

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

Product Summary



V_{DS}	60	V
I_D	17	A
$R_{DS(ON)}$ (at $V_{GS}=10V$)	75	m Ω
$R_{DS(ON)}$ (at $V_{GS}=4.5V$)	95	m Ω

Applications

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



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

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ¹	$I_D@T_C=25^{\circ}C$	17	A
Continuous Drain Current ¹	$I_D@T_C=100^{\circ}C$	12	A
Pulsed Drain Current ²	I_{DM}	50	A
Single Pulse Avalanche Energy ³	E_{AS}	11	mJ
Total Power Dissipation ⁴	P_D	42	W
Storage Temperature Range	T_{STG}	-55 to 150	$^{\circ}C$
Operating Junction Temperature Range	T_J	-55 to 150	$^{\circ}C$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance Junction-Ambient ¹	$R_{\theta JA}$	---	62	$^{\circ}C/W$
Thermal Resistance Junction-Case ¹	$R_{\theta JC}$	---	3	$^{\circ}C/W$

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	60	---	---	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=5A$	---	60	75	$m\Omega$
		$V_{GS}=4.5V, I_D=5A$	---	85	95	$m\Omega$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	2.0	---	4.0	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=48V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	---	---	1	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
Total Gate Charge	Q_g	$V_{DS}=12V, V_{GS}=10V, I_D=5A$	---	6	---	nC
Gate-Source Charge	Q_{gs}		---	2	---	
Gate-Drain Charge	Q_{gd}		---	2.5	---	
Turn-On Delay Time	$T_{d(on)}$	$V_{DS}=12V, V_{GS}=10V, R_G=3\Omega, I_D=5A$	---	6	---	ns
Rise Time	T_r		---	10	---	
Turn-Off Delay Time	$T_{d(off)}$		---	15	---	
Fall Time	T_f		---	7	---	
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V, f=1\text{MHz}$	---	690	---	pF
Output Capacitance	C_{oss}		---	140	---	
Reverse Transfer Capacitance	C_{rss}		---	7	---	

Drain-Source Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Diode Forward Voltage ²	V_{SD}	$V_{GS}=0V, I_S=1A, T_J=25^{\circ}\text{C}$	---	0.8	1.2	V

Note:

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
3. The EAS data shows Max. rating. The test condition is $V_{DS}=25V, V_{GS}=10V, L=0.1mH$
4. The power dissipation is limited by 150 $^{\circ}\text{C}$ junction temperature

Typical Characteristics

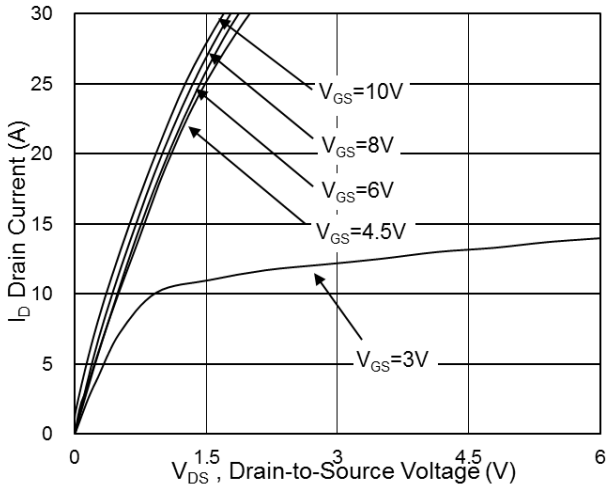


Fig.1 Typical Output Characteristics

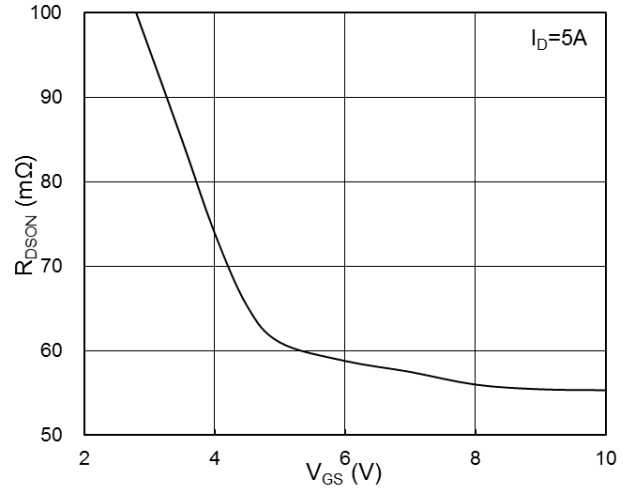


Fig.2 On-Resistance vs. Gate-Source Voltage

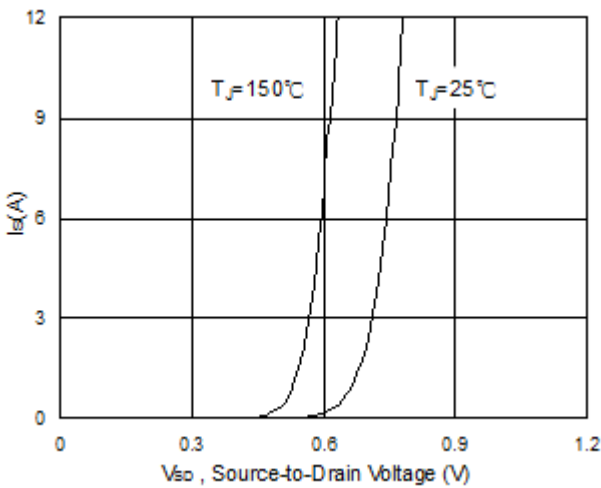


Fig.3 Forward Characteristics of Reverse

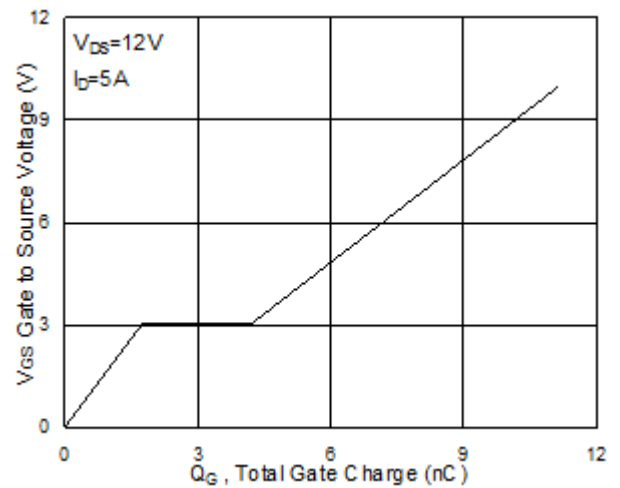


Fig.4 Gate-Charge Characteristics

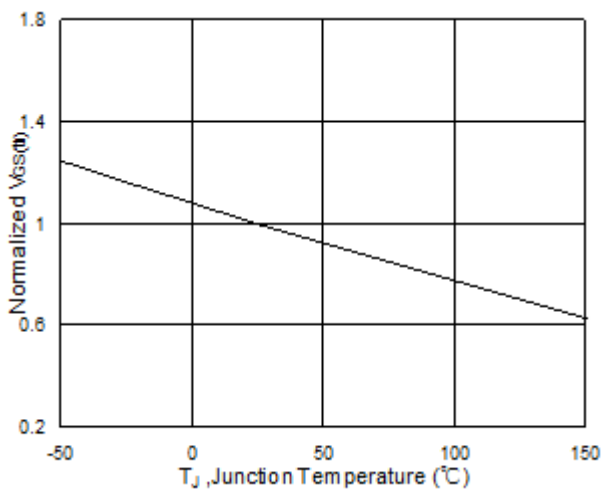


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

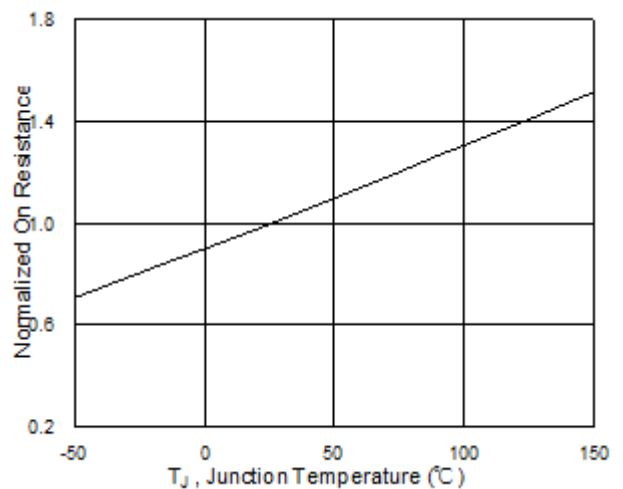


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

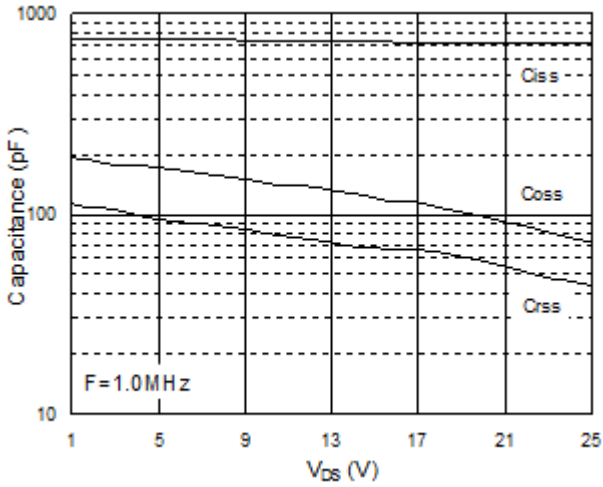


Fig.7 Capacitance

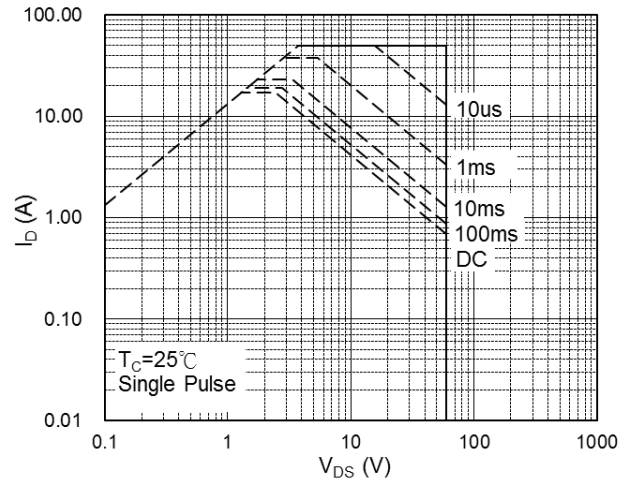


Fig.8 Safe Operating Area

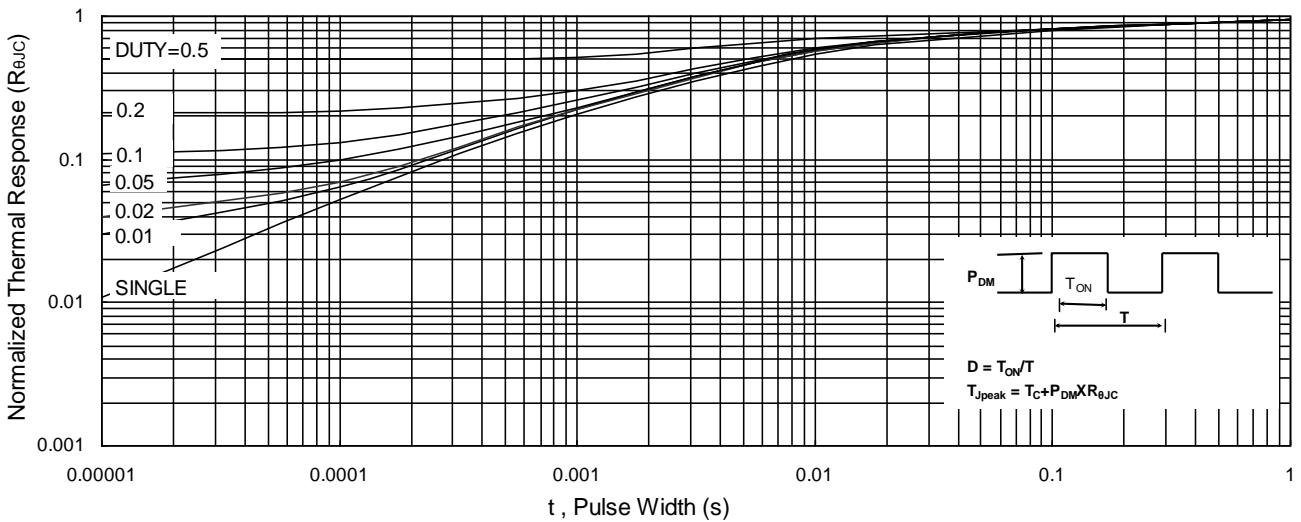


Fig.9 Normalized Maximum Transient Thermal Impedance

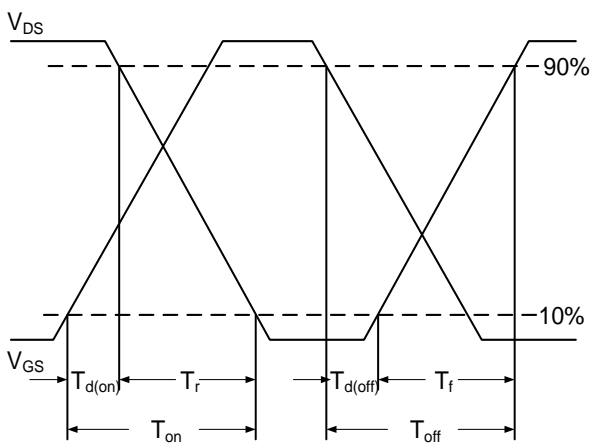


Fig.10 Switching Time Waveform

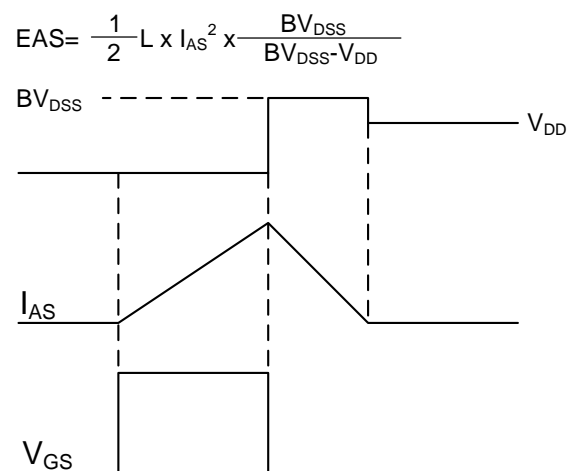
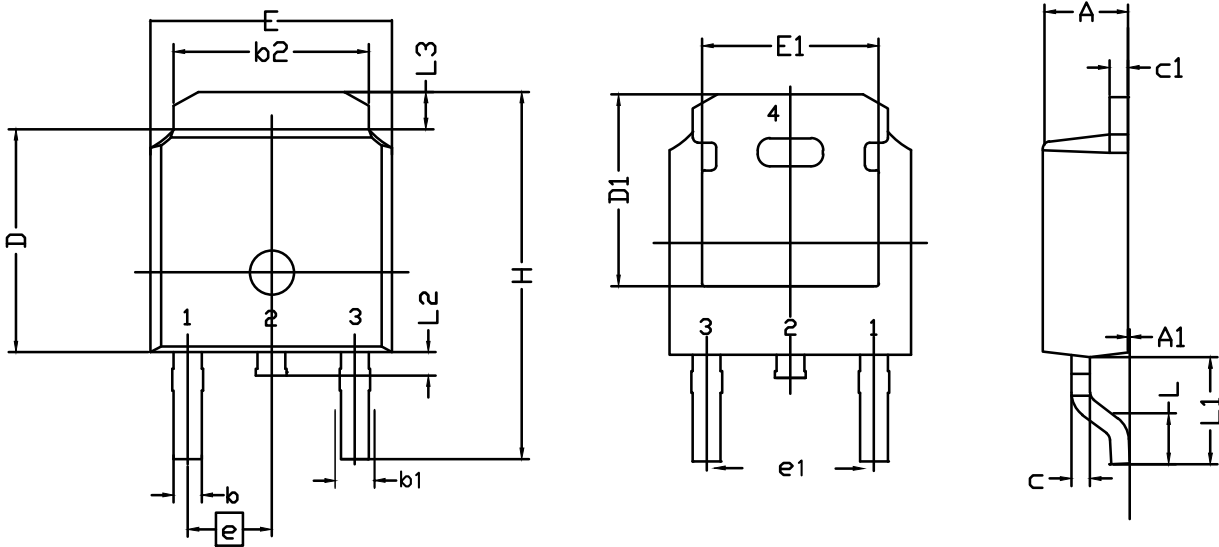


Fig.11 Unclamped Inductive Switching Waveform

TO-252 Package Outline Dimensions



Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
A	2.20	2.30	2.38	E	6.40	6.60	6.731
A₁	0.00	0.10	0.20	E₁	4.40	--	--
b	0.64	0.76	0.89	e	2.286 BSC		
b₁	0.77	0.85	1.14	e₁	4.572 BSC		
b₂	5.00	5.33	5.46	H	9.40	10.00	10.40
c	0.458	0.508	0.610	L	1.40	1.52	1.77
C₁	0.458	0.508	0.620	L₁	--	2.743	--
D	5.98	6.10	6.223	L₂	0.60	0.80	1.01
D₁	5.20	5.25	5.38	L₃	0.90	1.06	1.25