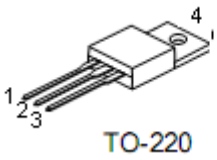
1. Description

This power MOSFET is designed using trench layout-based process.This technology improves the performances compared with standard parts from various sources.All of these power MOSFETs are designed for applications in switching regulators,switching convertors,motor and relay drivers,and drivers for high power bipolar switching transistors demanding high speed and low gate drive power.

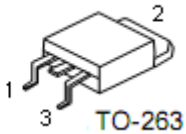
2. Applications

- V_{DSS}=100V,$R_{DS(on)}$=18mΩ,I_D=59A
- Ultra low on-resistance
- Dynamic dv/dt rating
- 175°C operating temperature
- Fast switching
- Fully avalanche rated

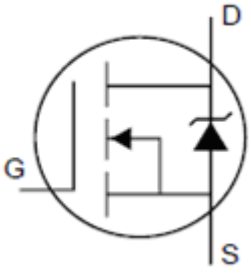
3. Pin configuration



TO-220



TO-263



Pin	Function
1	Gate
2	Drain
3	Source
4	Drain

4. Absolute maximum ratings

Parameter	Symbol	Max.	Units
Continuous drain current, V_{GS} @ 10V	I_D @ T_C = 25°C	59	A
Continuous drain current, V_{GS} @ 10V	I_D @ T_C = 100°C	42	
Pulsed drain current[1)]	I_{DM}	240	
Maximum power dissipation	P_D @T_C = 25°C	160	W
Gate-to-source voltage	V_{GS}	±20	V
Single pulse avalanche energy (thermally limited) (T_j=25°C,L=0.27mH,R_G=25Ω,I_{AS}=35A,V_{GS}=10V)	E_{as}	170	mJ
Operating junction and storage temperature range	T_j	-55 to +175	°C
Soldering temperature, for 10 seconds		300	

5. Thermal resistance

Parameter	Symbol	Typ.	Max.	Units
Junction-to-case	$R_{\theta JC}$	-	0.92	°C/W
Case-to-sink, flat, greased surface	$R_{\theta CS}$	0.50	-	
Junction-to-ambient	$R_{\theta JA}$	-	62	

6. Electrical characteristics

(T_J=25°C,unless otherwise notes)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Untis
Drain-to-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=0V,I_D=250μA	100	-	-	V
Breakdown voltage temp.coefficient	$\Delta V_{(BR)DSS}/\Delta T_J$	Reference to 25°C,I_D=1mA	-	0.10	-	V/°C
Static drain-to-source on-resistance[2]	$R_{DS(ON)}$	V_{GS}=10V,I_D=35A	-	-	18	mΩ
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	2.0	-	4.0	V
Forward transconductance[2]	$g_{(fs)}$	V_{DS}=50V,I_D=35A	35	-	-	S
Drain-to-source leakage current	I_{DSS}	V_{DS}=100V,V_{GS}=0V	-	-	20	μA
		[3] V_{DS}=100V,V_{GS}=0V	-	-	250	
Gate-to-source forward leakage	I_{GSS}	V_{GS}=20V	-	-	+200	nA
Gate-source reverse leakage		V_{GS}=-20V	-	-	-200	
Total gate charge[2]	Q_g	I_D=35A V_{DS}=80V V_{GS}=10V	-	87	120	nC
Gate-to-source charge[2]	Q_{gs}		-	21	28	
Gate-to-drain charge[2]	Q_{gd}		-	30	40	
Turn-on delay time[2]	$t_{d(on)}$	V_{DD}=50V I_D=35A R_G=6.8Ω V_{GS}=10V,		18	-	ns
Rise time[2]	t_r			86	-	
Turn-off delay time[2]	$t_{d(off)}$		-	47	-	
Fall time[2]	t_f		-	60	-	
Input capacitance	C_{ISS}	V_{GS}=0V V_{DS}=25V f=1.0MHz	-	2990	-	pF
Output capacitance	C_{OSS}		-	300	-	
Reverse transfer capacitance	C_{RSS}		-	160	-	
Output capacitance	C_{OSS}	V_{GS}=0V,V_{DS}=1V, f=1.0MHz		1180	-	
Output capacitance	C_{OSS}	V_{GS}=0V,V_{DS}=80V, f=1.0MHz		190	-	
Effective output capacitance	$C_{OSS\ eff}$	V_{GS}=0V,V_{DS}=0V to 80V		300	-	

7. Source-drain ratings and characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Untis
Diode forward voltage[2)]	V_{SD}	V_{GS}=0V,I_S=35A	-	-	1.3	V
Continuous source current (body diode)	I_S	V_{GS}=0V	-	-	59	A
Pulsed source current (body diode)	I_{SM}	repetitive,pulse width limited by T_{JM}	-	-	240	
Reverse recovery time[2)]	t_{rr}	I_F=35A,V_{DD}=25V di/dt=100A/μs	-	56	75	ns
Reverse recovery charge[2)]	Q_{rr}		-	106	160	nC

(T_J=25°C,unless otherwise notes)

Notes:
1. Repetitive rating;pulse width limited by max. junction temperature.
2. Pulse test,t≤300μs;duty cycle≤2%.
3. T_J=+125°C.

8. Test circuits and waveforms

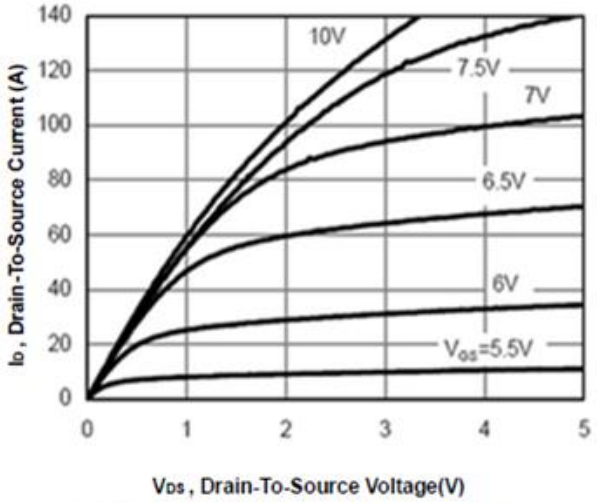


Fig 1. Output Characteristics

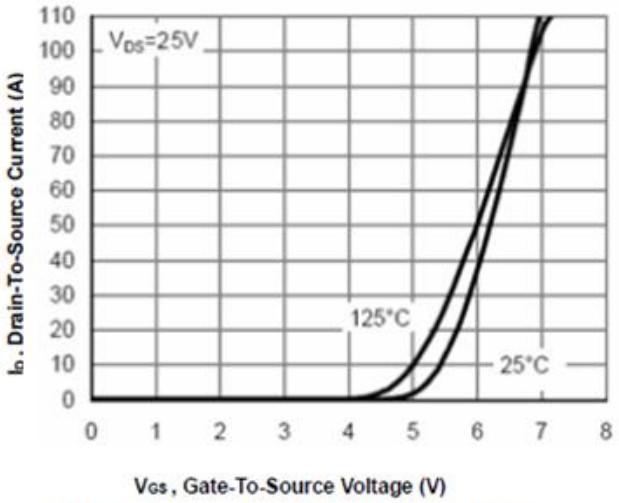


Fig 2. Transfer Characteristics

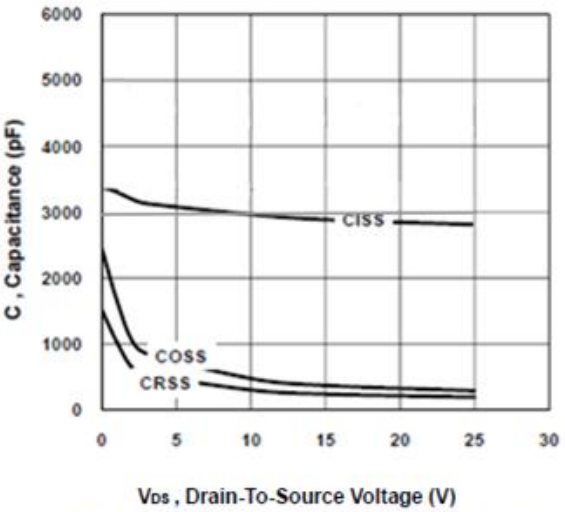


Fig 3. Capacitance Characteristic

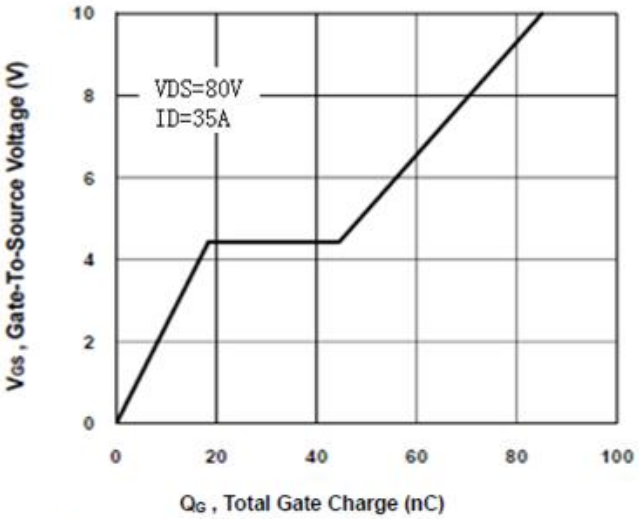


Fig 4. Gate charge Characteristics

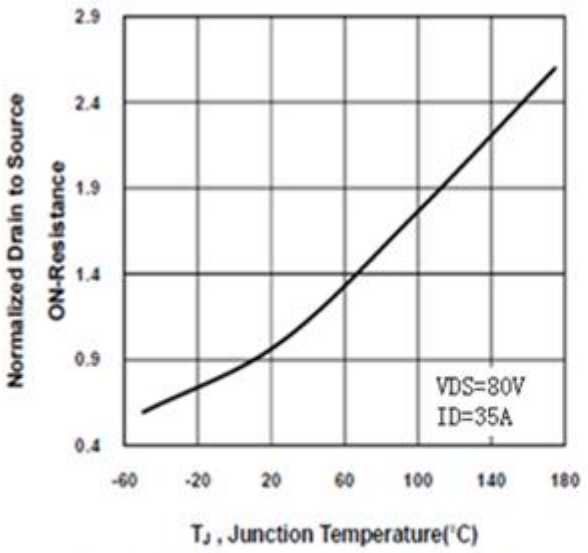


Fig 5. Normalized On-Resistance VS Temperature

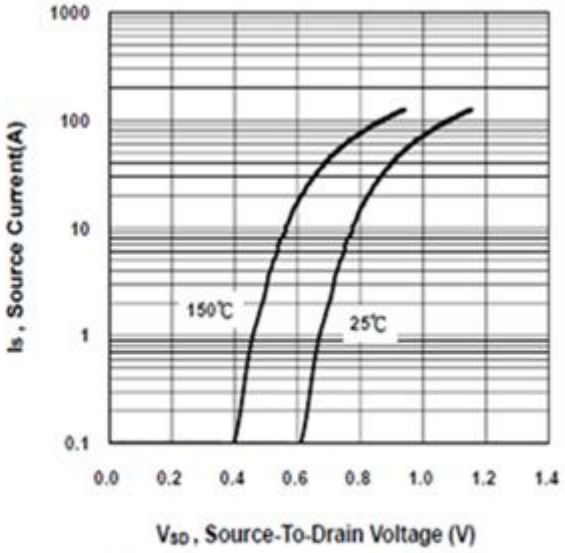


Fig 6. Source-Drain Diode Forward Voltage

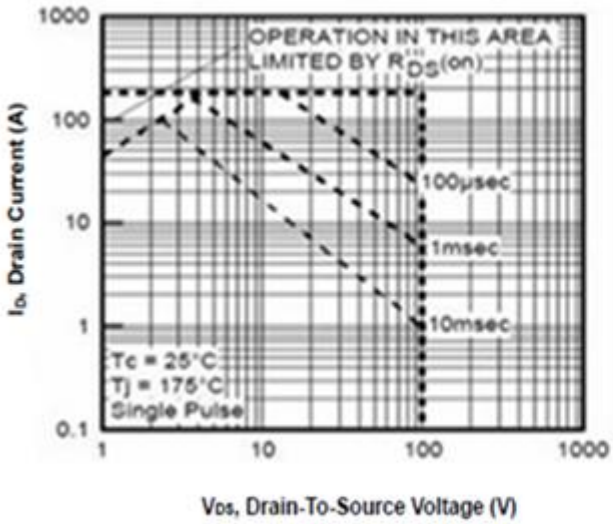


Fig 7. Safe Operating Area

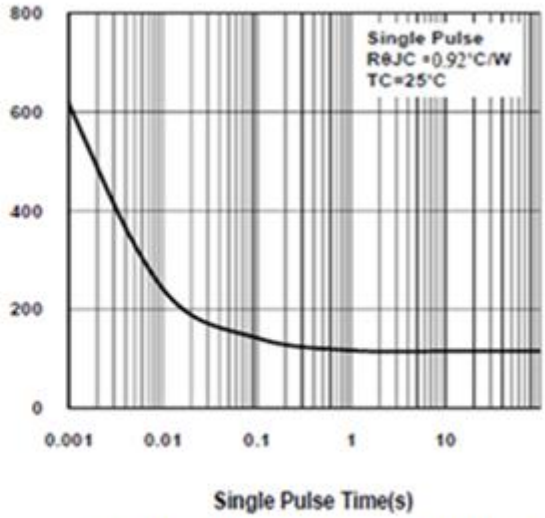


Fig 8. Single Pulse Maximum Power Dissipation

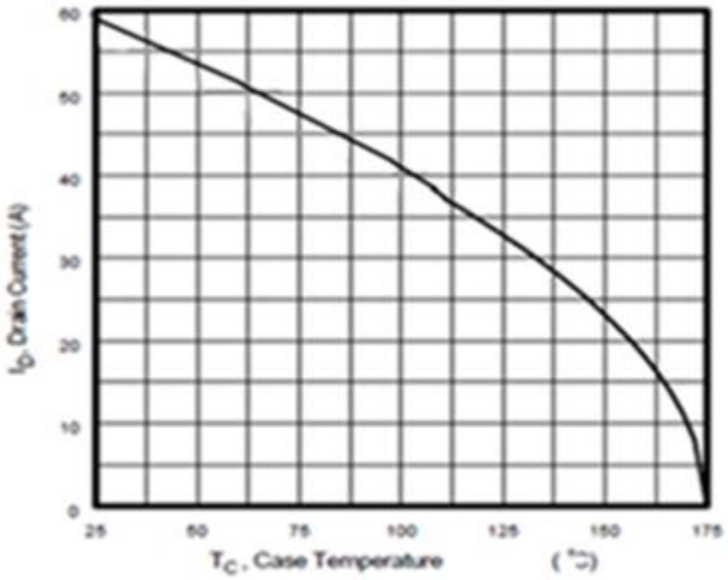


Fig 9. Maximum Drain Current Vs. Case Temerature

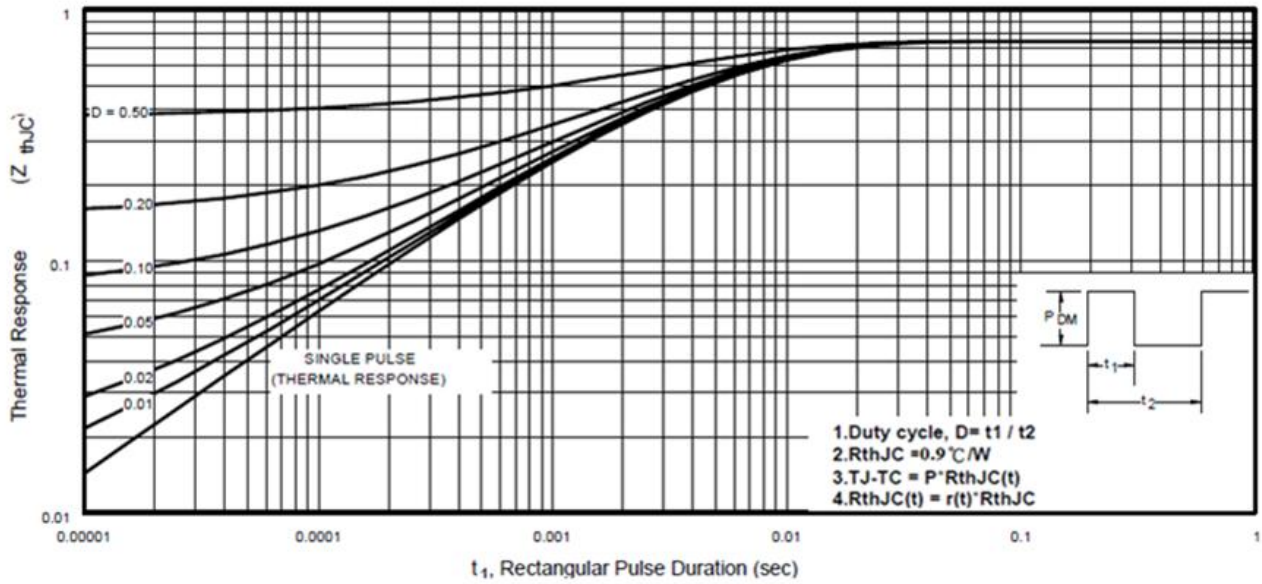


Fig 10. T1 , Transient Thermal Response Curve