

V_{DS}	=	3300V
$R_{DS(on)}$	=	120mΩ
$I_D@25\text{ }^\circ\text{C}$	=	33A

Features

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

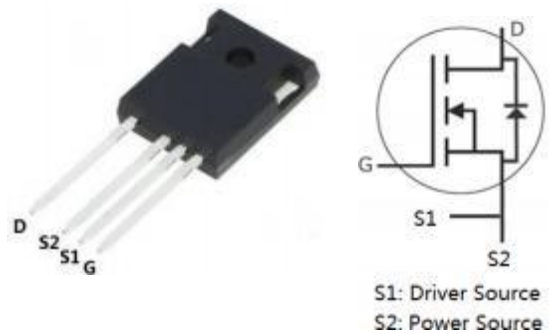
Benefits

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

Applications

- Power Supplies
- High Voltage DC/DC Converters
- Motor Drives
- Switch Mode Power Supplies
- Pulsed Power Applications

Package



Part Number	Package
YX330R120	TO-247-4

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

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{DSmax}	Drain- Source Voltage	3300	V	$V_{GS}=0V, I_D=100\mu A$	
V_{GSmax}	Gate- Source Voltage	-10/+25	V	Absolute maximum values	
V_{GSop}	Gate- Source Voltage	-5/+20	V	Recommended operational values	
I_D	Continuous Drain Current	33	A	$V_{GS}=20V, T_c=25\text{ }^\circ\text{C}$	Fig. 15
		24		$V_{GS}=20V, T_c=100\text{ }^\circ\text{C}$	
$I_{D(pulse)}$	Pulsed Drain Current	100	A	Pulse width t_p limited by T_{Jmax}	Fig. 14
P_D	Power Dissipation	366	W	$T_c=25\text{ }^\circ\text{C}$,	Fig. 16
T_J, T_{STG}	Operating Junction and Storage Temperature	-55 to +175	$^\circ\text{C}$		

Electrical Characteristics (T_c=25 °C unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions	Note
V _{(BR)DSS}	Drain- Source Breakdown Voltage	3300	/	/	V	V _{GS} =0V, I _D =100μA	
V _{GS(th)}	Gate Threshold Voltage	2.5	3.5	/	V	V _{DS} =V _{GS} , I _D =4mA	Fig. 9
		/	2.4	/		V _{DS} =V _{GS} , I _D =4mA, T _J =175 °C	
I _{DSS}	Zero Gate Voltage Drain Current	/	1		μA	V _{DS} =3300V, V _{GS} =0V	
I _{GSS+}	Gate- Source Leakage Current	/	10	100	nA	V _{DS} =0V, V _{GS} =25V	
I _{GSS-}	Gate- Source Leakage Current	/	10	100	nA	V _{DS} =0V, V _{GS} =-10V	
R _{DS(on)}	Drain- Source On-State Resistance	/	120	156	mΩ	V _{GS} =20V, I _D =15A	Fig.5-8
		/	251	/		V _{GS} =20V, I _D =15A, T _J =175 °C	
g _{fs}	Transconductance	/	6.0	/		V _{DS} =10V, I _D =15A	Fig.4
		/	6.5	/	V _{DS} =10V, I _D =15A, T _J =175 °C		
C _{iss}	Input Capacitance	/	3099	/	pF	V _{GS} =0V	Fig.11
C _{oss}	Output Capacitance	/	55	/		V _{DS} =1000V	
C _{rss}	Reverse Transfer Capacitance	/	5.2	/		f=1MHz	
E _{oss}	C _{oss} Stored Energy	/	36	/	μJ	V _{AC} =25mV	Fig.12
E _{ON}	Turn- On Switching Energy	/	437	/	μJ	V _{DS} =1700V, V _{GS} =-5V/20V	Fig.22,26
E _{OFF}	Turn- Off Switching Energy	/	140	/		I _D =15A, R _g =8Ω, L=220μH	
t _{d(on)}	Turn- On Delay Time	/	82	/	ns	V _{DS} =1700V, V _{GS} =-5V/20V, I _D =15A R _g =8Ω, L=220μH	Fig.24
t _r	Rise Time	/	28	/			
t _{d(off)}	Turn- Off Delay Time	/	33	/			
t _f	Fall Time	/	18	/			
R _{G(int)}	Internal Gate Resistance	/	1.3	/	Ω	f=1MHz, V _{AC} =25mV	
Q _{GS}	Gate to Source Charge	/	41	/	nC	V _{DS} =1000V	Fig.10
Q _{GD}	Gate to Drain Charge	/	43	/		V _{GS} =-5V/20V	
Q _G	Total Gate Charge	/	130	/		I _D =15A	

Reverse Diode Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V _{SD}	Diode Forward Voltage	4.0	/	V	V _{GS} =-5V, I _F =7A	Fig. 17-18
		3.4	/		V _{GS} =-5V, I _F =7A, T _J =175 °C	
I _S	Continuous Diode Forward Current	/	33	A	T _C = 25 °C	
t _{rr}	Reverse Recover Time	72	/	ns	V _R =1700V, I _{SD} =15A T _J =25 °C	
Q _{rr}	Reverse Recovery Charge	340	/	nC		
I _{rrm}	Peak Reverse Recovery Current	8	/	A		

Reverse Diode Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
R _{θJC}	Thermal Resistance	0.34	0.41	°C/W		Fig.13

Figure1: Output Characteristics ($T_j = 25^\circ\text{C}$)

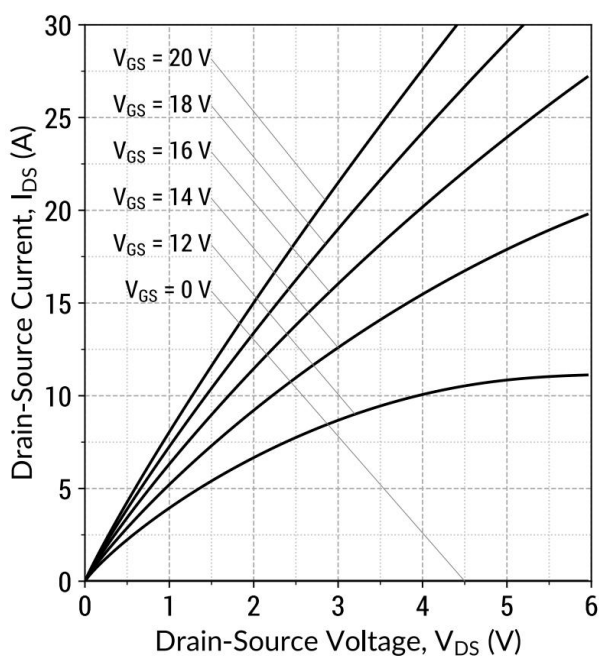


Figure 2: Output Characteristics ($T_j = 175^\circ\text{C}$)

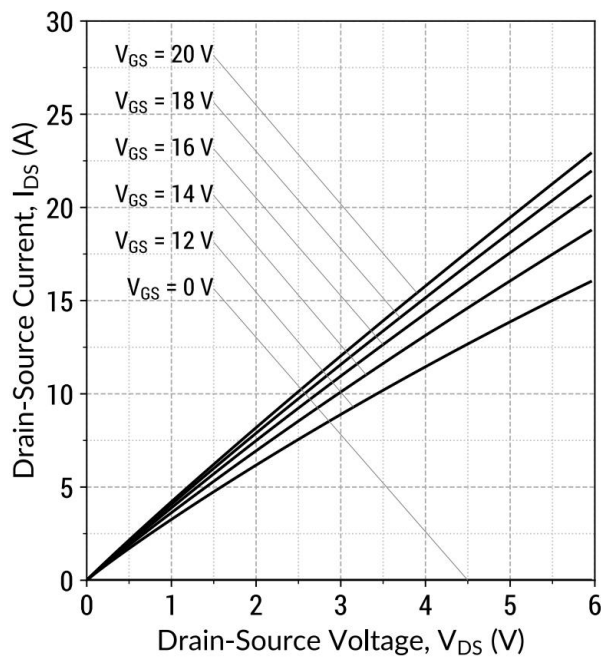


Figure3: Output Characteristics ($V_{GS} = 20\text{V}$)

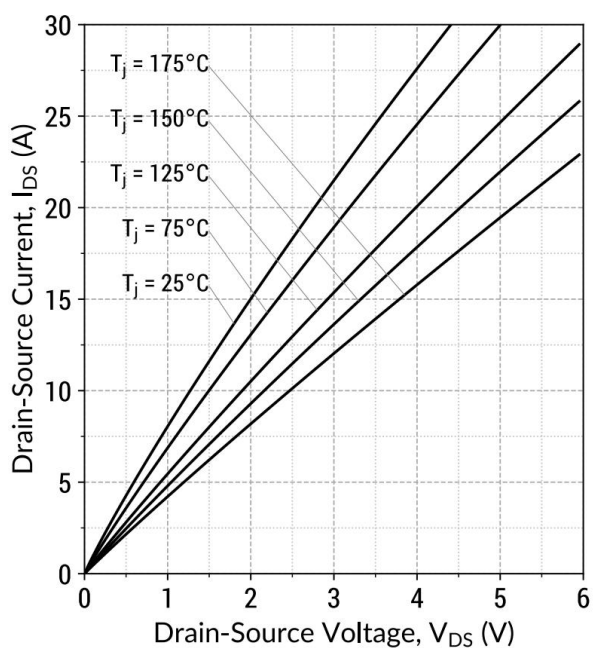


Figure4: Transfer Characteristics ($V_{DS} = 10\text{V}$)

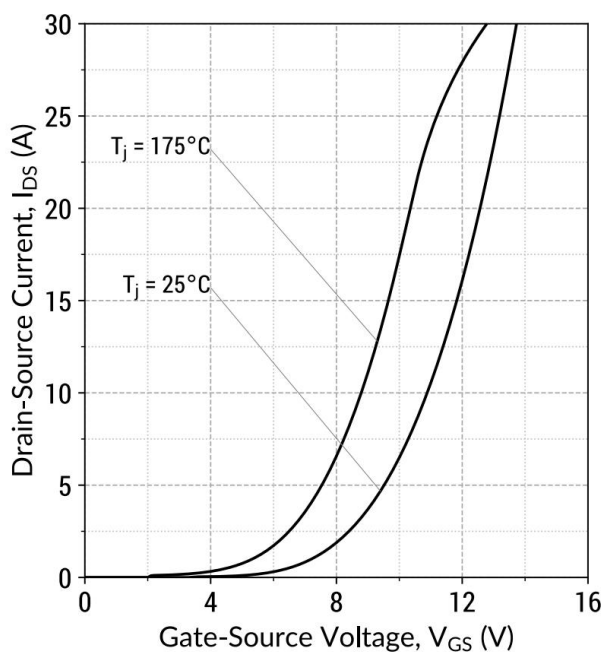


Figure5:On-StateResistance v/s Temperature

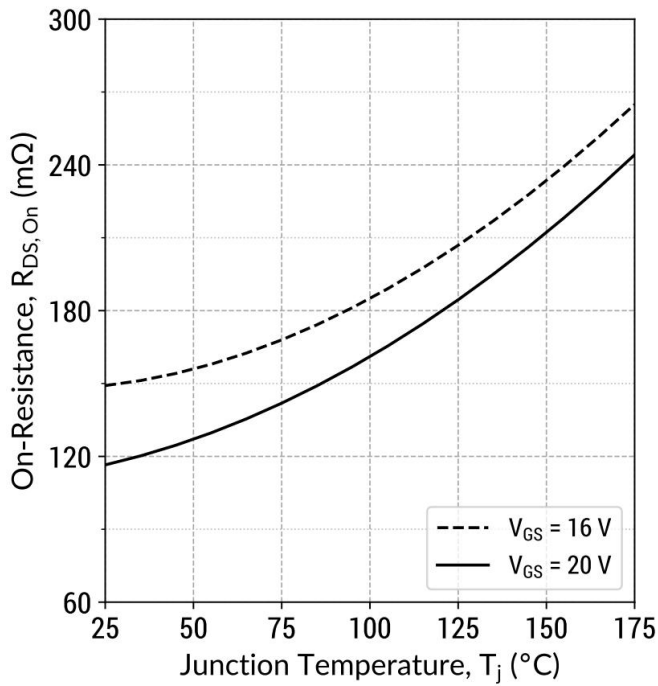


Figure6:On-StateResistance v/s DrainCurrent

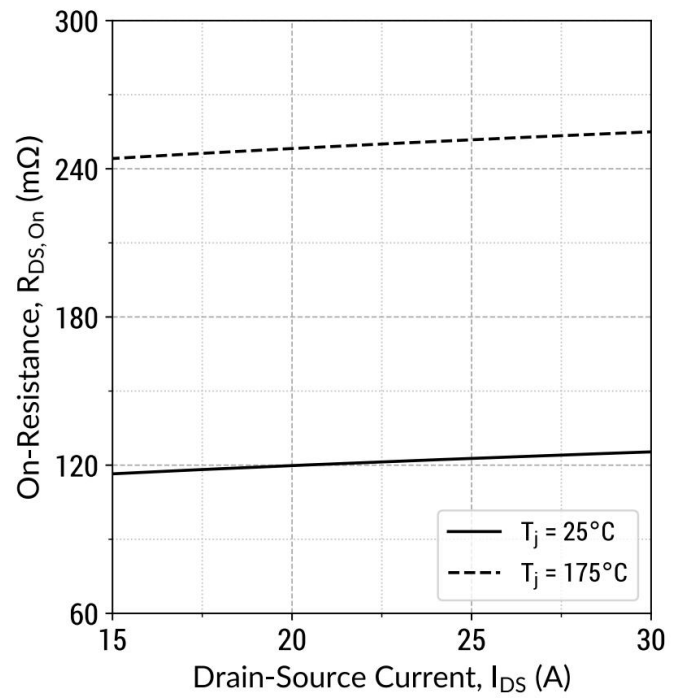


Figure7:NormalizedOn-StateResistance v/s Temperature

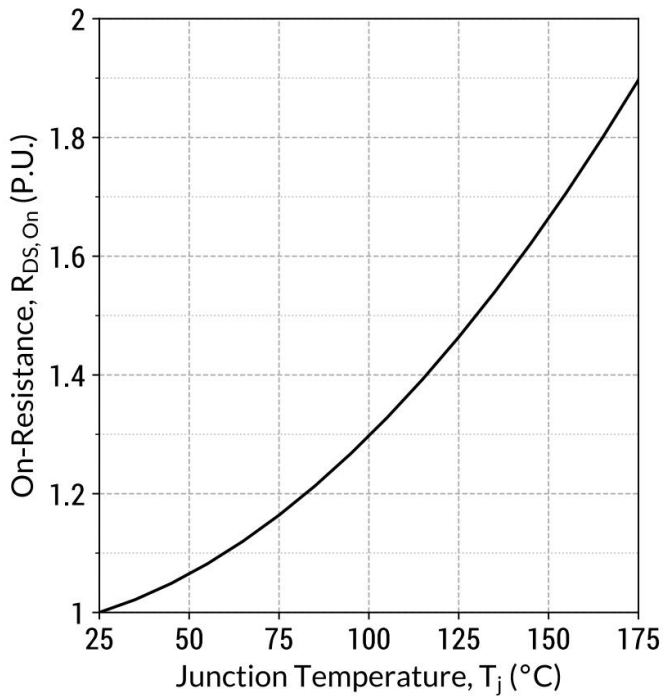


Figure8:On-StateResistance v/s GateVoltage

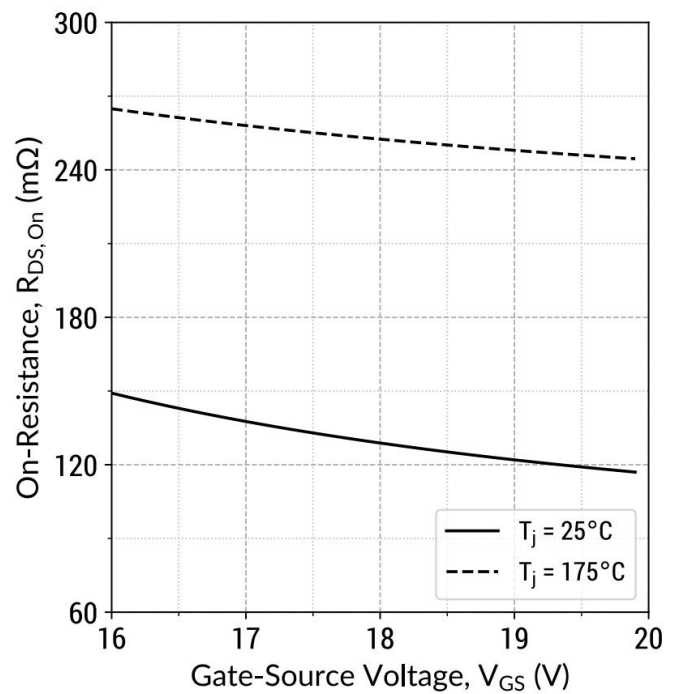


Figure9:ThresholdVoltageCharacteristics

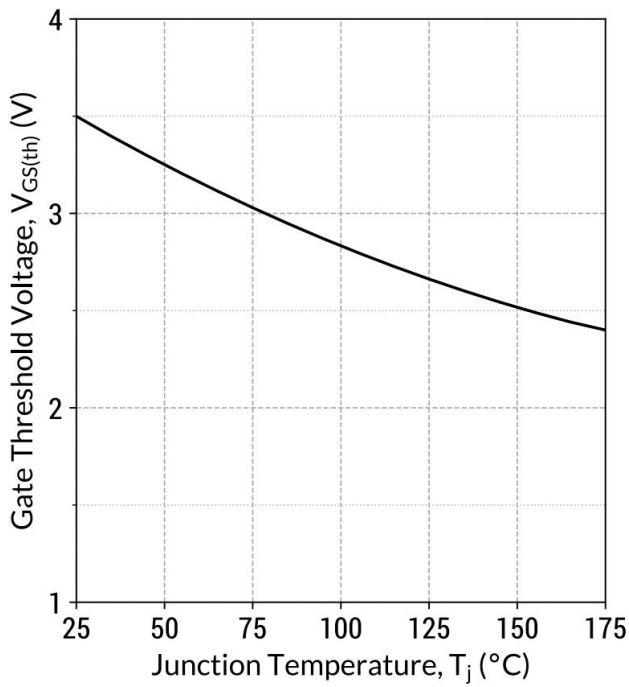


Figure10:GateChargeCharacteristics

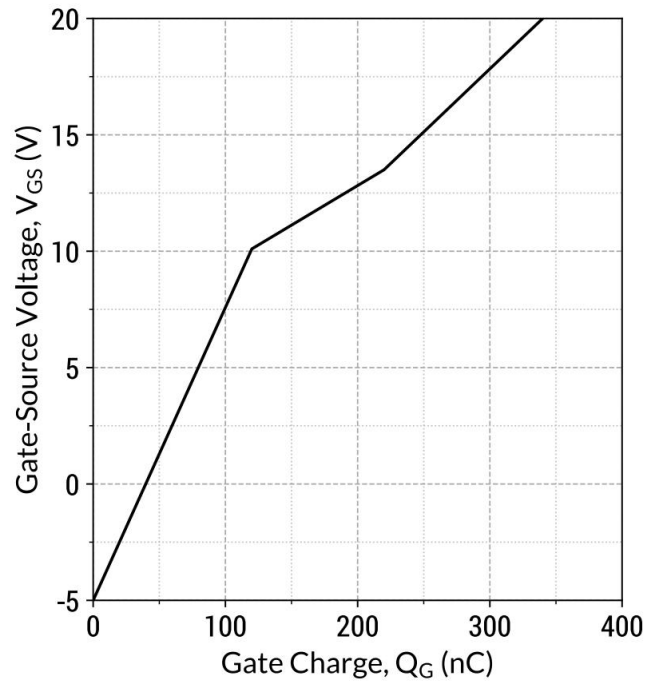


Figure11:CapacitancevsDrain-SourceVoltage

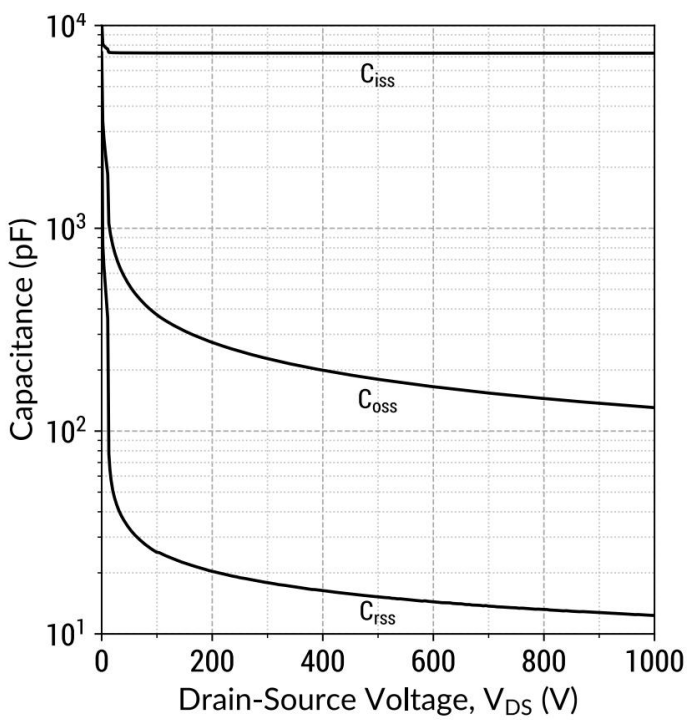


Figure12:OutputCapacitorStoredEnergy

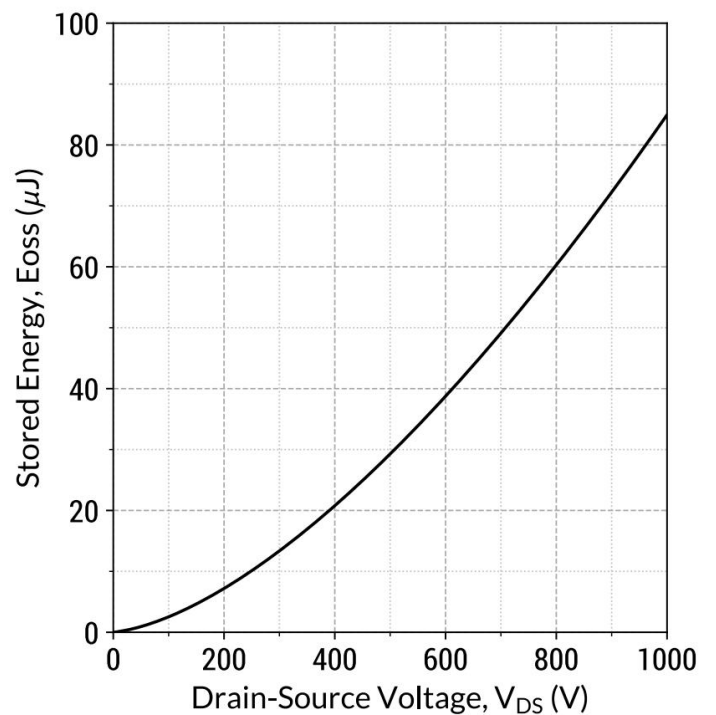


Figure13:TransientThermalImpedance

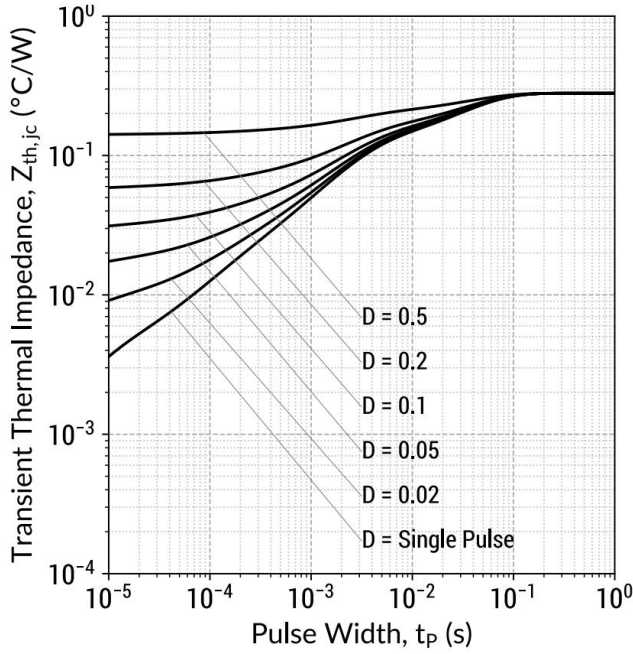


Figure14:SafeOperatingArea($T_j = 25^{\circ}C$)

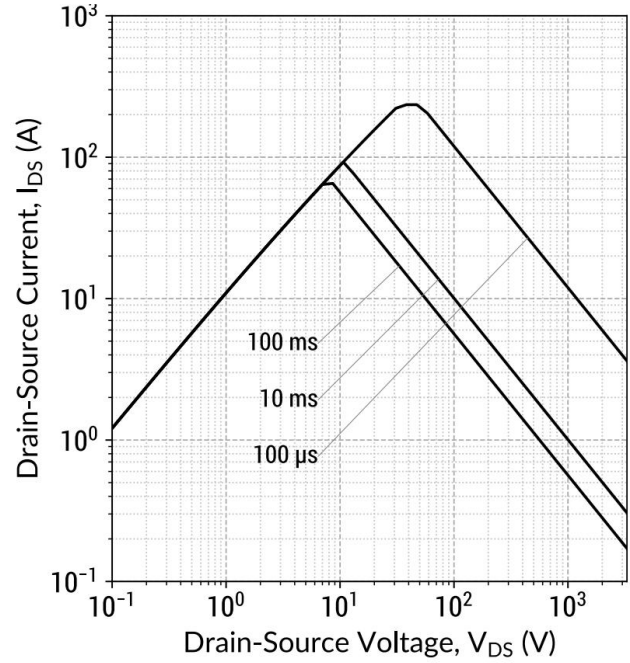


Figure15:CurrentDe-ratingCurve

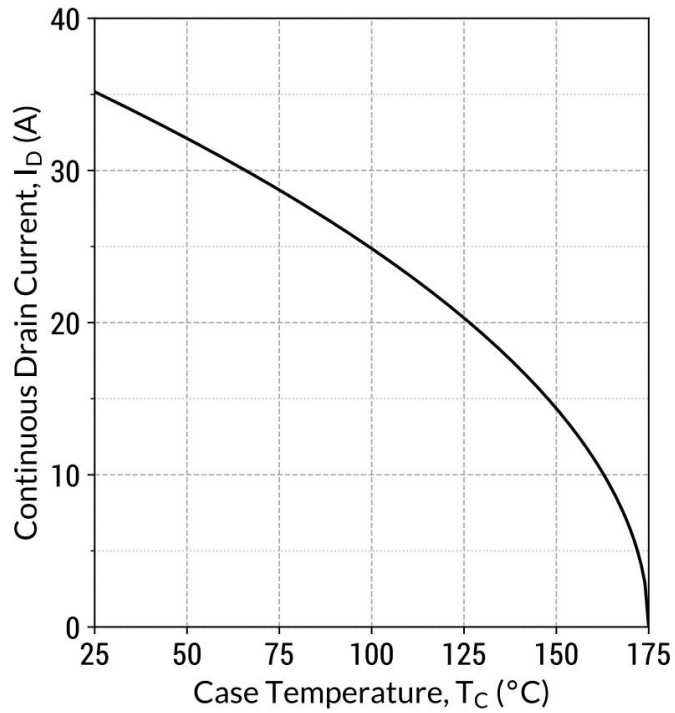


Figure16:PowerDe-ratingCurve

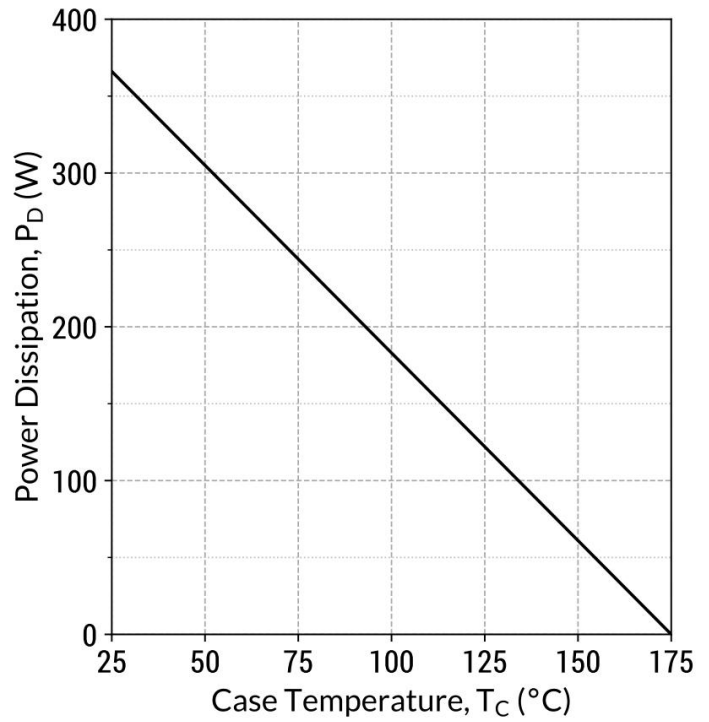


Figure17:BodyDiodeCharacteristics($T_j=25^\circ\text{C}$)

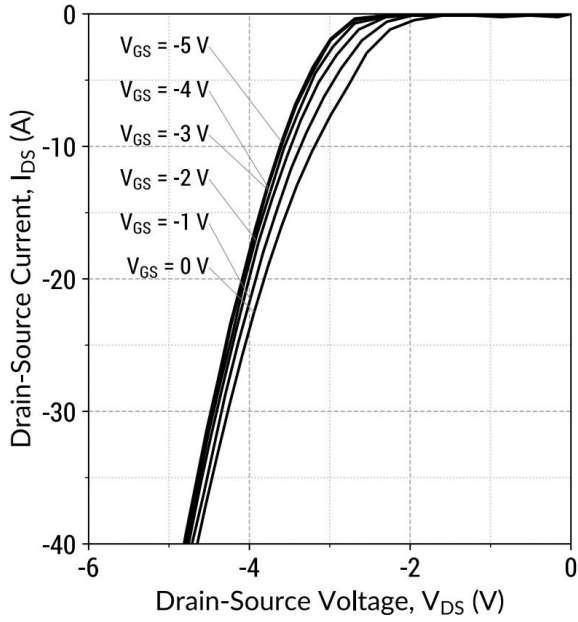


Figure18:BodyDiodeCharacteristics($T_j=175^\circ\text{C}$)

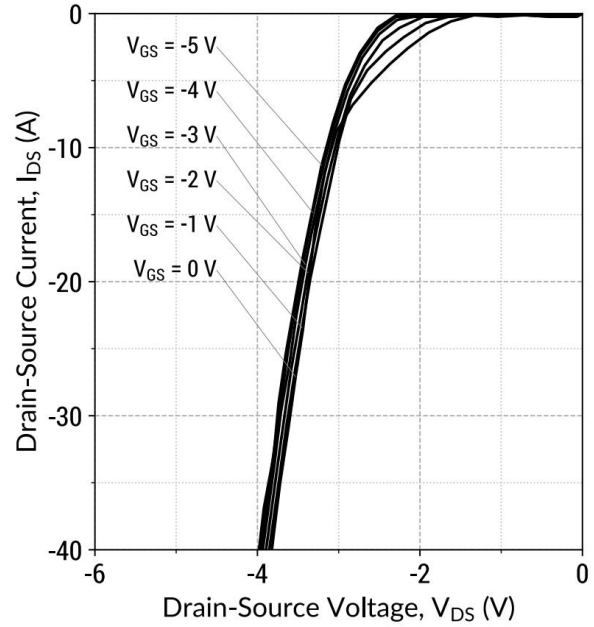


Figure19:ThirdQuadrantCharacteristics($T_j=25^\circ\text{C}$)

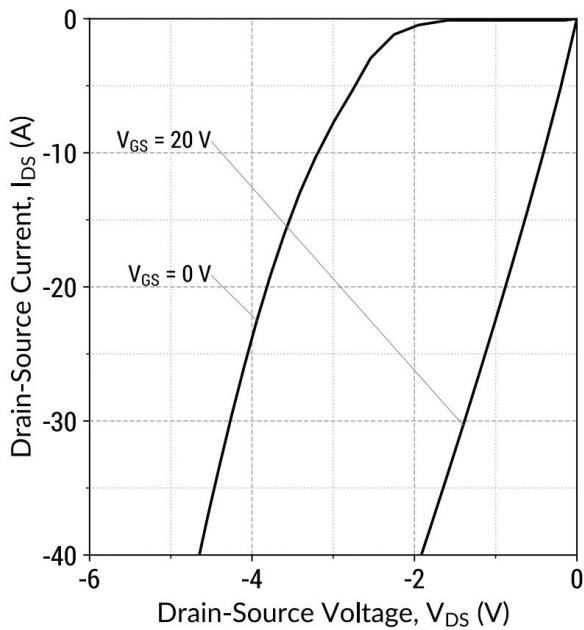


Figure20:ThirdQuadrantCharacteristics($T_j=175^\circ\text{C}$)

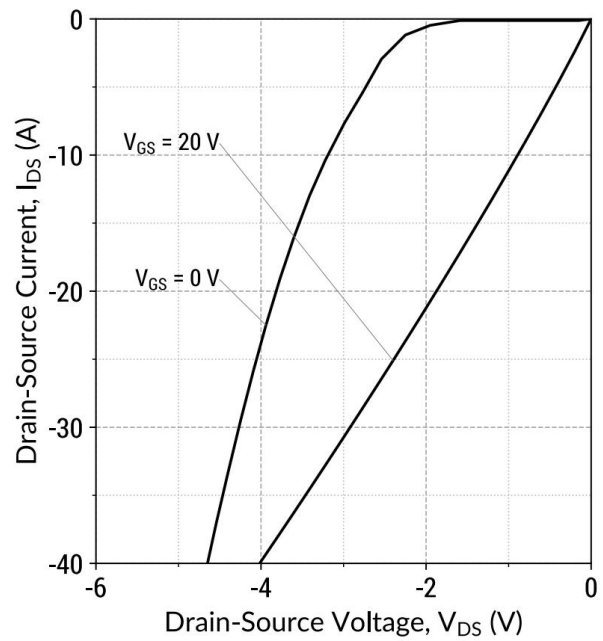


Figure21: Inductive Switching Energy vs Drain Current (V_{ds}=1500V)

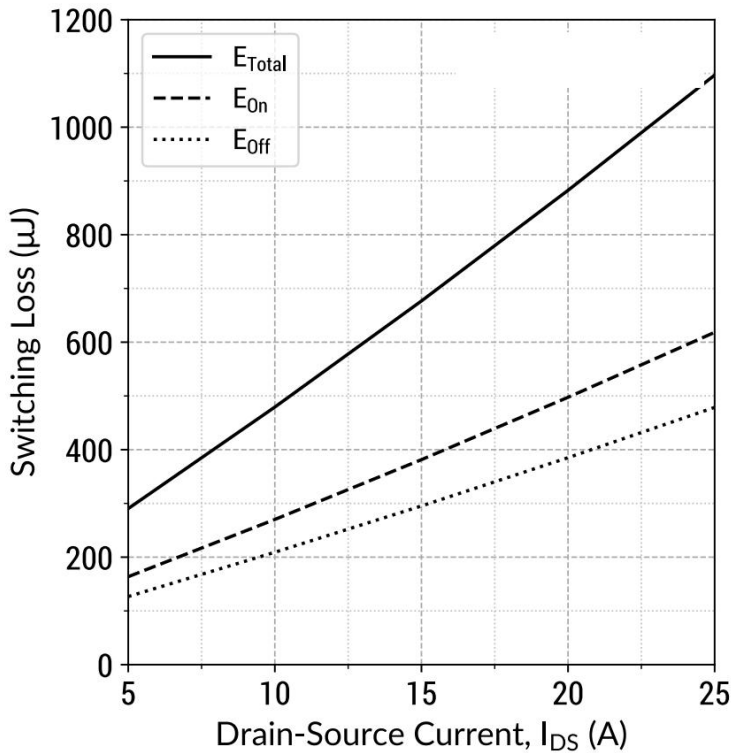


Figure21: Inductive Switching Energy vs Drain Current (V_{ds}=1700V)

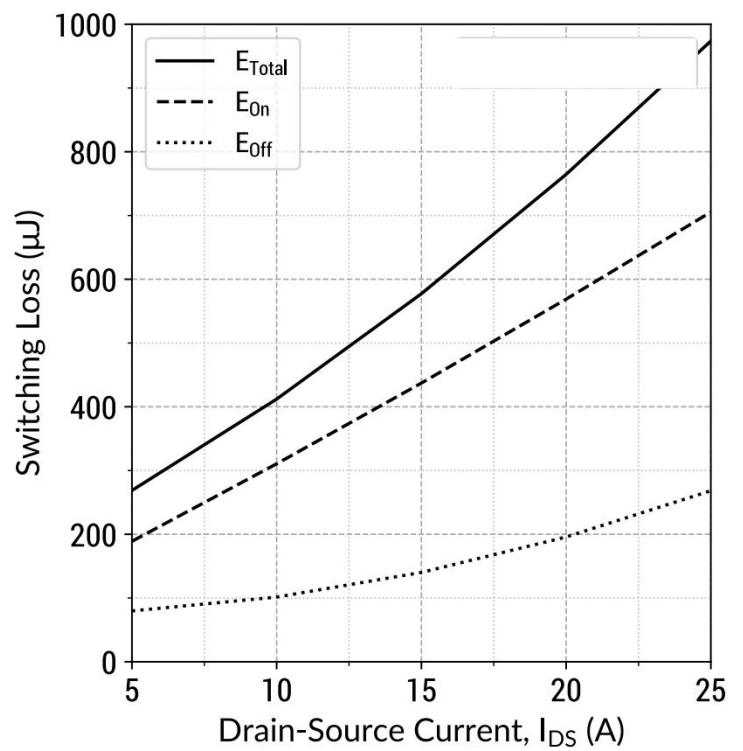


Figure23: Inductive Switching Energy vs Rg (V_{ds}=1700V)

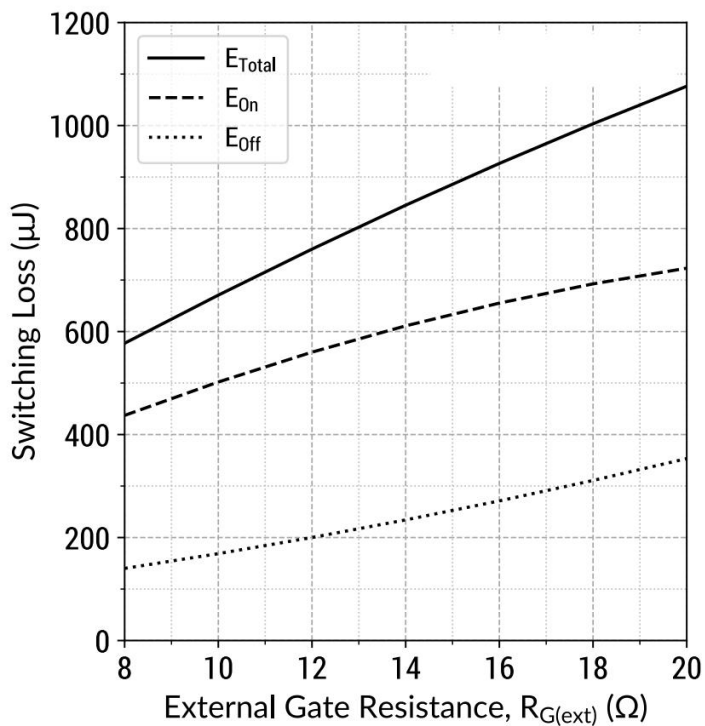


Figure24: Switching Time vs Rg (V_{ds}=1700V)

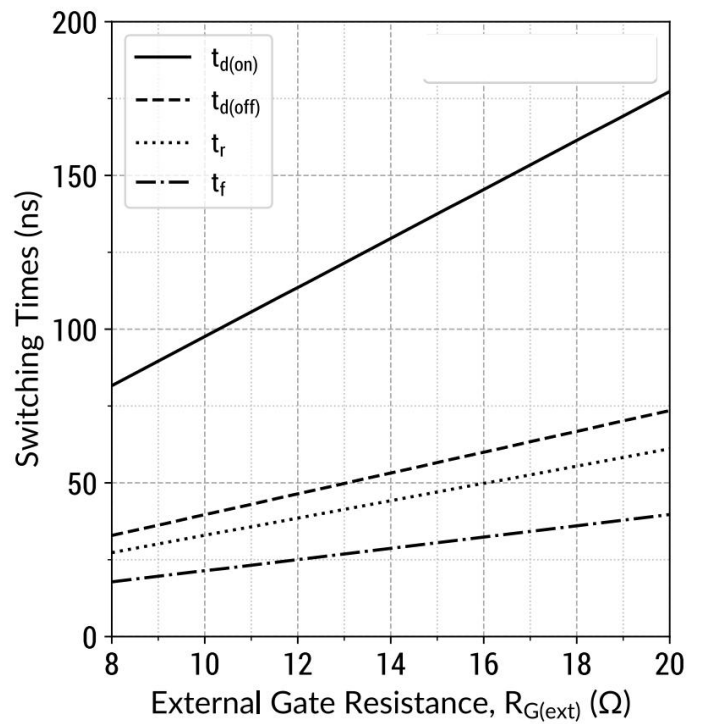


Figure25: Inductive Switching Energy vs Temperature
($V_{ds}=1700V$)

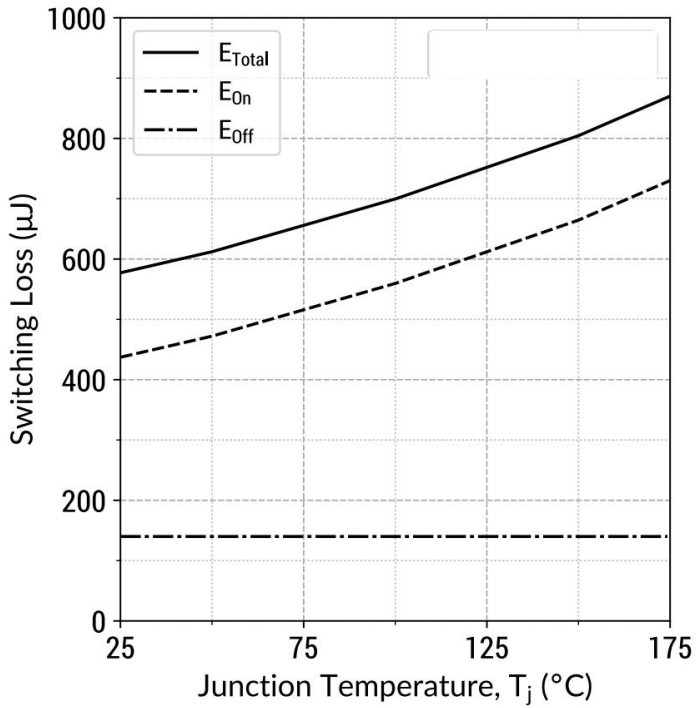


Figure26: dV/dt vs R_g ($V_{ds}=1700V$)

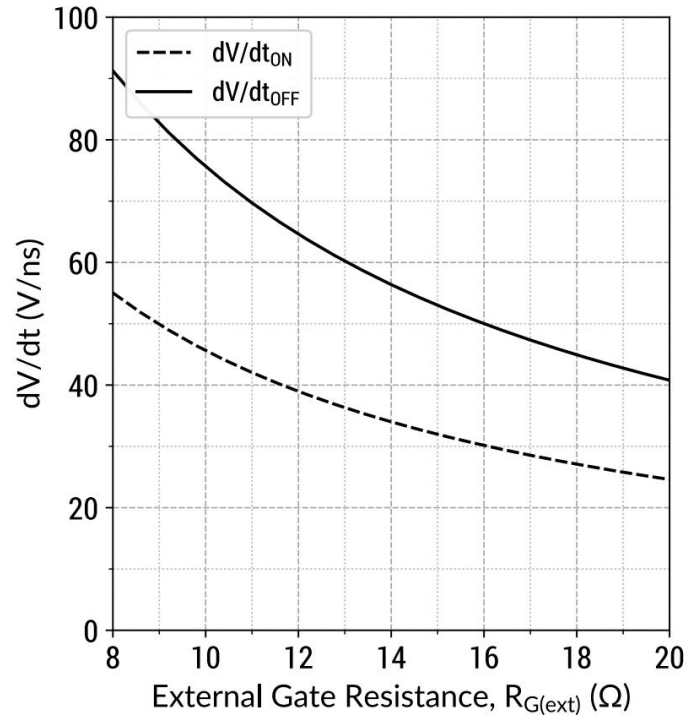
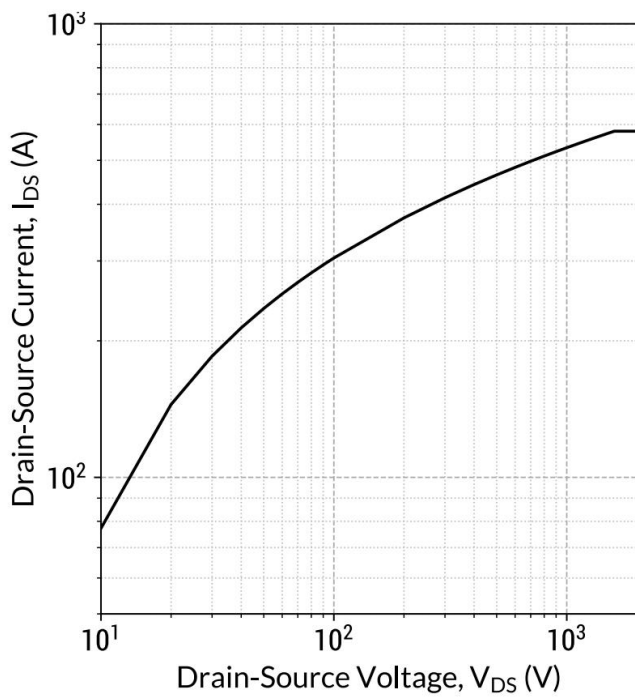
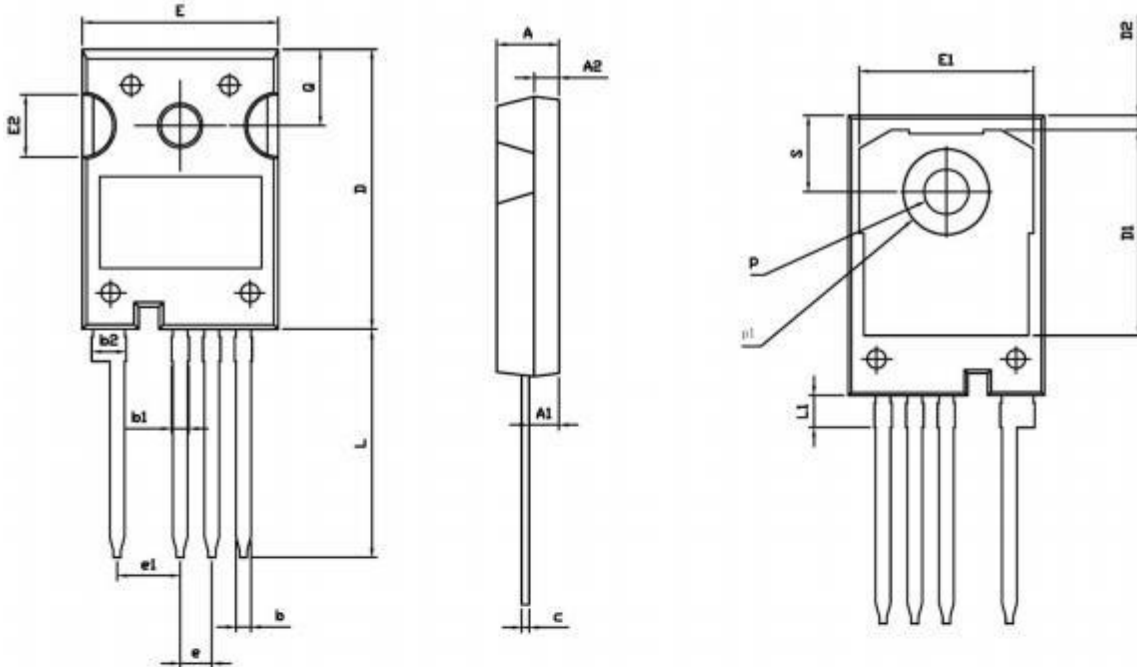


Figure27: High Current IV

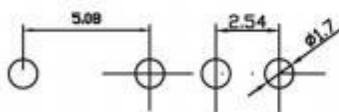


Package Dimensions

Package TO-247-4



RECOMMENDED LAND PATTERN



UNIT: mm

	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.25	2.40	2.45
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