40V P-Channel Power MOSFET

General Description

The CMY9004PL is the high cell density trenched P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications. The CMY9004PL meets the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

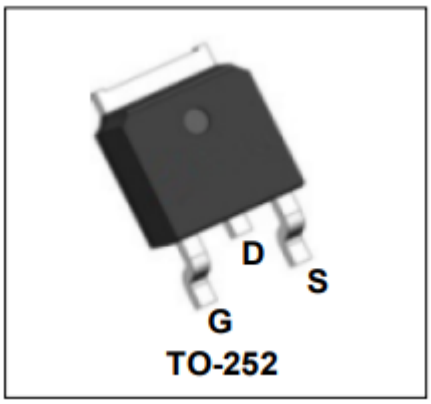
Product Summary

Item	Typical Value	Unit
V_{DS} @ T_{JMAX}	-40	V
$V_{GS(th)}$	-1.75	V
Q_g @ V_{GS} =-4.5V	9	nC
$R_{DS(on)}$ @ V_{GS} =-10V	40	mΩ

Features

- VDS = -40V, ID = -18A
- RDS(on) < 50mΩ @ VGS = -10V
- RDS(on) < 60mΩ @ VGS = -4.5V
- Extremely Low Switching Loss
- 150°C operating temperature.
- Pb-free, Halogen-free.
- RoHS compliant.
- 100% UIS and R_g tested.

Pin Configuration



Applications

- Switching Mode Power Supply
- DC/DC Conversion
- AC/DC Conversion
- Motor Drive
- UPS
- LED Display/ Environment Lighting
- Appliances and White Goods

Absolute Ratings (T_A = 25℃ unless otherwise noted)

Parameter	Symbol	Value	Units
Drain-Source Voltage	V_{DS}	-40	V
Gate-Source Voltage	V_{GS}	±20	V
Single Pulse UIS Capability, 0.1mH	E_{AS}	37	mJ
Continuous Drain Current, T_C = 25°C/100°C	I_D	-23/-18	A
Junction Temperature Maximum	T_{JMAX}	150	°C
Storage Temperature	$T_{Storage}$	-55 to 150	°C

Electrical Characteristics

Static (T_J=25℃ unless otherwise specified)						
Parameter	**Symbol**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Units**
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V, I_D = 250uA	-40	---	---	V
Gate-Source Leakage	I_{GSS}	V_{GS} = ± 20V, V_{DS} = 0V	---	---	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -32V, V_{GS} = 0V, T_J=25℃	---	---	1	uA
		V_{DS} = -32V, V_{GS} = 0V, T_J=55℃	---	---	5	
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS} = -10V, I_D = -18A, T_J=25℃	---	---	40	mΩ
		V_{GS} = -4.5V, I_D = -12A, T_J=25℃	---	---	65	
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250uA	-1.0	---	-2.5	V
Reverse diode forward voltage	V_{FSD}	IS = 20A, VGS = 0V	---	---	-1	V
Dynamic (T_J=25℃ unless otherwise specified)						
Parameter	**Symbol**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Units**
Input Capacitance	Ciss	V_{GS} = 0V, V_{DS} = -15 V, f = 1MHz	---	1004	---	pF
Output Capacitance	Coss		---	108	---	
Reverse Transfer Capacitance	Crss		---	80	---	
Gate-Source Charge	Q_{gs}	V_{DS} = -20V, I_D = -12A, V_{GS} = -4.5 V	---	2.54	---	nC
Gate-Drain Charge	Q_{gd}		---	3.1	---	
Gate charge total	Q_g		---	9	---	
Turn-on delay time	$T_{d(on)}$	V_{DD} = -15V, I_D = -1A, V_{GS} = -10V, $R_{G,ext}$ = 3.3Ω	---	19.2	---	ms
Rise time	T_r		---	12.8	---	ms
Turn-off delay time	$T_{d(off)}$		---	48.6	---	ms
Fall time	T_f		---	4.6	---	ms
Transconductance	g_{fs}	V_{DS}≧2*I_D*R_{DS}(on)max, I_D=-18A	---	12.6	---	S

P-Channel Typical Characteristics

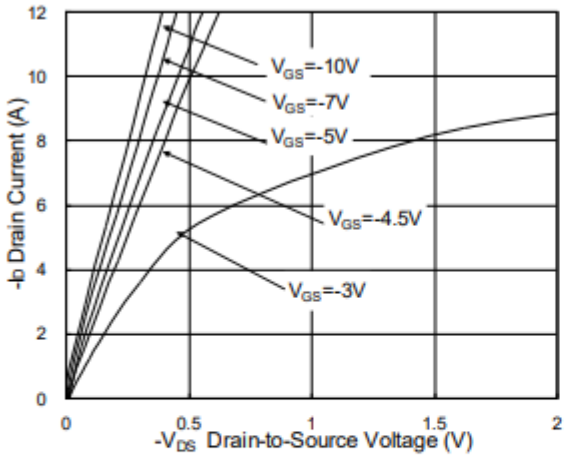


Fig.1 Typical Output Characteristics

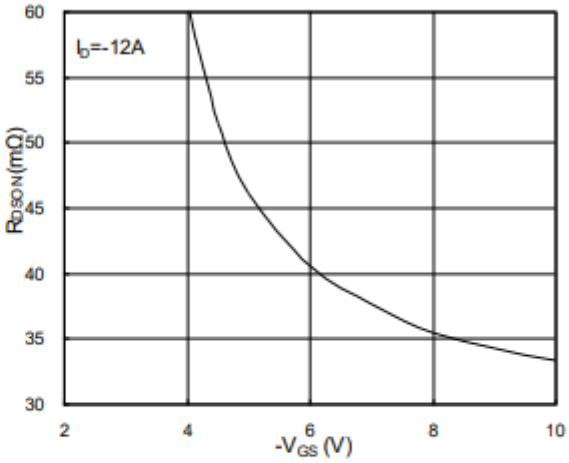


Fig.2 On-Resistance v.s Gate-Source

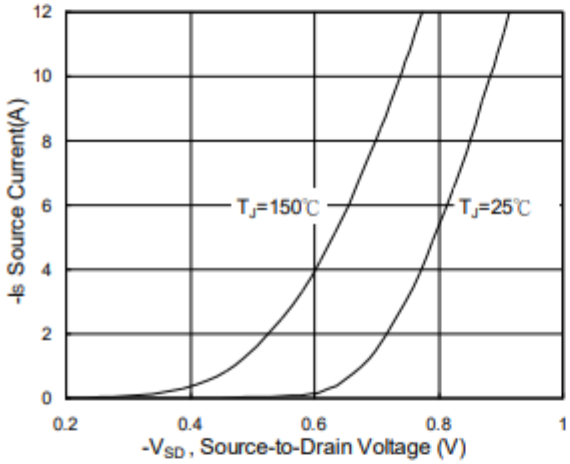


Fig.3 Forward Characteristics of Reverse

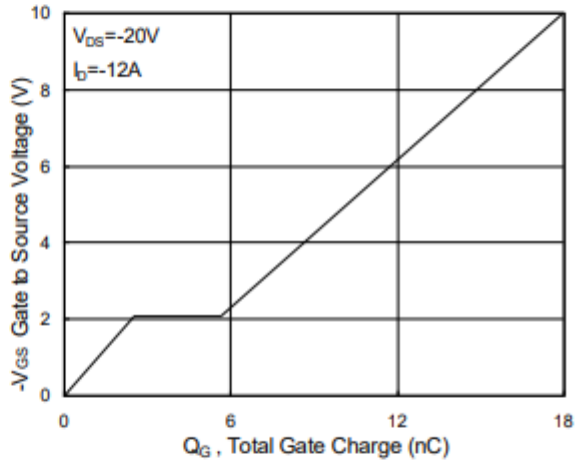


Fig.4 Gate-Charge Characteristics

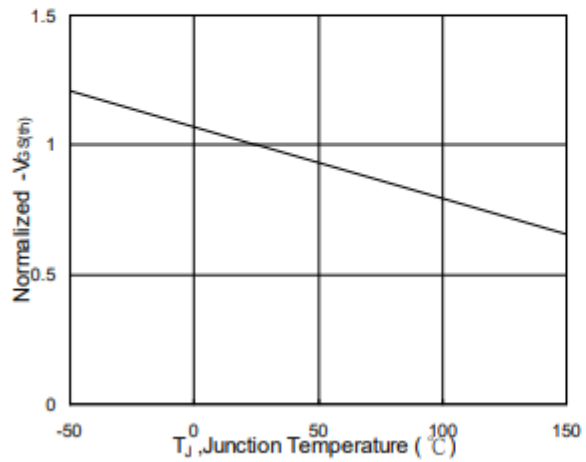


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

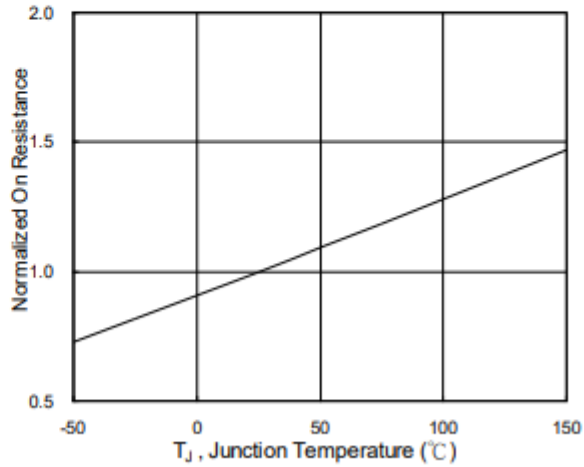


Fig.6 Normalized R_{DSON} v.s T_J

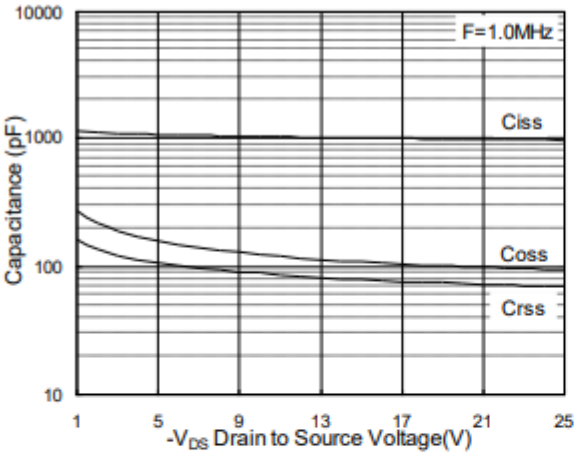


Fig.7 Capacitance

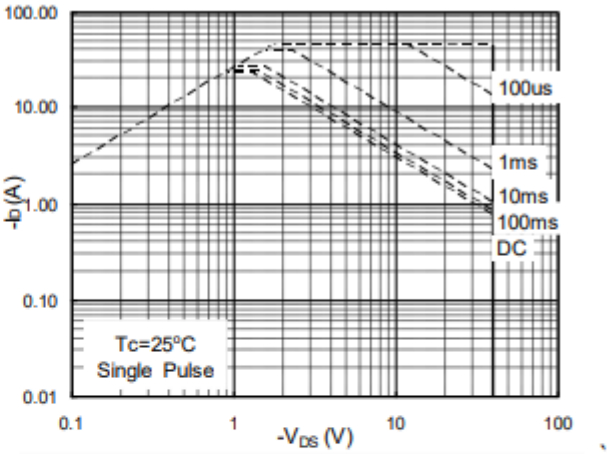


Fig.8 Safe Operating Area

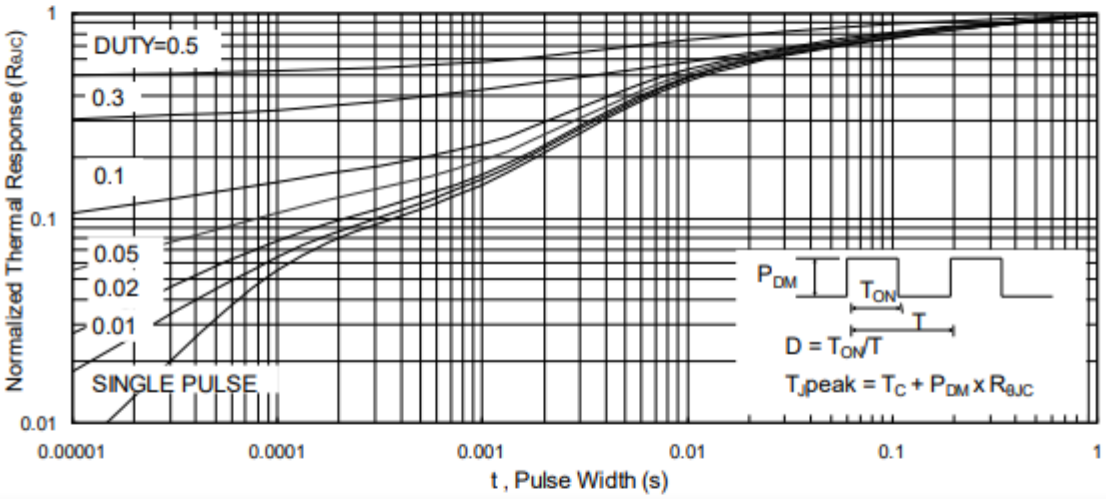


Fig.9 Normalized Maximum Transient Thermal Impedance

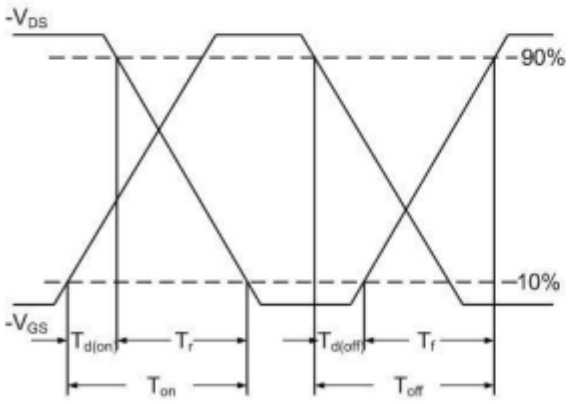


Fig.10 Switching Time Waveform

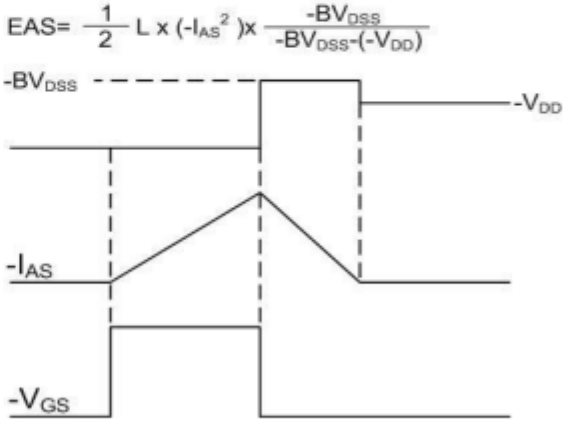
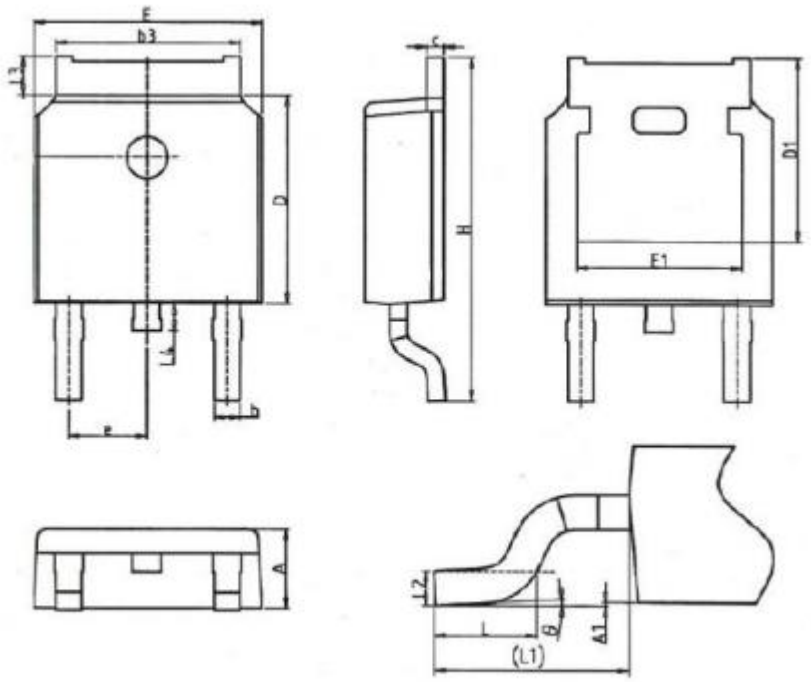
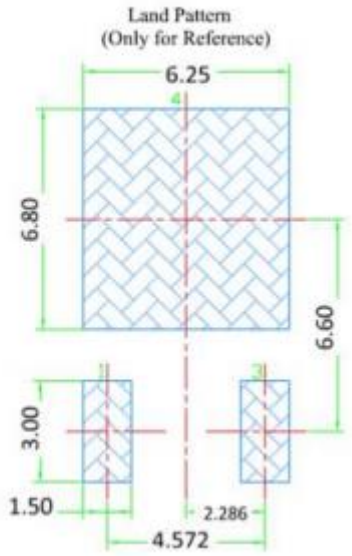


Fig.11 Unclamped Inductive Waveform

TO252-2L Package Outline



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.18	2.40	0.086	0.095
A1	-	0.2	-	0.008
b	0.68	0.9	0.026	0.036
b3	4.95	5.46	0.194	0.215
c	0.43	0.89	0.017	0.035
D	5.97	6.22	0.235	0.245
D1	5.300REF		0.209REF	
E	6.35	6.73	0.250	0.265
E1	4.32	--	0.170	-
e	2.286BSC		0.09BSC	
H	9.4	10.5	0.370	0.413
L	1.38	1.78	0.054	0.070
L1	2.90REF		0.114REF	
L2	0.51BSC		0.020BSC	
L3	0.88	1.28	0.034	0.050
L4	0.5	1	0.019	0.039
Θ	0°	8°	0°	8°


Land Pattern
(Only for Reference)
6.25
6.80
6.60
3.00
1.50
2.286
4.572

UNIT: mm