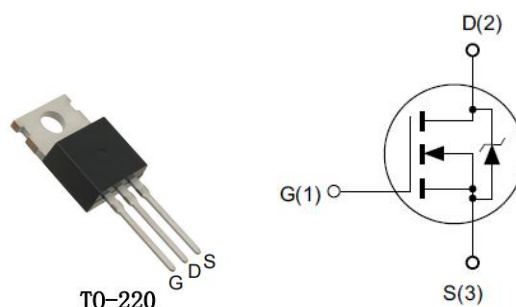


Features

- ◆ 200V, 52A, $R_{DS(ON)}(Typ.) = 0.05\Omega @ V_{GS} = 10V$.
- ◆ Low Gate Charge
- ◆ Fast Switching
- ◆ 100% Avalanche Tested

Application

- ◆ High efficiency switch mode power supplies
- ◆ Electronic lamp ballasts based on half bridge
- ◆ UPS



Absolute Maximum Ratings $T_c = 25^\circ \text{C}$ unless otherwise noted

Symbol	Parameter	Rating	Unit
V_{DS}	Drain-Source Voltage ^a	200	V
V_{GS}	Gate-Source Voltage	± 30	V
I_D	Drain Current-Continuous, $T_c = 25^\circ \text{C}$	52	A
	Drain Current-Continuous, $T_c = 100^\circ \text{C}$	33	A
I_{DM}	Drain Current-Pulsed ^b	208	A
P_D	Maximum Power Dissipation @ $T_J = 25^\circ \text{C}$	208	W
dv/dt	Peak Diode Recovery dv/dt ^c	5	V/ns
E_{AS}	Single Pulsed Avalanche Energy ^d	1080	mJ
T_J, T_{STG}	Operating and Store Temperature Range	150, -55 to 150	$^\circ \text{C}$

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	0.6	$^\circ \text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	69	$^\circ \text{C/W}$

Electrical Characteristics $T_J = 25^\circ \text{C}$ unless otherwise noted

■ Off Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	200	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 200V, V_{GS} = 0V$	-	-	1	μA
I_{GSS}	Forward Gate Body Leakage Current	$V_{DS} = 0V, V_{GS} = \pm 30V$	-	-	± 100	nA

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	-	4.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 10V, I_D = 26A$	-	0.05	0.065	Ω

■ Dynamic Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
R_g	Gate Resistance	$f = 1.0MHz$	-	1.8	-	Ω
C_{iss}	Input Capacitance	$V_{DS} = 100V,$ $V_{GS} = 0V,$ $f = 1.0MHz$	-	2691	-	pF
C_{oss}	Output Capacitance		-	207	-	pF
C_{rss}	Reverse Transfer Capacitance		-	33	-	pF

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 100V, I_D = 52A,$ $V_{GS} = 10V, R_{GEN} = 24\Omega$	-	31	-	ns
t_r	Turn-On Rise Time		-	120	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	142	-	ns
t_f	Turn-Off Fall Time		-	107	-	ns
Q_g	Total Gate Charge	$V_{DS} = 100V, I_D = 52A,$ $V_{GS} = 0 \text{ to } 10V$	-	61	-	nC
Q_{gs}	Gate-Source Charge		-	17	-	nC
Q_{gd}	Gate-Drain Charge		-	24	-	nC

■ Drain-Source Diode Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
I_S	Drain-Source Diode Forward Continuous Current	$V_{GS} = 0V$	-	-	52	A
I_{SM}	Maximum Pulsed Current	$V_{GS} = 0V$	-	-	208	A
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS} = 0V, I_S = 26A$	-	-	1.2	V
T_{rr}	Body Diode Reverse Recovery Time	$I_S = 52A, V_{GS} = 0V$ $dI_F/dt = 100A/\mu s$	-	161	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_S = 52A, V_{GS} = 0V$ $dI_F/dt = 100A/\mu s$	-	1445	-	nC

Notes:

- $T_J = +25^\circ C$ to $+150^\circ C$
- Repetitive rating; pulse width limited by maximum junction temperature.
- $I_{SD} = 52A, dI_F/dt \leq 100A/\mu s, V_{DD} \leq BV_{DS}$, Start $T_J = 25^\circ C$.
- $L = 10mH, V_{DD} = 100V, I_{AS} = 14.7A, R_G = 25\Omega$ Starting $T_J = 25^\circ C$.

■ Characteristic Curve

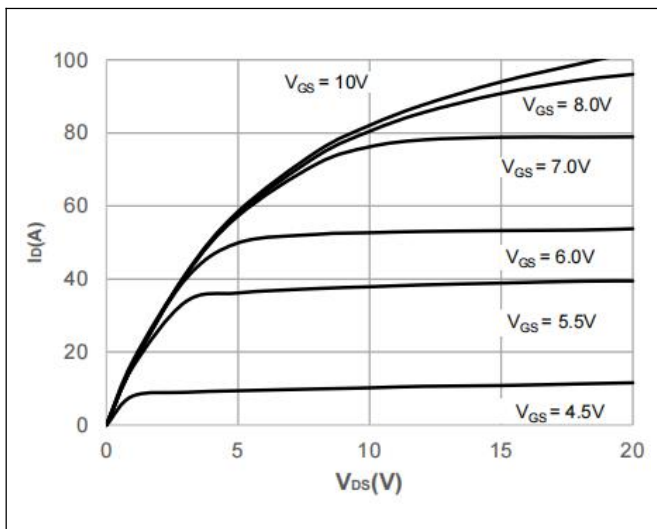


Figure 1. Typical Output Characteristics

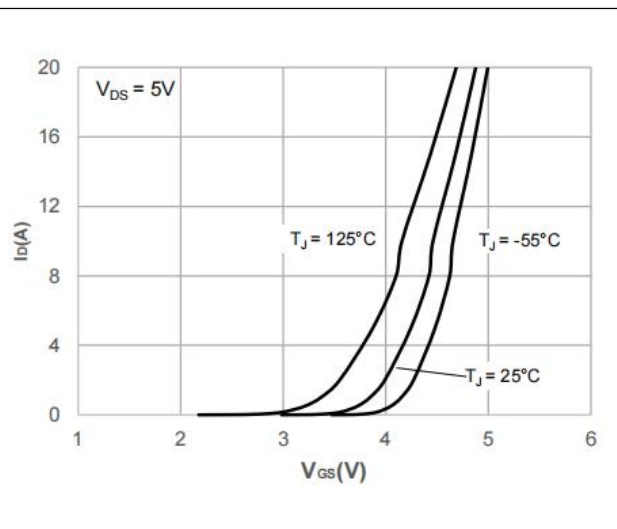


Figure 2. Typical Transfer Characteristics

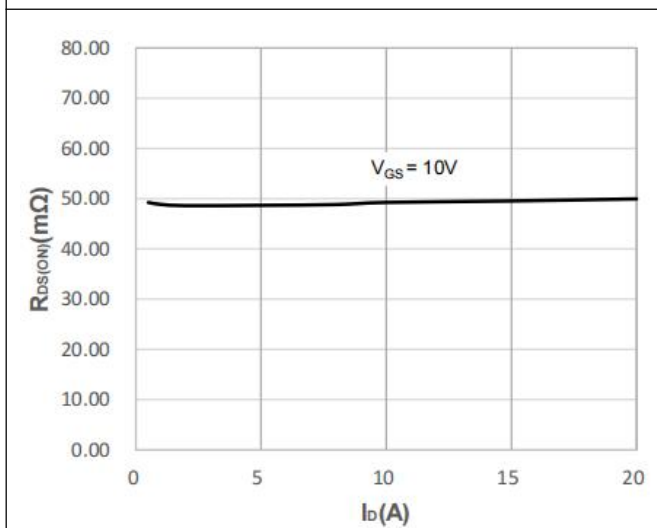


Figure 3. On- Resistance vs. Drain Current

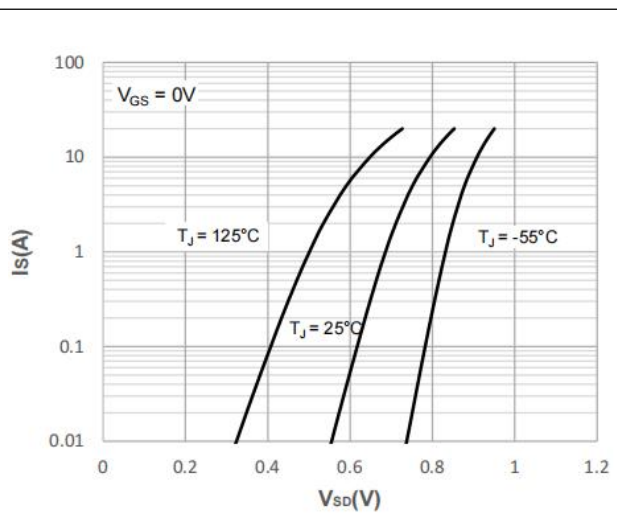


Figure 4. Body-Diode Characteristics

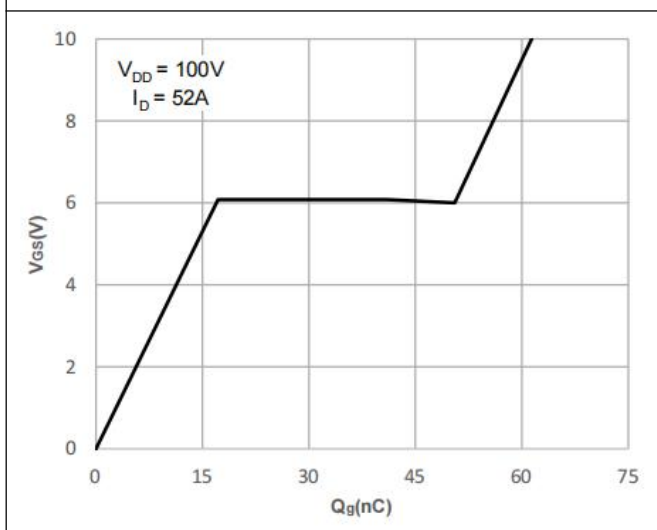


Figure 5. Gate-Charge Characteristics

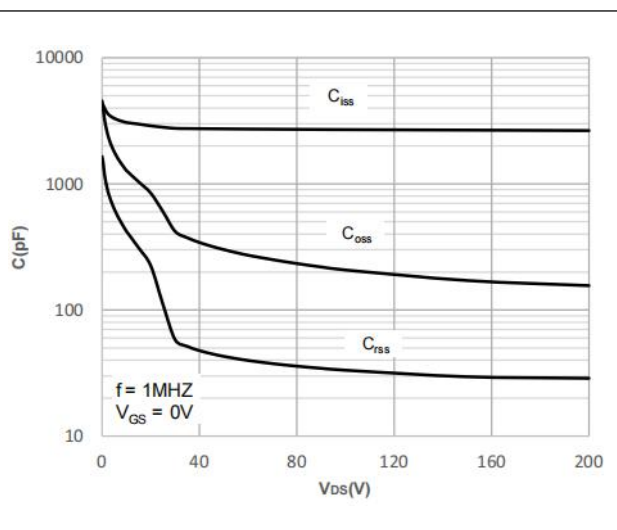


Figure 6. Capacitance Characteristics

■ Characteristic Curve

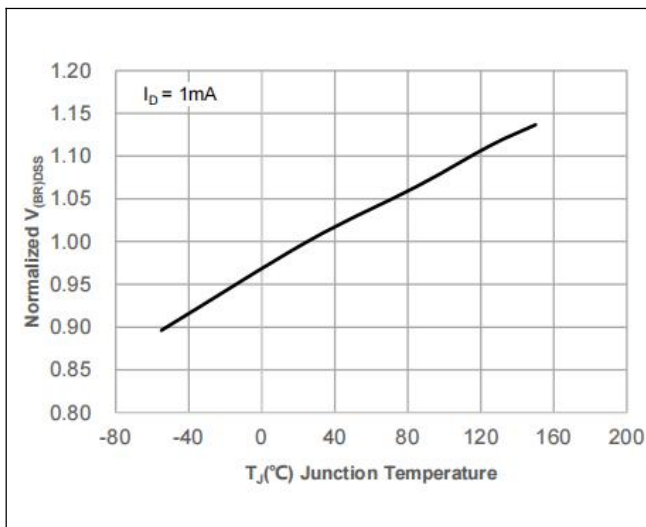


Figure 7. Normalized Breakdown voltage vs. Junction Temperature

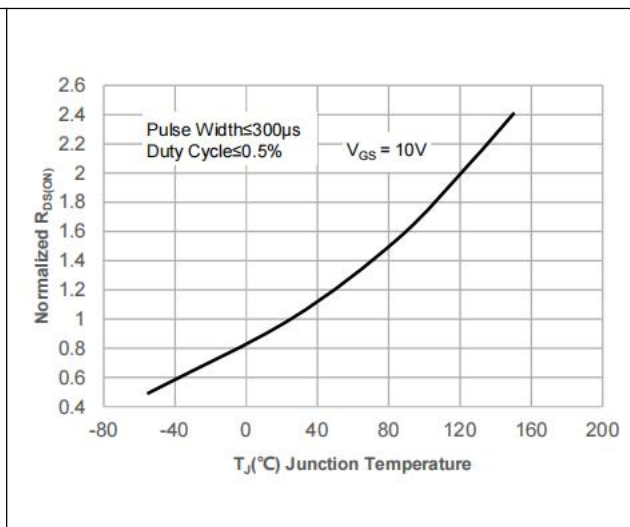


Figure 8. Normalized on Resistance vs. Junction Temperature

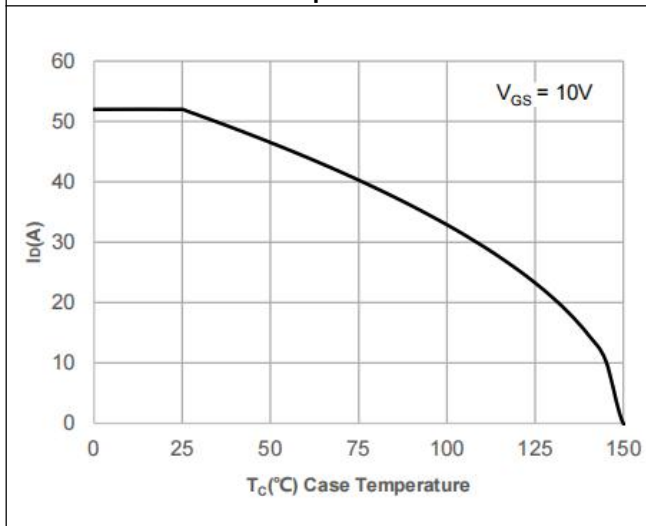


Figure 9: Maximum Continuous Drain Current vs. Case Temperature

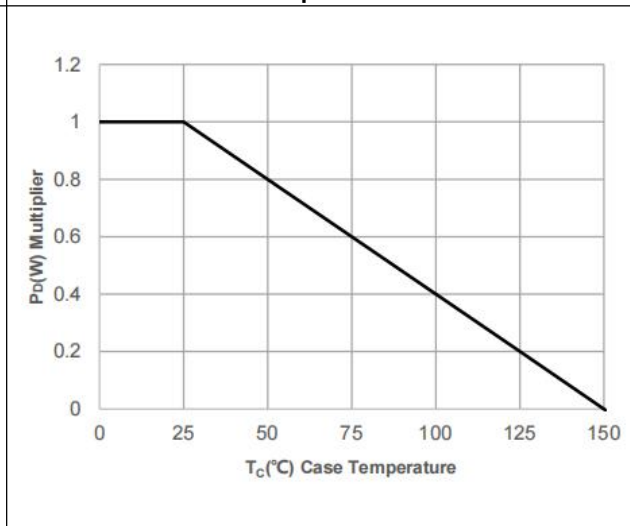


Figure 10: Maximum Power Dissipation vs Case Temperature

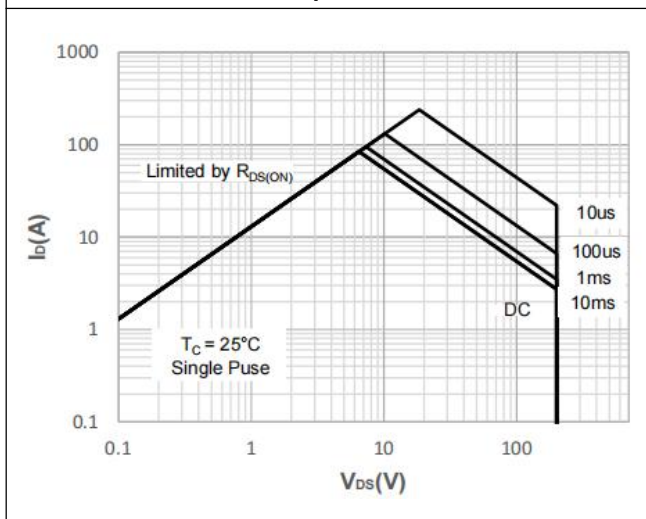


Figure 11. Maximum Safe Operating Area

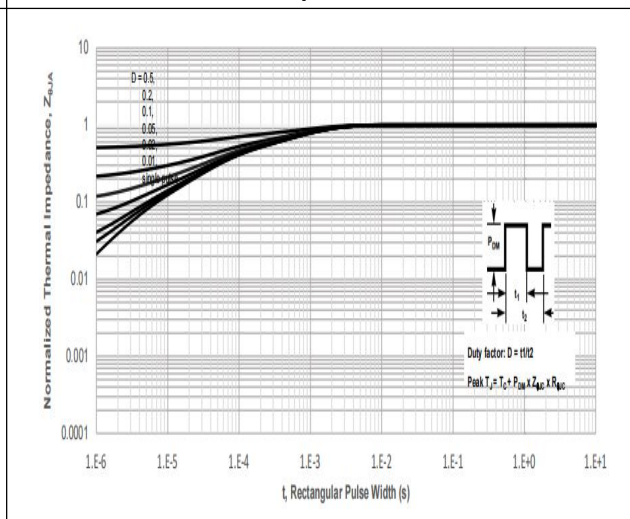
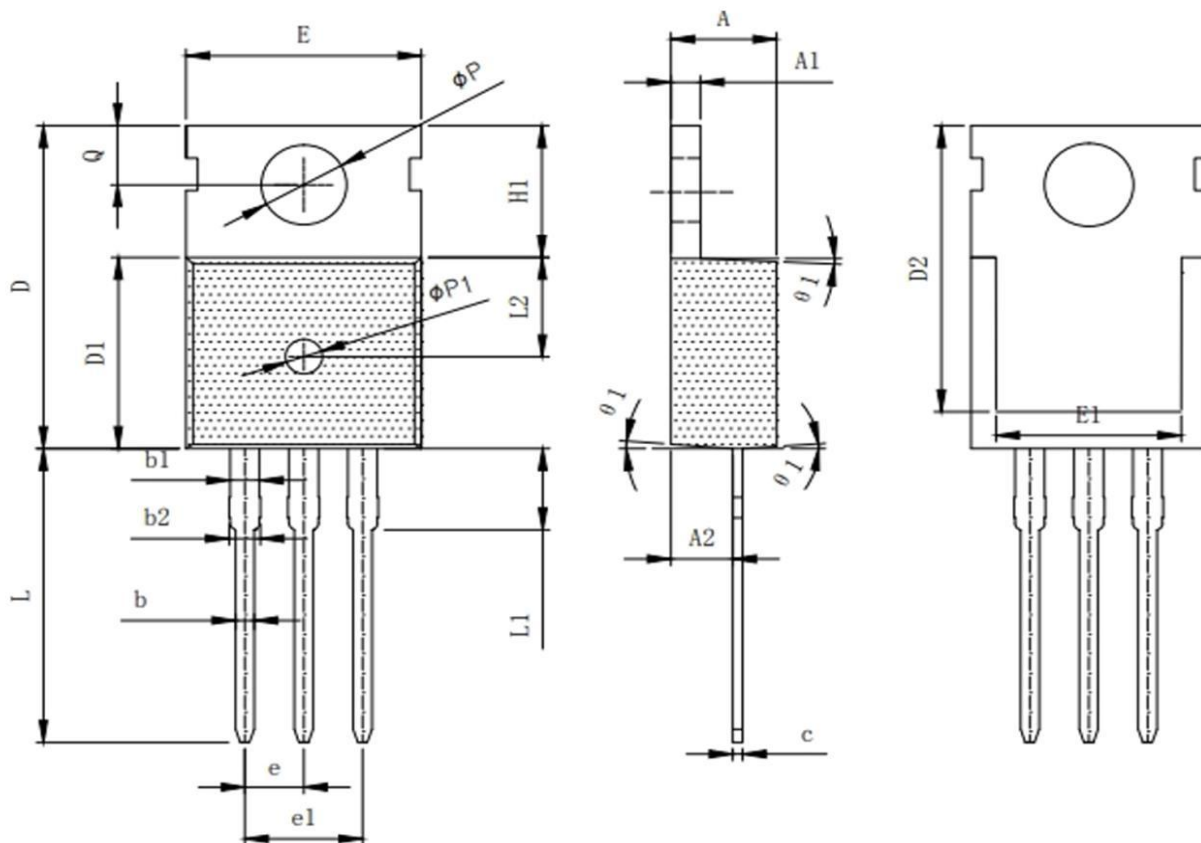


Figure 12: Normalized Maximum Transient Thermal Impedance

■ Package Information

TO-220



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.40	4.50	4.60
A1	1.25	1.30	1.35
A2	2.30	2.40	2.50
b	0.70	0.80	0.90
b1	1.21	1.27	1.40
b2	1.25	1.35	1.45
c	0.40	0.50	0.60
D	15.40	15.70	16.00
D1	9.10	9.20	9.30
D2	13.14	13.24	13.70
E	9.70	9.90	10.20
E1	7.60	8.00	8.40
e	2.54 (BSC)		
e1	5.08 (BSC)		
H1	6.30	6.50	6.80
L	12.75	13.08	13.50
L1	—	—	3.10
L2	4.30	4.60	4.90
φP	3.50	3.60	3.70
φP1	1.40	1.50	1.60
Q	2.70	—	2.90
θ1	1°	3°	5°