

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
60V	16mΩ@10V	40A
	20mΩ@4.5V	
-60V	24mΩ@-10V	-40A
	29mΩ@-4.5V	

Feature

- Trench Technology Power MOSFET
- Low $R_{DS(ON)}$
- Low Gate Charge
- Low Gate Resistance
- 100% UIS Tested

Application

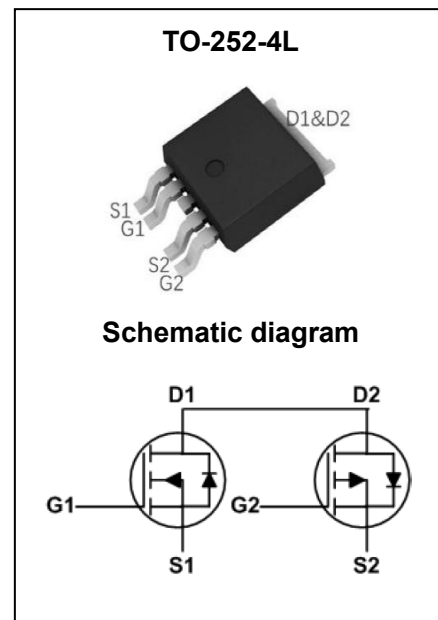
- Power Management
- Load Switching

Package Marking and Ordering Information

Part Number	Package	Marking	Packing	Reel Size	Tape Width	Qty
GPM210NP06LTG	TO-252-4L	M210NP06L	Reel & Tape	330mm	16mm	2500pcs

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter		Symbol	Value		Unit
Drain-Source Voltage		V_{DS}	60	-60	V
Gate-Source Voltage		V_{GS}	±20	±20	V
Continuous Drain Current ¹	$T_C = 25^\circ\text{C}$	I_D	40	-40	A
	$T_C = 100^\circ\text{C}$		25	-25	
Pulsed Drain Current ²		I_{DM}	160	-160	A
Single Pulsed Avalanche Current ³		I_{AS}	17	-25	A
Single Pulsed Avalanche Energy ³		E_{AS}	72	156	mJ
Power Dissipation ⁵		P_D	75		W
Thermal Resistance from Junction to Ambient ⁶		$R_{\theta JA}$	70		$^\circ\text{C/W}$
Thermal Resistance from Junction to Case		$R_{\theta JC}$	1.88		$^\circ\text{C/W}$
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55~ +150		$^\circ\text{C}$



MOSFET ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)
NMOS:

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	60			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 60V, V_{GS} = 0V$			1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$			± 100	nA
On Characteristics ⁴						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1	1.6	3	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$		16	20	m Ω
		$V_{GS} = 4.5V, I_D = 20A$		20	30	
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS} = 30V, V_{GS} = 0V, f = 1MHz$		2291		pF
Output Capacitance	C_{oss}			92		
Reverse Transfer Capacitance	C_{rss}			81		
Gate Resistance	R_g	$V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$		2.2		Ω
Switching Characteristics						
Total Gate Charge	Q_g	$V_{DS} = 30V, V_{GS} = 10V, I_D = 20A$		46		nC
Gate-Source Charge	Q_{gs}			7.3		
Gate-Drain Charge	Q_{gd}			11		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 30V, V_{GS} = 10V, R_L = 3\Omega, R_G = 6\Omega$		5		ns
Turn-On Rise Time	t_r			21		
Turn-Off Delay Time	$t_{d(off)}$			12		
Turn-Off Fall Time	t_f			4		
Source-Drain Diode Characteristics						
Diode Forward Voltage ⁴	V_{SD}	$V_{GS} = 0V, I_S = 20A$			1.2	V

MOSFET ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)
PMOS:

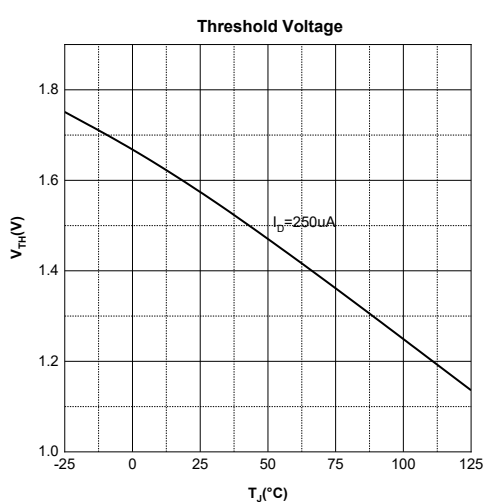
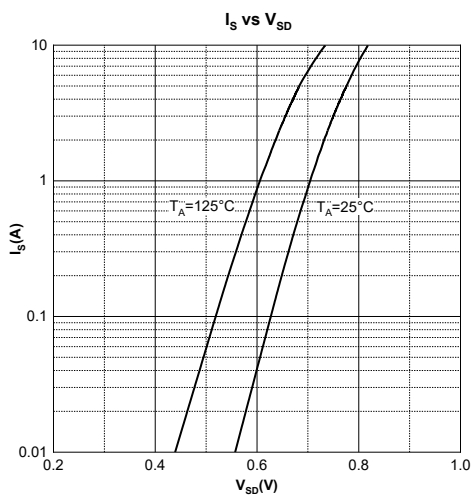
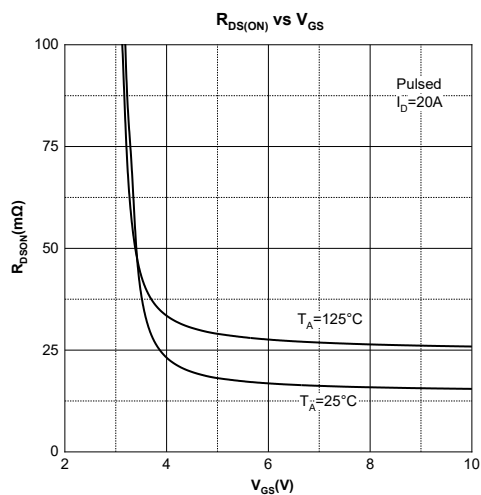
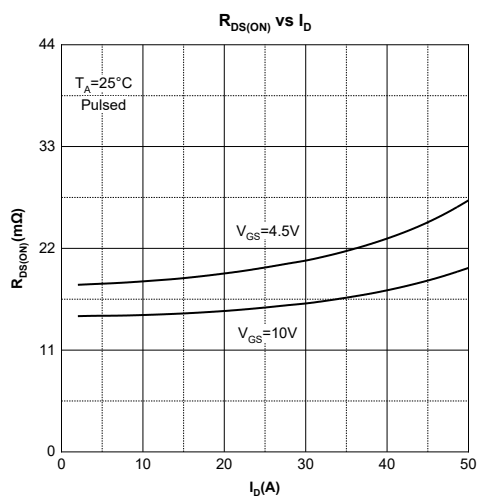
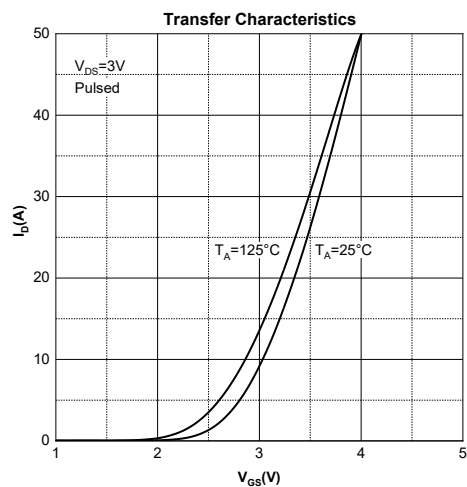
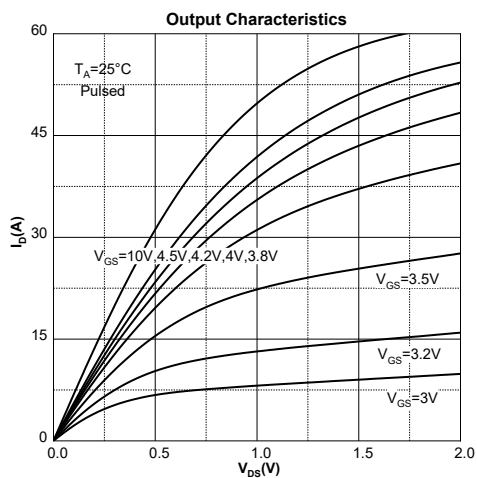
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-60			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -60V, V_{GS} = 0V$			-1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$			± 100	nA
On Characteristics ⁴						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1	-1.7	-3	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = -10V, I_D = -20A$		24	31	m Ω
		$V_{GS} = -4.5V, I_D = -20A$		29	41	
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS} = -30V, V_{GS} = 0V, f = 1MHz$		2672		pF
Output Capacitance	C_{oss}			149		
Reverse Transfer Capacitance	C_{rss}			131		
Gate Resistance	R_g	$V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$		9.9		Ω
Switching Characteristics						
Total Gate Charge	Q_g	$V_{DS} = -30V, V_{GS} = -10V, I_D = -20A$		54		nC
Gate-Source Charge	Q_{gs}			8		
Gate-Drain Charge	Q_{gd}			11		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -20V, V_{GS} = -10V, R_G = 3\Omega, R_L = 1.5\Omega$		7		ns
Turn-On Rise Time	t_r			3		
Turn-Off Delay Time	$t_{d(off)}$			32		
Turn-Off Fall Time	t_f			6		
Source-Drain Diode Characteristics						
Diode Forward Voltage ⁴	V_{SD}	$V_{GS} = 0V, I_S = -20A$			-1.2	V

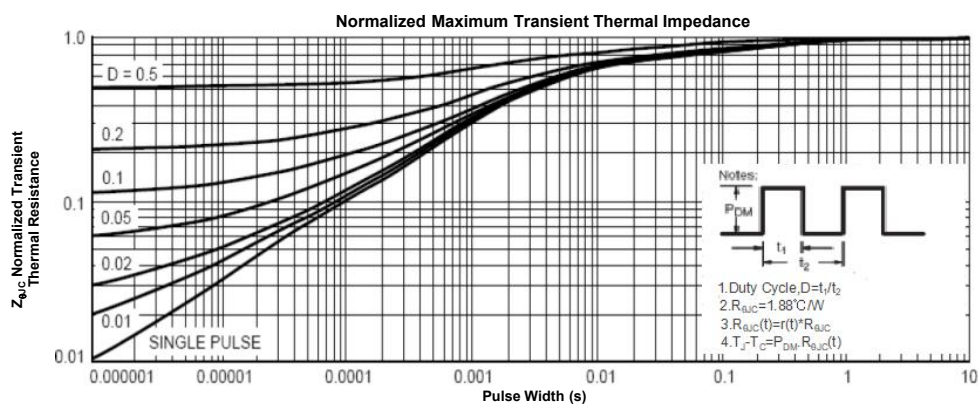
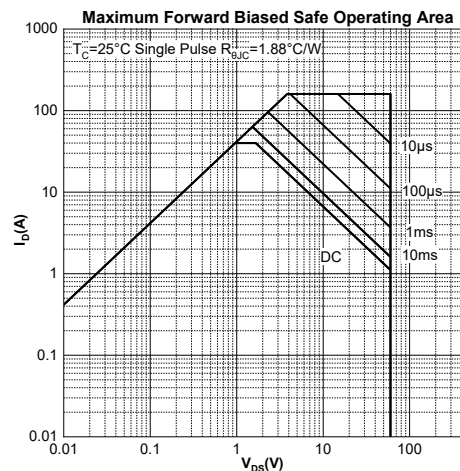
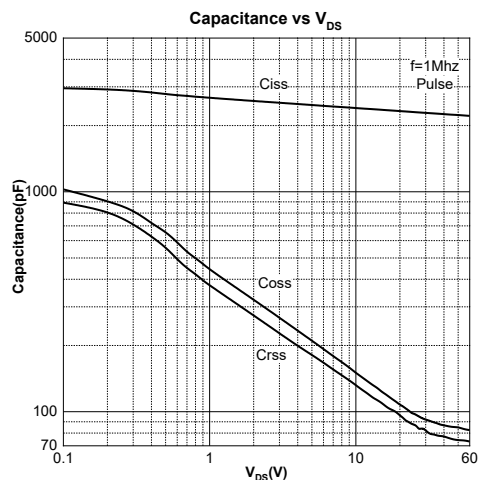
Notes:

- 1.The maximum current rating is limited by package. And device mounted on a large heatsink.
- 2.Pulse Test: Pulse Width $\leq 10\mu s$, duty cycle $\leq 1\%$.
- 3.EAS condition: $V_{DD} = \pm 60V, V_{GS} = \pm 10V, L = 0.5mH, R_G = 25\Omega$ Starting $T_J = 25^\circ\text{C}$.
- 4.Pulse Test: Pulse Width $\leq 300\mu s$, duty cycle $\leq 2\%$.
- 5.The power dissipation P_D is limited by $T_{J(MAX)} = 150^\circ\text{C}$. And device mounted on a large heatsink.
- 6.Device mounted on $1in^2$ FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^\circ\text{C}$.

Typical Characteristics

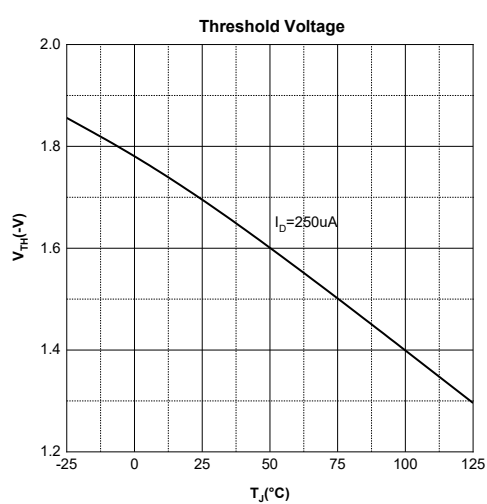
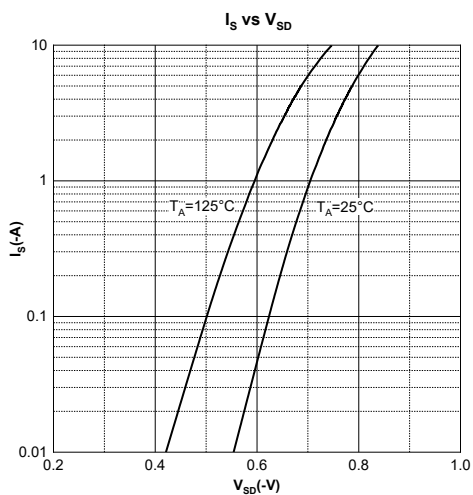
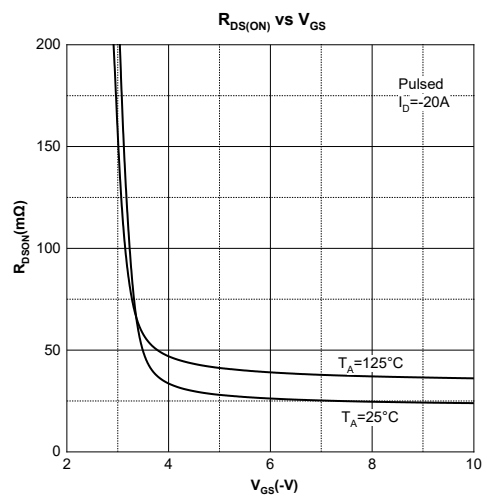
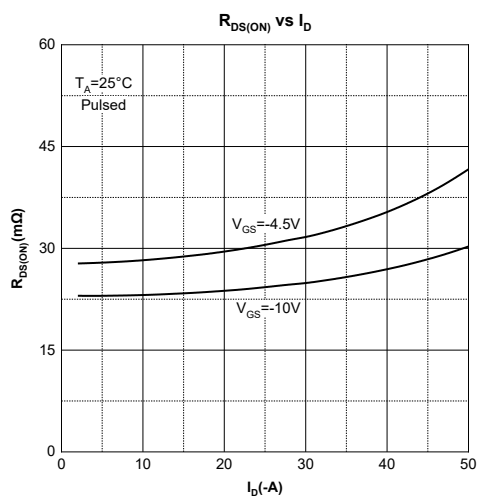
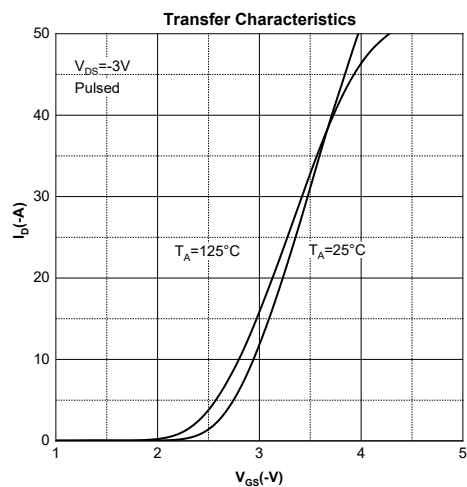
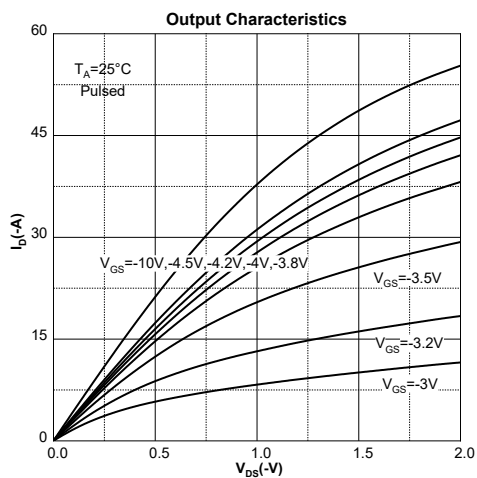
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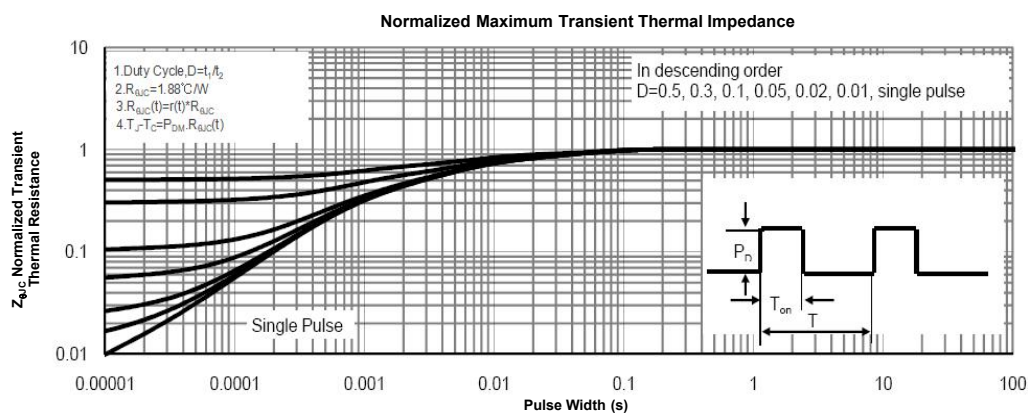
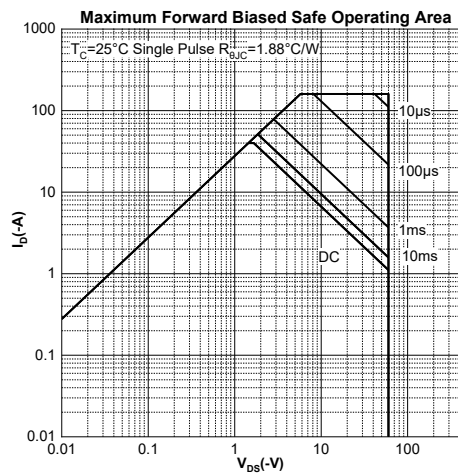
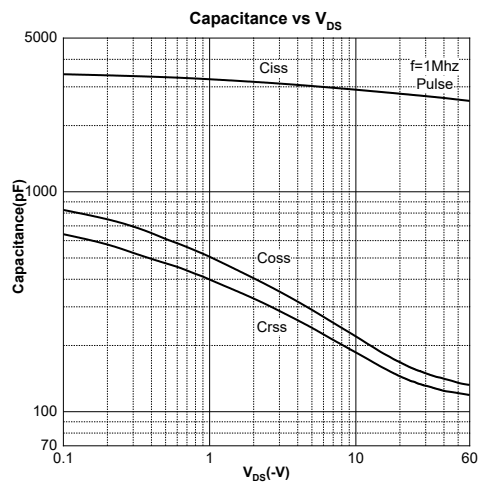


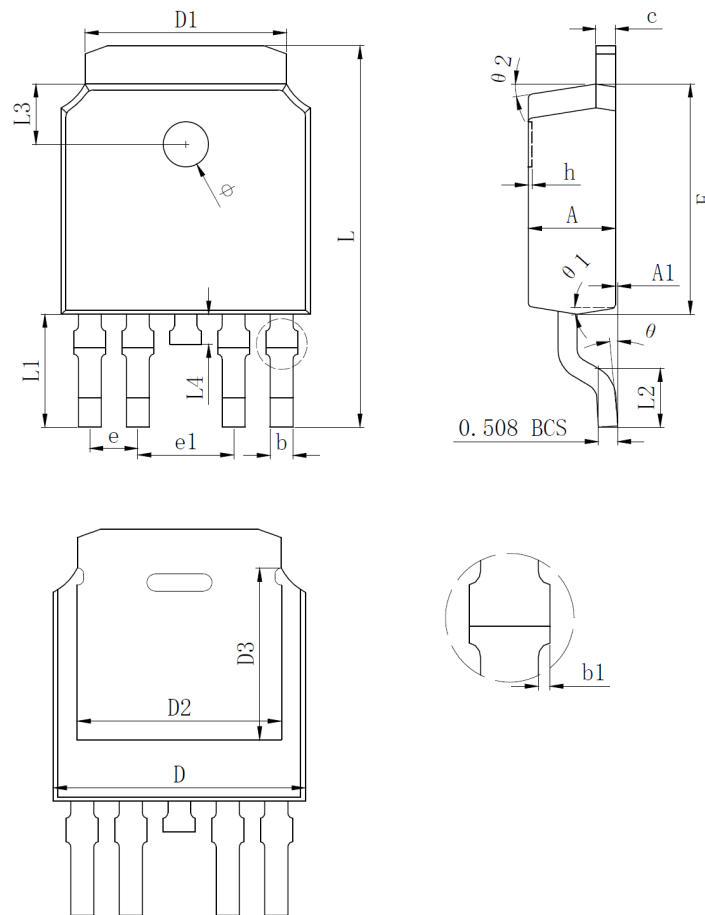


Typical Characteristics

PMOS:





TO-252-4L Package Information


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.550	0.650	0.022	0.026
b1	0.000	0.120	0.000	0.005
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.334REF		0.210REF	
D2	5.346REF		0.210REF	
D3	4.490REF		0.177REF	
E	6.000	6.200	0.236	0.244
e	1.270TYP		0.050TYP	
e1	2.540TYP		0.100TYP	
h	0.000	0.200	0.000	0.008
L	9.900	10.300	0.390	0.406
L1	2.988REF		0.118REF	
L2	1.400	1.700	0.055	0.067
L3	1.600REF		0.063REF	
L4	0.700	0.900	0.028	0.035
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
$\theta 1$	9°TYP		9°TYP	
$\theta 2$	9°TYP		9°TYP	

Attention:

- GreenPower Electronics reserves the right to improve product design function and reliability without notice.
- Any and all semiconductor products have certain probability to fail or malfunction, which may result in personal injury, death or property damage. Customer are solely responsible for providing adequate safe measures when design their systems.
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