

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- Green Device Available

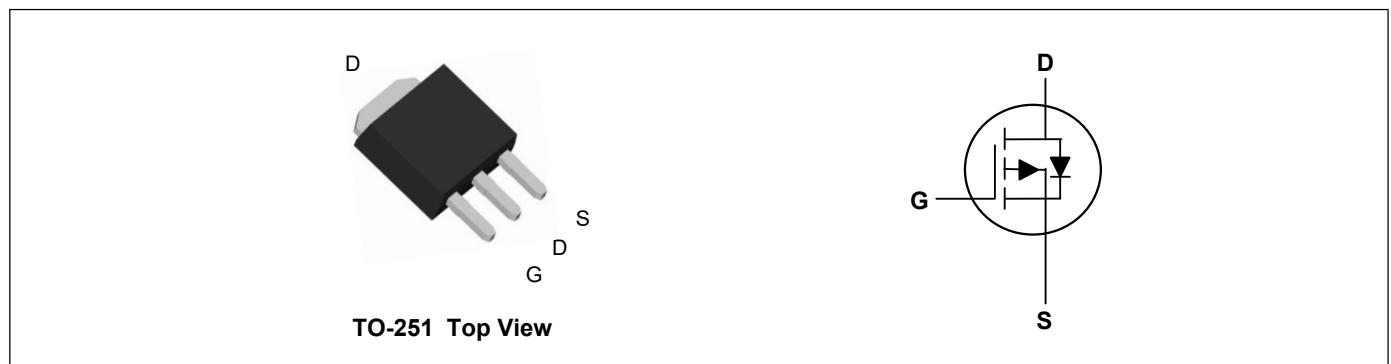
Product Summary



V_{DS}	-30	V
I_D	-45	A
$R_{DS(ON)}$ (at $V_{GS}=-10V$)	15	m Ω
$R_{DS(ON)}$ (at $V_{GS}=-4.5V$)	25	m Ω

Applications

- High Frequency Point-of-Load, Synchronous Buck Converter
- Networking DC-DC Power System
- Load Switch



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

Parameter	Symbol	Rating		Units
		10S	Steady State	
Drain-Source Voltage	V_{DS}	-30		V
Gate-Source Voltage	V_{GS}	± 25		V
Continuous Drain Current, $V_{GS} @ -10V^1$	$I_D @ T_C=25^\circ\text{C}$	-45		A
Continuous Drain Current, $V_{GS} @ -10V^1$	$I_D @ T_C=100^\circ\text{C}$	-30		A
Continuous Drain Current, $V_{GS} @ -10V^1$	$I_D @ T_A=25^\circ\text{C}$	-15	-9.6	A
Continuous Drain Current, $V_{GS} @ -10V^1$	$I_D @ T_A=70^\circ\text{C}$	-12	-7.7	A
Pulsed Drain Current ²	I_{DM}	-150		A
Single Pulse Avalanche Energy ³	EAS	125		mJ
Avalanche Current	I_{AS}	-50		A
Total Power Dissipation ⁴	$P_D @ T_C=25^\circ\text{C}$	45		W
Total Power Dissipation ⁴	$P_D @ T_A=25^\circ\text{C}$	5	2	W
Storage Temperature Range	T_{STG}	-55 to 150		$^\circ\text{C}$
Operating Junction Temperature Range	T_J	-55 to 150		$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance Junction-Ambient ¹ ($t \leq 10s$)	$R_{\theta JA}$	---	25	$^\circ\text{C/W}$
Thermal Resistance Junction-Ambient ¹		---	62	$^\circ\text{C/W}$
Thermal Resistance Junction-Case ¹	$R_{\theta JC}$	---	2.8	$^\circ\text{C/W}$

Electrical Characteristics (T_J=25°C, unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =-250uA	-30	---	---	V
BV _{DSS} Temperature Coefficient	ΔBV _{DSS} /ΔT _J	Reference to 25°C, I _D =-1mA	---	-0.023	---	V/°C
Static Drain-Source On-Resistance ²	R _{DS(ON)}	V _{GS} =-10V, I _D =-30A	---	---	15	mΩ
		V _{GS} =-4.5V, I _D =-15A	---	---	25	mΩ
Gate Threshold Voltage	V _{GS(th)}	V _{GS} =V _{DS} , I _D =-250uA	-1.0	---	-2.5	V
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)}		---	4.6	---	mV/°C
Drain-Source Leakage Current	I _{DSS}	V _{DS} =-24V, V _{GS} =0V, T _J =25°C	---	---	-1	uA
		V _{DS} =-24V, V _{GS} =0V, T _J =55°C	---	---	-5	uA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±25V, V _{DS} =0V	---	---	±100	nA
Forward Transconductance	g _{fs}	V _{DS} =-5V, I _D =-30A	---	30	---	S
Gate Resistance	R _g	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	9	---	Ω
Total Gate Charge	Q _g	V _{DS} =-15V, V _{GS} =-4.5V, I _D =-15A	---	22	---	nC
Gate-Source Charge	Q _{gs}		---	8.7	---	
Gate-Drain Charge	Q _{gd}		---	7.2	---	
Turn-On Delay Time	T _{d(on)}	V _{DD} =-15V, V _{GS} =-10V, R _G =3.3Ω, I _D =-15A	---	8	---	ns
Rise Time	T _r		---	73.7	---	
Turn-Off Delay Time	T _{d(off)}		---	61.8	---	
Fall Time	T _f		---	24.4	---	
Input Capacitance	C _{iss}	V _{DS} =-15V, V _{GS} =0V, f=1MHz	---	2215	---	pF
Output Capacitance	C _{oss}		---	310	---	
Reverse Transfer Capacitance	C _{rss}		---	237	---	

Drain-Source Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Continuous Source Current ^{1,5}	I _S	V _G =V _D =0V, Force Current	---	---	-45	A
Pulsed Source Current ^{2,5}	I _{SM}		---	---	-150	A
Diode Forward Voltage ²	V _{SD}	V _{GS} =0V, I _S =-1A, T _J =25°C	---	---	-1	V
Reverse Recovery Time	t _{rr}	I _F =-15A, di/dt=100A/μs, T _J =25°C	---	19	---	nS
Reverse Recovery Charge	Q _{rr}		---	9	---	nC

Note:

- The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
- The EAS data shows Max. rating. The test condition is V_{DD}=-25V, V_{GS}=-10V, L=0.1mH
- The power dissipation is limited by 150°C junction temperature
- The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

Typical Characteristics

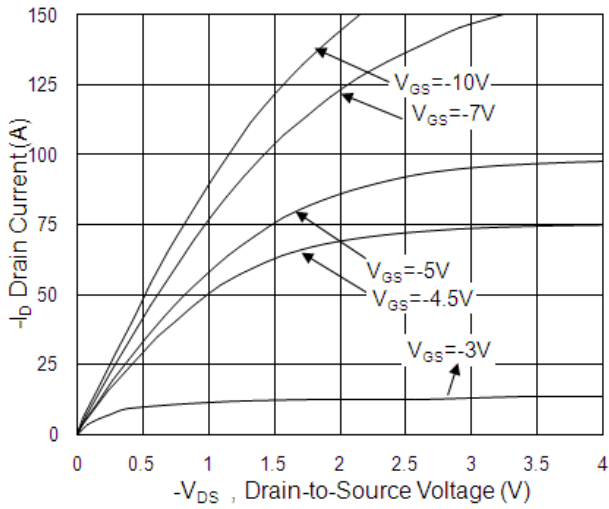


Fig.1 Typical Output Characteristics

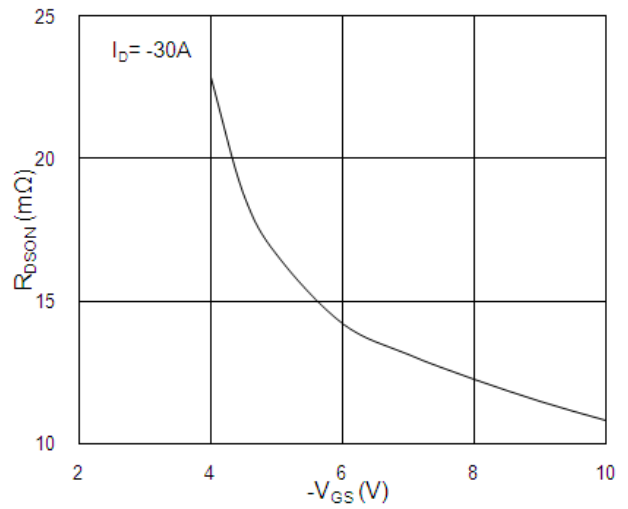


Fig.2 On-Resistance vs. G-S Voltage

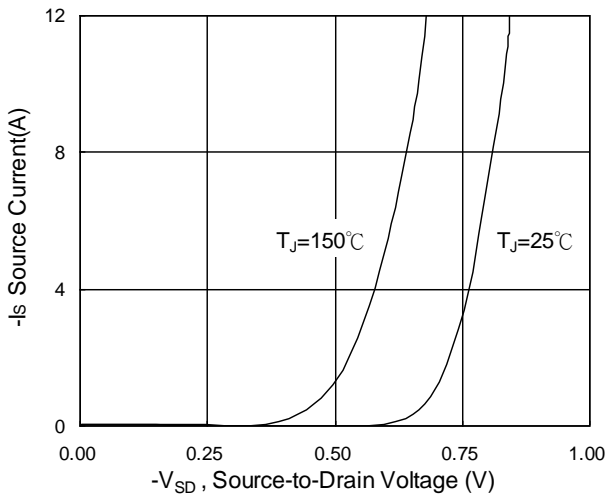


Fig.3 Forward Characteristics of Reverse

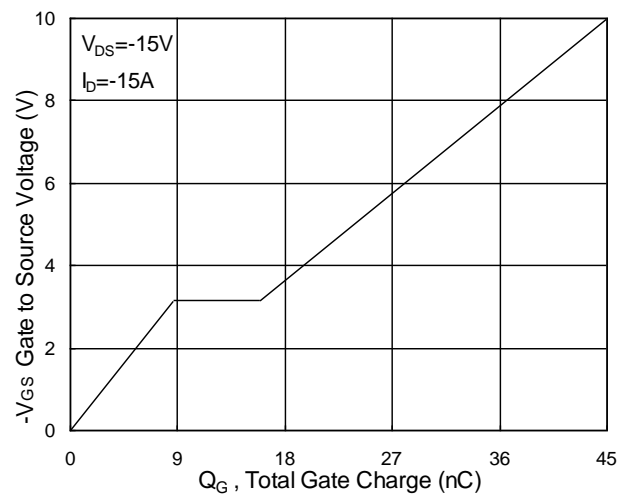


Fig.4 Gate-charge Characteristics

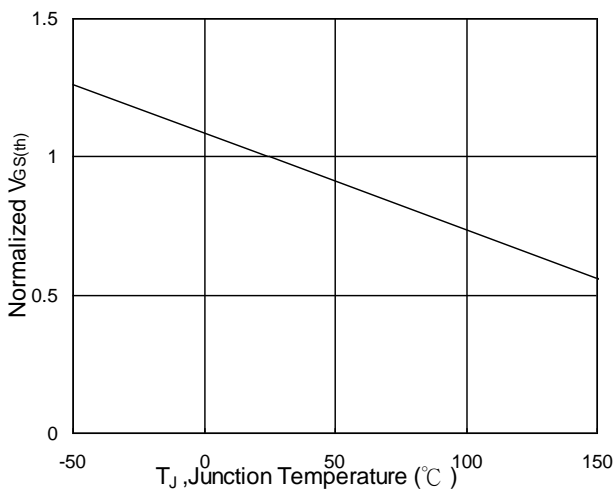


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

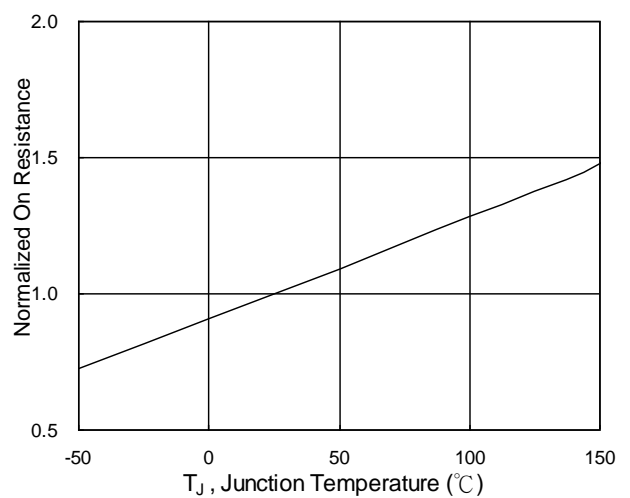


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

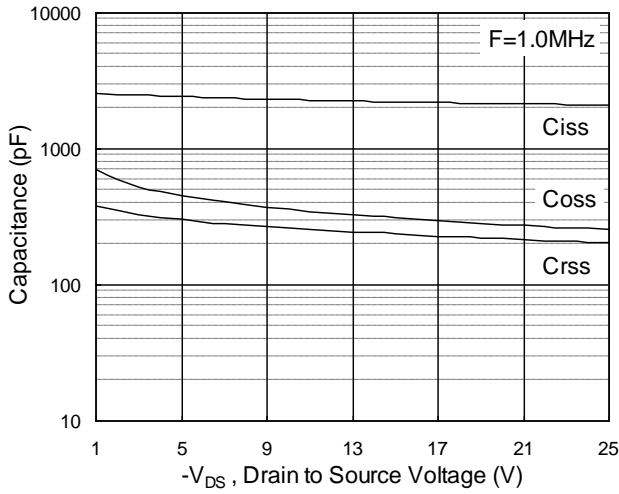


Fig.7 Capacitance

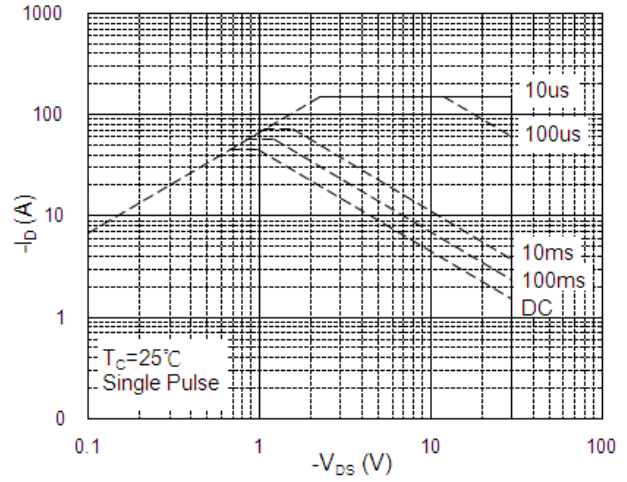


Fig.8 Safe Operating Area

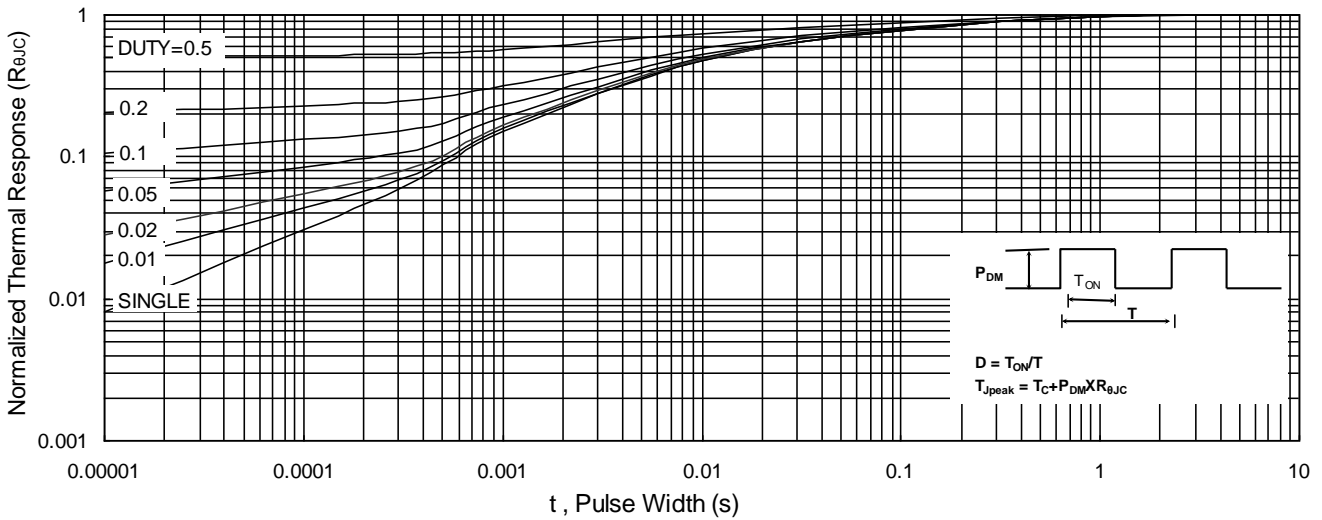


Fig.9 Normalized Maximum Transient Thermal Impedance

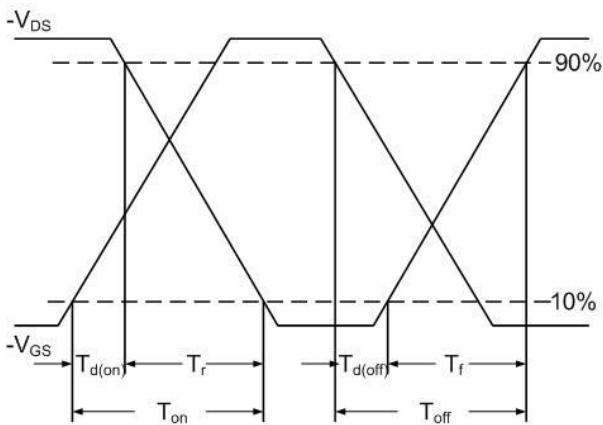


Fig.10 Switching Time Waveform

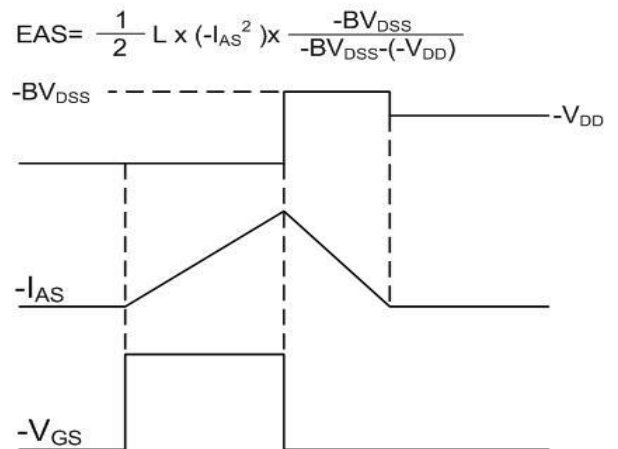
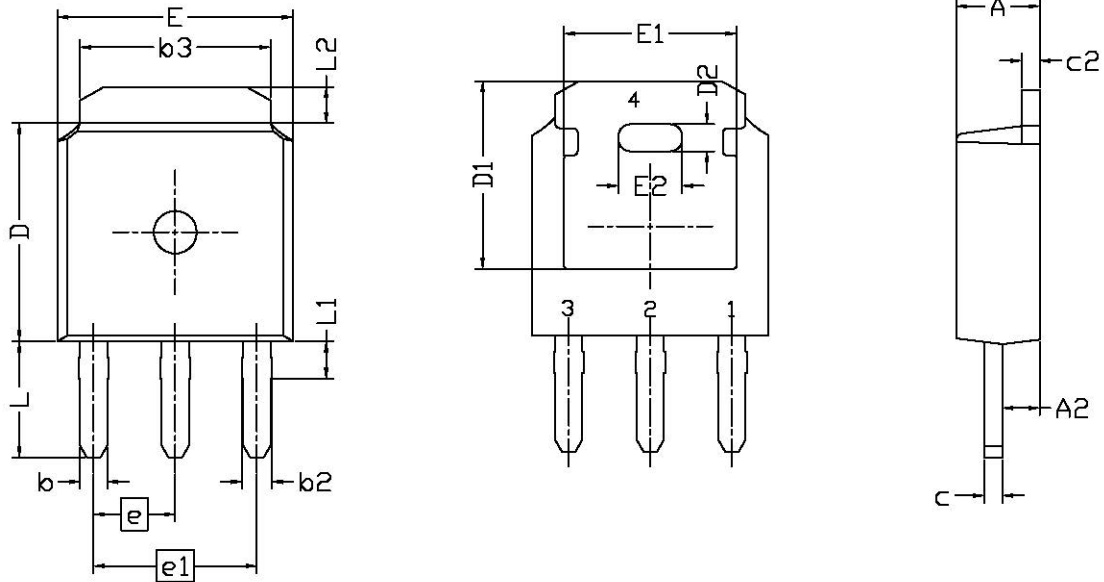


Fig.11 Unclamped Inductive Switching Waveform

TO-251 Package Outline Dimensions



Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
A	2.20	2.30	2.39	A2	0.90	1.00	1.14
b	0.63	0.76	0.85	b2	0.76	0.85	1.05
b3	5.10	5.40	5.60	C	0.46	0.51	0.61
C2	0.46	0.51	0.61	D	5.90	6.10	6.30
D1	5.25 REF			D2	0.508 BSC		
E	6.35	6.55	6.70	E1	5.06 REF		
E2	1.524 BSC			e	2.29 BSC		
e1	4.57 BSC			L	3.70	4.00	4.40
L1	1.15 REF			L2	0.90	1.06	1.20