

P-Channel Enhancement Mode MOSFET

TDM3605

**DESCRIPTION**

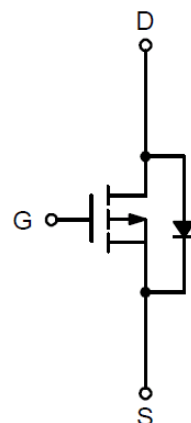
The TDM3605 uses advanced trench technology to provide excellent RDS(ON) and low gate charge. This device is suitable for use as a load switch or in PWM applications.

**GENERAL FEATURES**

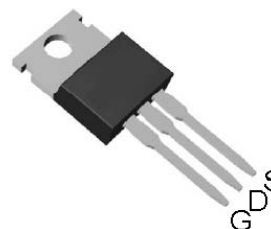
- -60V/-132A
- RDS(ON) < 7.2mΩ @ VGS=-10V
- Reliable and Rugged
- Lead free product is available
- TO220 Package

**Application**

- PWM applications
- Load switch
- Power management



P-Channel MOSFET



Top View of TO-220

ABSOLUTE MAXIMUM RATINGS(T<sub>A</sub>=25 °C unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V <sub>DS</sub>	-60	V
Gate-Source Voltage	V <sub>GS</sub>	±25	V
Diode Continuous Forward Current	I <sub>S</sub>	-80	A
Pulse Drain Current Tested	I <sub>DP</sub> (T <sub>C</sub> =25 °C)	-264	A
Continuous Drain Current	I <sub>D</sub> (T <sub>C</sub> =25 °C)	-132 <small>note1</small>	A
	I <sub>D</sub> (T <sub>C</sub> =100 °C)	-83	A
Maximum Power Dissipation	P <sub>D</sub> (T <sub>C</sub> =25 °C)	250	W
	P <sub>D</sub> (T <sub>C</sub> =100 °C)	100	W
Thermal Resistance-Junction to Ambient	R <sub>θJA</sub>	50	°C/W
Thermal Resistance-Junction to Case	R <sub>θJC</sub>	0.5	°C/W

NOTES:

1. Max continuous current is limited by bonding wire.

**ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C unless otherwise noted)**

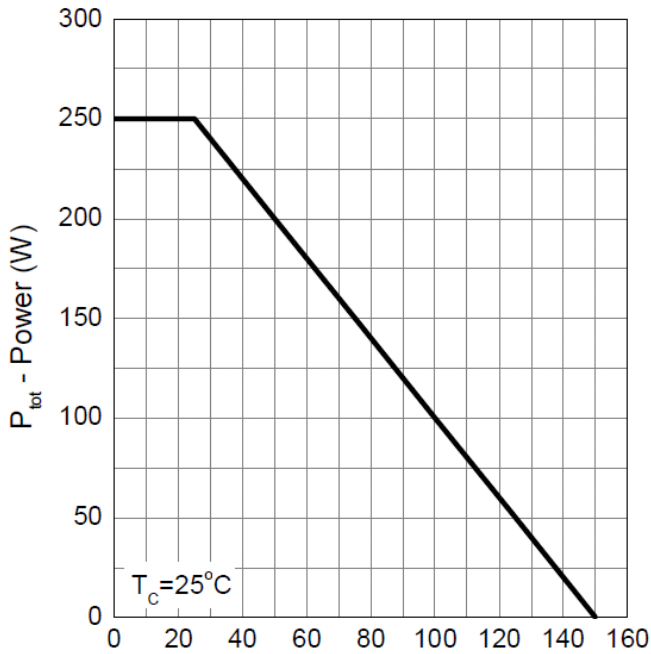
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>STATIC CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V I <sub>D</sub> =-250μA	-60	-	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-48V, V <sub>GS</sub> =0V	-	-	-1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±25V, V <sub>DS</sub> =0V	-	-	±100	nA
<b>ON CHARACTERISTICS (Note 2)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-1		-3	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =-10V, I <sub>DS</sub> =-20A	-	5.6	7.2	mΩ
<b>DYNAMIC CHARACTERISTICS (Note3)</b>						
Gate Resistance	R <sub>G</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, F=1.0MHz	-	3	-	Ω
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V, F=1.0MHz	-	6095	-	PF
Output Capacitance	C <sub>oss</sub>		-	1080	-	PF
Reverse Transfer Capacitance	C <sub>rss</sub>		-	430	-	PF
<b>SWITCHING CHARACTERISTICS (Note 3)</b>						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =-30V, R <sub>L</sub> =30 Ω, V <sub>GEN</sub> =-10V, R <sub>G</sub> =6 Ω I <sub>DS</sub> =-1A	-	18	33	nS
Turn-on Rise Time	t <sub>r</sub>		-	20	36	nS
Turn-Off Delay Time	t <sub>d(off)</sub>		-	200	360	nS
Turn-Off Fall Time	t <sub>f</sub>		-	120	216	nS
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =-30V, I <sub>DS</sub> =-20A, V <sub>GS</sub> =-10V	-	136	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	20	-	nC
Gate-Drain Charge	Q <sub>gd</sub>		-	33	-	nC
Body Diode Reverse Recovery Time	T <sub>rr</sub>	I <sub>DS</sub> =-20A, di/dt=100A/μs	-	51	-	nS
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>		-	90	-	nC
<b>DRAIN-SOURCE DIODE CHARACTERISTICS</b>						
Diode Forward Voltage (Note 2)	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>SD</sub> =-1A	-	-0.7	-1	V

**NOTES:**

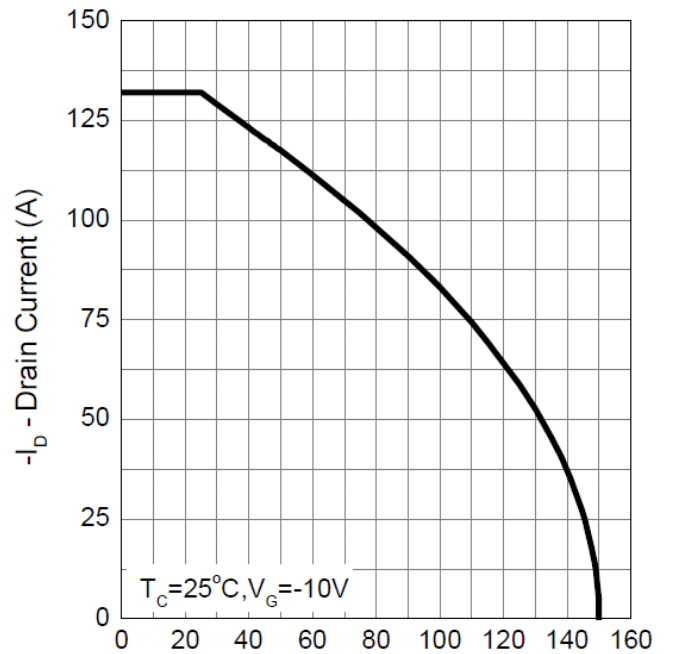
- Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
- Guaranteed by design, not subject to production testing

Typical Operating Characteristics

Power Dissipation



Drain Current

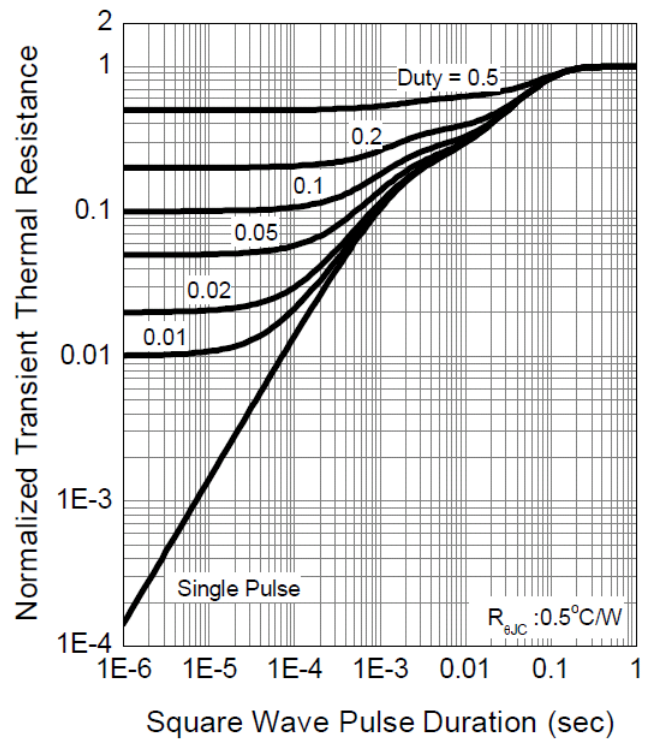
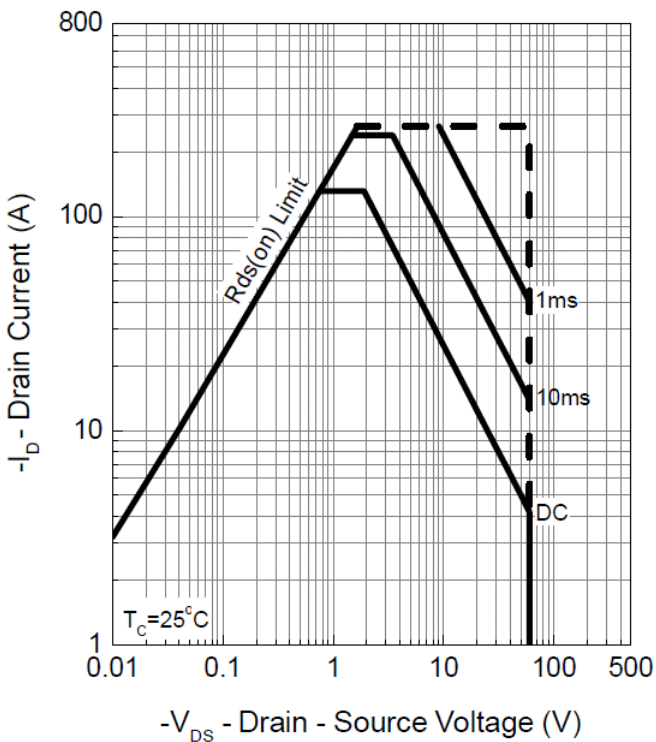


T<sub>j</sub> - Junction Temperature (°C)

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Safe Operation Area

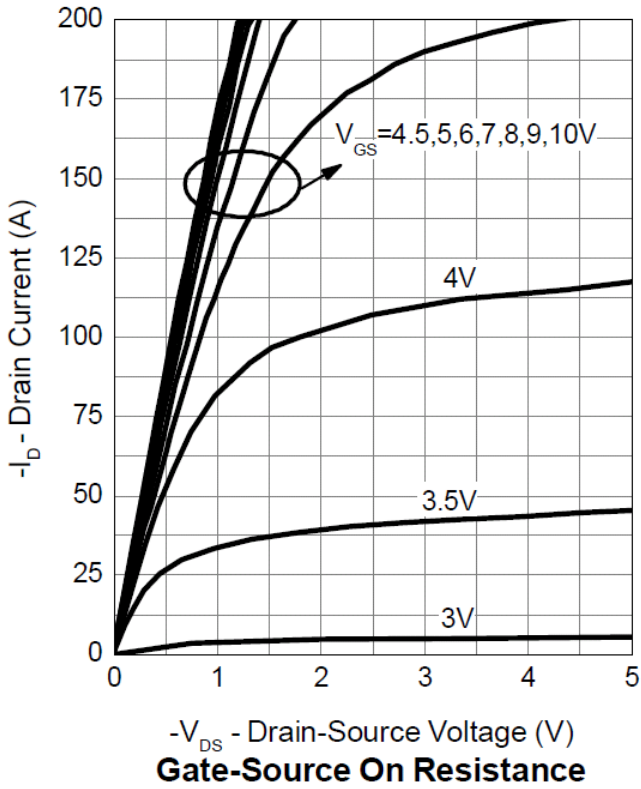
Thermal Transient Impedance



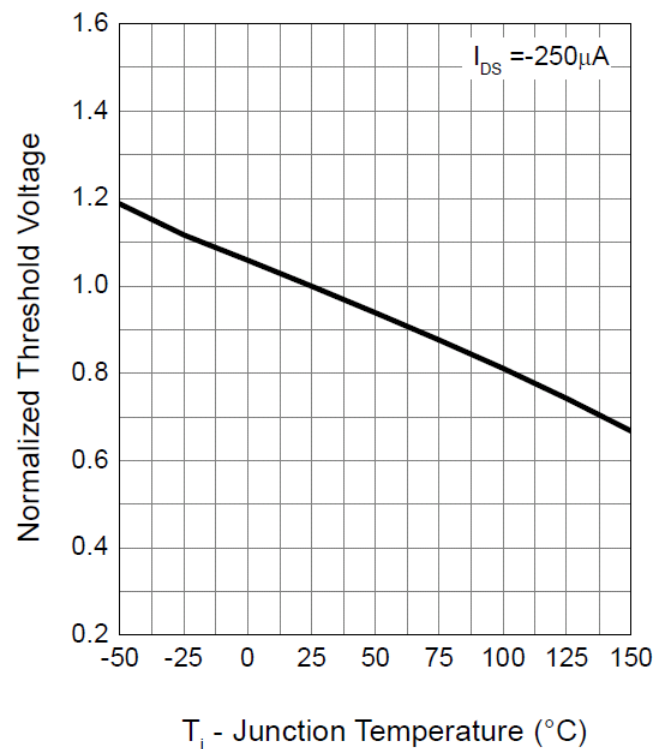
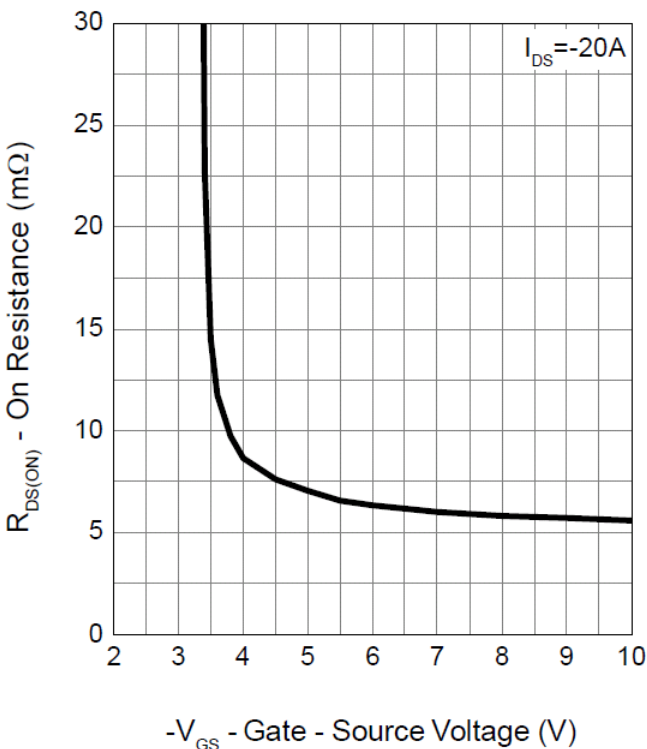
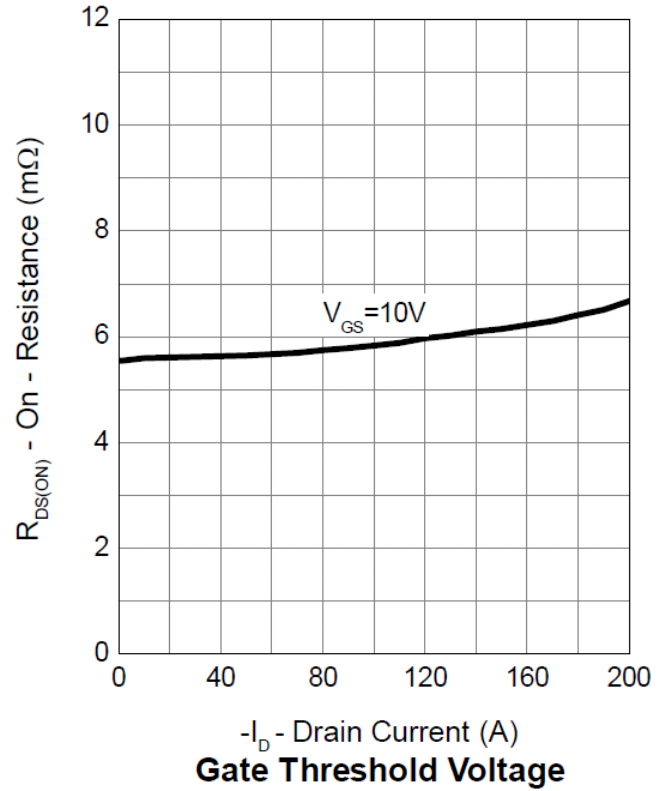
P-Channel Enhancement Mode MOSFET TDM3605

Typical Operating Characteristics(Cont.)

Output Characteristics

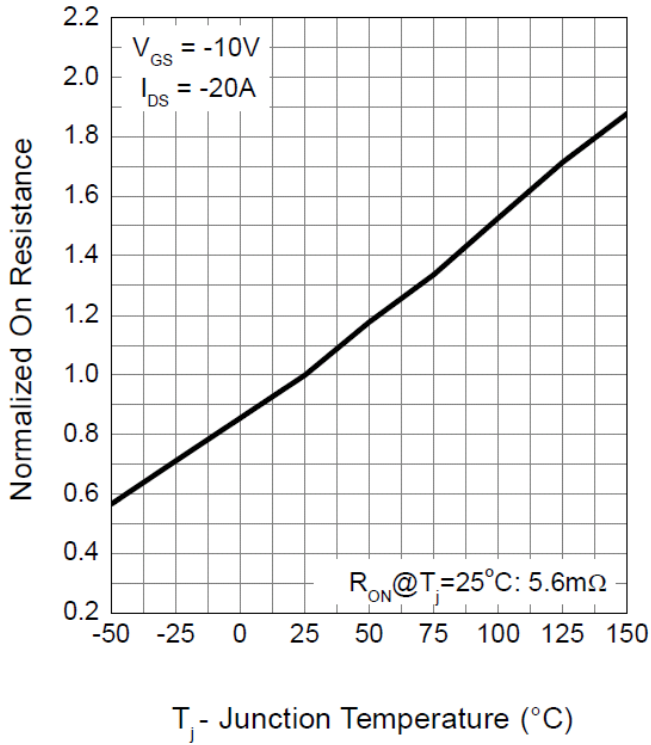


Drain-Source On Resistance

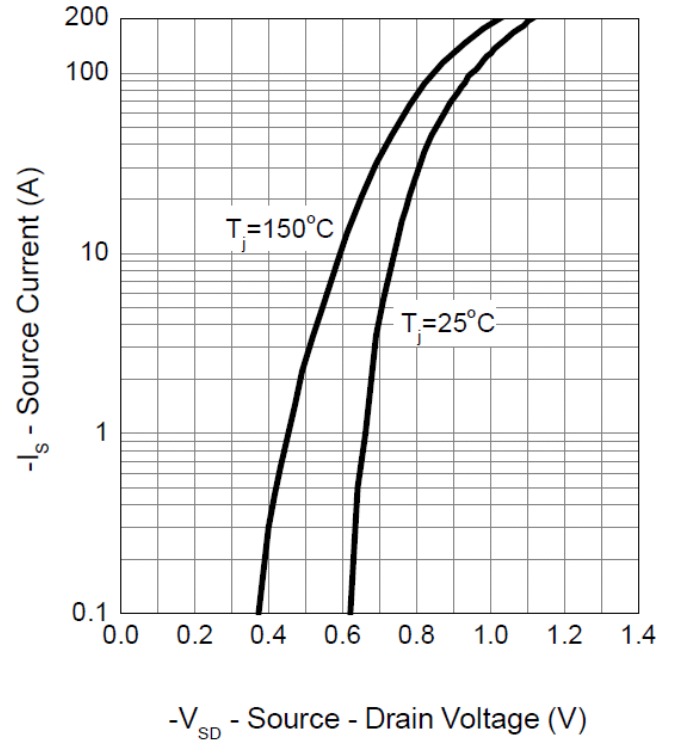


Typical Operating Characteristics (Cont.)

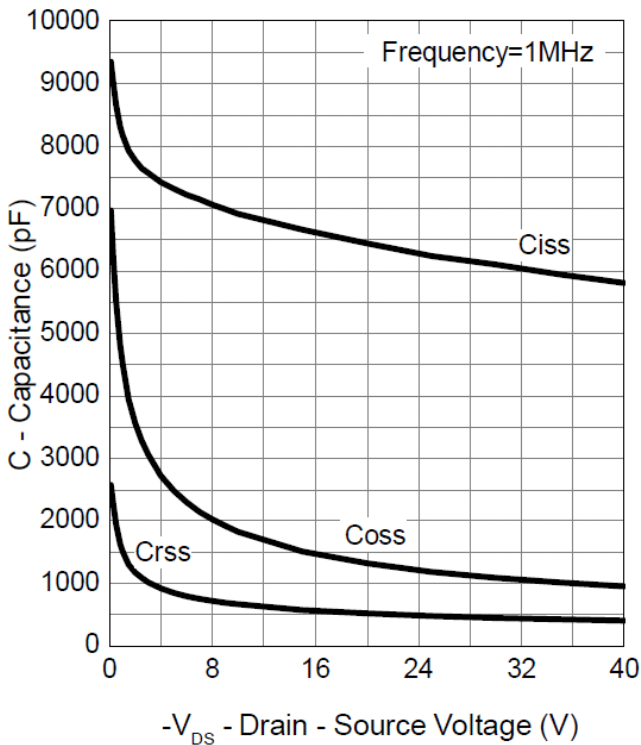
Drain-Source On Resistance



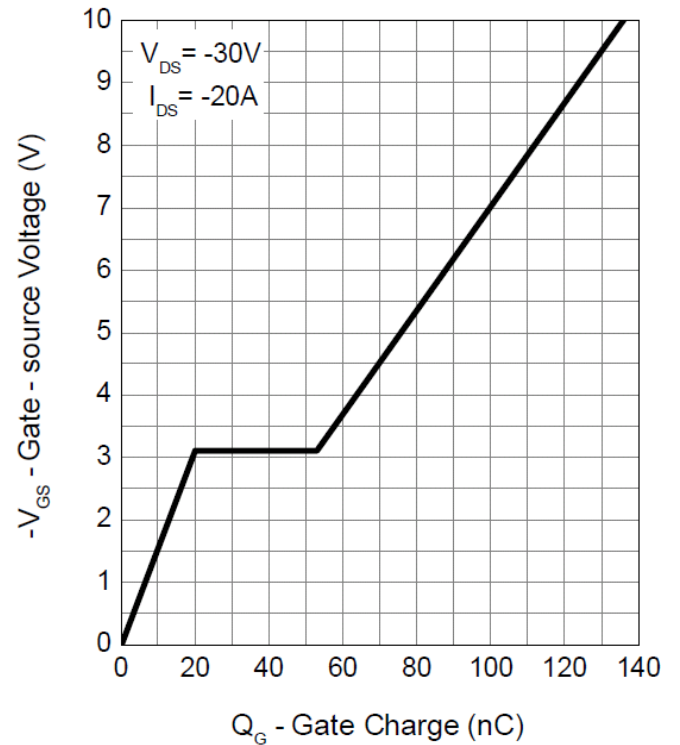
Source-Drain Diode Forward



Capacitance

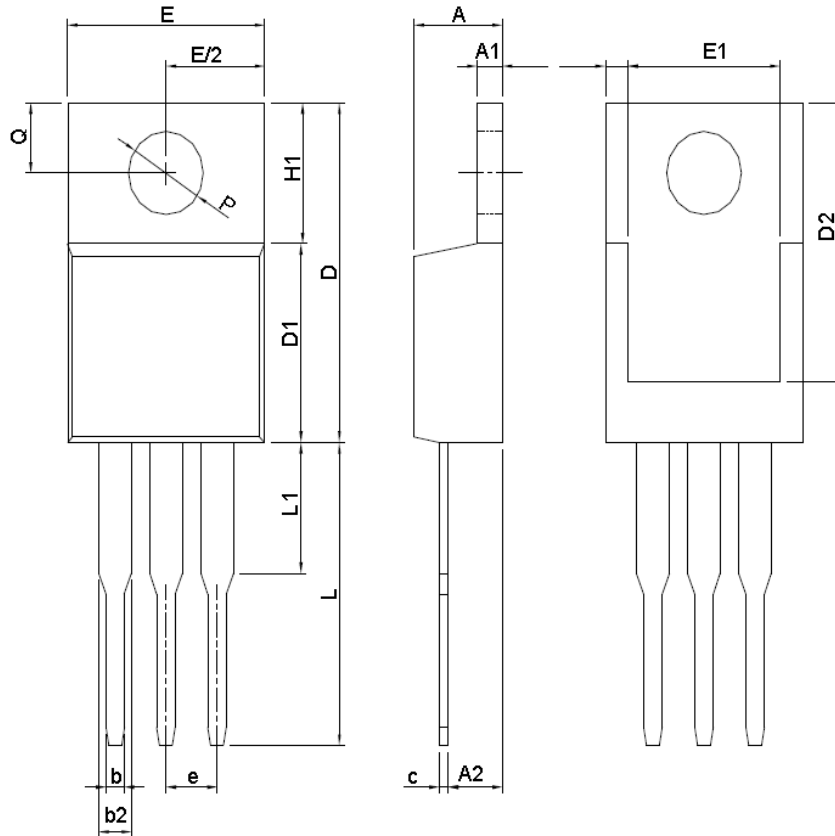


Gate Charge



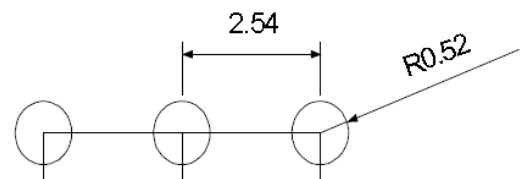
Package Information

TO-220 Package



SYMBOL	TO-220			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	3.56	4.83	0.140	0.190
A1	0.51	1.40	0.020	0.055
A2	2.03	2.92	0.080	0.115
b	0.38	1.02	0.015	0.040
b2	1.14	1.78	0.045	0.070
c	0.36	0.61	0.014	0.024
D	14.22	16.51	0.560	0.650
D1	8.38	9.30	0.330	0.366
D2	12.19	13.65	0.480	0.537
E	9.65	10.67	0.380	0.420
E1	6.86	8.89	0.270	0.350
e	2.54 BSC		0.100 BSC	
H1	5.84	6.86	0.230	0.270
L	12.70	14.73	0.500	0.580
L1	-	6.35	-	0.250
P	3.53	4.09	0.139	0.161
Q	2.54	3.43	0.100	0.135

RECOMMENDED LAND PATTERN



UNIT: mm

Design Notes