

Features

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

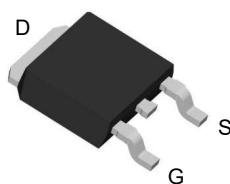
Product Summary



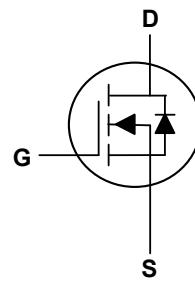
V_{DS}	60	V
I_D	85	A
$R_{DS(ON)}$ (at $V_{GS}=10V$)	6.2	mΩ
$R_{DS(ON)}$ (at $V_{GS}=4.5V$)	8.5	mΩ

Applications

- High Frequency Point-of-Load Synchronous Buck Converter
- Networking DC-DC Power System
- Power Tool Application



TO-252 Top View



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 ^{1,6}	$I_D @ T_c = 25^\circ C$	85	A
Continuous Drain Current ^{1,6}	$I_D @ T_c = 100^\circ C$	67	A
Pulsed Drain Current ²	I_{DM}	300	A
Single Pulse Avalanche Energy ³	EAS	125	mJ
Avalanche Current	I_{AS}	50	A
Total Power Dissipation ⁴	$P_D @ T_c = 25^\circ C$	267	W
Storage Temperature Range	T_{STG}	-55 to 175	°C
Operating Junction Temperature Range	T_J	-55 to 175	°C

Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance Junction-Ambient ¹	$R_{\theta JA}$	---	60	°C/W
Thermal Resistance Junction-Case ¹	$R_{\theta JC}$	---	0.56	°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}	$V_{\text{GS}}=0\text{V}$, $I_D=250\mu\text{A}$	60	---	---	V
Static Drain-Source On-Resistance ²	$R_{\text{DS}(\text{ON})}$	$V_{\text{GS}}=10\text{V}$, $I_D=30\text{A}$	---	5.0	6.2	$\text{m}\Omega$
		$V_{\text{GS}}=4.5\text{V}$, $I_D=12\text{A}$	---	6	8.5	$\text{m}\Omega$
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{GS}}=V_{\text{DS}}$, $I_D=250\mu\text{A}$	1.5	2	2.5	V
Drain-Source Leakage Current	I_{DSS}	$V_{\text{DS}}=48\text{V}$, $V_{\text{GS}}=0\text{V}$, $T_J=25^\circ\text{C}$	---	---	1	uA
		$V_{\text{DS}}=48\text{V}$, $V_{\text{GS}}=0\text{V}$, $T_J=55^\circ\text{C}$	---	---	5	
Gate-Source Leakage Current	I_{GSS}	$V_{\text{GS}}=\pm 20\text{V}$, $V_{\text{DS}}=0\text{V}$	---	---	± 100	nA
Forward Transconductance	g_{fs}	$V_{\text{DS}}=10\text{V}$, $I_D=30\text{A}$	---	75	---	S
Gate Resistance	R_g	$V_{\text{DS}}=0\text{V}$, $V_{\text{GS}}=0\text{V}$, $f=1\text{MHz}$	---	0.7	---	Ω
Total Gate Charge	Q_g	$V_{\text{DS}}=48\text{V}$, $V_{\text{GS}}=10\text{V}$, $I_D=18\text{A}$	---	75	---	nC
Gate-Source Charge	Q_{gs}		---	15.5	---	
Gate-Drain Charge	Q_{gd}		---	20.3	---	
Turn-On Delay Time	$T_{\text{d}(\text{on})}$	$V_{\text{DD}}=30\text{V}$, $V_{\text{GS}}=10\text{V}$, $R_G=3.3\Omega$, $I_D=18\text{A}$	---	18.5	---	ns
Rise Time	T_r		---	8.8	---	
Turn-Off Delay Time	$T_{\text{d}(\text{off})}$		---	58.8	---	
Fall Time	T_f		---	15.8	---	
Input Capacitance	C_{iss}	$V_{\text{DS}}=15\text{V}$, $V_{\text{GS}}=0\text{V}$, $f=1\text{MHz}$	---	4706	---	pF
Output Capacitance	C_{oss}		---	325	---	
Reverse Transfer Capacitance	C_{rss}		---	245	---	

Drain-Source Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Continuous Source Current ^{1,5}	I_s	$V_G=V_D=0\text{V}$, Force Current	---	---	85	A
Diode Forward Voltage ²	V_{SD}	$V_{\text{GS}}=0\text{V}$, $I_s=1\text{A}$, $T_J=25^\circ\text{C}$	---	---	1.2	V
Reverse Recovery Time	t_{rr}	$I_F=18\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$, $T_J=25^\circ\text{C}$	---	22.9	---	nS
			---	11.6	---	nC
Reverse Recovery Charge	Q_{rr}					

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 $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is $V_{\text{DD}}=50\text{V}$, $V_{\text{GS}}=10\text{V}$, $L=0.1\text{mH}$
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.
- 6.The maximum current rating is limited by bond-wires.

Typical Characteristics

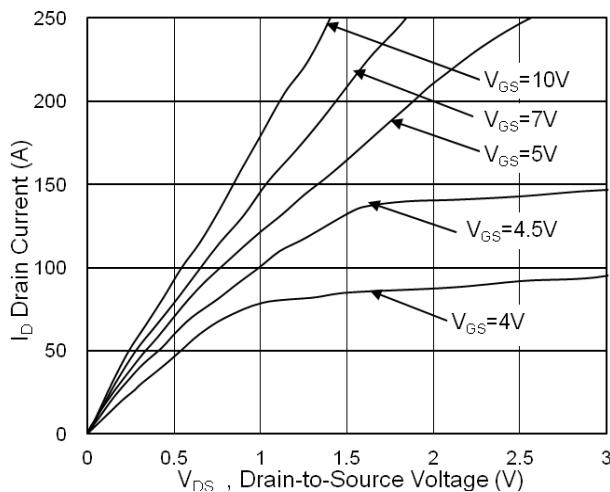


Fig.1 Typical Output Characteristics

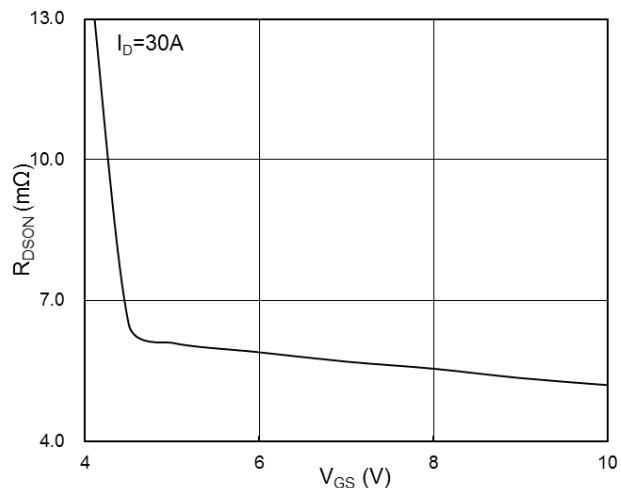


Fig.2 On-Resistance vs. G-S Voltage

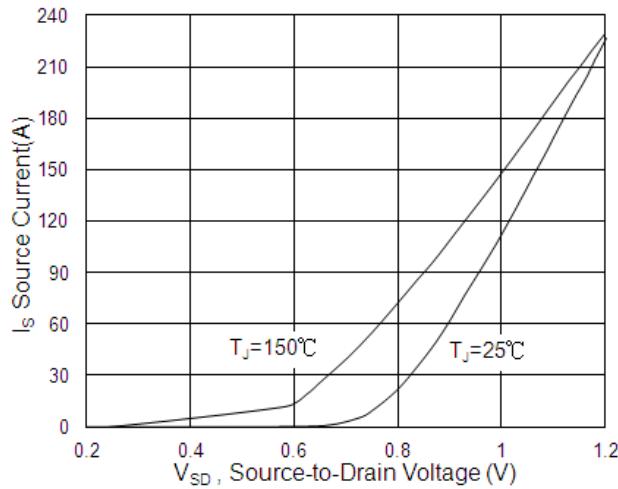


Fig.3 Source-Drain Forward Characteristics

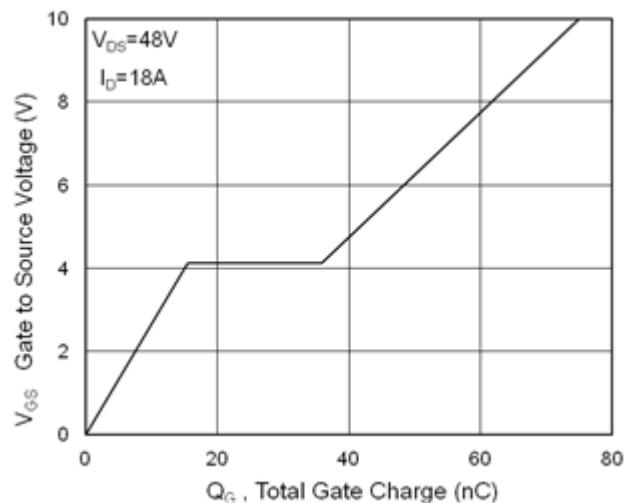


Fig.4 Gate-Charge Characteristics

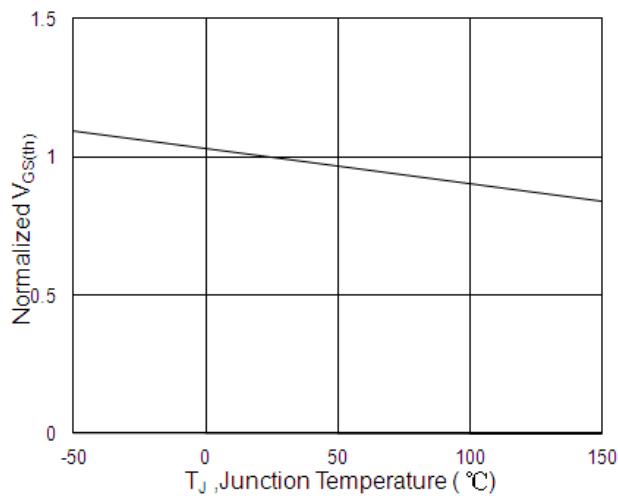


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

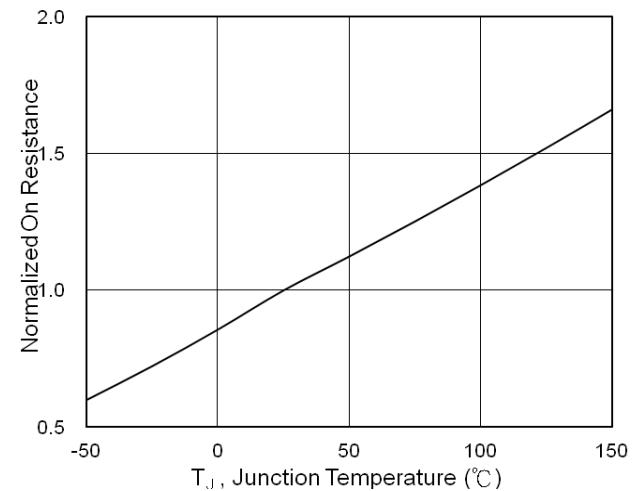
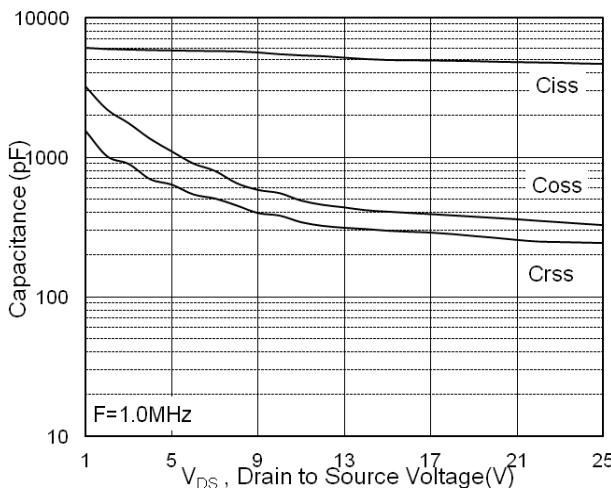
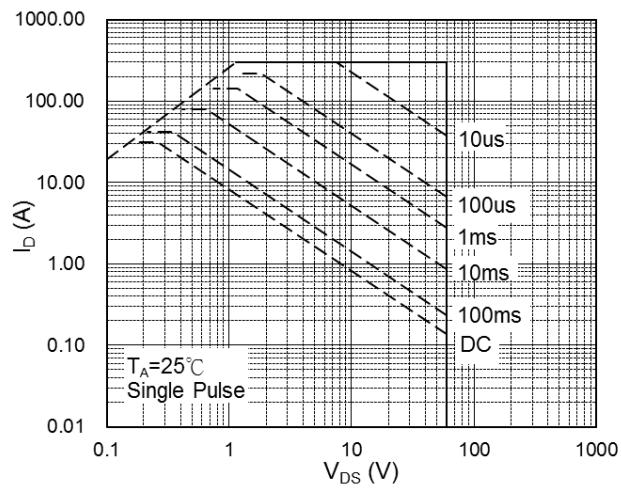
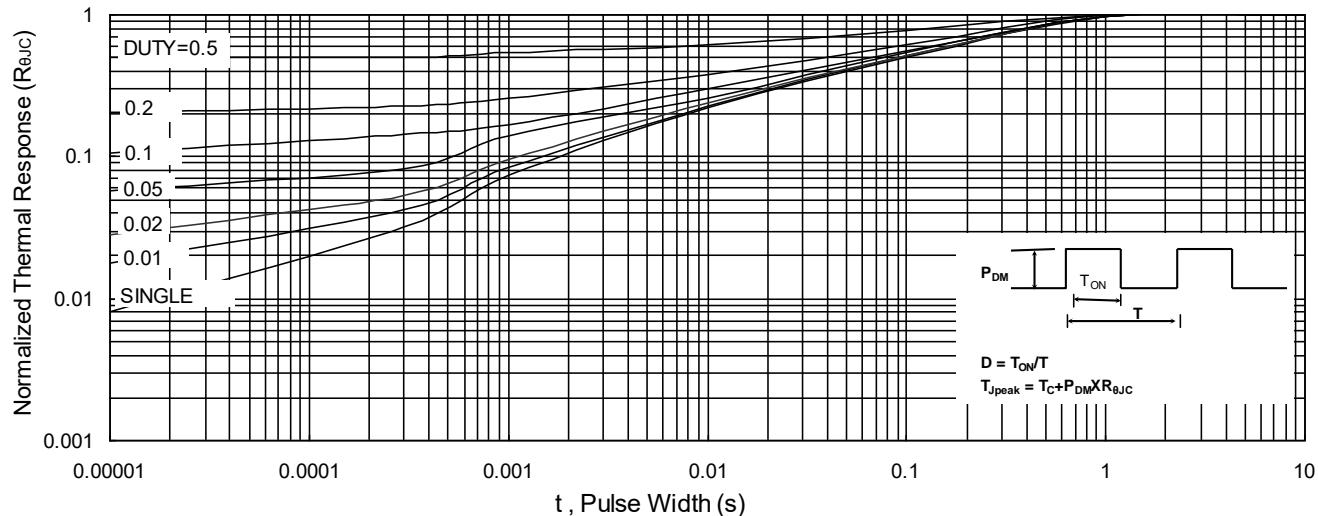
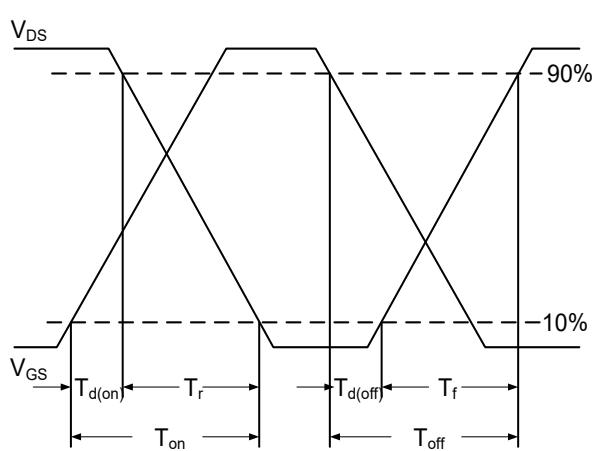
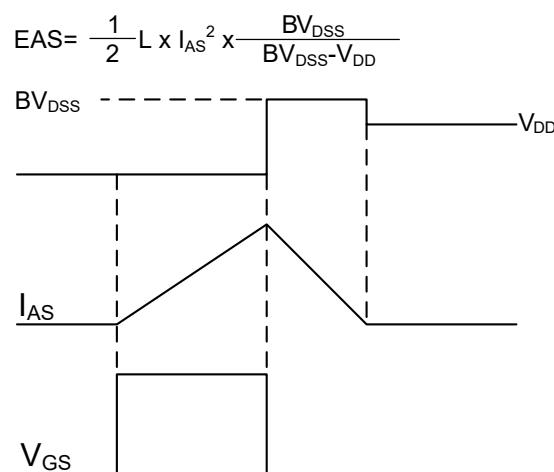
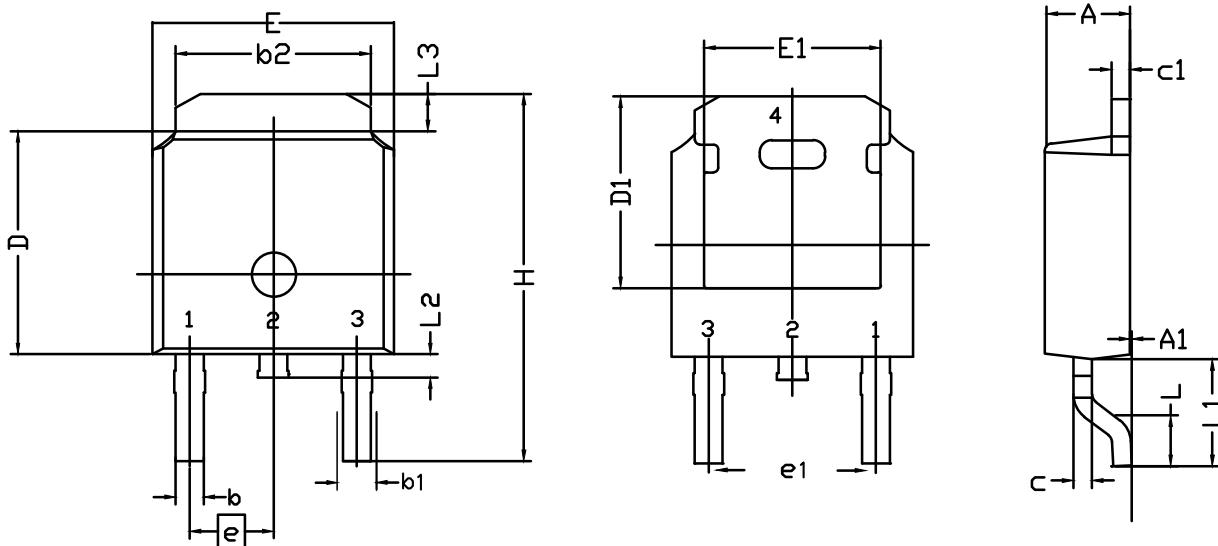


Fig.6 Normalized $R_{DS(on)}$ vs. T_J


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