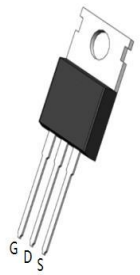
GPT166N25NTB

250V N-Channel MOSFET

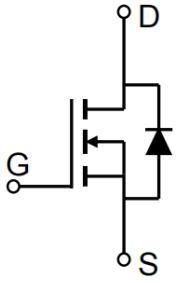
Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
250V	16.6mΩ@10V	93A

TO-220-3L-C



Schematic diagram



Feature

- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Split Gate Trench Technology
- 100% UIS TESTED
- 100% Rg TESTED

Application

- Synchronous Rectification in SMPS
- Hard Switching and High Speed Circuit
- Power Tools
- UPS
- Motor Control

Package Marking and Ordering Information

Part Number	Package	Marking	Packing	Tube	Qty
GPT166N25NTB	TO-220-3L-C	T166N25N	Tube	50pcs	5000pcs

ABSOLUTE MAXIMUM RATINGS (T_A=25℃ unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain - Source Voltage		V_{DS}	250	V
Gate - Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C = 25℃	I_D	93	A
	T_C = 100℃		66	
Pulsed Drain Current		I_{DM}	290	A
Single Pulsed Avalanche Energy[1]		E_{AS}	180	mJ
Power Dissipation	T_C = 25℃	P_D	429	W
Thermal Resistance from Junction to Ambient		$R_{\theta JA}$	60	℃/W
Thermal Resistance from Junction to Case		$R_{\theta JC}$	0.35	℃/W
Operating Junction And Storage Temperature		T_J,T_{STG}	-55~ +175	℃

MOSFET ELECTRICAL CHARACTERISTICS (T_A=25℃ unless otherwise noted)

Parameter	Symbol	Test Condition		Min	Type	Max	Unit
Off Characteristics							
Drain - Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA		250			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 200V	T_J = 25℃			1	μA
		V_{GS} = 0V	T_J = 100℃			100	μA
Gate - Body Leakage Current	I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V				±100	nA
On Characteristics							
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA		2	3	4	V
Drain-source On-resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 20A			16.6	22	mΩ
Transconductance	g_{fs}	V_{DS}=5V, I_D=20A			70		S
Dynamic Characteristics							
Input Capacitance	C_{iss}	V_{DS} = 100V, V_{GS} = 0V, f = 1MHz			4950		pF
Output Capacitance	C_{oss}				348		
Reverse Transfer Capacitance	C_{rss}				7		
Gate Resistance	R_G	f=1MHz			3.7		Ω
Switching Characteristics							
Total Gate Charge	Q_g	V_{DS} = 125V, I_D = 20A V_{GS} = 10V			58		nC
Gate-source Charge	Q_{gs}				18		
Gate-drain Charge	Q_{gd}				6		
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 125V, V_{GS} = 10V, I_D = 20A R_G = 10Ω			17		ns
Turn-on Rise Time	t_r				22		
Turn-off Delay Time	$t_{d(off)}$				38		
Turn-off Fall Time	t_f				11		
Source - Drain Diode Characteristics							
Diode Forward Voltage	V_{SD}	V_{GS} = 0V, I_S = 20A			0.9		V
Reverse Recovery Time	t_{rr}	V_R=125V, I_F= 20A,dI/dt=100A/us			168		ns
Reverse Recovery Charge	Q_{rr}				840		nC

Notes：

1. L=0.4mH, TC=25℃.

Typical Characteristics

Fig 1. Typical Output Characteristics

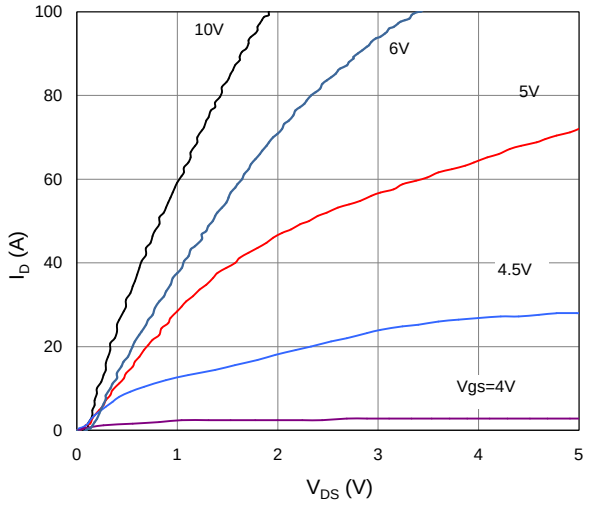


Figure 2. On-Resistance vs. Gate-Source Voltage

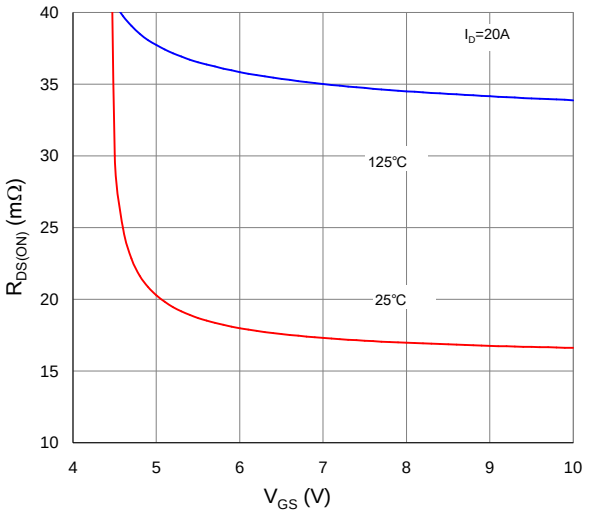


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

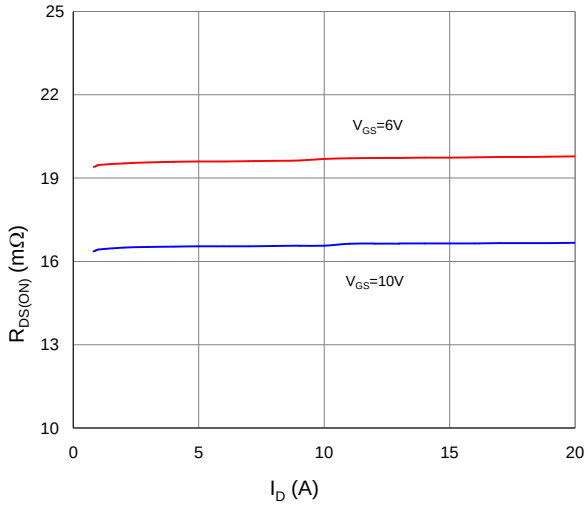


Figure 4. Normalized On-Resistance vs. Junction Temperature

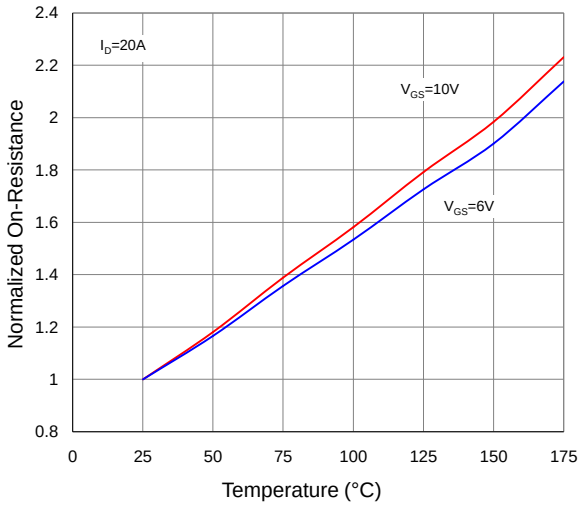


Figure 5. Typical Transfer Characteristics

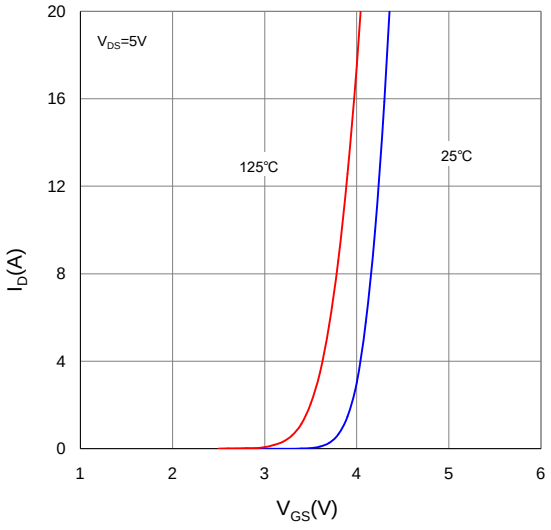
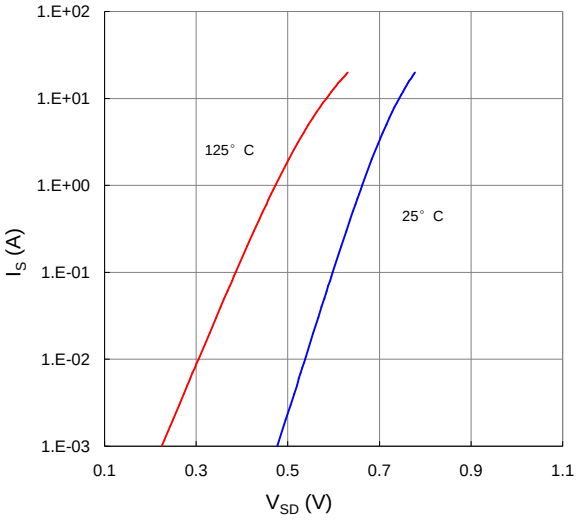


Figure 6. Typical Source-Drain Diode Forward Voltage



Typical Characteristics

Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

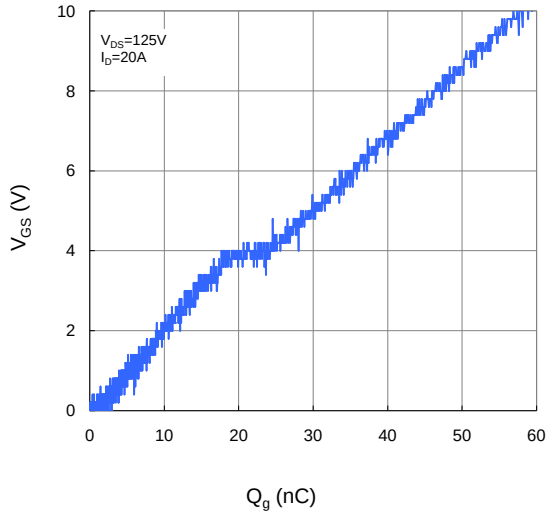


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

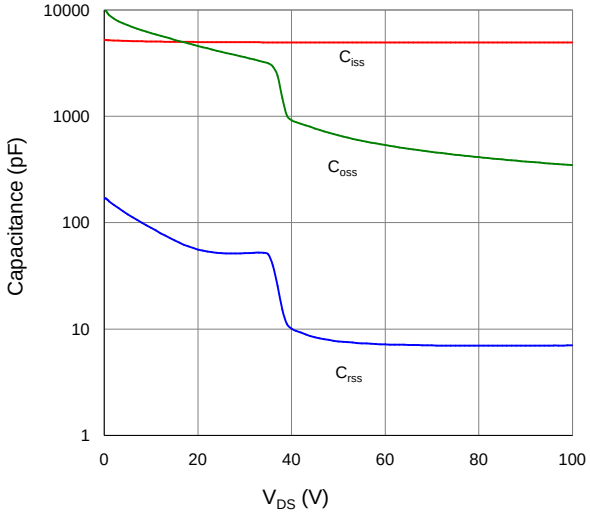


Figure 9. Maximum Safe Operating Area

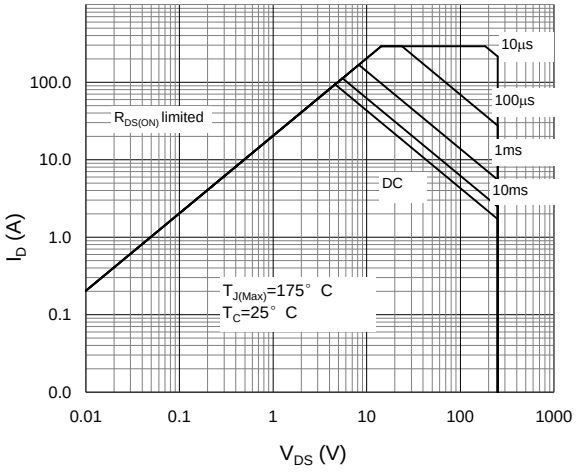


Figure 10. Maximun Drain Current vs. Case Temperature

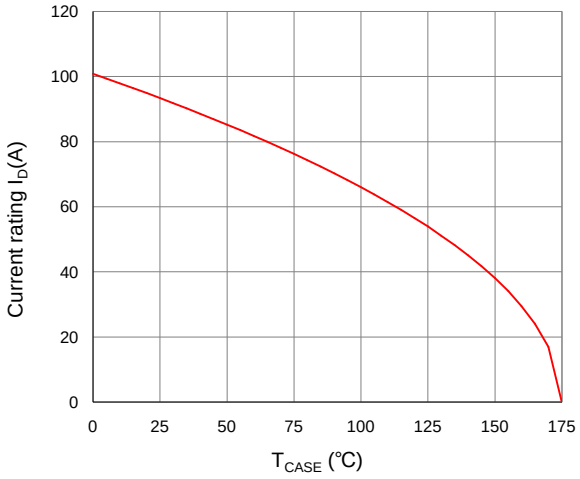
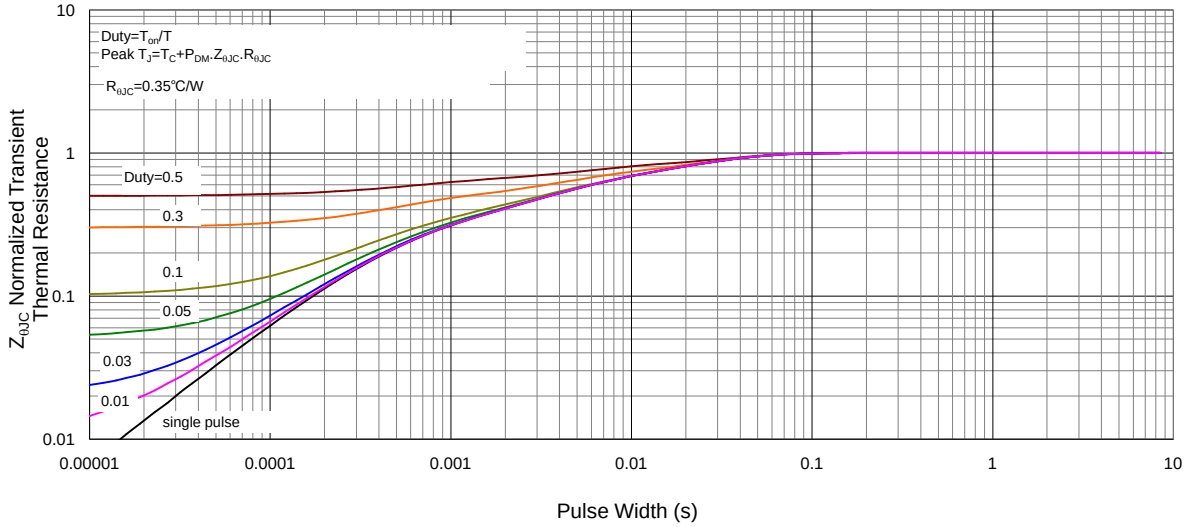
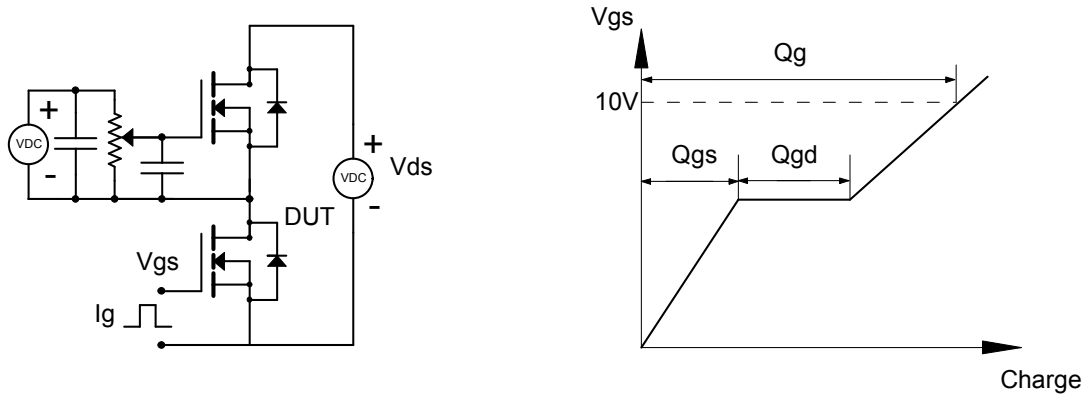


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Case

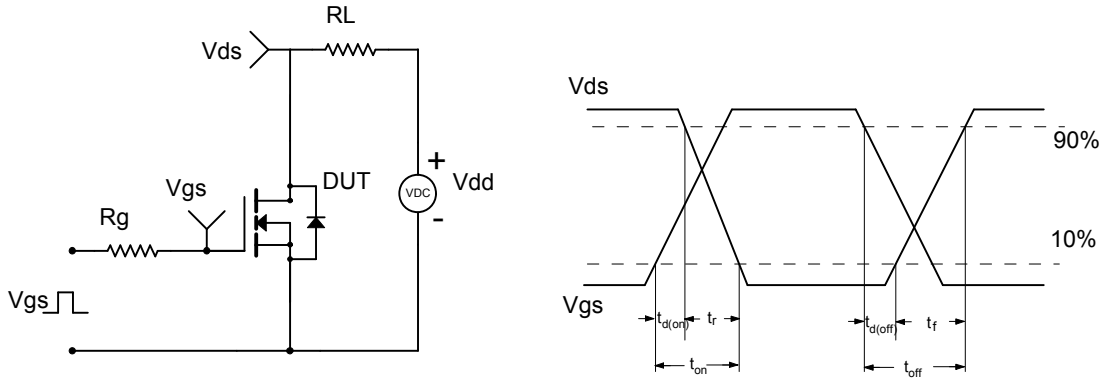


Test Circuit

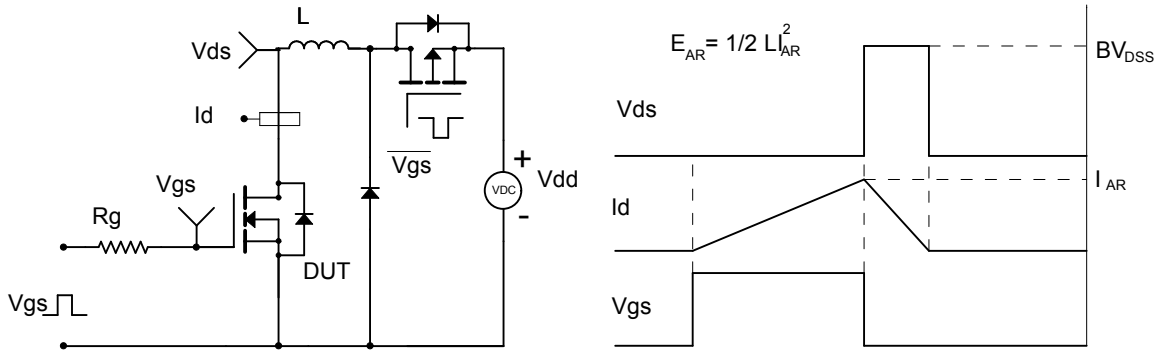
Gate Charge Test Circuit & Waveform



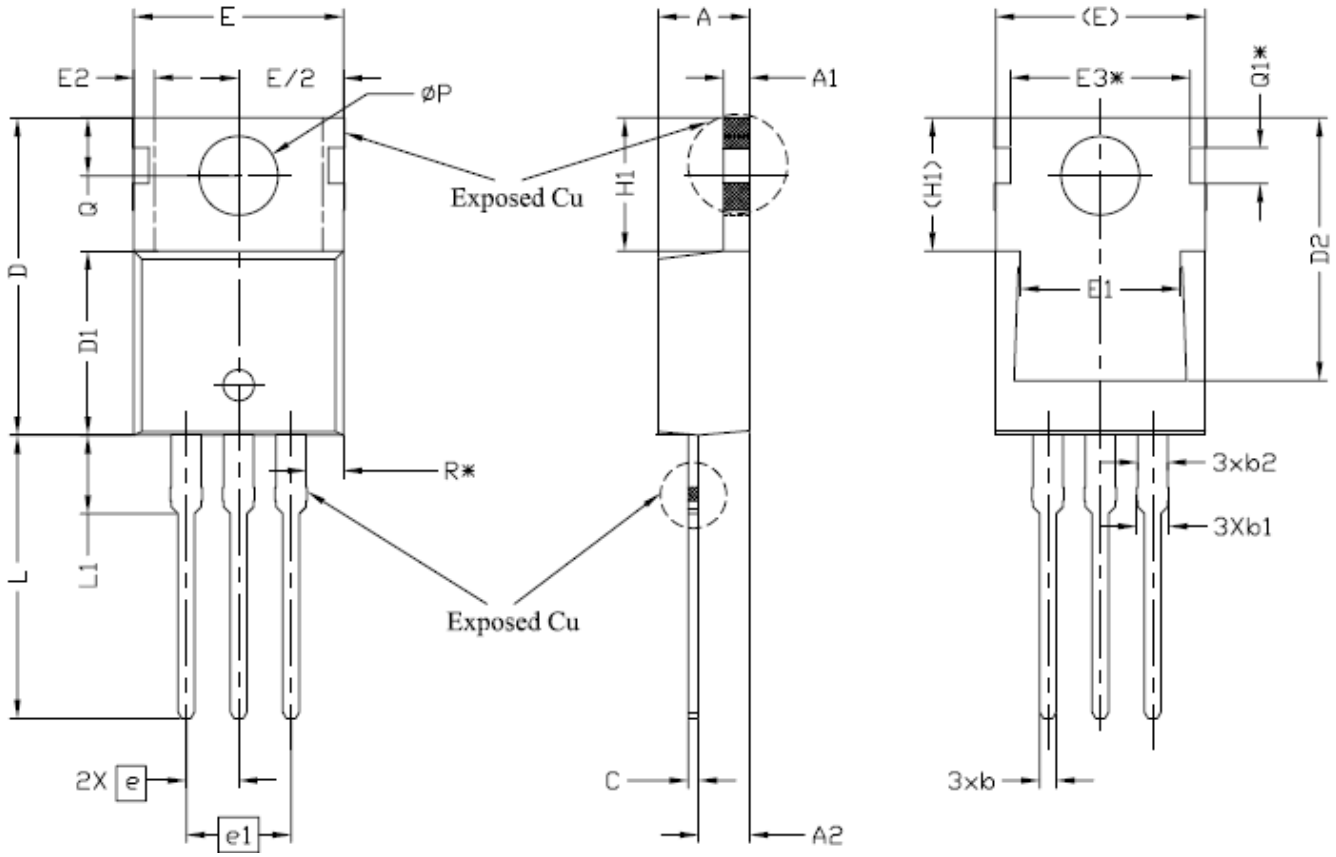
Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



TO-220-3L-C Package Information



Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min.	Max.		Min.	Max.
A	4.24	4.64	E2	-	0.76
A1	1.15	1.40	E3*	8.70REF	
A2	2.30	2.70	e	2.54BSC	
b	0.7	0.9	e1	5.08BSC	
b1	1.20	1.70	H1	6.30	6.60
b2	1.20	1.70	L	13.47	13.97
c	0.40	0.60	L1	3.60	4.00
D	14.70	16.00	ΦP	3.75	3.93
D1	8.82	9.02	Q	2.60	3.00
D2	12.63	12.83	Q1*	1.73REF	
E	9.96	10.36	R*	1.82REF	
E1	6.86	8.89			

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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