

N-Channel Enhancement Mode Field Effect Transistor

Product Summary

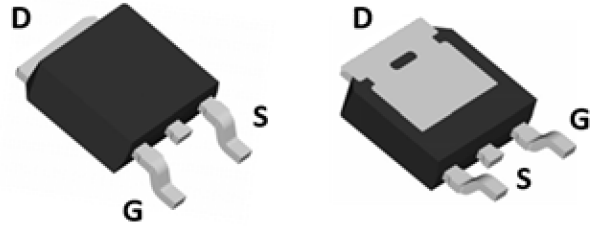
- V_{DS} 100V
- I_D 50A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) < 17 mohm
- $R_{DS(ON)}$ (at $V_{GS}=4.5V$) < 21.5 mohm
- 100% UIS Tested
- 100% ∇V_{DS} Tested

General Description

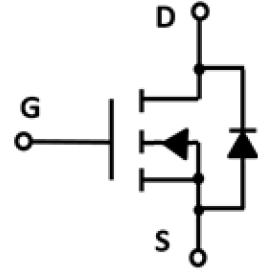
- Low $R_{DS(on)}$ & FOM
- Extremely low switching loss
- Excellent stability and uniformity
- Fast switching and soft recovery

Applications

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply



TO-252



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

Parameter	Symbol	Limit	Unit
Drain-source Voltage	V_{DS}	100	V
Gate-source Voltage	V_{GS}	± 20	V
Drain Current	I_D	$T_C=25^\circ\text{C}$	50
		$T_C=100^\circ\text{C}$	28.5
Pulsed Drain Current ^A	I_{DM}	180	A
Avalanche energy ^B	EAS	81	mJ
Total Power Dissipation ^C	P_D	$T_C=25^\circ\text{C}$	72
		$T_C=100^\circ\text{C}$	28.8
Junction and Storage Temperature Range	T_J, T_{STG}	-55~+150	$^\circ\text{C}$

■ Thermal resistance

Parameter	Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Ambient ^D	$R_{\theta JA}$	15	20	$^\circ\text{C/W}$
Thermal Resistance Junction-to-Ambient ^D		Steady-State	40	
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	1.35	1.7	

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

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	100			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=100V, V_{GS}=0V$			1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.8	3	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$		14	17	m Ω
		$V_{GS}=4.5V, I_D=20A$		17	21.5	m Ω
Diode Forward Voltage	V_{SD}	$I_S=20A, V_{GS}=0V$			1.3	V
Maximum Body-Diode Continuous Current	I_S				45	A
Gate resistance	R_G	$f=1\text{ MHz, Open drain}$		1		Ω
Dynamic Parameters						
Input Capacitance	C_{iss}	$V_{DS}=50V, V_{GS}=0V, f=1\text{ MHz}$		1135		pF
Output Capacitance	C_{oss}			399		
Reverse Transfer Capacitance	C_{rss}			18		
Switching Parameters						
Total Gate Charge	Q_g	$V_{GS}=10V, V_{DS}=50V, I_D=25A$		16		nC
Gate-Source Charge	Q_{gs}			5.6		
Gate-Drain Charge	Q_{gd}			2.4		
Reverse Recovery Charge	Q_{rr}	$I_F=20A, di/dt=100A/\mu s$		42		ns
Reverse Recovery Time	t_{rr}			39.8		
Turn-on Delay Time	$t_{D(on)}$	$V_{GS}=10V, V_{DD}=50V, I_D=25A$ $R_{GEN}=2.2\Omega$		39.2		ns
Turn-on Rise Time	t_r			11		
Turn-off Delay Time	$t_{D(off)}$			53.2		
Turn-off fall Time	t_f			15.8		

A. Repetitive rating; pulse width limited by max. junction temperature.

B. $V_{DD}=50V, V_{GS}=10V, L=5mH, I_{AS}=5.7A$.

C. P_d is based on max. junction temperature, using junction-case thermal resistance.

D. The value of R_{qJA} is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$. The Power dissipation PDSM is based on $R_{qJA} \leq 10s$ and the maximum allowed junction temperature of 150°C . The value in any given application depends on the user's specific board design.

■ Typical Performance Characteristics

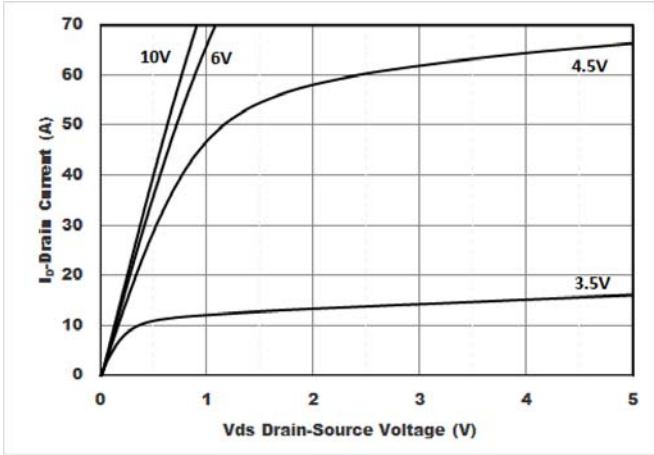


Figure1. Output Characteristics

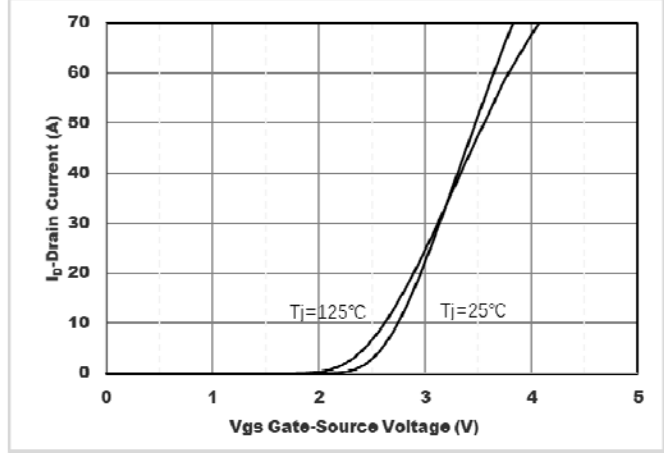


Figure2. Transfer Characteristics

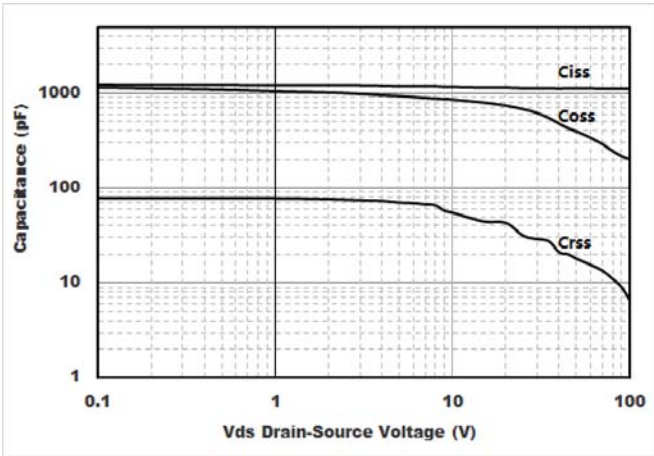


Figure3. Capacitance Characteristics

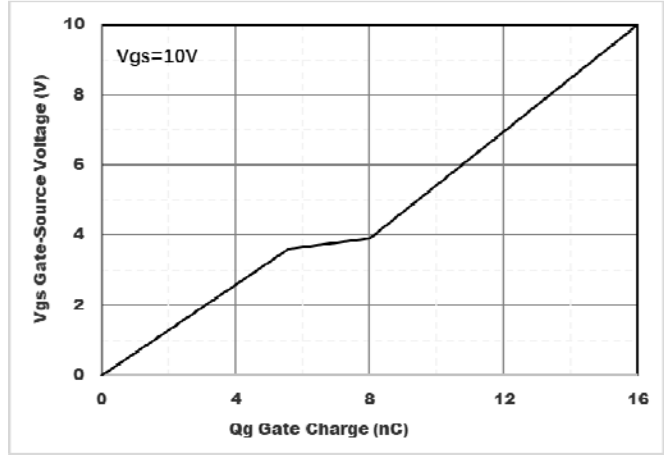


Figure4. Gate Charge

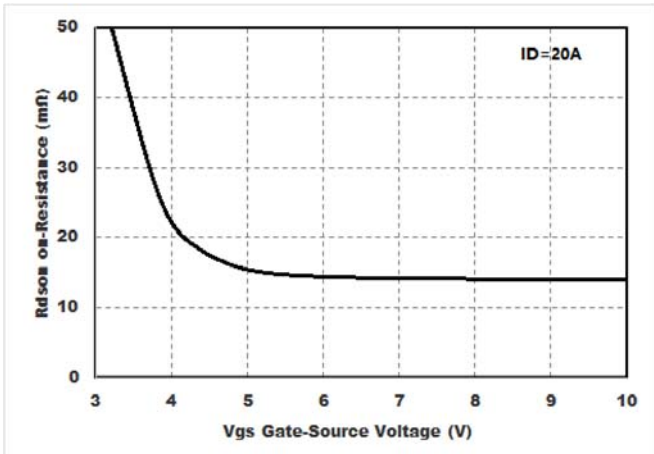


Figure5. : On-Resistance vs. Drain Current and Gate Voltage

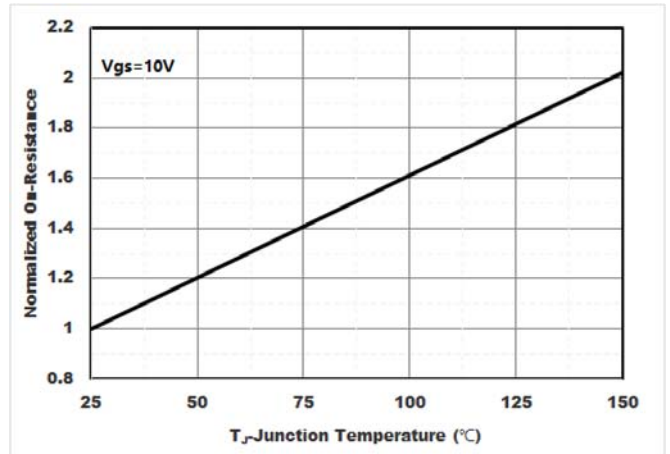


Figure6. Normalized On-Resistance

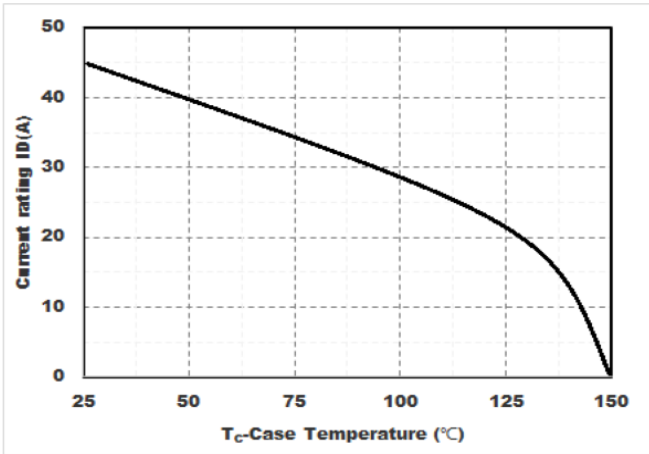


Figure7. Drain current

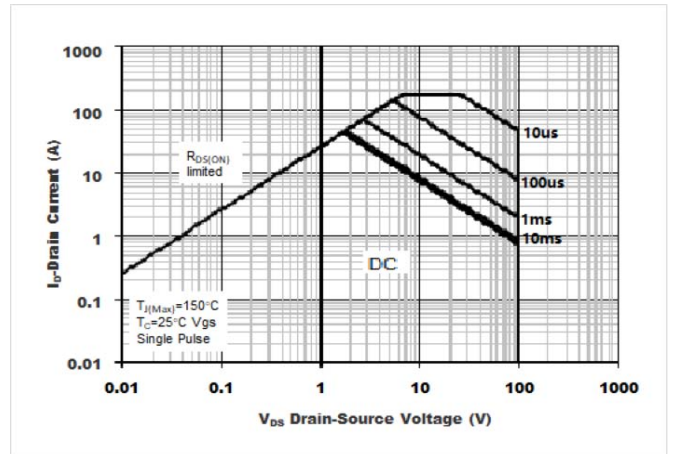


Figure8.Safe Operation Area

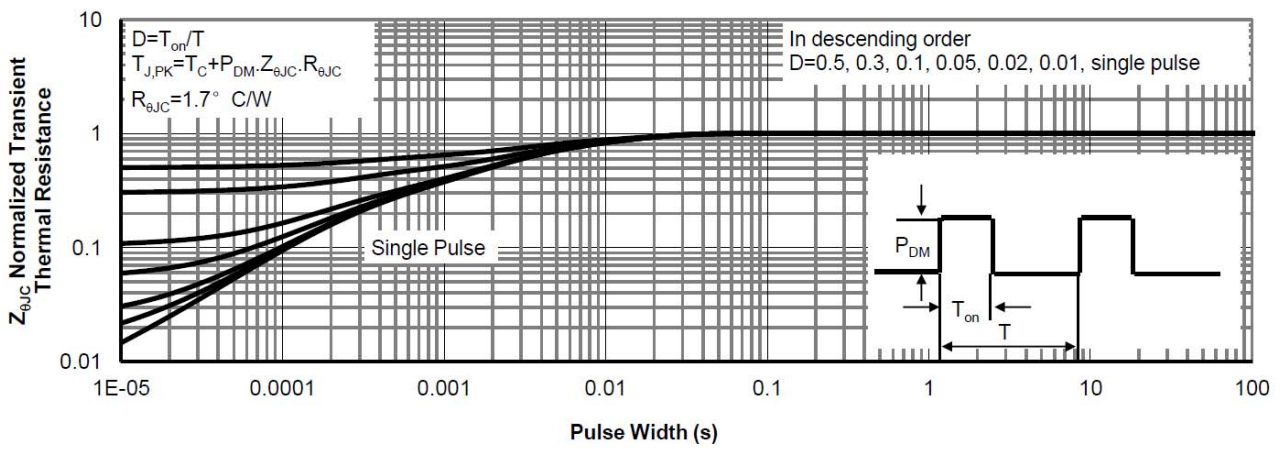
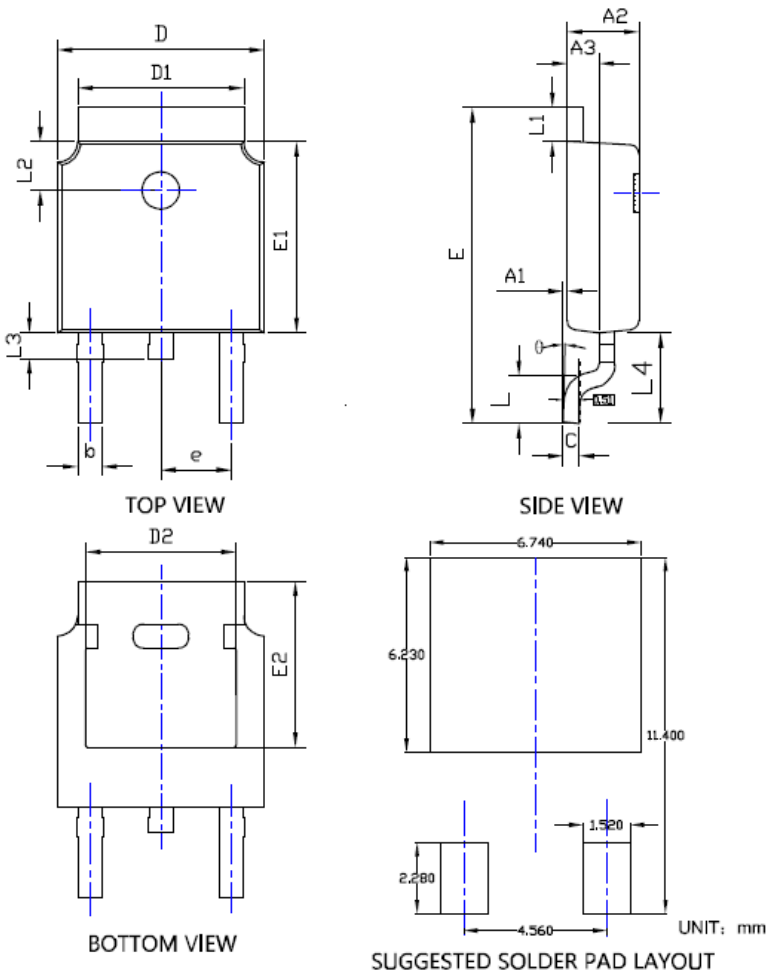


Figure9.Normalized Maximum Transient thermal impedance

■ TO-252 Package information



SYMBOL	DIMENSIONS					
	INCHES			Millimeter		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A1	0.000	----	0.008	0.000	----	0.200
A2	0.087	0.091	0.094	2.200	2.300	2.400
A3	0.035	0.039	0.043	0.900	1.000	1.100
b	0.026	0.030	0.034	0.660	0.760	0.860
c	0.018	0.020	0.023	0.460	0.520	0.580
D	0.256	0.260	0.264	6.500	6.600	6.700
D1	0.203	0.209	0.215	5.150	5.300	5.450
D2	0.181	0.189	0.195	4.600	4.800	4.950
E	0.390	0.398	0.406	9.900	10.100	10.300
E1	0.236	0.240	0.244	6.000	6.100	6.200
E2	0.203	0.209	0.215	5.150	5.300	5.450
e	0.090BSC			2.286BSC		
L	0.049	0.059	0.069	1.250	1.500	1.750
L1	0.035	----	0.050	0.900	----	1.270
L2	0.055	----	0.075	1.400	----	1.900
L3	0.240	0.310	0.039	0.600	0.800	1.000
L4	0.114REF			2.900REF		
θ	0°	----	10°	0°	----	10°