



高效能 BMS 電池管理系統解決方案

低內阻，高可靠性與成本優化的 MOSFET 選型指南

專為電池電源設計的核心優勢

極致效能

提供更低的導通電阻 (Lower $R_{ds(on)}$)，顯著提升系統效率並降低發熱。



安全可靠

擁有更寬的安全工作區 (Wider SOA)，並具備高峯值電流的短路保護能力。



成本與空間優化

實現更緊湊的物料清單 (Compact BOM) 與更高效的並聯方案，提供極具成本競爭力的解決安案。



靈活應用

針對不同應用需求，量身打造最佳的開啟 (Turn-on) 與關閉 (Turn-off) 解決方案。

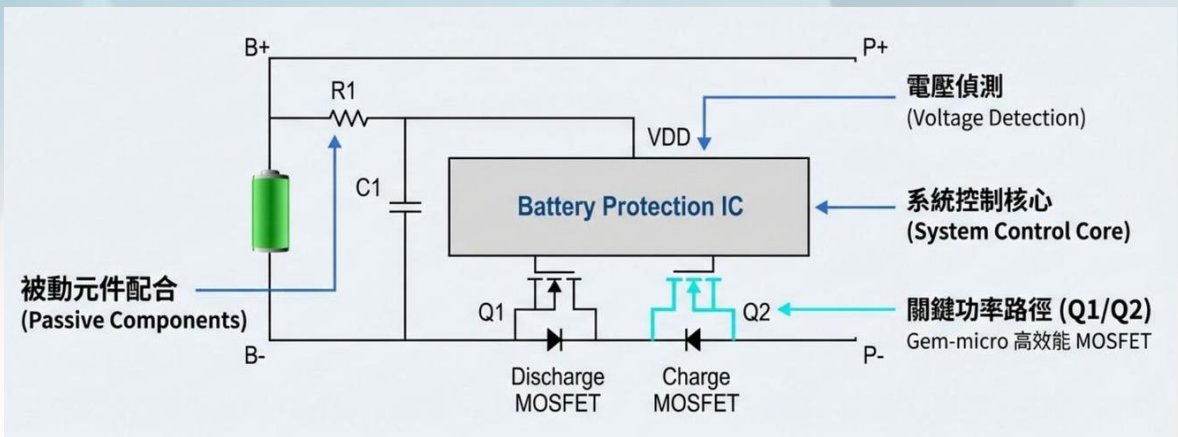


Battery Management System (BMS)

Battery Power Solutions

Key features and benefits

- Higher performance with lower Rds(on).
- Wider safe operating area (SOA)
- Cheaper solutions with more compact bill of material and more effective parallelization solutions
- Short circuit protection with higher peak current rates
- Turn-on and turn-off solutions tailored to applications needs



Functional Block	Description	Gem-micro PN#	Package	Feature
Balancing	均衡MOSFET	GS4410	SO-08	SMD MOSFET, 11mΩ
Balancing	均衡MOSFET	GN2300 GN3400 GV2306-G GV3400-G	SOT-23-3L	SMD MOSFET
Charging & Discharging Protection+Pre-Charge	3~4串	GD110N03	TO-252	30V/40V SMD low Rds(on) MOSFET · 1.3mΩ
Charging & Discharging Protection+Pre-Charge	3~4串	GR100N03 GR040N03	PDFN5x6 PDFN3x3	30V/40V SMD low Rds(on) MOSFET · 3~6mΩ
Charging & Discharging Protection+Pre-Charge	3~4串	GD055N03 GD077N03 GD085N03 GD110N03	TO-252	30V/40V SMD low Rds(on) MOSFET · 3~6.6mΩ
Charging & Discharging Protection+Pre-Charge	6~8串	GD065N04 GD080N04 GD090N04	TO-252	40V/60V SMD low Rds(on) MOSFET · 3~6.6mΩ
Charging & Discharging Protection+Pre-Charge	10~12串	GD090N08	TO-252	60V/80V SMD low Rds(on) MOSFET · 3.5mΩ
Charging & Discharging Protection+Pre-Charge	10~12串	GP255N08	TOLL	60V/80V SMD low Rds(on) MOSFET · 3.3mΩ
Charging & Discharging Protection+Pre-Charge	10~12串	GR075N06 GR125N06 GR160N06 GR210N06	PDFN5X6	60V/80V SMD low Rds(on) MOSFET · 2.5~4.8mΩ
Charging & Discharging Protection+Pre-Charge	12~15串	GL130N10 GL180N10 GL195N10	TO-220AB	100V THL low Rds(on) MOSFET, 1.5~4mΩ
Charging & Discharging Protection+Pre-Charge	12~15串	GR125N10 GR170N10 GR195N10	PDFN5X6	100V SMD low Rds(on) MOSFET, 2~4mΩ
Charging & Discharging Protection+Pre-Charge	12~15串	GU130N10 GU165N10 GU195N10	TO-263	100V SMD low Rds(on) MOSFET · 1.8~4mΩ
Charging & Discharging Protection+Pre-Charge	12~15串	GP270N10 GP325N10 GP390N10	TOLL	100V SMD low Rds(on) MOSFET · 1~2mΩ
Charging & Discharging Protection+Pre-Charge	≥16串	GU105N15 GU128N15 GU195N15	TO-220AB	150V THL low Rds(on) MOSFET · 5.7~9.5mΩ
Charging & Discharging Protection+Pre-Charge	≥16串	GP100N15 GP225N15 GP295N15	TOLL	150V SMD low Rds(on) MOSFET · 3.9~9.2mΩ
Balancing	均衡MOSFET	GV2313-G GV2305-G GV3415E	P-MOSFET, SOT23-3L	SMD MOSFET

BMS Applications

電池均衡與低壓應用方案 (3-4串)

適用於電動工具, LED 與小型家電



Consumer



Power Tools



LED

電池均衡 (Balancing)

針對電池單元電壓一致性的精密控制

GS4410 (SO-08): 11mR

**SOT-23-3L系列: GN2300,
GN3400, GV-2306-G, GV3400-G**

充放電保護 (3-4串 / 30V-40V)

**SMD 低導通電阻 MOSFET, $R_{ds(on)}$ 低至
1.3m Ω**

**TO-252 Package: GD110N03
(1.3m Ω), GD055N03, GD077N03**

**PDFN5X6 / PDFN3X3 Packages:
GR100N03, GR040N03 (3-6m Ω)**

BMS Applications

中功率應用方案 (6-12串)

覆蓋40V~80V電壓平台的多樣化選擇



DC Motor



DC.DC



Drone

➤ 充放電保護電池: 6-8串 (40V ~ 60V平台)

- 設計焦點: 平衡體積與散熱 (TO-252)
- 推薦型號: **GD065N04, GD080N04, GD090N04**
- 性能指標: $R_{ds(on)}$ range: 3~6m Ω



➤ 充放電電池保護: 10-12串 (60V ~ 80V 平台)

- 設計焦點: 高效能充放電與預充電保護
- 產品封裝型號選擇:
- TO-252: **GD090N08** (3.5m Ω)
- TOLL: **GP255N08** (3.3m Ω) ← 首推建議
- PDFN5X6: **GR075N06, GR125N06** (2.5~4.8m Ω)



BMS Applications

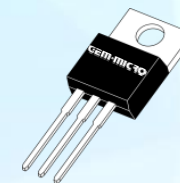
高功率與輕型載具應用方案 (12-15串)

100V耐壓等級，專為電動滑板車與伺服器電源設計



TO-220AB
(THL)

- **GL130N10, GL180N10**
- Rds(on) range: 1.5~4mΩ
- 特點: 優異的散熱特性



PDFN5x6
(SMD)

- **GR125N10, GR170N10**
- Rds(on) range: 2~4mΩ
- 特點: 節省PCB空間



TO-263
(SMD)

- **GU130N10, GU165N10**
- Rds(on) range: 1.8~4mΩ



TOLL
(SMD)

推薦封裝

- **GP270N10, GP325N10, GP390N10**
- Rds(on) range: 1~2mΩ
- 特點: 散熱佳, 極致低內阻



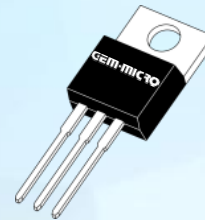
BMS Applications

工業級與儲能應用方案 (≥ 16串)

150V Heavy Duty Solutions

**TO-220AB
(THL)**

- **GU105N15, GU128N15, GU195N15**
- **Rds(on) range: 5.7~9.5mΩ**



**TOLL
(SMD)**

- **GP100N15, GP225N15, GP295N15**
- **Rds(on) range: 3.9~9.2mΩ**
- **特點: 散熱佳, 極致低內阻**



針對太陽能光伏逆變器與電動車充電樁等的高壓需求，提供兼具安全性與效率的解決方案。



Solar



UPS



EV Charger



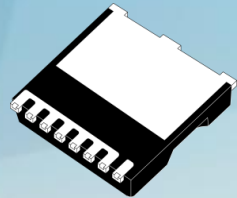
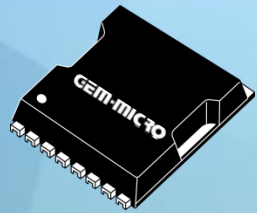
Forklift



SMPS

BMS Applications

TOLL 封裝系列規格



P/N	Package	Type	B _{VDSS}	V _{GS}	ID	R _{DS(on)} max. (mΩ) at V _{GS} =		
			V	V	A	10V	4.5V	2.5V
GP636N04	TOLL	Single N	40	±20	636	0.65		
GP550N06	TOLL	Single N	60	±20	550	0.8		
GP240N08	TOLL	Single N	80	±25	240	2.4		
GP255N08	TOLL	Single N	80	±25	255	1.3		
GP325N08	TOLL	Single N	85	±20	325	1.2		
GP148N10	TOLL	Single N	100	±20	148	3.5		
GP200N10	TOLL	Single N	100	±20	200	3		
GP270N10	TOLL	Single N	100	±20	270	1.8		
GP283N10	TOLL	Single N	100	±20	283	1.5		
GP390N10	TOLL	Single N	100	±20	395	1		
GP244N12	TOLL	Single N	120	±20	244	3		
GP350N12	TOLL	Single N	120	±20	350	1.7		
GP355N13	TOLL	Single N	135	±20	355	2.1		
GP252N15	TOLL	Single N	150	±20	252	4.2		
GP249N15	TOLL	Single N	150	±20	249	4.3		
GJ390N10	TOLT	Single N	100	±20	390	1		
GJ325N10	TOLT	Single N	100	±20	325	1.2		
GJ325N10B	TOLT	Single N	100	±20	325	1.5		

*TOLT 為頂部散熱封裝