

PRODUCT SUMMARY (TYPICAL)

V_{DS} (V)	600
$R_{DS(on)}$ (Ω)	0.29
Q_{rr} (nC)	29

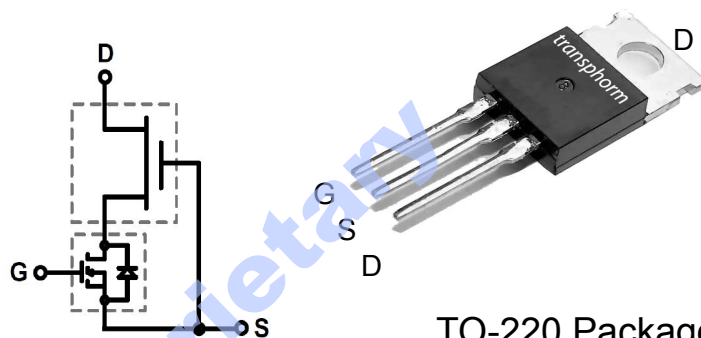
GaN Power Low-loss Switch

Features

- Low Q_{rr}
- Free-wheeling diode not required
- High-side Quiet Tab™ for reduced EMI
- GSD pin layout improves high speed design
- RoHS compliant

Applications

- High frequency operation
- Compact DC-DC converters
- AC motor drives
- Battery chargers
- Switch mode power supplies



TO-220 Package

Absolute Maximum Ratings ($T_C=25^\circ\text{C}$ unless otherwise stated)

Symbol	Parameter	Limit Value	Unit
$I_{D25^\circ\text{C}}$	Continuous Drain Current @ $T_C=25^\circ\text{C}$	9	A
$I_{D100^\circ\text{C}}$	Continuous Drain Current @ $T_C=100^\circ\text{C}$	6	A
I_{DM}	Pulsed Drain Current (pulse width: 100 μs)	33	A
V_{DSS}	Drain to Source Voltage	600	V
V_{TDS}	Transient Drain to Source Voltage ^a	750	V
V_{GSS}	Gate to Source Voltage	± 18	V
$P_{D25^\circ\text{C}}$	Maximum Power Dissipation	65	W
T_C	Operating Temperature Case	-55 to 150	$^\circ\text{C}$
T_J	Junction	-55 to 175	$^\circ\text{C}$
T_S	Storage Temperature	-55 to 150	$^\circ\text{C}$
T_{Csold}	Soldering peak Temperature ^b	260	$^\circ\text{C}$

Thermal Resistance

Symbol	Parameter	Typical	Unit
$R_{\theta JC}$	Junction-to-Case	2.3	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Junction-to-Ambient	62	$^\circ\text{C}/\text{W}$

Notes

a: For 1 usec, duty cycle $D=0.1$

b: For 10 sec, 1.6mm from the case

Electrical Characteristics (T_C=25°C unless otherwise stated)

Symbol	Parameter	Min	Typical	Max	Unit	Test Conditions
Static						
V _{DSS-MAX}	Maximum Drain-Source Voltage	600			V	V _{GS} =0V
V _{GS(th)}	Gate Threshold Voltage	1.35	1.8	2.35	V	V _{DS} =V _{GS} , I _D =1mA
R _{DS(on)}	Drain-Source On-Resistance (T _J = 25°C)	-	0.29	0.35	Ω	V _{GS} =8V, I _D =5.5A, T _J = 25°C
R _{DS(on)}	Drain-Source On-Resistance (T _J = 175°C)	-	0.76		Ω	V _{GS} =8V, I _D =5.5A, T _J = 175°C
I _{DSS}	Drain-to-Source Leakage Current, T _J = 25°C	-	2.5	60	μA	V _{DS} =600V, V _{GS} =0V, T _J = 25°C
I _{DSS}	Drain-to-Source Leakage Current, T _J = 150°C	-	10		μA	V _{DS} =600V, V _{GS} =0V, T _J = 150°C
Dynamic						
C _{ISS}	Input Capacitance	-	785	-		V _{GS} =0 V, V _{DS} =400V, f =1 MHz
C _{OSS}	Output Capacitance	-	26	-		
C _{RSS}	Reverse Transfer Capacitance	-	3.5	-	pF	
C _{O(er)}	Output Capacitance, energy related	-	36	-		V _{GS} =0 V, V _{DS} =0 V to 480 V
C _{O(tr)}	Output Capacitance, time related	-	63	-		
Q _g	Total Gate Charge	-	6.2	9.3		nC V _{DS} =100 V ^b , V _{GS} = 0-4.5 V, I _D = 5.5A
Q _{gs}	Gate-Source Charge	-	2.1	-		
Q _{gd}	Gate-Drain Charge	-	2.2	-		
t _{d(on)}	Turn-On Delay		7.5			ns V _{DS} =480 V, V _{GS} = 0-10 V, I _D = 5.5 A, R _G = 2 Ω
t _r	Rise Time		4			
T _{d(off)}	Turn-Off Delay		10			
t _f	Fall Time		4.5			
Reverse operation						
I _S	Reverse Current	-	-	12	A	V _{GS} =0 V, T _J =100°C, Duty=5%, >10kHz
V _{SD}	Reverse Voltage	-	2.3	2.9	V	V _{GS} =0 V, I _S =6A, T _J =25°C, Duty=10, >10 kHz
V _{SD}	Reverse Voltage	-	1.8	2.3	V	V _{GS} =0 V, I _S =3A, T _J =25°C, Duty=10%, >10 kHz
t _{rr}	Reverse Recovery Time	-	30		ns	I _S =5.5A, V _{DD} =480 V, di/dt =450 A/μs, T _J =25°C
Q _{rr}	Reverse Recovery Charge	-	29		nC	

Notes

b: Q_g does not change for V_{DS}>100 V

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Typical Characteristic Curves 25 °C unless otherwise noted

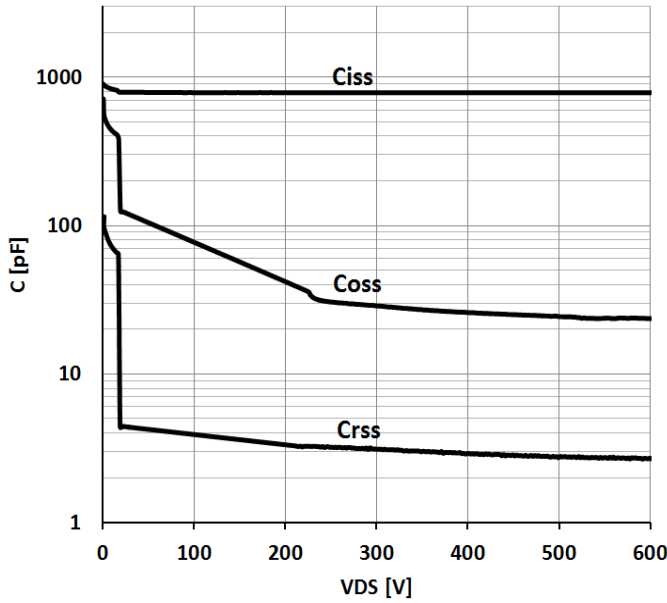


Fig. 5. Typical Capacitance
 $V_{GS}=0\text{ V}$, $f=1\text{ MHz}$

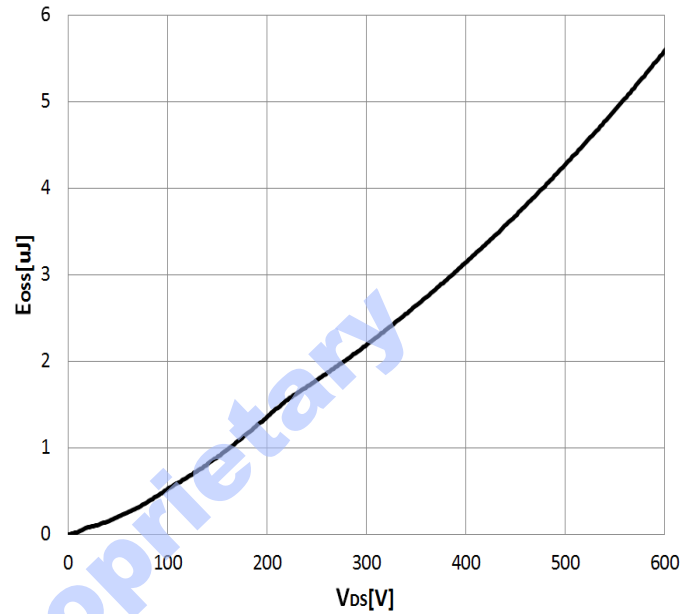


Fig. 6. Typical Coss Stored Energy

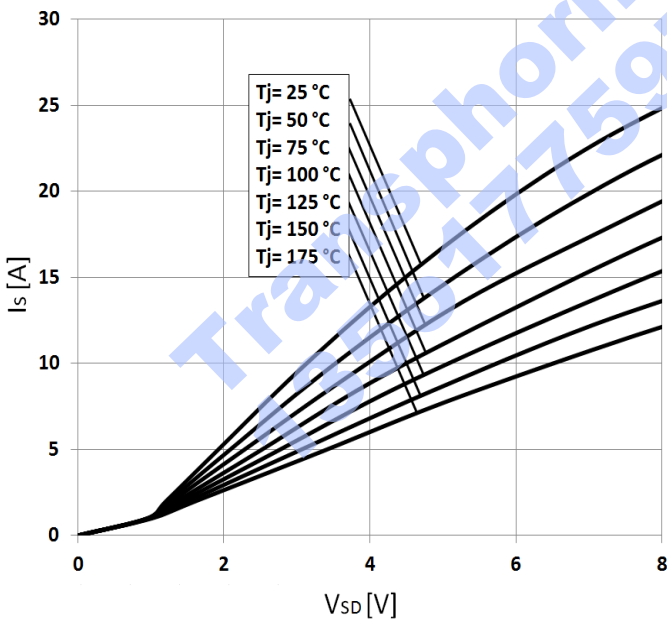


Fig. 7. Forward Characteristics of Rev. Diode
 $I_S=f(V_{SD})$; parameter T_j

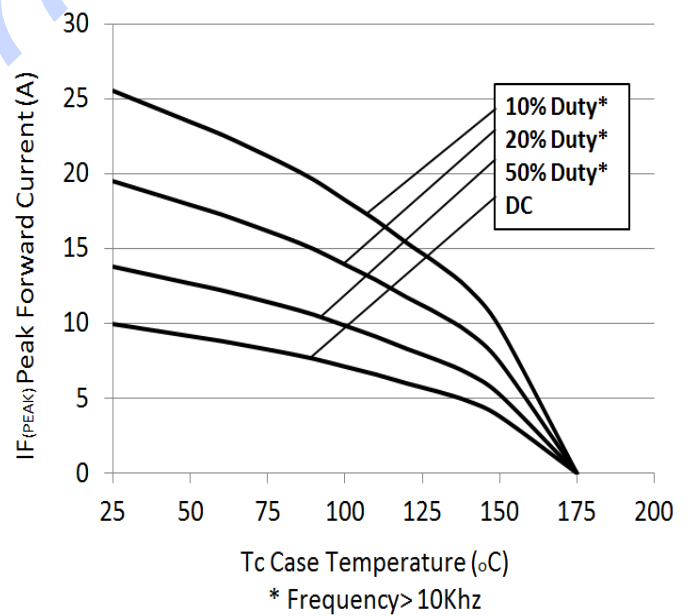


Fig. 8. Current Derating
 * Frequency > 10Khz

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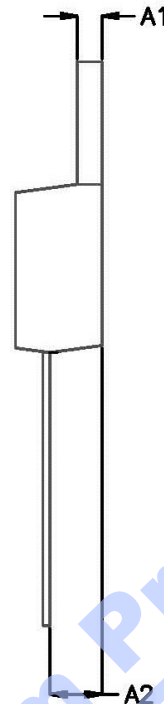
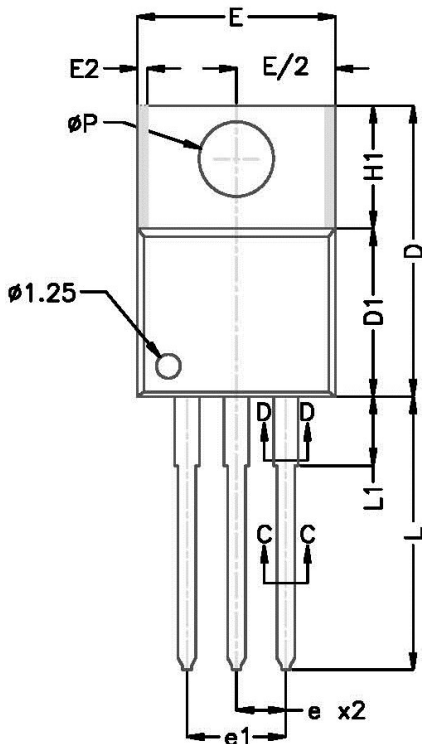


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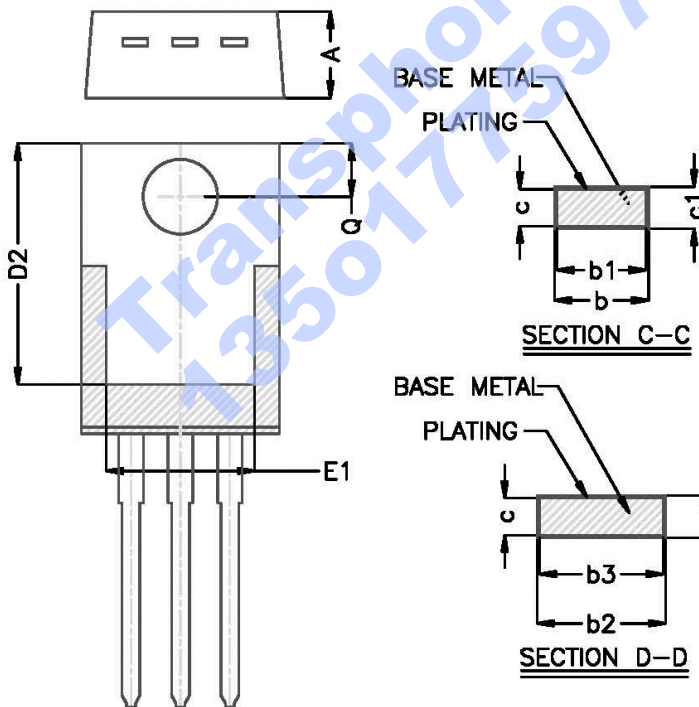
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SYMBOL	MILLIMETERS			INCHES		
	MINIMUM	NOMINAL	MAXIMUM	MINIMUM	NOMINAL	MAXIMUM
A	3.58	4.45	4.83	0.140	0.175	0.190
A1	0.51	1.27	1.40	0.020	0.050	0.055
A2	2.03	-	2.92	0.080	-	0.115
b	0.38	-	1.01	0.015	-	0.040
b1	0.38	-	0.97	0.015	-	0.038
b2	1.14	-	1.78	0.045	-	0.070
b3	1.14	1.27	1.73	0.045	0.050	0.068
c	0.38	-	0.81	0.014	-	0.024
c1	0.38	0.38	0.58	0.014	0.015	0.022
D	14.22	-	18.51	0.560	-	0.650
D1	8.38	8.04	9.02	0.330	0.340	0.355
D2	11.68	-	12.88	0.460	-	0.507
E	8.85	10.19	10.67	0.380	0.401	0.420
E1	6.38	-	8.89	0.270	-	0.350
E2	-	-	0.78	-	-	0.030
e	2.54 BSC			0.100 BSC		
e1	5.08 BSC			0.200 BSC		
H1	5.84	6.30	6.88	0.230	0.248	0.270
L	12.70	14.05	14.73	0.500	0.553	0.580
L1	-	-	6.35	-	-	0.250
ØP	3.54	3.84	4.08	0.139	0.151	0.161
Q	2.54	-	3.42	0.100	-	0.135

NOTES:

1. DIMENSIONS D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.127 MM (0.005") PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTERMOST EXTREME OF THE PLASTIC BODY.
2. DIMENSIONS E2 & H1 DEFINE A ZONE WHERE STAMPING AND SINGULATION IRREGULARITIES ARE ALLOWED.
3. OUTLINE CONFORMS TO JEDEC TO-220AB.



TO-220 Package

Pin 1: Gate, Pin 2: Source, Pin 3: Drain, Tab: Drain

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