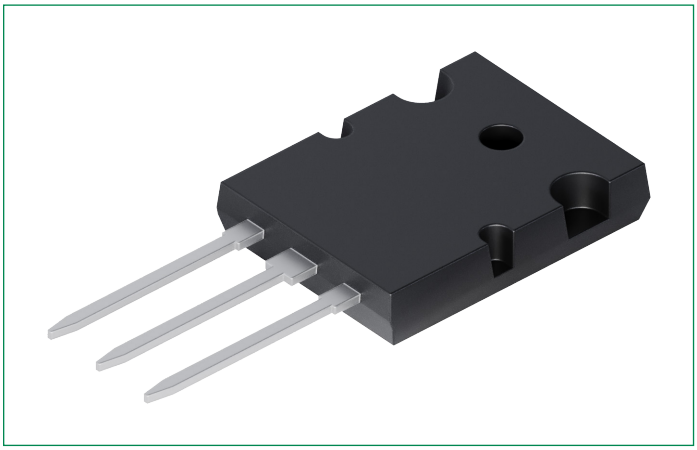
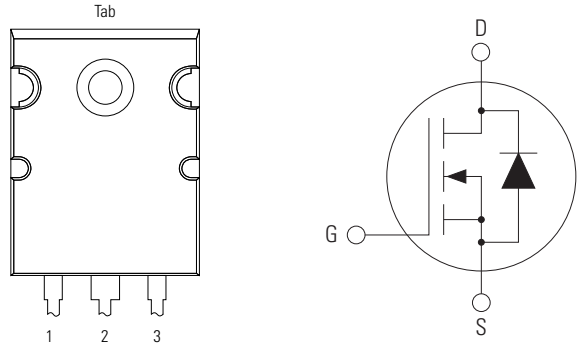
IXTK22N100L

1000 V, 22 A, 600 mΩ, Linear™ Power MOSFET w/ Extended FBSOA

N-Channel Enhancement Mode, Avalanche Rated



Pinout Diagram TO-264 (IXTK)



1/G: Gate; **2/D:** Drain; **3/S:** Source; **Tab:** Drain

Features

- Designed for Linear Operation
- Avalanche Rated
- Molding Epoxy Meets UL94 V-0 Flammability Classification

Advantages

- Easy to Mount
- Space Savings
- High Power Density

Applications

- Programmable Loads
- Current Regulators
- DC-DC Converters
- Battery Chargers
- DC Choppers
- Temperature and Lighting

Product Summary

Characteristic	Value	Unit
V_{DSS}	1000	V
I_{D25}	22	A
$R_{DS(on)}$	≤ 600	mΩ

Maximum Ratings

Symbol	Characteristic	Conditions	Value	Unit
V_{DSS}	Drain-source voltage	T_{vj} = 25 °C to 150 °C	1000	V
V_{GSS}	Gate-source voltage	Continuous	±30	V
V_{GSM}		Transient	±40	
I_D	Drain current	T_c = 25 °C	22	A
I_{DM}	Pulse drain current	T_c = 25 °C, pulse width limited by $T_{vj(max)}$	50	
I_{AS}	Single pulse avalanche current	T_c = 25 °C	22	A
E_{AS}	Single pulse avalanche energy	T_c = 25 °C	1.5	J
P_{tot}	Total power dissipation	T_c = 25 °C	700	W
T_{vj}	Virtual junction temperature range	–	−55 to +150	°C
$T_{vj(max)}$	Maximum virtual junction temperature	–	150	
T_{stg}	Storage temperature range	–	−55 to +150	
T_{sld}	Soldering temperature	–	300	°C
M_S	Mounting torque for screws to heat sink	–	1.13/10	Nm/lb.in.
G	Weight	–	10	g

Electrical Characteristics – Static (T_{vj} = 25 °C unless otherwise specified)

Symbol	Characteristic	Conditions	Value			Unit
			Min.	Typ.	Max.	
$V_{(BR)DSS}$	Drain-source breakdown voltage	I_D = 1 mA, V_{GS} = 0 V	1000	–	–	V
$V_{GS(th)}$	Gate threshold voltage	I_D = 250 µA, V_{GS} = V_{DS}	3.0	–	5.5	V
I_{GSS}	Gate-source leakage current	V_{DS} = 0 V, V_{GS} = ±30 V	–	–	±200	nA
I_{DSS}	Drain-source leakage current	V_{DS} = V_{DSS}, V_{GS} = 0 V	–	–	50	µA
		V_{DS} = V_{DSS}, V_{GS} = 0 V, T_{vj} = 125 °C	–	–	1	mA
$R_{DS(on)}$	Drain-source on-resistance[1]	V_{GS} = 20 V, I_D = 0.5 × I_{DSS}	–	–	600	mΩ

Note 1: Pulse test, t ≤ 300 µs, duty cycle, d ≤ 2%

Electrical Characteristics – Dynamic (T_{vj} = 25 °C unless otherwise specified)

Symbol	Characteristic	Conditions	Value			Unit
			Min.	Typ.	Max.	
g_{fs}	Transconductance[1]	V_{DS} = 20 V, I_D = 0.5 × I_{DSS}	4.5	7.0	9.5	S
C_{iss}	Input capacitance	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	–	7050	–	pF
C_{oss}	Output capacitance		–	600	–	
C_{rss}	Reverse transfer capacitance		–	100	–	
$t_{d(on)}$	Turn-on delay time	Resistive switching times V_{GS} = 15 V, V_{DS} = 0.5 × V_{DSS}, I_D = 0.5 × I_{DSS}, $R_{G(ext)}$ = 2 Ω	–	36	–	ns
t_r	Rise time		–	35	–	
$t_{d(off)}$	Turn-off delay time		–	80	–	
t_f	Fall time		–	50	–	
Q_G	Total gate charge	V_{GS} = 15 V, V_{DS} = 0.5 × V_{DSS}, I_D = 0.5 × I_{DSS}	–	270	–	nC
Q_{GS}	Gate-source charge		–	70	–	
Q_{GD}	Gate-drain charge		–	110	–	

Note 1: Pulse test, t ≤ 300 µs, duty cycle, d ≤ 2%

Thermal Specifications

Symbol	Characteristics	Value	Unit
$R_{th(j-c)}$	Thermal resistance, junction to case	0.18	K/W
$R_{th(j-a)}$	Thermal resistance, junction to ambient	0.15	K/W

Safe-Operating-Area Specification

Symbol	Conditions	Value			Unit
		Min.	Typ.	Max.	
SOA	V_{DS} = 800 V, I_D = 0.3 A, T_C = 90 °C , t_p = 5 s	240	–	–	W

Source-Drain Diode Characteristics (T_{vj} = 25°C unless otherwise specified)

Symbol	Characteristic	Conditions	Value			Unit
			Min.	Typ.	Max.	
I_S	Continuous diode forward current	V_{GS} = 0 V	–	–	22	A
I_{SM}	Diode pulse current	Repetitive, pulse width limited by $T_{vj(max)}$	–	–	50	A
V_{SD}	Diode forward voltage[1]	I_F = I_S, V_{GS} = 0 V	–	–	1.5	V
t_{rr}	Reverse recovery time	I_F = I_S, -di/dt = 100 A/µs, V_R = 100 V, V_{GS} = 0 V	–	1000	–	ns

Note 1: Pulse test, t ≤ 300 µs, duty cycle, d ≤ 2%

Characteristic Curves

Fig. 1. Output Characteristics @ T_{vj} = 25 °C

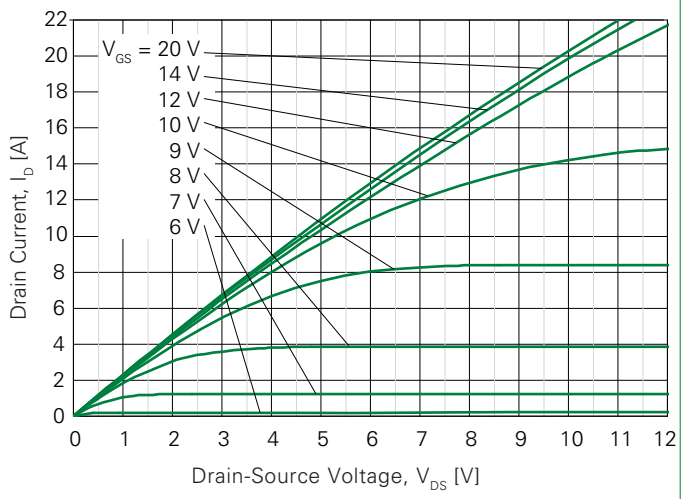


Fig. 2. Extended Output Characteristics @ T_{vj} = 25 °C

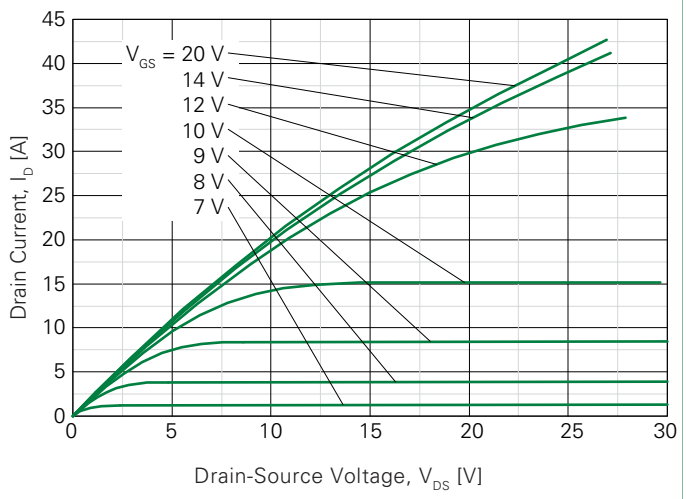


Fig. 3. Output Characteristics @ T_{vj} = 125 °C

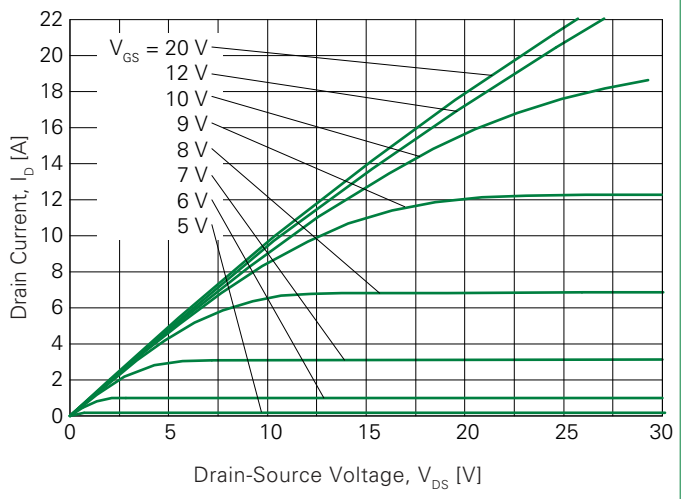


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 11 A Value vs. Junction Temperature

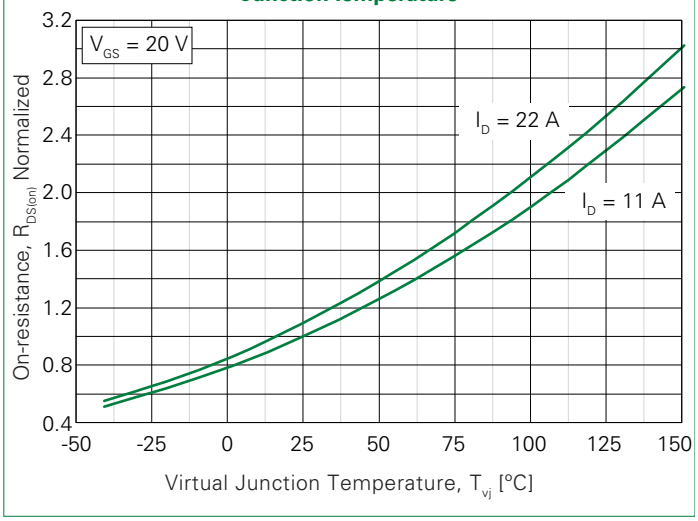


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 11 A Value vs. Drain Current

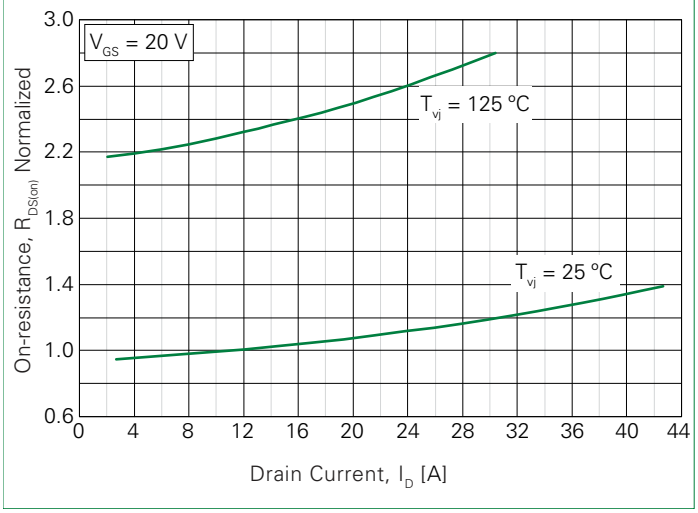


Fig. 6. Maximum Drain Current vs. Case Temperature

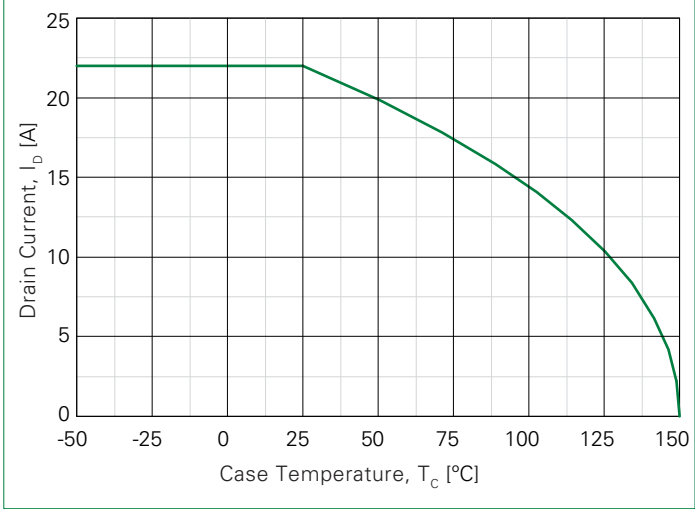


Fig. 7. Input Admittance

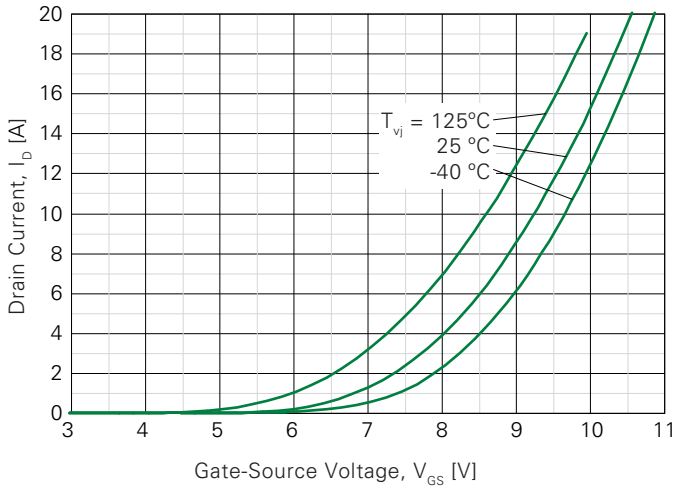


Fig. 8. Transconductance

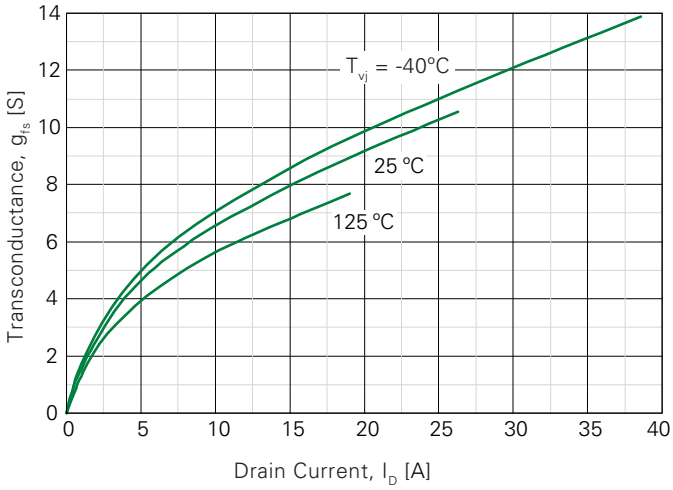


Fig. 9. Forward Voltage Drop of Intrinsic Diode

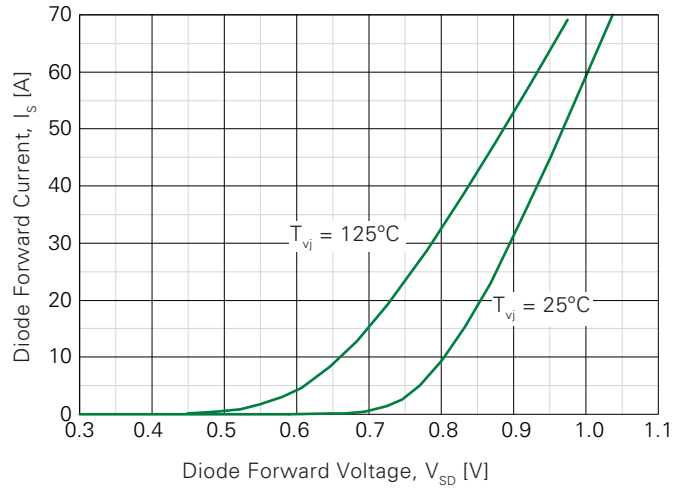


Fig. 10. Gate Charge

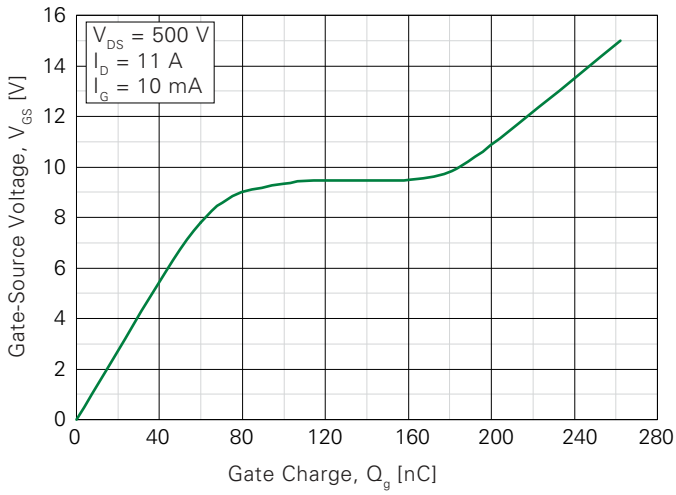


Fig. 11. Capacitance

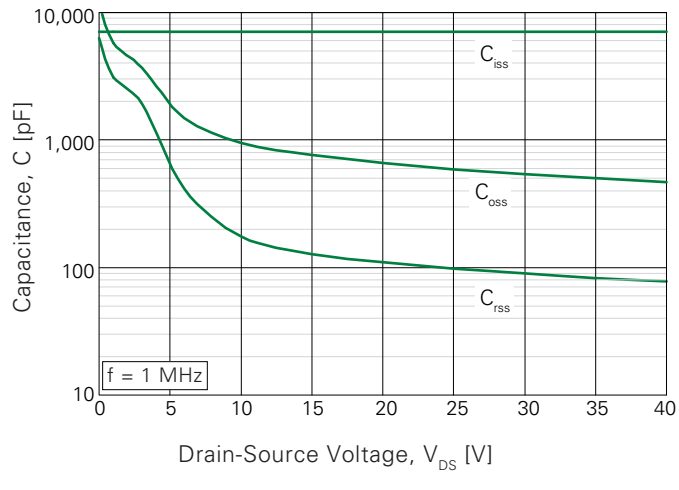


Fig. 12. Maximum Transient Thermal Impedance

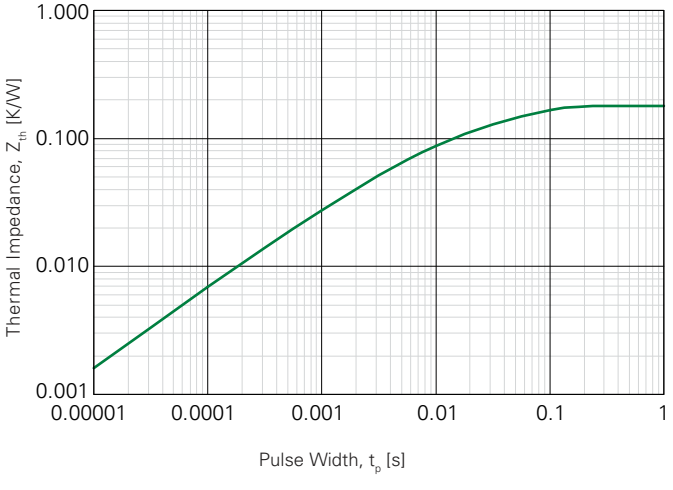


Fig. 13. Forward-Bias Safe Operating Area @ T_c = 25 °C

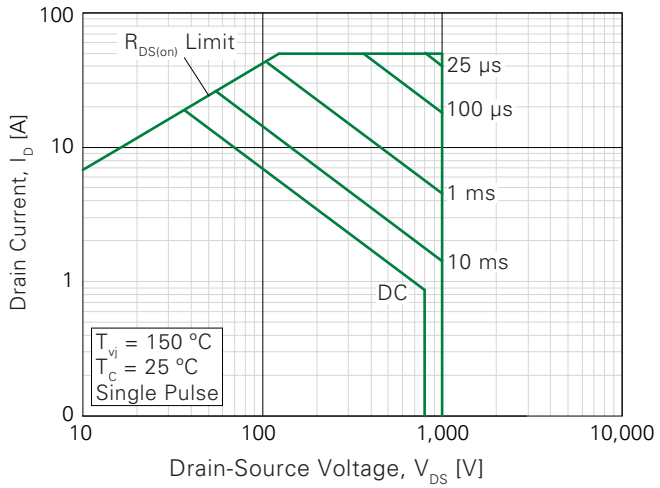
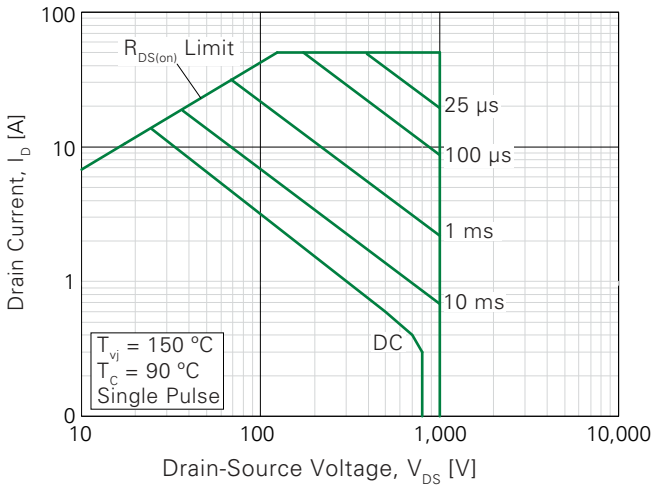
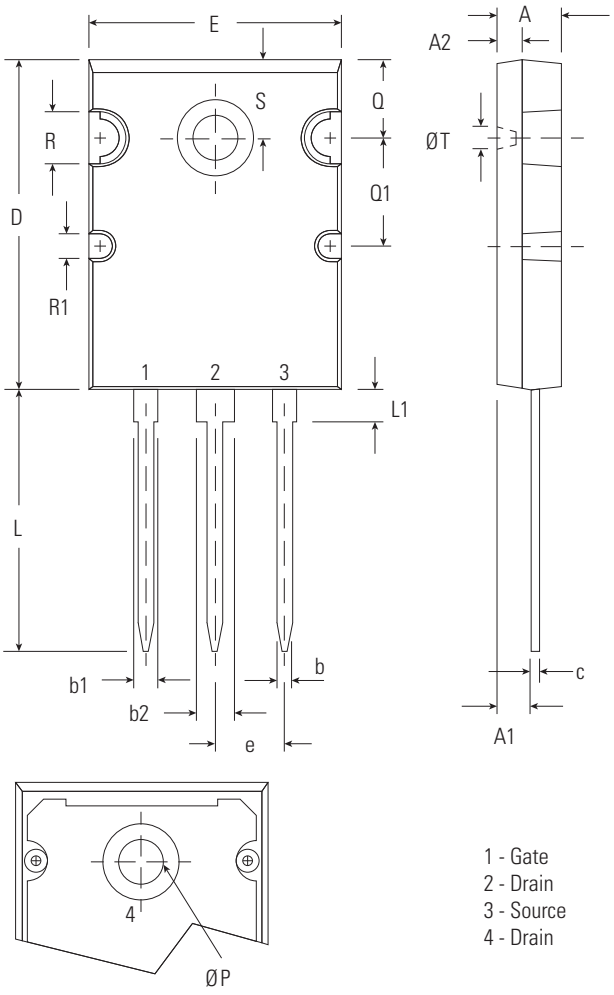


Fig. 14. Forward-Bias Safe Operating Area @ T_c = 90°



Part Outline Drawing (TO-264)



Symbol	Inches		Millimeters	
	Min.	Max.	Min.	Max
A	4.82	5.13	0.190	0.202
A1	2.54	2.89	0.100	0.114
A2	2.00	2.10	0.079	0.083
b	1.12	1.42	0.044	0.056
b1	2.39	2.69	0.094	0.106
b2	2.90	3.09	0.114	0.122
c	0.53	0.83	0.021	0.033
D	25.91	26.16	1.020	1.030
E	19.81	19.96	0.780	0.786
e	5.46 BSC		0.215 BSC	
J	0.00	0.25	0.000	0.010
K	0.00	0.25	0.000	0.010
L	20.32	20.83	0.800	0.820
L1	2.29	2.59	0.090	0.102
P	3.17	3.66	0.125	0.144
Q	6.07	6.27	0.239	0.247
Q1	8.38	8.69	0.330	0.342
R	3.81	4.32	0.150	0.170
R1	1.78	2.29	0.070	0.090
S	6.04	6.30	0.238	0.248
T	1.57	1.83	0.062	0.072

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