

P/N: YZPST-M2A016120L

**N-Channel SiC Power MOSFET**

$V_{DS}$	=	1200	V
$R_{DS(on)}$	=	16	mΩ
$I_D@25^{\circ}C$	=	115	A

**Features**

- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitance
- Easy to Parallel and Simple to Drive

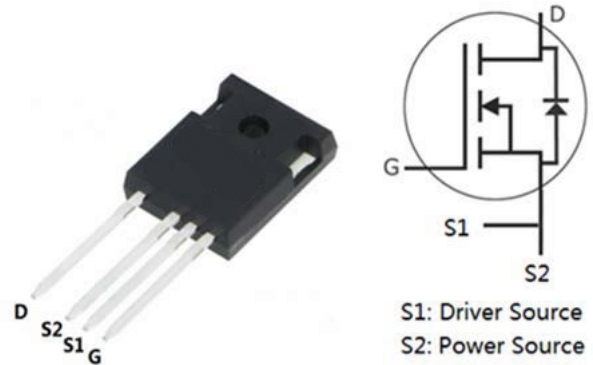
**Benefits**

- Higher System Efficiency
- Reduced Cooling Requirements
- Increased Power Density
- Increased System Switching Frequency

**Applications**

- Renewable Energy
- EV Battery Chargers
- High Voltage DC/DC Converters
- Switch Mode Power Supplies

**Package**



<b>Part Number</b>	<b>Package</b>
M2A016120L	TO-247-4

**Maximum Ratings ( $T_c=25^{\circ}C$  unless otherwise specified)**

Symbol	Parameter	Value	Unit	Test Conditions	Note
$V_{DSmax}$	Drain-Source Voltage	1200	V	$V_{GS}=0V, I_D=100\mu A$	
$V_{GSmax}$	Gate-Source Voltage	-8/+22	V	Absolute maximum values	
$V_{GSop}$	Gate-Source Voltage	-4/+18	V	Recommended operational values	
$I_D$	Continuous Drain Current	115	A	$V_{GS}=18V, T_c=25^{\circ}C$	
		76		$V_{GS}=18V, T_c=100^{\circ}C$	
$I_{D(pulse)}$	Pulsed Drain Current	250	A	Pulse width $t_p$ limited by $T_{Jmax}$	
$P_D$	Power Dissipation	582	W	$T_c=25^{\circ}C, T_J=175^{\circ}C$	
$T_J, T_{STG}$	Operating Junction and Storage Temperature	-55 to +175	$^{\circ}C$		

**Electrical Characteristics ( $T_c=25^\circ\text{C}$  unless otherwise specified)**

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions	Note
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	1200	/	/	V	$V_{GS}=0V, I_D=100\mu A$	
$V_{GS(th)}$	Gate Threshold Voltage	1.9	2.6	4.0	V	$V_{DS}=V_{GS}, I_D=23mA$	
		/	1.8	/		$V_{DS}=V_{GS}, I_D=23mA, T_J=175^\circ\text{C}$	
$I_{DSS}$	Zero Gate Voltage Drain Current	/	1	100	$\mu A$	$V_{DS}=1200V, V_{GS}=0V$	
$I_{GSS+}$	Gate-Source Leakage Current	/	10	250	nA	$V_{DS}=0V, V_{GS}=22V$	
$I_{GSS-}$	Gate-Source Leakage Current	/	10	250	nA	$V_{DS}=0V, V_{GS}=-8V$	
$R_{DS(on)}$	Drain-Source On-State Resistance	/	16	21	$m\Omega$	$V_{GS}=18V, I_D=75A$	
		/	28	/		$V_{GS}=18V, I_D=75A, T_J=175^\circ\text{C}$	
$g_{fs}$	Transconductance	/	40.5	/	S	$V_{DS}=20V, I_D=75A$	
		/	37	/		$V_{DS}=20V, I_D=75A, T_J=175^\circ\text{C}$	
$C_{iss}$	Input Capacitance	/	4300	/	$pF$	$V_{GS}=0V$	
$C_{oss}$	Output Capacitance	/	236	/		$V_{DS}=1000V$	
$C_{rSS}$	Reverse Transfer Capacitance	/	35	/		$f=1MHz$	
$E_{oss}$	$C_{oss}$ Stored Energy	/	136	/		$V_{AC}=25mV$	
$E_{ON}$	Turn-On Switching Energy	/	2.1	/	$\mu J$	$V_{DS}=800V, V_{GS}=-4V/18V$	
$E_{OFF}$	Turn-Off Switching Energy	/	1.6	/		$I_D=40A, R_{G(ext)}=2.5\Omega, L=100\mu H$	
$t_{d(on)}$	Turn-On Delay Time	/	150	/	ns	$V_{DS}=800V, V_{GS}=-4V/18V, I_D=40A$ $R_{G(ext)}=2.5\Omega, R_L=20\Omega$	
$t_r$	Rise Time	/	38	/			
$t_{d(off)}$	Turn-Off Delay Time	/	108	/			
$t_f$	Fall Time	/	35	/			
$R_{G(int)}$	Internal Gate Resistance	/	2.3	/	$\Omega$	$f=1MHz, V_{AC}=25mV$	
$Q_{GS}$	Gate to Source Charge	/	60	/	nC	$V_{DS}=800V$	
$Q_{GD}$	Gate to Drain Charge	/	44	/		$V_{GS}=-4V/18V$	
$Q_G$	Total Gate Charge	/	242	/		$I_D=40A$	

**Reverse Diode Characteristics**

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
$V_{SD}$	Diode Forward Voltage	4.5	/	V	$V_{GS}=-4V, I_{SD}=10A$	
		4.2	/		$V_{GS}=-4V, I_{SD}=10A, T_J=175^\circ\text{C}$	
$I_S$	Continuous Diode Forward Current	/	115	A	$T_c=25^\circ\text{C}$	
$t_{rr}$	Reverse Recover Time	55	/	ns	$V_R=800V, I_{SD}=40A$	
$Q_{rr}$	Reverse Recovery Charge	278	/	nC		
$I_{rrm}$	Peak Reverse Recovery Current	8.9	/	A		

**Thermal Characteristics**

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case	0.23	/	$^\circ\text{C/W}$		
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient	/	40			

Typical Performance

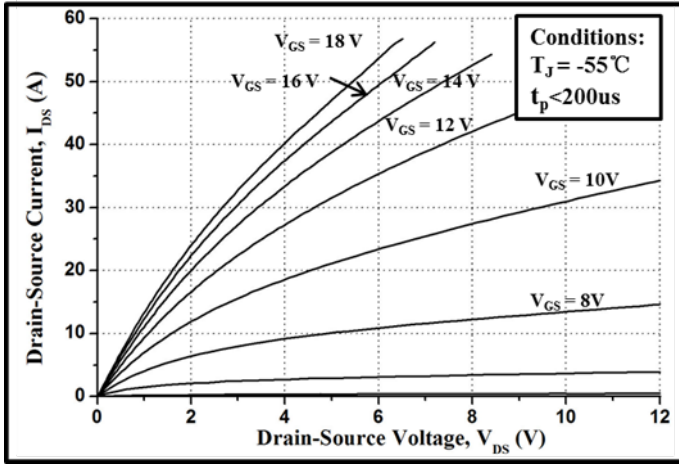


Figure 1. Output Characteristics  $T_j = -55^\circ\text{C}$

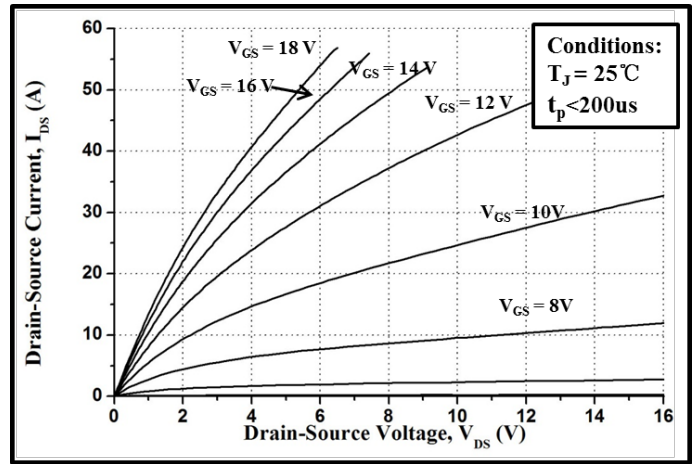


Figure 2. Output Characteristics  $T_j = 25^\circ\text{C}$

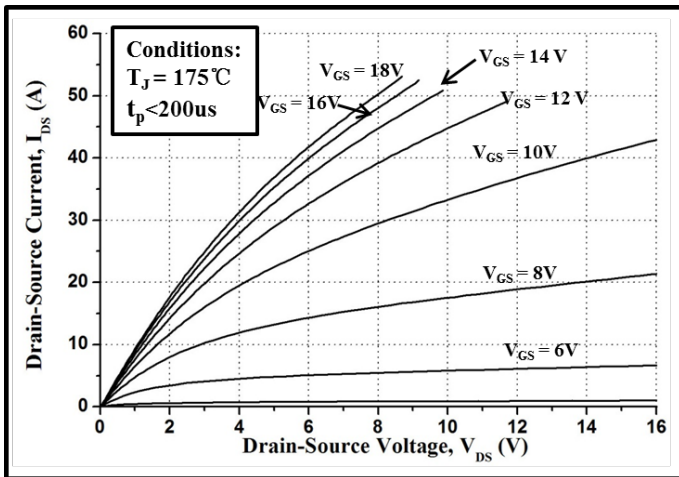


Figure 3. Output Characteristics  $T_j = 175^\circ\text{C}$

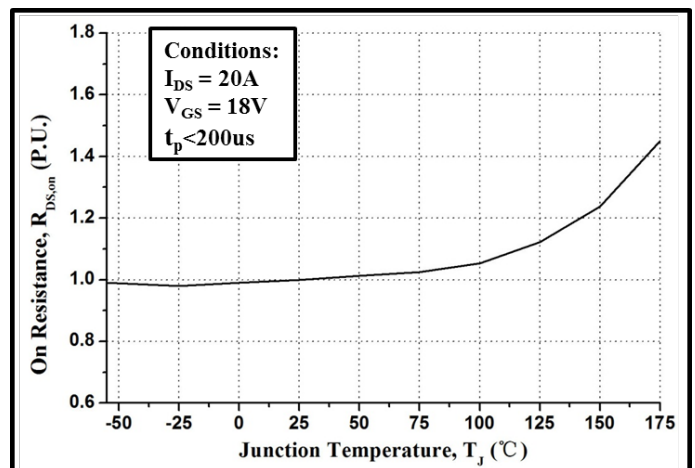


Figure 4. Normalized On-Resistance vs. Temperature

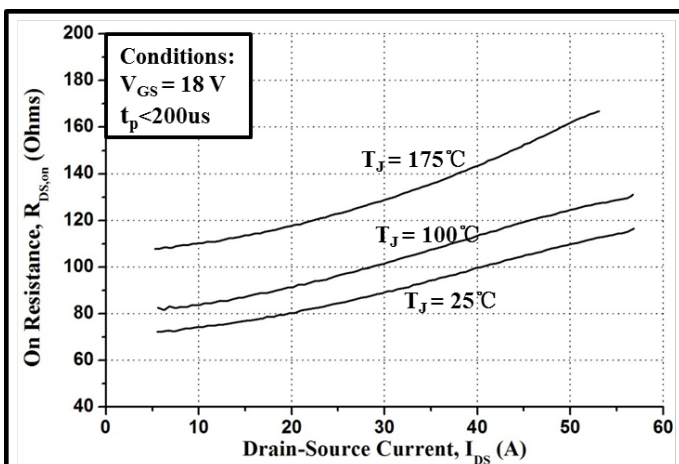


Figure 5. On-Resistance vs. Drain Current For Various Temperatures

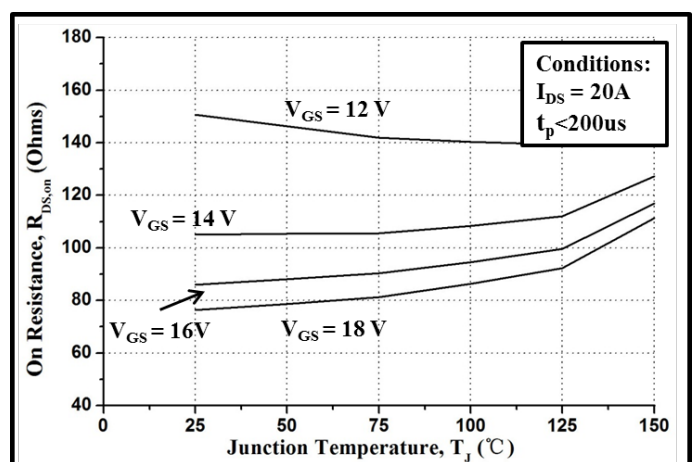


Figure 6. On-Resistance vs. Temperature For Various Gate Voltage

Typical Performance

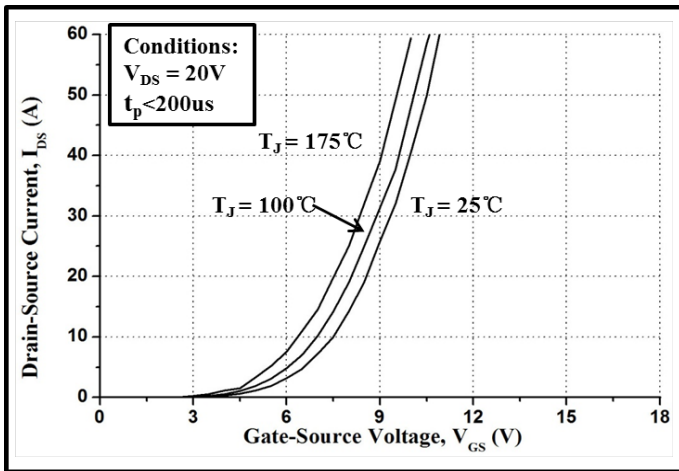


Figure 7. Transfer Characteristic for Various Junction Temperatures

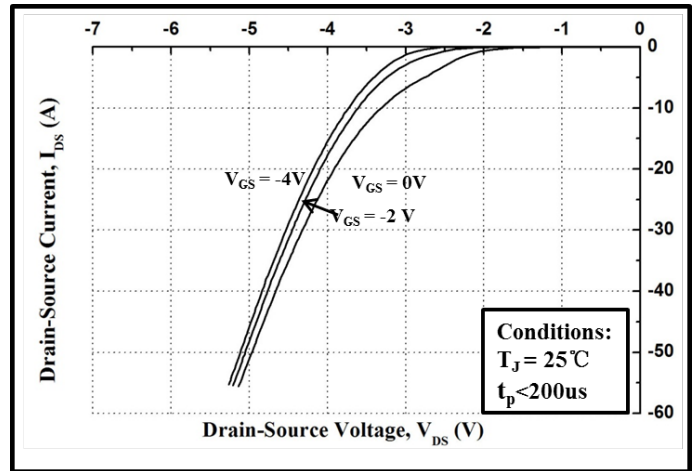


Figure 8. Body Diode Characteristic at 25°C

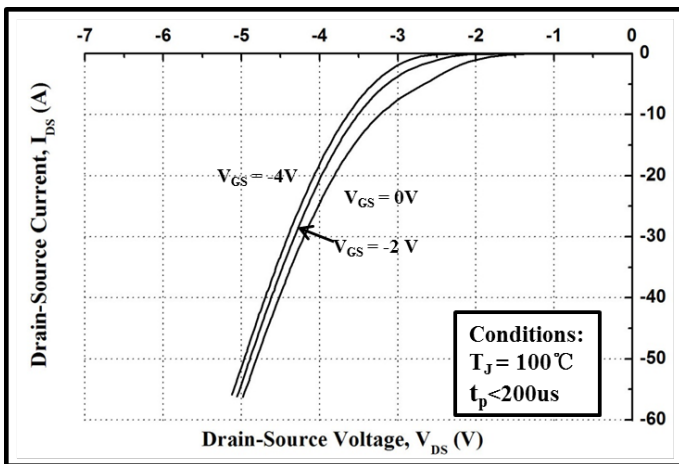


Figure 9. Body Diode Characteristic at 100°C

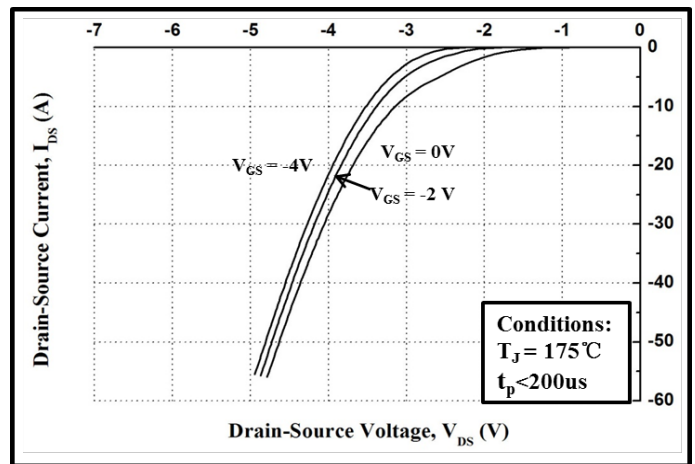


Figure 10. Body Diode Characteristic at 175°C

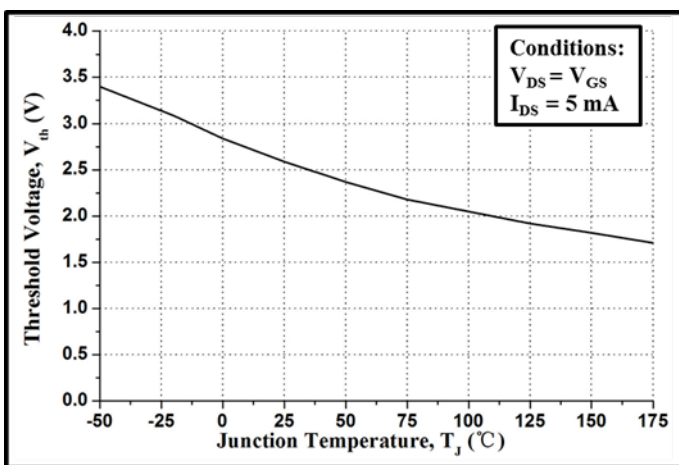


Figure 11. Threshold Voltage vs. Temperature

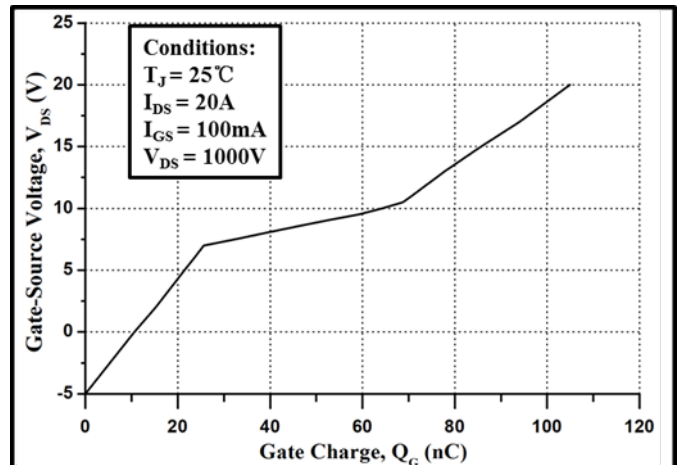


Figure 12. Gate Charge Characteristics

Typical Performance

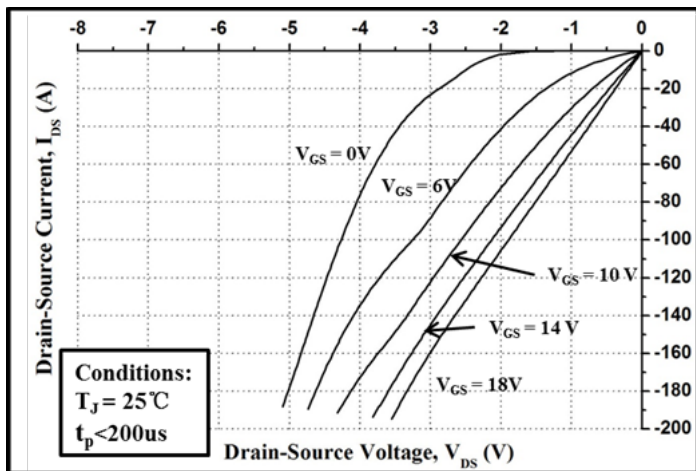


Figure 13. 3rd Quadrant Characteristic at 25°C

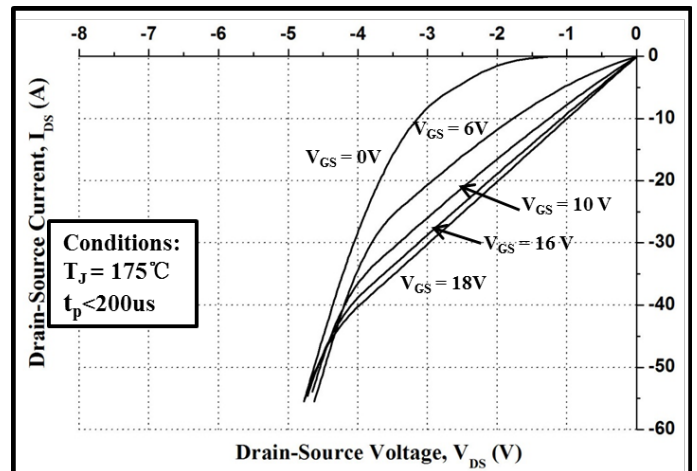


Figure 14. 3rd Quadrant Characteristic at 175°C

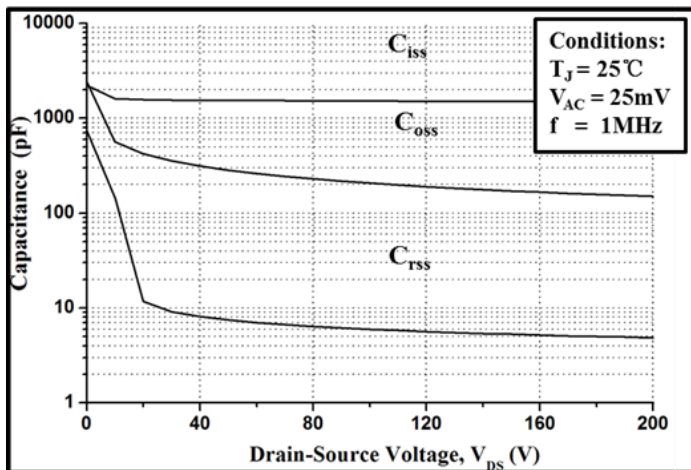


Figure 15. Capacitances vs. Drain-Source Voltage (0 - 200V)

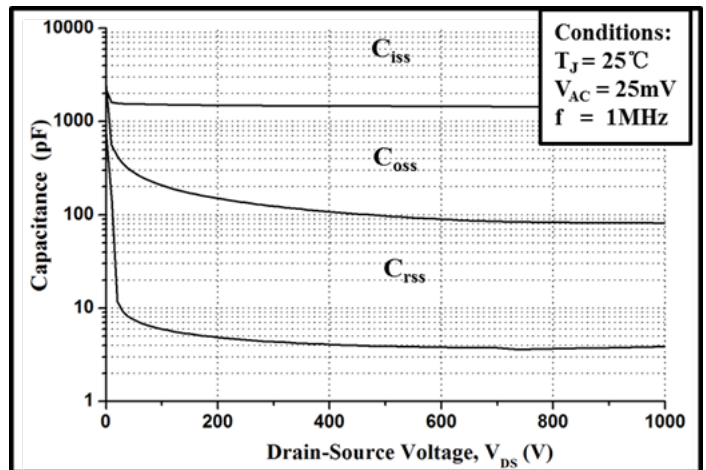
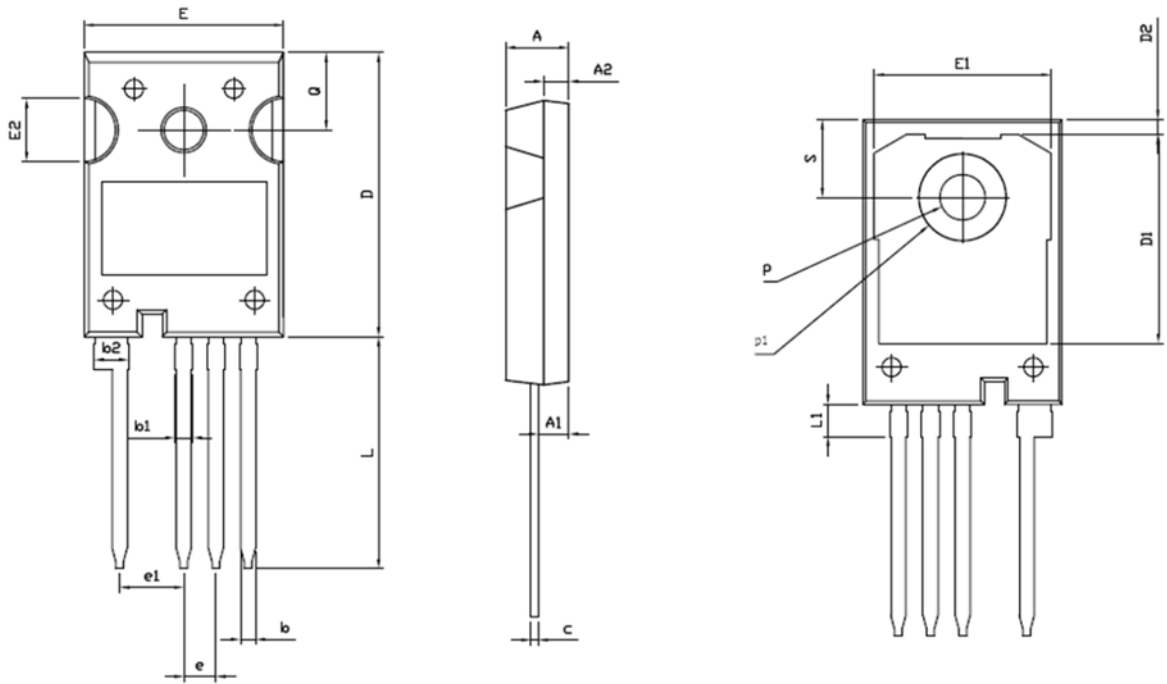
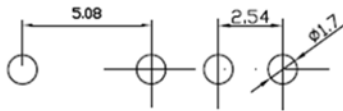


Figure 16. Capacitances vs. Drain-Source Voltage (0 - 1000V)

Package Dimensions



RECOMMENDED LAND PATTERN



UNIT: mm

	MIN	NOM	MAX
A2	1.85	2.00	2.15
b	1.05	1.20	1.35
b1	1.00	1.30	1.60
b2	2.35	2.65	2.95
c	0.50	0.60	0.70
D	22.34	22.54	22.74
D1	16.00	16.50	17.00
D2	0.97	1.17	1.37
e	2.34	2.54	2.74
e1	4.88	5.08	5.28
E	15.60	15.80	16.00
E1	13.50	14.00	14.50
E2	4.80	5.00	5.20
L	18.08	18.38	18.68
L1	2.38	2.58	2.78
p	3.50	3.60	3.70
p1	6.60	6.80	7.00
Q	6.00	6.15	6.30
S	6.00	6.15	6.30