

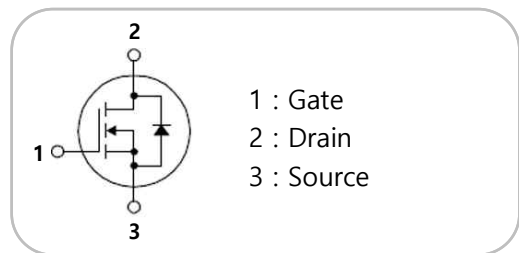

General description

Symbol	Value
V_{DSS} @ $T_C=25^\circ\text{C}$	Min 650V
I_D @ $T_C=25^\circ\text{C}$	10A
$R_{DS(on)}$	Max 400mΩ
Q_G	Typ 20nC


Package


Features

- Gate Charge(Typ. $Q_g=20$ nC)
- Improved dv/dt Capability
- 100% Avalanche Tested



Applications

- LCD/LED/PDP TV
- Telecom/Server Power supplies
- AC-DC Power Supply
- LED Lighting


Maximum Ratings ($T_C = 25^\circ\text{C}$)

Parameter	Symbol	Test Condition	Value	Units
Drain - source voltage	V_{DSS}	$V_{GS}=0V, I_D=250\mu A$	650	V
Drain current	I_D	$T_C=25^\circ\text{C}$	10	A
Drain current	I_{DM}	Pulse width limited by junction temperature	40	A
Gate-source voltage	V_{GS}	-	± 30	V
Single pulsed avalanche energy	E_{AS}	$I_{AS}=4.5A, R_G=25\Omega, V_{DD}=50V, L=20mH$	170	mJ
Power dissipation	P_D	$T_C=25^\circ\text{C}$	32	W
Operating junction	T_j	-	-55 to 150	$^\circ\text{C}$
Storage temperature	T_{stg}	-	-55 to 150	$^\circ\text{C}$




Electrical Characteristics ($T_j = 25^\circ\text{C}$)

Parameter	Symbol	Test Condition	Value			Units
			Min	Typ	Max	
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=1mA$	650	-	-	V
Zero gate voltage drain current	I_{DSS}	$V_{DS}=650V, V_{GS}=0V$	-	-	30	μA
Gate-source leakage current	I_{GSS}	$V_{GS}=\pm 30V, V_{DS}=0V$	-	-	±70	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	3	-	5	V
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=10A$	-	380	400	mΩ
Gate input resistance	R_G	$V_{GS}=0V, f=100kHz$	-	8	10	Ω
Input capacitance	C_{iss}	$V_{DS}=200V, V_{GS}=0V$ $f=1MHz$	-	1000	-	pF
Output capacitance	C_{oss}		-	30	-	
Reverse transfer capacitance	C_{rss}		-	2	-	
Total gate charge at 10V	$Q_{G(tot)}$	$V_{DS}=520V, I_D=10A,$ $V_{GS(on)}=10V, V_{GS(off)}=0V$	-	20	-	nC
Gate-source charge	Q_{GS}		-	5	-	
Gate-drain charge	Q_{GD}		-	10	-	
Turn on delay time	$t_{d(on)}$	$V_{DS}=380V, I_D=5A,$ $V_{GS}=10V, R_G=4.7\Omega$	-	15	-	ns
Rise time	t_r		-	9	-	
Turn off delay time	$t_{d(off)}$		-	59	-	
Fall time	t_f		-	10	-	

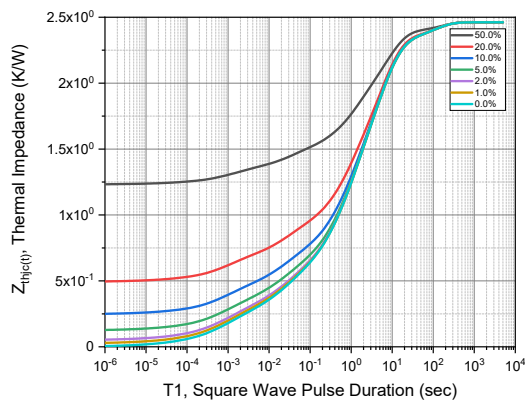



Body Diode(Source – Drain) Electrical Characteristics (T_j = 25°C)

Parameter	Symbol	Test Condition	Value			Units
			Min	Typ	Max	
Continuous diode forward current	I _S	-	-	-	10.0	A
Maximum pulsed drain to source diode forward current	I _{SM}	-	-	-	40.0	
Forward voltage	V _{SD}	I _{SD} =10A, V _{GS} =0V	-	-	1.0	V
Reverse recovery time	t _{rr}	I _{SD} =5A, V _{GS} =0V di/dt=100A/μs	-	265.0	-	ns
Reverse recovery charge	Q _{rr}		-	2.9	-	nC
Peak reverse recovery current	I _{rrm}		-	22.0	-	A

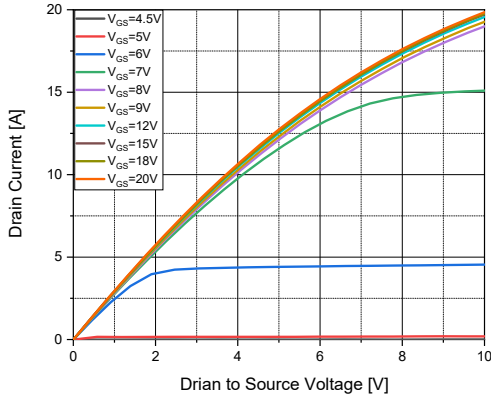

Thermal Characteristics(T_C = 25°C)

Symbol	Parameter	Typ	Max	Units
R _{th(j-c)}	Junction to case	3.9	-	°C/W

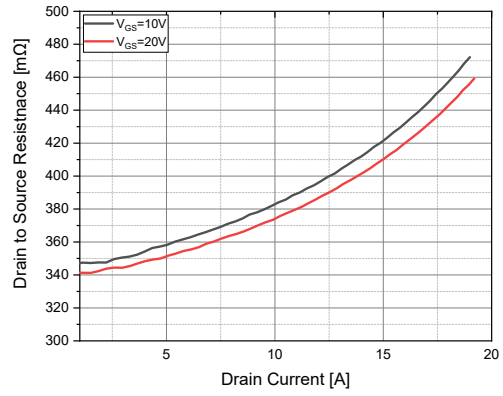
 t_p – Z_{th(j-c)} Characteristics


Typical Electrical Characteristics Curves ($T_j = 25^\circ\text{C}$)

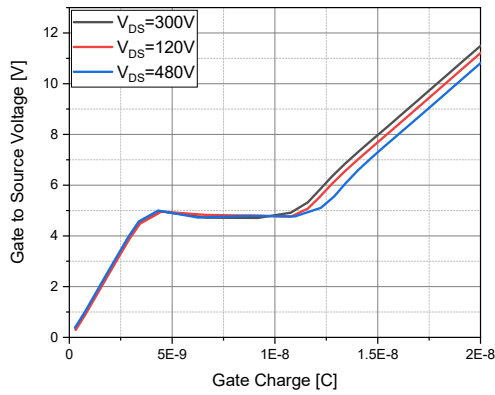
$V_{DS} - I_D$ Characteristics, $T_j=25^\circ\text{C}$



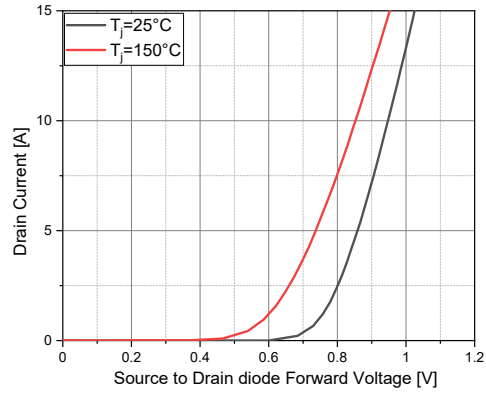
$I_D - R_{DS(on)}$ Characteristics



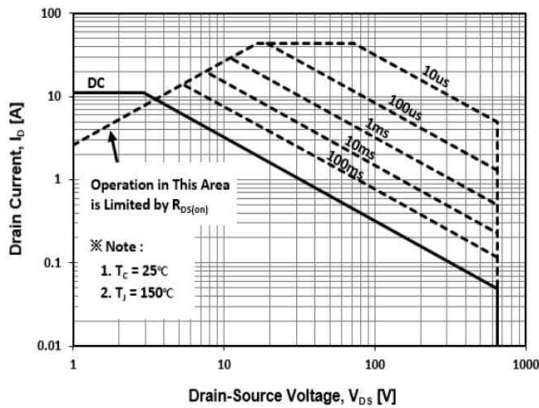
$Q_g - V_{GS}$ Characteristics



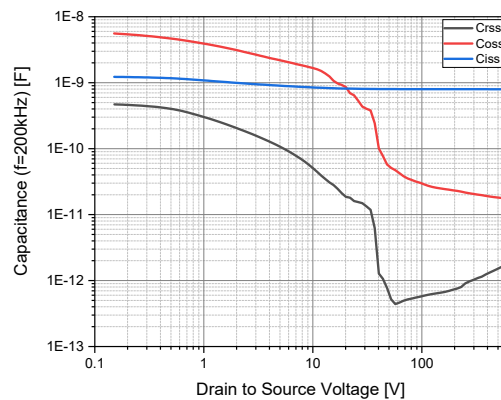
$V_{SD} - I_D$ Characteristics



Safe Operating Area, $T_c=25^\circ\text{C}$

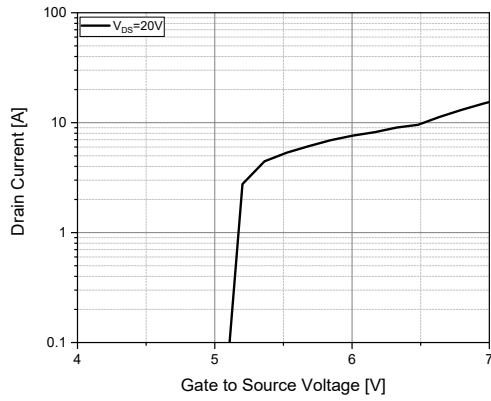


$V_{DS} - C$ Characteristics

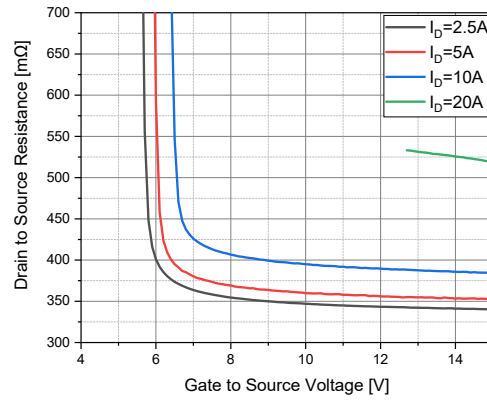


Typical Electrical Characteristics Curves ($T_j = 25^\circ\text{C}$)

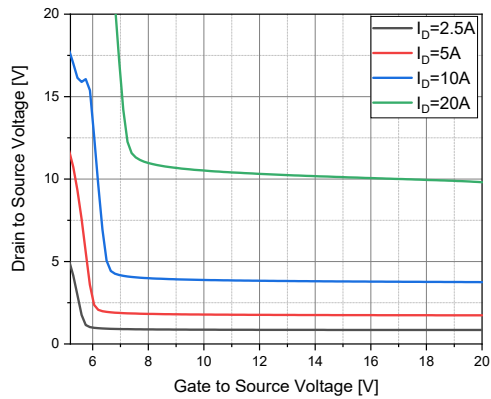
$V_{GS} - I_D$ Characteristics, $T_j=25^\circ\text{C}$



$V_{GS} - R_{DS(on)}$ Characteristics

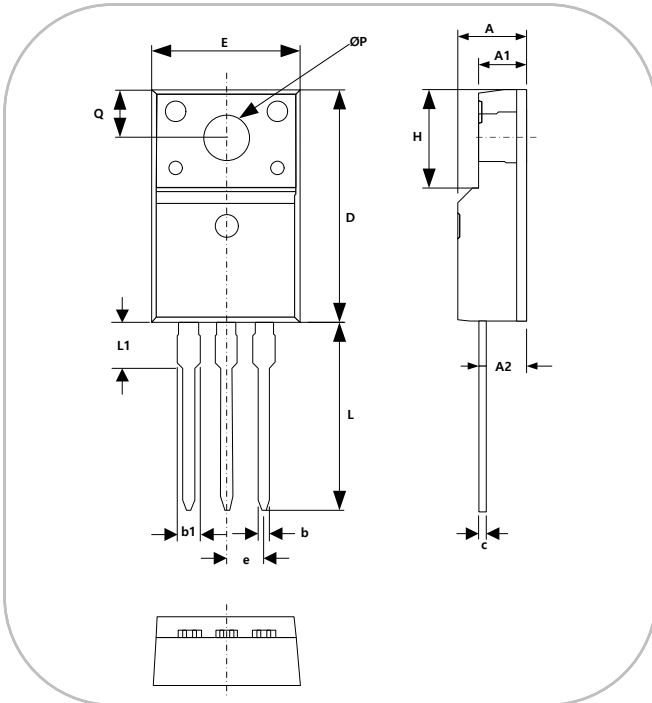


$V_{GS} - V_{DS}$ Characteristics



Package Dimensions(TO-220F)

[Unit : mm]



SYMBOL	MIN	MAX
A	4.50	4.90
A1	2.34	2.74
A2	2.56	2.96
b	0.70	0.90
b1	1.27	1.47
c	0.45	0.60
D	15.67	16.07
E	9.96	10.36
e	2.54 BSC	
H	6.48	6.88
L	12.68	13.28
L1	3.03	3.43
φP	3.08	3.28
Q	3.20	3.40
A	4.50	4.90
A1	2.34	2.74
A2	2.56	2.96
b	0.70	0.90

Marking Information

