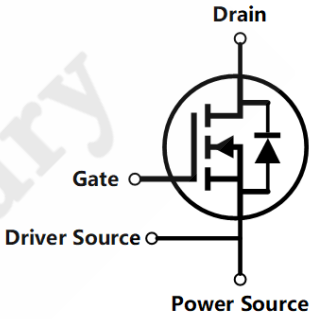
SiC MOS P3M06025K4
N-Channel Enhancement Mode



Features

- Qualified to AEC-Q101
- High Blocking Voltage with Low On-Resistance
- High-Frequency Operation
- Ultra-Small Q_{gd}
- 100% UIS tested



Standards Benefits

- Improve System Efficiency
- Increase Power Density
- Reduce Heat Sink Requirements
- Reduction of System Cost

TO-247-4

Drain	1
Power Source	2
Driver Source	3
Gate	4

Applications

- Solar Inverters
- EV Battery Chargers
- High Voltage DC/DC Converters
- Switch Mode Power Supplies

RoHS

Halogen

Order Information

Part Number	Package	Marking
P3M06025K4	TO-247-4	P3M06025K4

PNJ Preliminary

Contents

Features....1
Standards Benefits....1
Applications....1
Order Information....1
Contents....2
1. Maximum Ratings....3
2. Electrical Characteristics....4
3. Reverse Diode Characteristics....5
4. Thermal Characteristics....5
5. Typical Performance....6
6. Package Outlines....10

PNJ Preliminary

1. Maximum Ratings

At T_J= 25℃, unless specified otherwise

Parameter	Symbol	Value	Unit	Test Conditions
Drain - Source Voltage	V_{DSmax}	650	V	V_{GS}= -3V I_D= 100μA
Gate - Source Voltage (dynamic)	V_{GSmax}	-8 / +20	V	AC (f>1 Hz)
Gate - Source Voltage (static)	V_{GSop}	-3 / +15	V	Static
Continuous Drain Current	I_D	97	A	V_{GS}= 15V T_C= 25℃
		69		V_{GS}= 15V T_C= 100℃
Power Dissipation	P_D	326	W	
Operating Junction	T_J	-55 To +175	℃	
Storage Temperature	T_{stg}	-55 To +175	℃	
Solder Temperature	T_L	260	℃	
Mounting Torque	M_d	1 8.8	Nm lbf-in	M3 or 6-32 screw

PNJ Preliminary

2. Electrical Characteristics

At T_J= 25℃, unless specified otherwise

Parameter	Symbol	Value			Unit	Test Conditions
		Min.	Typ.	Max.		
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	650	/	/	V	V_{GS}= -3V I_D= 100μA
Gate Threshold Voltage	$V_{GS(th)}$	1.8	2.2	/	V	V_{DS}= V_{GS} I_D= 50mA T_J = 25℃
		/	1.45	/	V	V_{DS}= V_{GS} I_D= 50mA T_J = 175℃
Reverse Bias Drain Current	I_{DSS}	/	1	10	μA	V_{GS}= -3V V_{DS}= 650V
Gate-Source Leakage Current	I_{GSS}	/	20	250	nA	V_{GS}= 15V V_{DS}= 0V
Drain-Source On-State Resistance	$R_{DS(on)}$	/	25	34	mΩ	V_{GS}= 15V I_D= 50A
		/	20	/	mΩ	V_{GS}= 18V I_D= 50A
Trans conductance	g_{fs}	/	27	/	S	V_{DS}= 20V I_{DS}= 50A T_J = 25℃
		/	29	/	S	V_{DS}= 20V I_{DS}= 50A T_J= 175℃
Input Capacitance	C_{iss}	/	5251	/	pF	V_{GS}= 0V V_{DS}= 400V f= 1MHz V_{AC}= 25mV
Output Capacitance	C_{oss}	/	393	/	pF	
Reverse Transfer Capacitance	C_{rss}	/	10.6	/	pF	
Coss Stored Energy	E_{oss}	/	61	/	μJ	

PNJ Preliminary

Parameter	Symbol	Value			Unit	Test Conditions
		Min.	Typ.	Max.		
Gate to Source Charge	Q_{gs}	/	52.7	/	nC	V_{DS}= 400V I_{DS}= 50A V_{GS}= -3 to 15V I_G= 20mA
Gate to Drain Charge	Q_{gd}	/	29.3	/		
Total Gate Charge	Q_g	/	136	/		

3. Reverse Diode Characteristics

At T_J= 25℃, unless specified otherwise

Parameter	Symbol	Value		Unit	Test Conditions
		Typ.	Max.		
Diode Forward Voltage	V_{SD}	3.8	/	V	V_{GS}= -3V I_{SD}= 25A T_J= 25℃
		3.4	/	V	V_{GS}= -3V I_{SD}= 25A T_J= 175℃
Continuous Diode Forward Current	I_S	74	/	A	V_{GS}= -3V

4. Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction to Case	$R_{\theta JC}$	0.46	℃/W

PNJ Preliminary

5. Typical Performance

At T_J = 25°C, unless specified otherwise

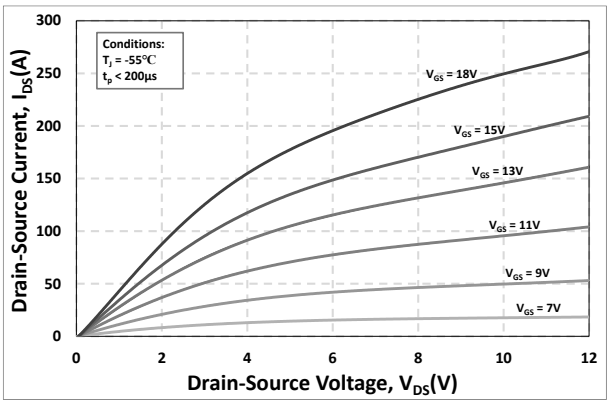


Figure 1. Output Characteristics T_J = -55°C

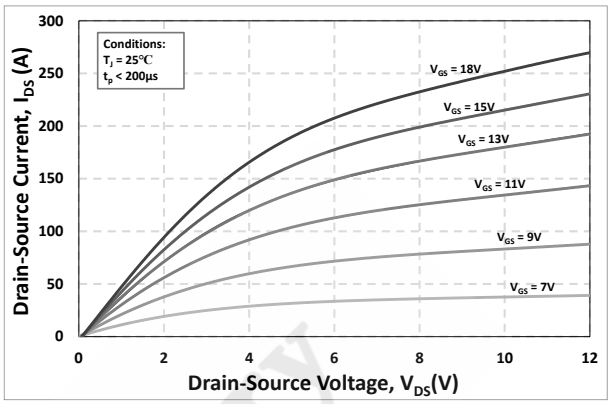


Figure 2. Output Characteristics T_J = 25°C

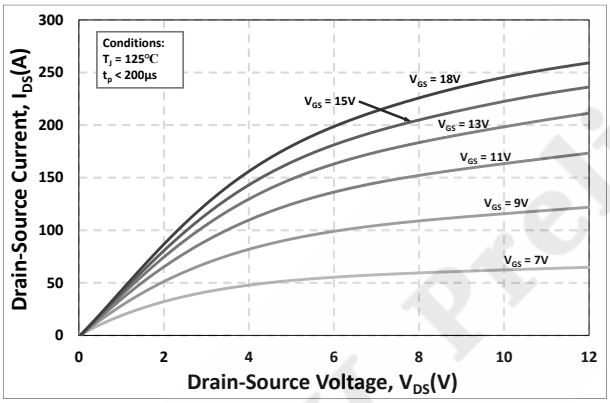


Figure 3. Output Characteristics T_J = 125°C

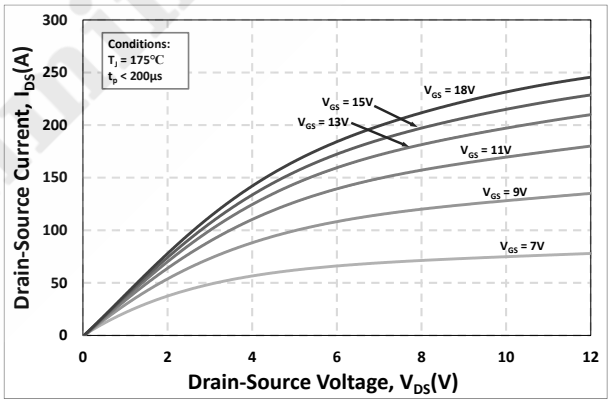


Figure 4. Output Characteristics T_J = 175ºC

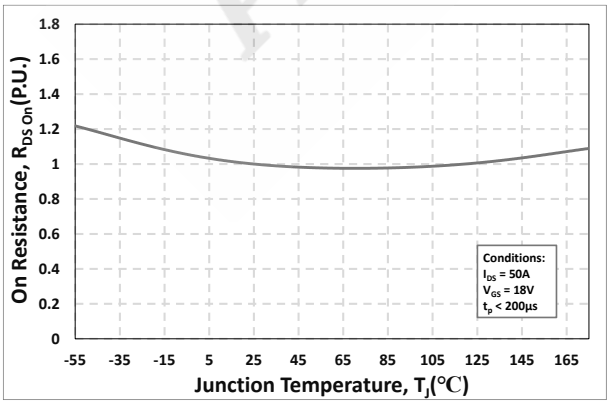


Figure 5. Normalized On-Resistance vs. Temperature

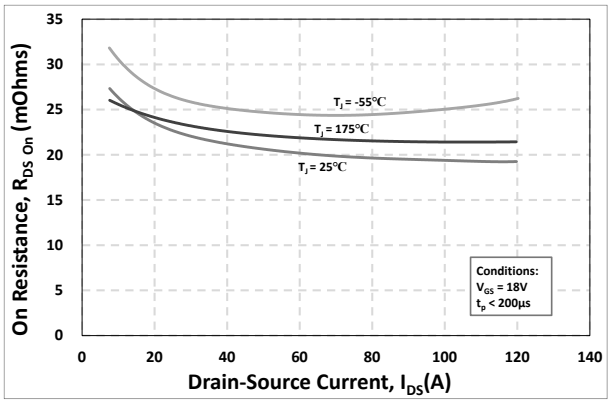


Figure 6. On-Resistance vs. Drain Current Various Temperatures

PNJ Preliminary

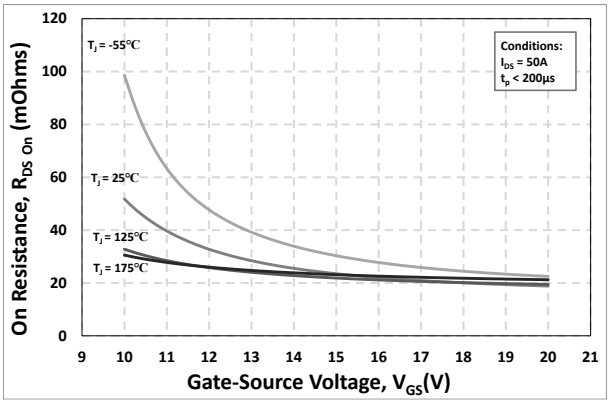


Figure 7. On-Resistance vs. Gate-Source Voltage

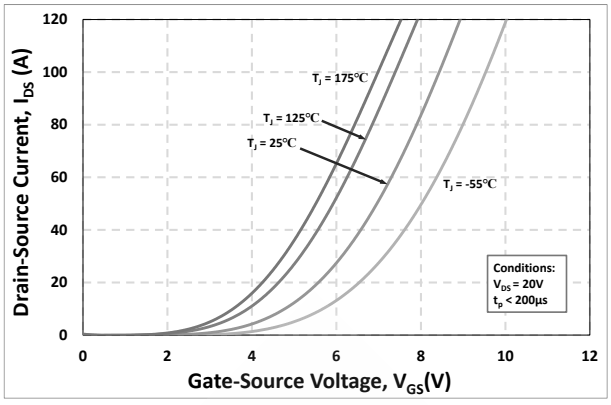


Figure 8. Transfer Characteristic for Various Junction Temperatures

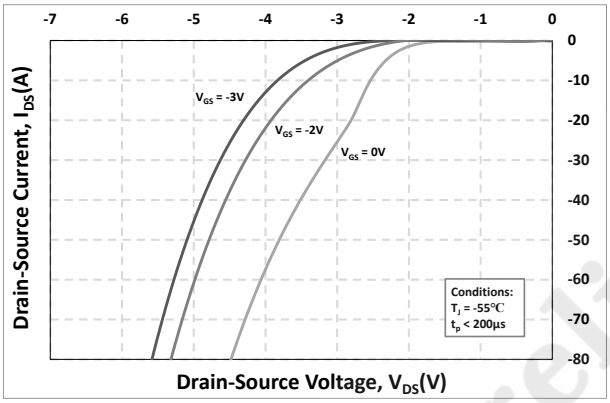


Figure 9. Body Diode Characteristic at -55°C

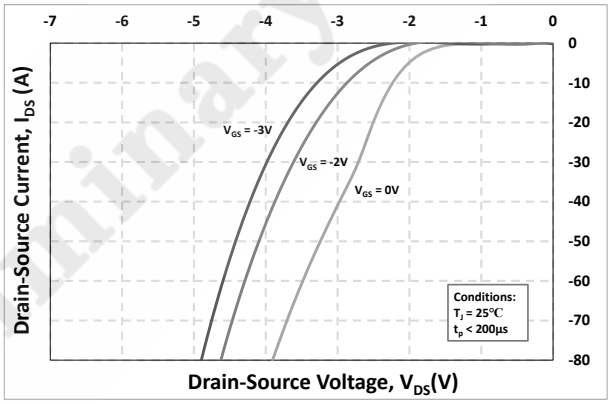


Figure 10. Body Diode Characteristic at 25°C

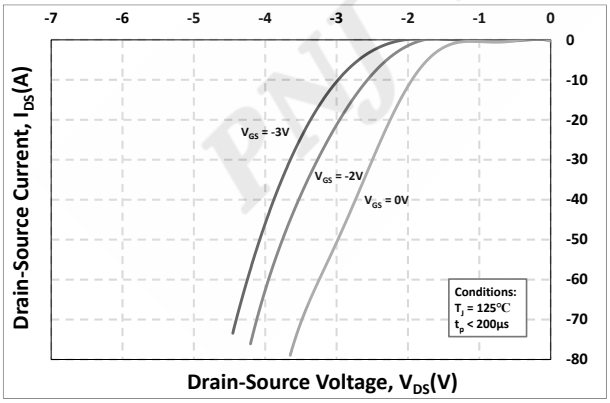


Figure 11. Body Diode Characteristic at 125°C

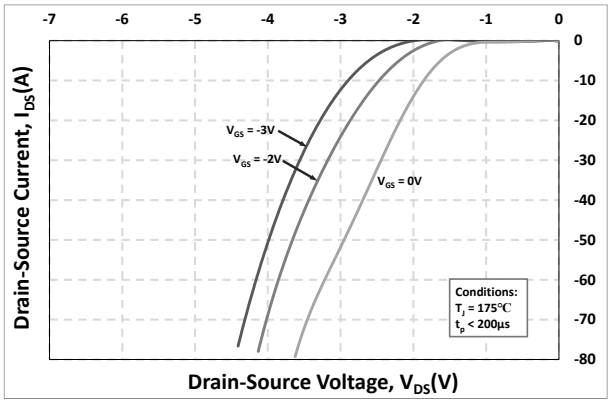


Figure 12. Body Diode Characteristic at 175°C

PNJ Preliminary

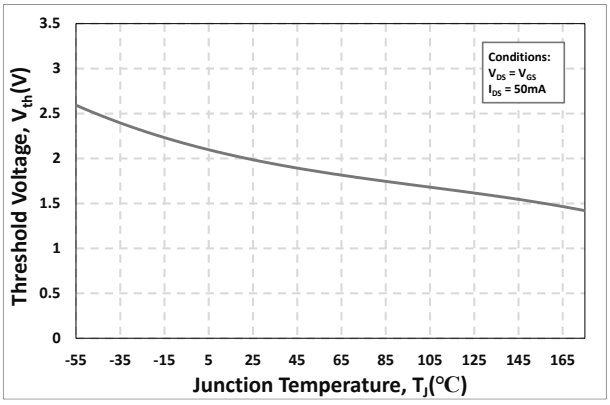


Figure 13. Threshold Voltage vs. Temperature

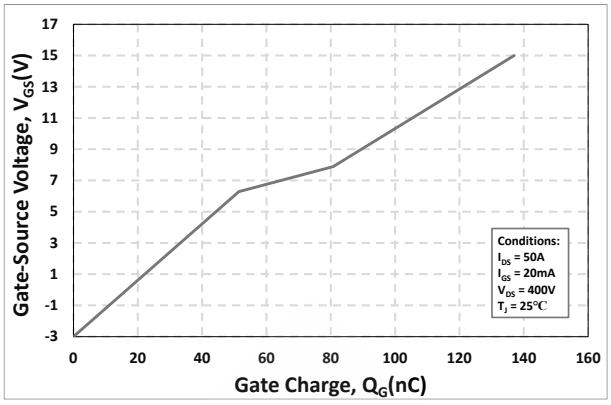


Figure 14. Gate Charge Characteristics

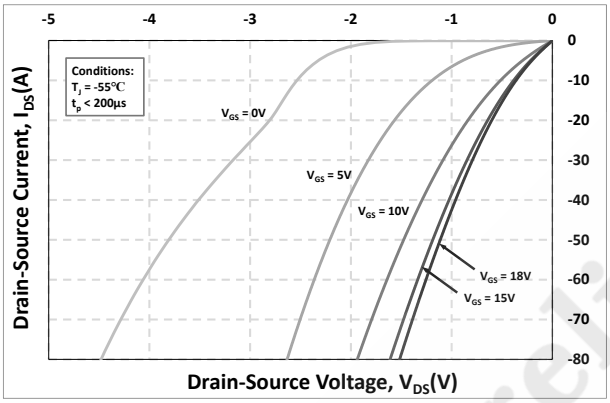


Figure 15. 3rd Quadrant Characteristic at -55℃

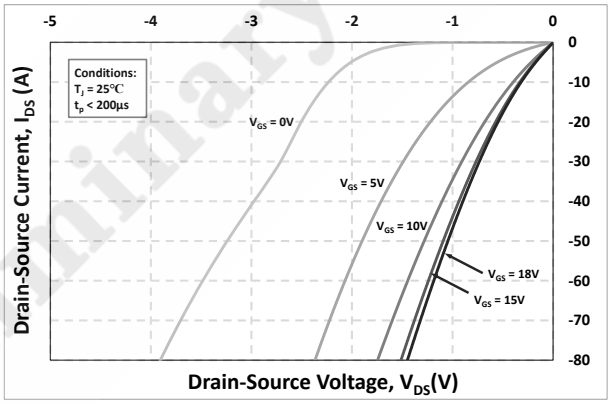


Figure 16. 3rd Quadrant Characteristic at 25℃

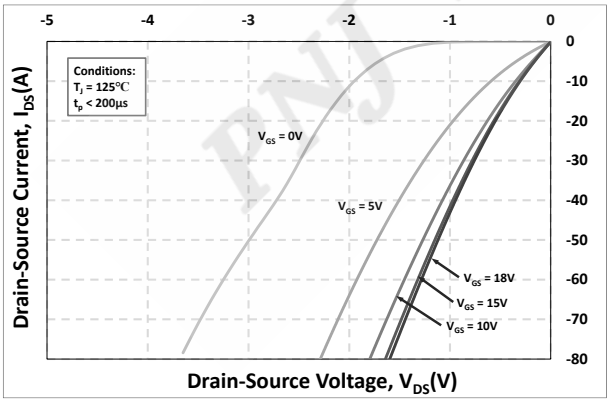


Figure 17. 3rd Quadrant Characteristic at 125℃

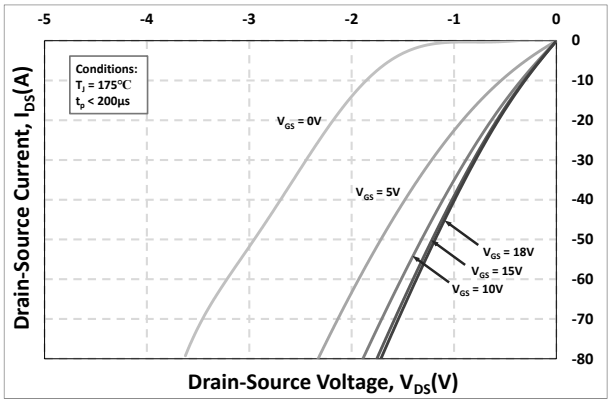


Figure 18. 3rd Quadrant Characteristic at 175℃

PNJ Preliminary

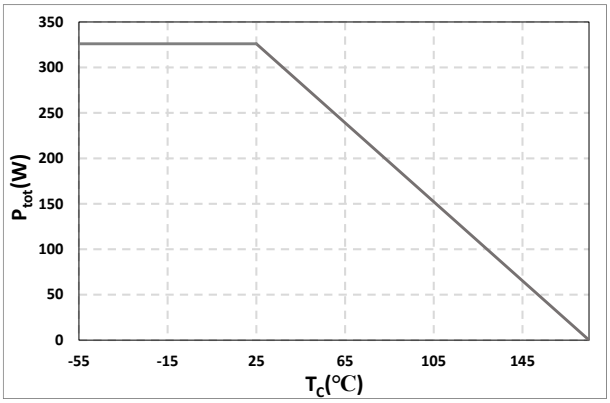


Figure 19. Maximum Power Dissipation Derating vs. Case Temperature

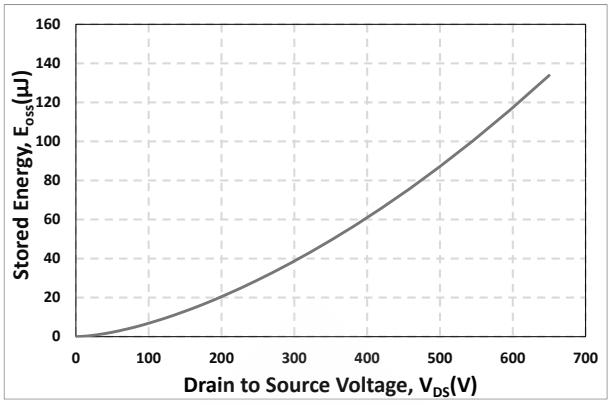


Figure 20. Output Capacitor Stored Energy

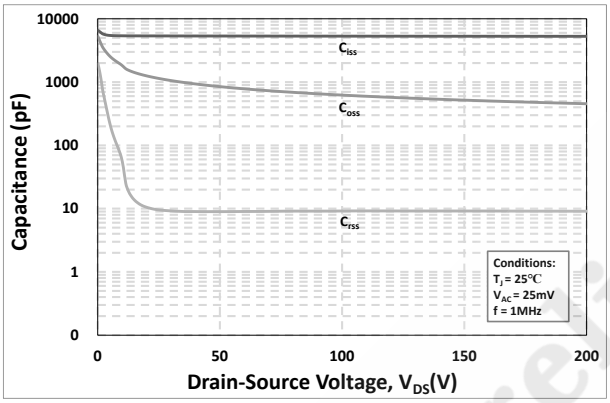


Figure 21. Capacitances vs. Drain-Source Voltage (0 - 200V)

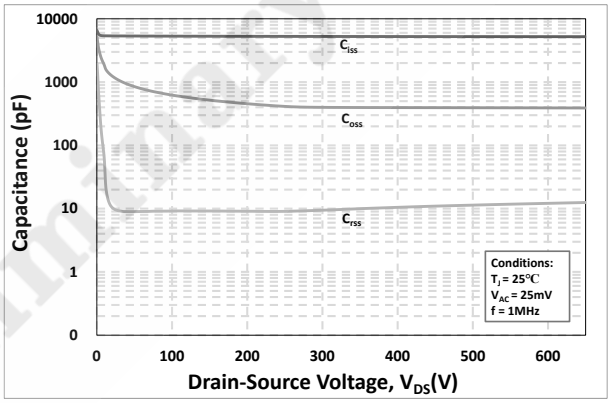
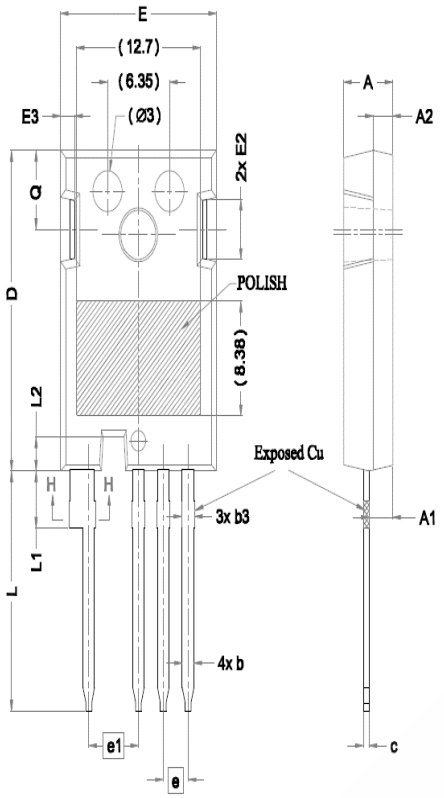


Figure 22. Capacitances vs. Drain-Source Voltage (0 - 650V)

PNJ Preliminary

6. Package Outlines



Symbol	Dimensions		
	Min.	Nom.	Max.
A	4.83	5.02	5.21
A1	2.28	2.41	2.54
A2	1.91	2.00	2.16
b[1]	1.07	1.20	1.28
b	1.07	1.20	1.33
b1	2.39	2.67	2.94
b2	2.39	2.67	2.84
b3	1.07	1.30	1.60
b4	1.07	1.30	1.50
b5	2.39	2.53	2.69
b6	2.39	2.53	2.64
c	0.55	0.60	0.68
c1	0.55	0.60	0.65
D	22.30	23.45	23.80
D1	16.25	16.55	17.65
D2	0.95	1.19	1.25
E	15.75	15.94	16.13
E1	13.10	14.02	14.15
E2	3.60	1.10	5.10
E3	1.00	1.45	1.90
E4	12.38	13.26	13.43
e	2.54BSC		
e1	5.08BSC		
L	17.31	17.57	17.82
L1	3.97	4.19	4.37
L2	2.35	2.50	2.65
ΦP	3.51	3.61	3.65
ΦP	7.19 REF.		
Q	5.49	5.79	6.00
S	6.04	6.17	6.30

Drawing and Dimensions

PNJ Preliminary