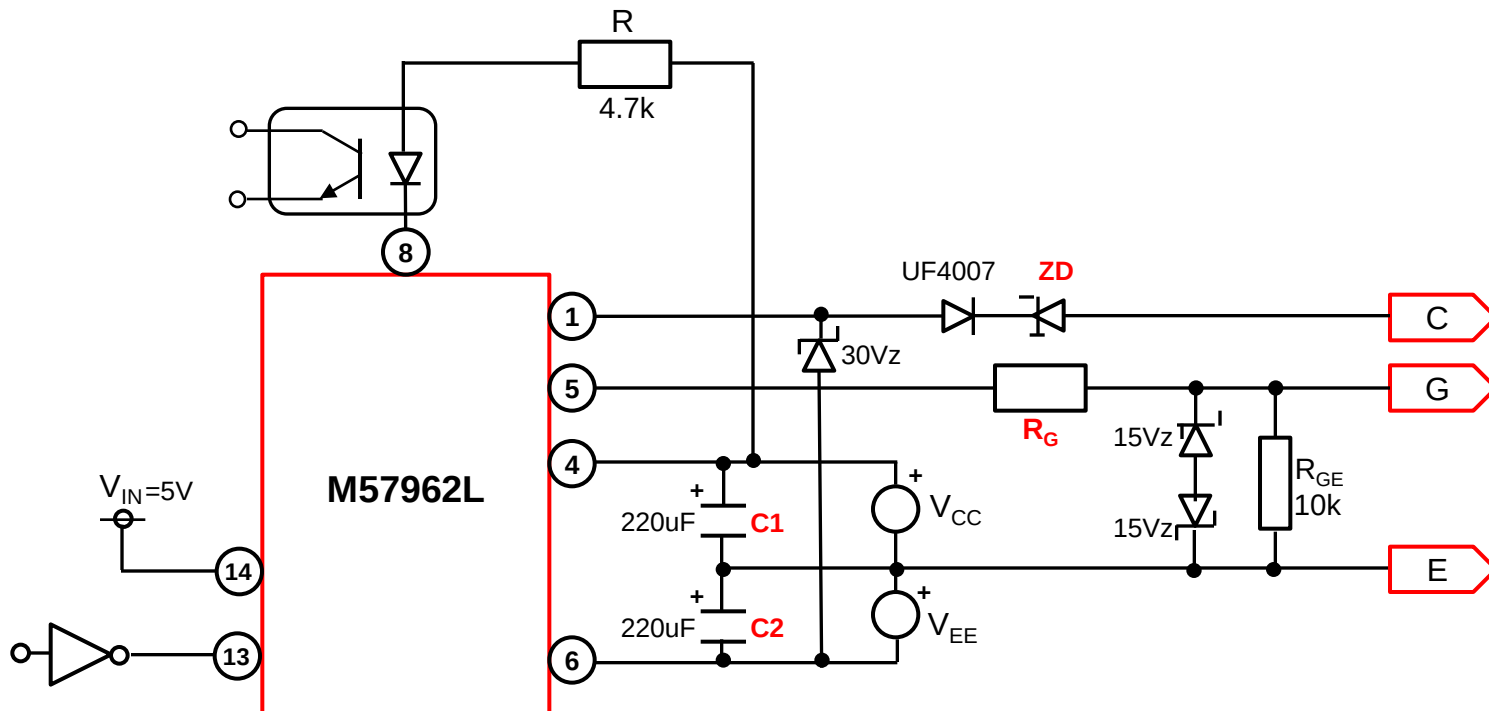


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Gate drive & protection suggestion(Drive IC)

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Module

➤ Recommendation of Gate drive and short circuit protection schematic



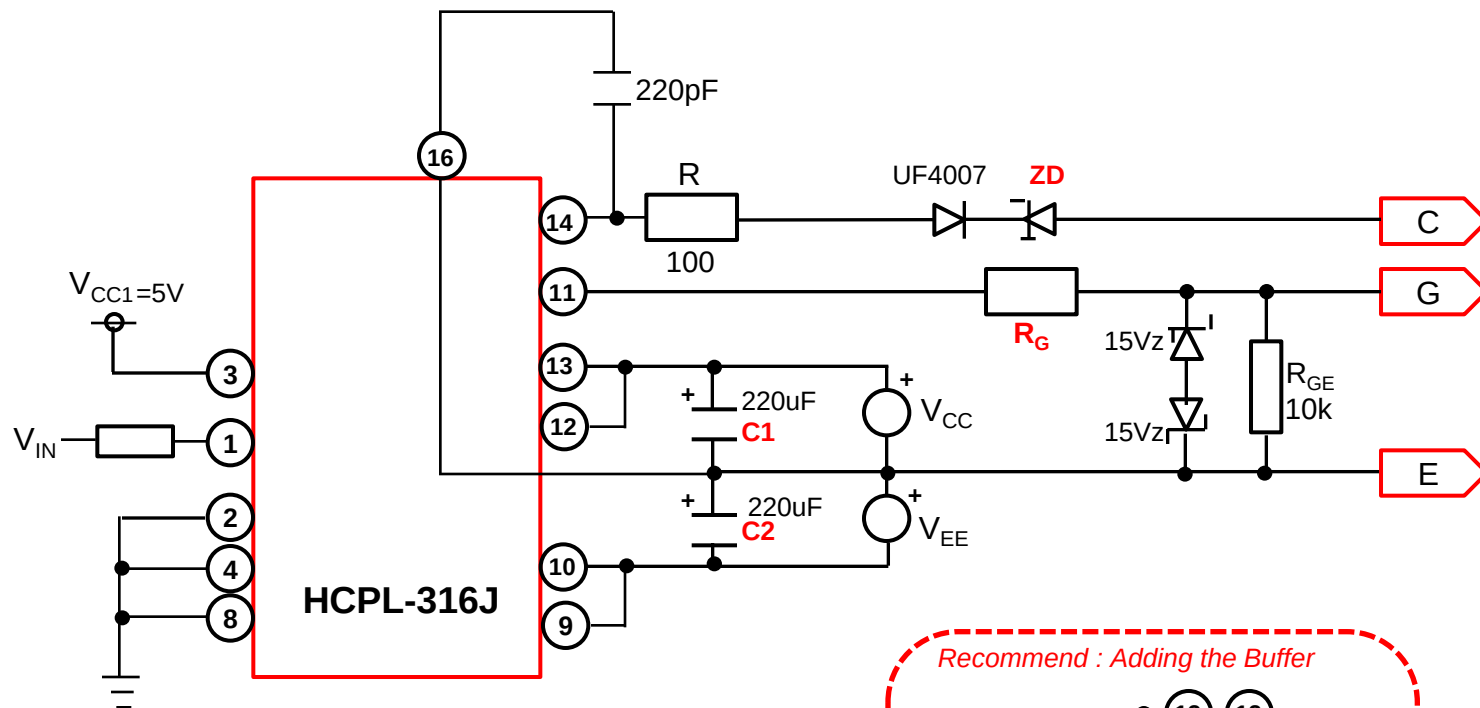
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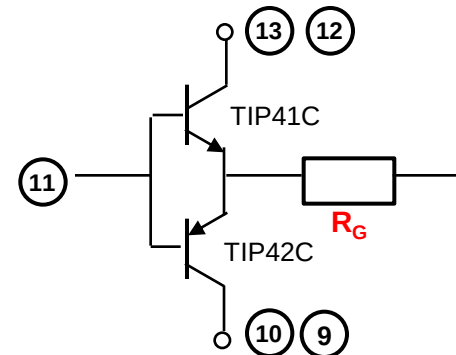
Gate drive & protection suggestion(Drive IC)

2 Pack IGBT Module

- Recommendation of Gate drive and short circuit protection schematic



Recommend : Adding the Buffer



Gate drive & protection suggestion(Drive IC)

2 Pack
IGBT
Module

➤ Recommendation of Gate drive and short circuit protection

602 / 1202 series

RATINGS		LS PART NO.	PKG. size	R _G	C1 & C2	ZD
600V	75A	LUH75G602Z	SUSPM1(34mm)	33ohm	220uF	4.3Vz
	100A	LUH100G602Z	SUSPM1(34mm)	22ohm	220uF	4.3Vz
	150A	LVH150G602Z	SUSPM2(48mm)	15ohm	220uF	4.7Vz
	200A	LVH200G602Z	SUSPM2(48mm)	10ohm	220uF	4.7Vz
1200V	75A	LUH75G1202Z	SUSPM1(34mm)	10ohm	220uF	4.3Vz
	100A	LUH100G1202Z	SUSPM1(34mm)	8.2ohm	220uF	4.3Vz
	150A	LWH150G1202	SUSPM3(62mm)	6.2ohm	220uF	4.7Vz
	200A	LWH200G1202	SUSPM3(62mm)	4.3ohm	220uF	4.7Vz

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Gate drive & protection suggestion(Drive IC)

2 Pack
IGBT
Module

➤ Recommendation of Gate drive and short circuit protection

603 / 1201 series

RATINGS		LS PART NO.	PKG. size	R _G	C1 & C2	ZD
600V	100A	LUH100G603Z	SUSPM1(34mm)	5.6ohm	220uF	4.3Vz
	150A	LUH150G603Z	SUSPM1(34mm)	5.6ohm	220uF	4.3Vz
	200A	LUH200G603Z	SUSPM1(34mm)	5.6ohm	220uF	4.3Vz
	300A	LVH300G603Z	SUSPM2(48mm)	7.5ohm	220uF	4.3Vz
	400A	LVH400G603Z	SUSPM2(48mm)	7.5ohm	220uF	4.3Vz
1200V	50A	LUH50G1201Z	SUSPM1(34mm)	10ohm	220uF	4.3Vz
	75A	LUH75G1201Z	SUSPM1(34mm)	10ohm	220uF	4.3Vz
	100A	LUH100G1201Z	SUSPM1(34mm)	10ohm	220uF	4.3Vz
	150A	LUH150G1201Z	SUSPM2(48mm)	10ohm	220uF	4.3Vz
	75A	LUH75G1202Z	SUSPM1(34mm)	10ohm	220uF	4.3Vz
	100A	LUH100G1202Z	SUSPM1(34mm)	8.2ohm	220uF	4.3Vz
	150A	LWH150G1202	SUSPM3(62mm)	6.2ohm	220uF	4.7Vz
	200A	LWH200G1202	SUSPM3(62mm)	4.3ohm	220uF	4.7Vz

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Gate drive & protection suggestion(Drive IC)

2 Pack
IGBT
Module

➤ Recommendation of Gate drive and short circuit protection

604 series

RATINGS		LS PART NO.	PKG. size	R_G	C1 & C2	ZD
650V	75A	LUH75G604	SUSPM1(34mm)	30ohm	220uF	4.7Vz
	100A	LUH100G604	SUSPM1(34mm)	22ohm	220uF	4.7Vz
	150A	LUH150G604	SUSPM1(34mm)	15ohm	220uF	4.7Vz
	200A	LUH200G604	SUSPM1(34mm)	12ohm	220uF	4.7Vz
	300A	LVH300G604	SUSPM2(48mm)	8.2ohm	220uF	4.7Vz
		LWH300G604	SUSPM3(62mm)	8.2ohm	220uF	4.7Vz
	400A	LVH400G604	SUSPM2(48mm)	6.2ohm	220uF	4.7Vz
		LWH400G604	SUSPM3(62mm)	6.2ohm	220uF	4.7Vz

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Gate drive & protection suggestion(Drive IC)

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➤ Recommendation of Gate drive and short circuit protection

1204 series

RATINGS		LS PART NO.	PKG. size	R_G	C1 & C2	ZD
1200V	75A	LUH75G1204	SUSPM1(34mm)	15ohm	220uF	4.7Vz
	100A	LUH100G1204	SUSPM1(34mm)	10ohm	220uF	4.7Vz
	150A	LUH150G1204	SUSPM1(34mm)	6.8ohm	220uF	4.7Vz
		LWH150G1204	SUSPM3(62mm)	6.8ohm	220uF	4.7Vz
	200A	LWH200G1204	SUSPM3(62mm)	5.1ohm	220uF	4.7Vz
	300A	LWH300G1204	SUSPM3(62mm)	3.9ohm	220uF	4.7Vz

1207 series

RATINGS		LS PART NO.	PKG. size	R_G	C1 & C2	ZD
1200V	400A	LWH400G1207	SUSPM3(62mm)	3.3ohm	220uF	4.7Vz

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