# MME80R290P
800V 0.29Ω N-channel MOSFET

■ **Description**

MME80R290P is power MOSFET using Magnachip's advanced super junction technology that can realize very low on-resistance and gate charge. It will provide much high efficiency by using optimized charge coupling technology. These user friendly devices give an advantage of Low EMI to designers as well as low switching loss.

■ **Key Parameters**

Parameter	Value	Unit
V_{DS} @ $T_{j,max}$	850	V
$R_{DS(on),max}$	0.29	Ω
$V_{TH,typ}$	3	V
I_D	17	A
$Q_{g,typ}$	56	nC

■ **Package & Internal Circuit**

D2PAK(TO-263)
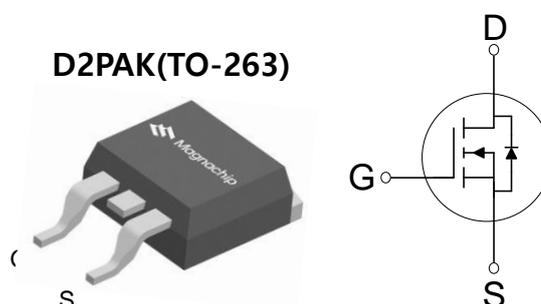
■ **Features**

- Low Power Loss by High Speed Switching and Low On-Resistance
- 100% Avalanche Tested
- Green Package – Pb Free Plating, Halogen Free

■ **Applications**

- PFC Power Supply Stages
- Switching Applications
- Adapter
- Motor Control
- DC – DC Converters

■ **Ordering Information**

Order Code	Marking	Temp. Range	Package	Packing	RoHS Status
MME80R290PRH	80R290P	-55 ~ 150℃	D2-PAK	Reel	Halogen Free

■ Absolute Maximum Rating (Tc=25℃ unless otherwise specified)

Parameter	Symbol	Rating	Unit	Note
Drain – Source voltage	V_{DSS}	800	V	
Gate – Source voltage	V_{GSS}	±30	V	
Continuous drain current[1]	I_D	17	A	T_C=25℃
		10.8	A	T_C=100℃
Pulsed drain current[2]	I_{DM}	51	A	
Power dissipation	P_D	181	W	
Single - pulse avalanche energy	E_{AS}	670	mJ	
MOSFET dv/dt ruggedness	dv/dt	50	V/ns	
Diode dv/dt ruggedness[3]	dv/dt	15	V/ns	
Storage temperature	T_{stg}	-55 ~150	℃	
Maximum operating junction temperature	T_j	150	℃	

1) Id limited by maximum junction temperature.
2) Pulse width t_P limited by $T_{j,max}$
3) $I_{SD} \leq I_D$, $V_{DS\ peak} \leq V_{(BR)DSS}$

■ Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal resistance, junction-case max	R_{thjc}	0.69	℃/W
Thermal resistance, junction-ambient max	R_{thja}	62.5	℃/W

■ Static Characteristics (T$_c$=25℃ unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Drain – Source Breakdown voltage	V$_{(BR)DSS}$	800	-	-	V	V$_{GS}$ = 0V, I$_D$=0.25mA
Gate Threshold Voltage	V$_{GS(th)}$	2.0	3.0	4.0	V	V$_{DS}$ = V$_{GS,}$ I$_D$=0.25mA
Zero Gate Voltage Drain Current	I$_{DSS}$	-	-	1	µA	V$_{DS}$ = 800V, V$_{GS}$ = 0V
Gate Leakage Current	I$_{GSS}$	-	-	100	nA	V$_{GS}$ = ±30V, V$_{DS}$ =0V
Drain-Source On State Resistance	R$_{DS(ON)}$	-	0.25	0.29	Ω	V$_{GS}$ = 10V, I$_D$ = 11A

■ Dynamic Characteristics (T$_c$=25℃ unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Input Capacitance	C$_{iss}$	-	1830	-	pF	V$_{DS}$ = 25V, V$_{GS}$ = 0V, f = 1.0MHz
Output Capacitance	C$_{oss}$	-	1510	-		
Reverse Transfer Capacitance	C$_{rss}$	-	53.2	-		
Effective Output Capacitance Energy Related [4]	C$_{o(er)}$	-	40	-		V$_{DS}$ = 0V to 640V, V$_{GS}$ = 0V,f = 1.0MHz
Turn On Delay Time	t$_{d(on)}$	-	32	-	ns	V$_{GS}$ = 10V, R$_G$ = 25Ω, V$_{DS}$ = 400V, I$_D$ = 17A
Rise Time	t$_r$	-	56.5	-		
Turn Off Delay Time	t$_{d(off)}$	-	160	-		
Fall Time	t$_f$	-	49	-		
Total Gate Charge	Q$_g$	-	56	-	nC	V$_{GS}$ = 10V, V$_{DS}$ =640V, I$_D$ = 17A
Gate – Source Charge	Q$_{gs}$	-	10.4	-		
Gate – Drain Charge	Q$_{gd}$	-	22	-		
Gate Resistance	R$_G$	-	2.05	-	Ω	V$_{GS}$ = 0V, f = 1.0MHz

4) C$_{o(er)}$ is a capacitance that gives the same stored energy as C$_{OSS}$ while V$_{DS}$ is rising from 0V to 80% V$_{(BR)DSS}$

■ **Reverse Diode Characteristics (T$_c$=25℃ unless otherwise specified)**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Continuous Diode Forward Current	I$_{SD}$	-	-	17	A	
Diode Forward Voltage	V$_{SD}$	-	-	1.4	V	I$_{SD}$ = 17 A, VGS = 0 V
Reverse Recovery Time	t$_{rr}$	-	565	-	ns	I$_{SD}$ = 17 A di/dt = 100 A/µs V$_{DD}$ = 100 V
Reverse Recovery Charge	Q$_{rr}$	-	9.6	-	µC	
Reverse Recovery Current	I$_{rrm}$	-	34.1	-	A	

![Magnachip logo]

■ **Characteristic Graph**

Fig.1 On-Region Characteristics.	Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

Fig.1 On-Region Characteristics.

Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

Fig.3 On-Resistance Variation with Temprature (Normalized)	Fig.4 Breakdown Voltage Variation vs. Temperature (Normalized)

Fig.3 On-Resistance Variation with Temprature (Normalized)

Fig.4 Breakdown Voltage Variation vs. Temperature (Normalized)

Fig.5 Transfer Characteristics	Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

Fig.5 Transfer Characteristics

Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

Fig.7 Gate Charge Characteristics
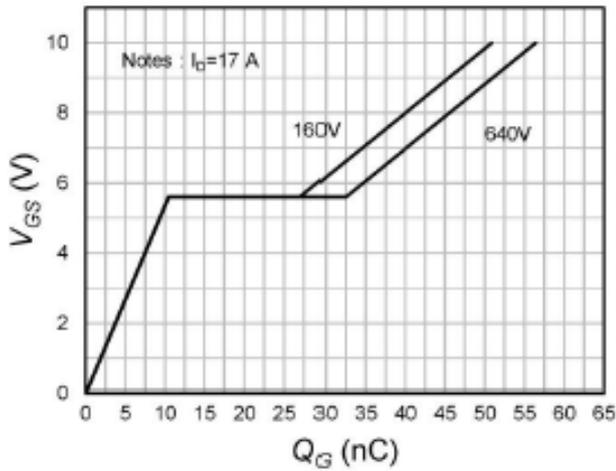
Fig.8 Capacitance Characteristics
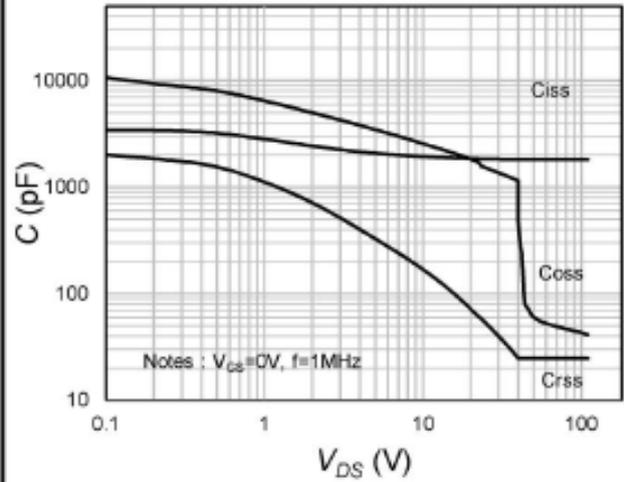
Fig.9 $V_{GS(th)}$ Variation with Temprature (Nomalized)
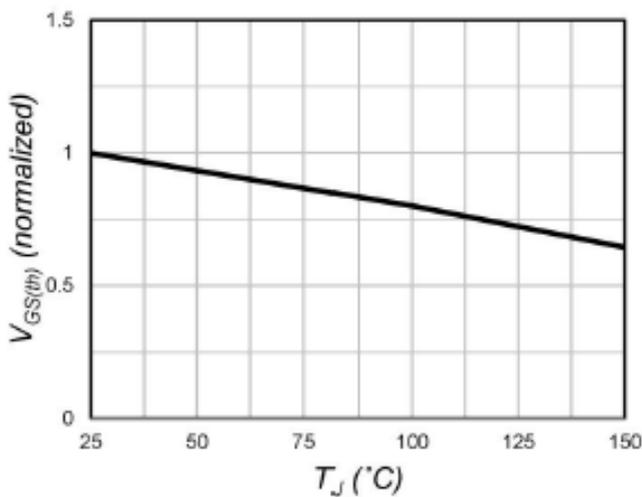
Fig.10 Maximum Drain Current vs. Case Temperature
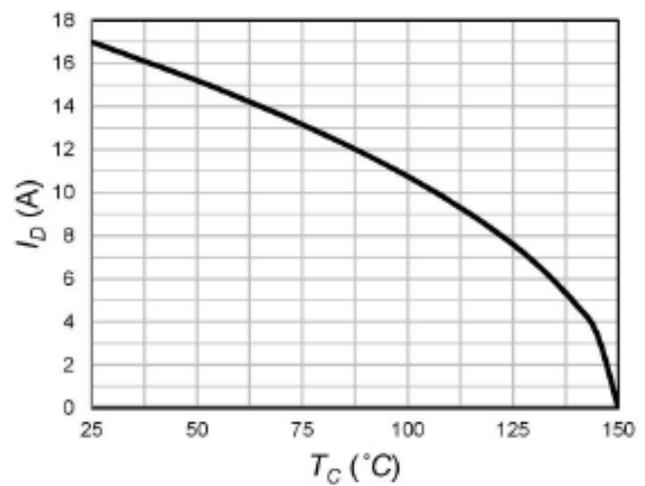
Fig.11 Single Pulse Maximum Power Dissipation
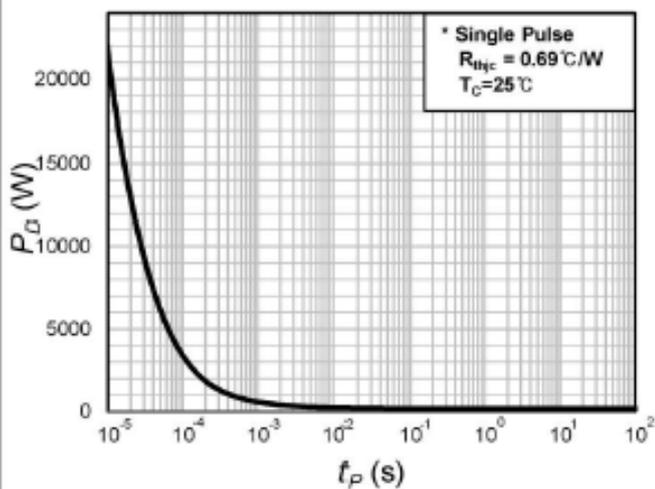
Fig.12 Output Capacitance Stored Energy
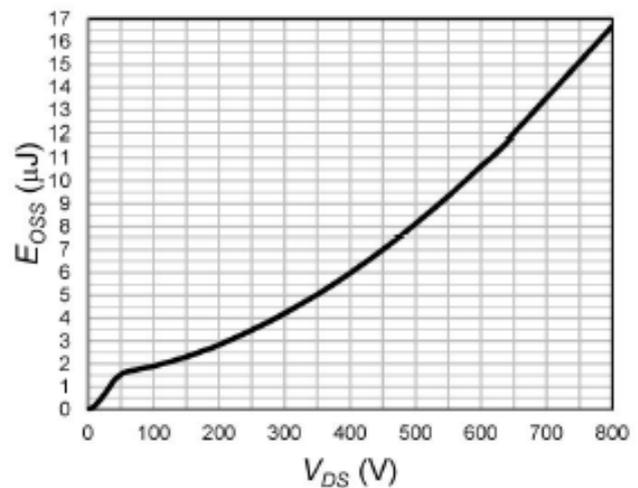
Fig.13 Transient Thermal Response Curve

* Notes:
Duty Factor, $D = t_1/t_2$
PEAK $T_j - T_C = P_{DM} * Z_{thjc}$
$R_{thjc} = 0.69°C/W$
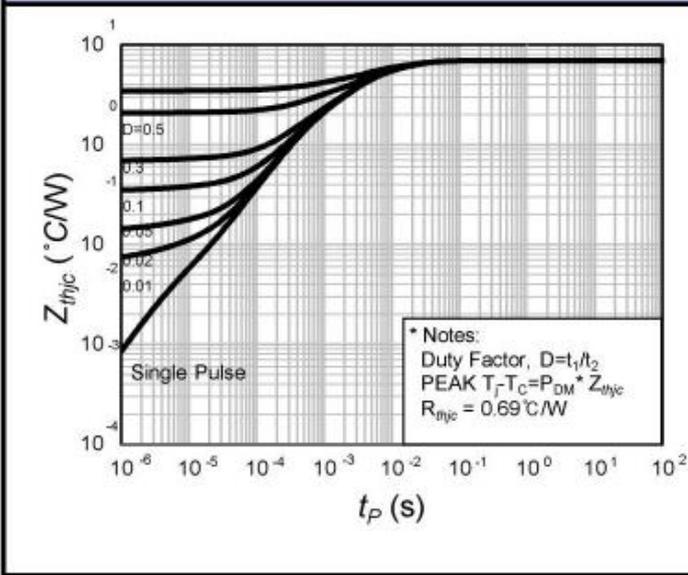
Fig.14 Maximum Safe Operating Area
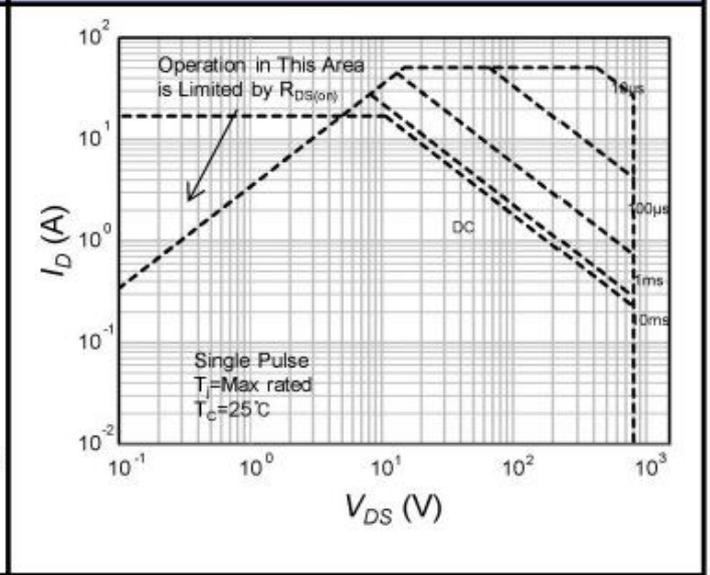
■ **Test Circuit**
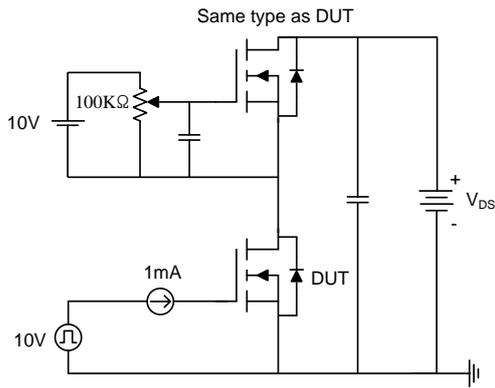
Fig15-1. Gate charge measurement circuit
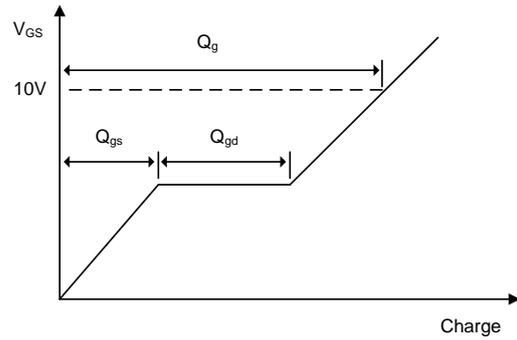
Fig15-2. Gate charge waveform
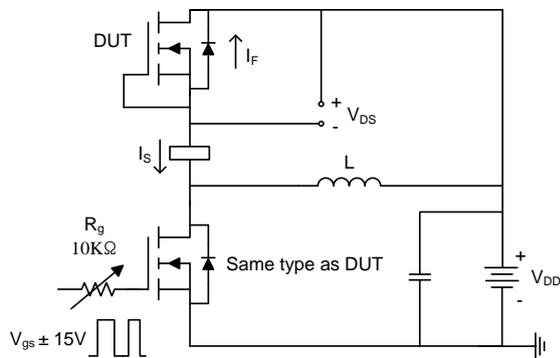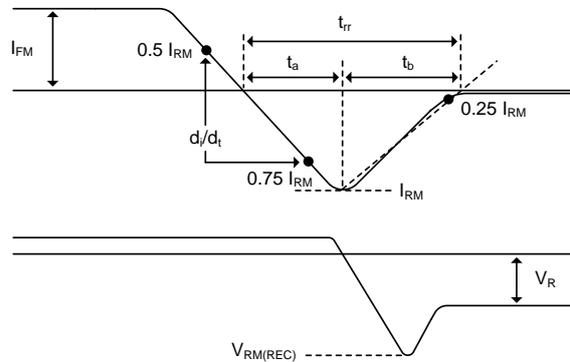
Fig16-1. Diode reverse recovery test circuit
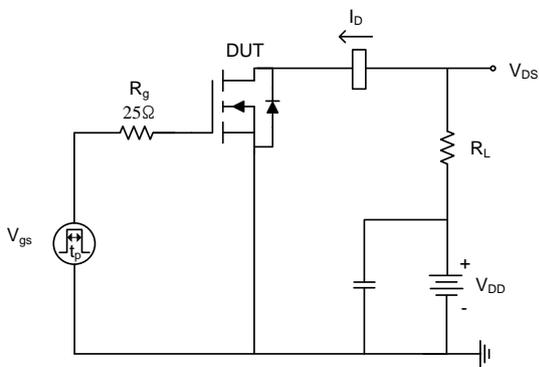
Fig16-1. Diode reverse recovery test waveform

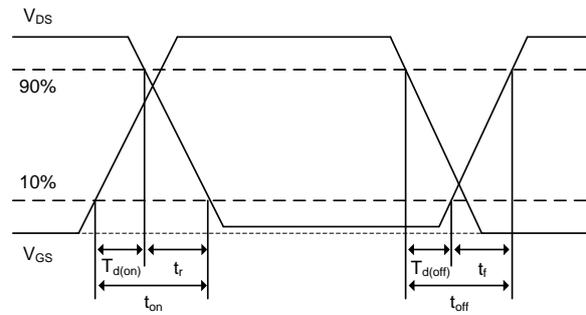Fig17-1. Switching time test circuit for resistive load

Fig17-2. Switching time waveform

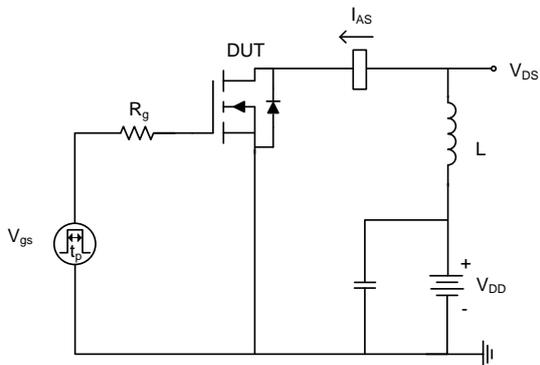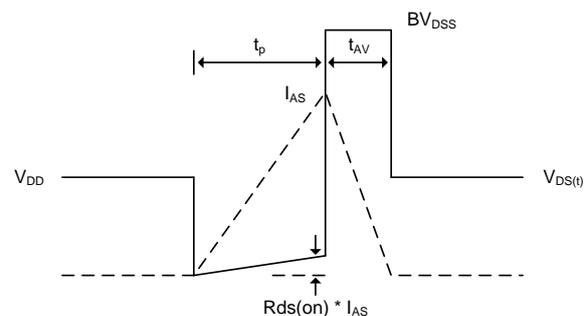Fig18-1. Unclamped inductive load test circuit

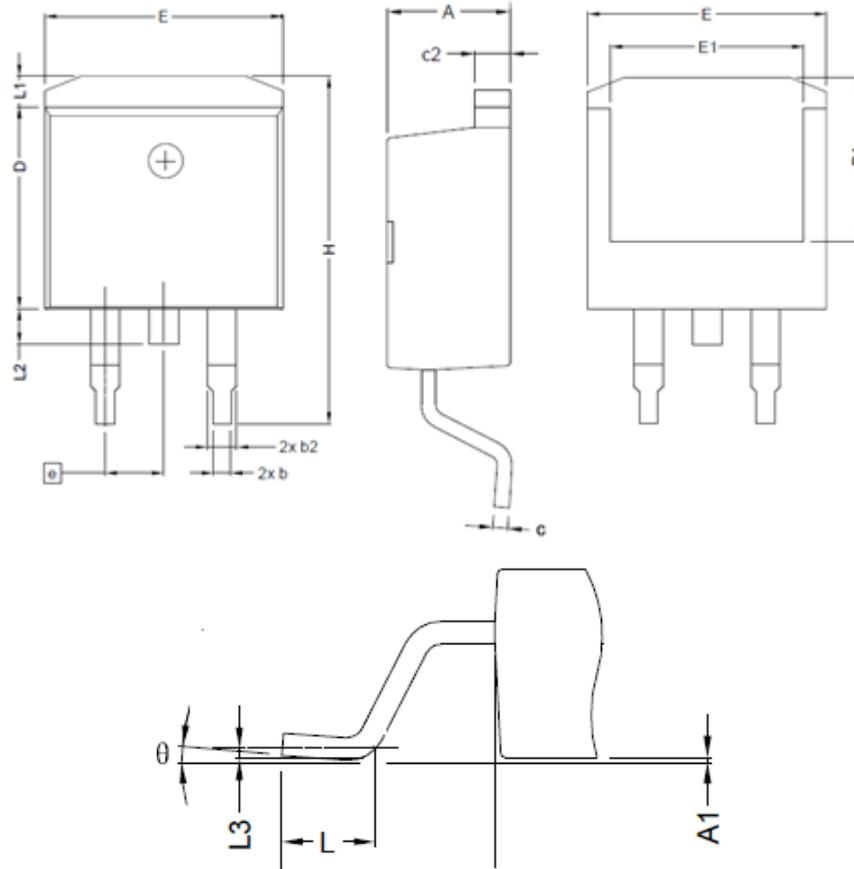Fig18-2. Unclamped inductive waveform

■ Physical Dimension

TO-263 (D2PAK) , 3L

Dimensions are in millimeters, unless otherwise specified

Symbol	Millimeters(mm)	
	Minimum	Maximum
A	4.064	4.826
A1	-	0.254
b	0.508	0.99
b2	1.140	1.778
c	0.340	0.736
c2	1.140	1.65
D	8.382	9.652
D1	6.6	-
E	9.652	10.668
E1	6.223	-
e	BSC 2.54	
H	14.605	15.875
L	1.778	2.794
L1	-	1.676
L2	-	1.778
L3	BSC 0.254	
Θ	0	8

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