

NCE1579A-VB Datasheet

N-Channel 150 V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)	Q_g (TYP.)
150	0.0085 at $V_{GS} = 10$ V	100	60 nC
	0.0095 at $V_{GS} = 7.5$ V	98	

FEATURES

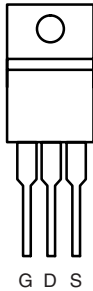
- Thunder power MOSFET
- Maximum 175 °C junction temperature
- 100 % R_g and UIS tested


RoHS
 COMPLIANT

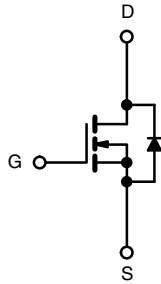
APPLICATIONS

- Power supplies:
 - Uninterruptible power supplies
 - AC/DC switch-mode power supplies
 - Lighting
- Synchronous rectification
- DC/DC converter
- Motor drive switch
- DC/AC inverter
- Solar micro inverter
- Class D audio amplifier

TO-220AB



Top View



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ($T_C = 25$ °C, unless otherwise noted)

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DS}	150	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 150$ °C)	I_D	100	A
		70	
Pulsed Drain Current ($t = 100$ μ s)	I_{DM}	320	
Avalanche Current	I_{AS}	55	
Single Avalanche Energy ^a	E_{AS}	180	mJ
Maximum Power Dissipation ^a	P_D	375 ^b	W
		125 ^b	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +175	°C

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Junction-to-Ambient (PCB Mount) ^c	R_{thJA}	40	°C/W
Junction-to-Case (Drain)	R_{thJC}	0.4	

Notes

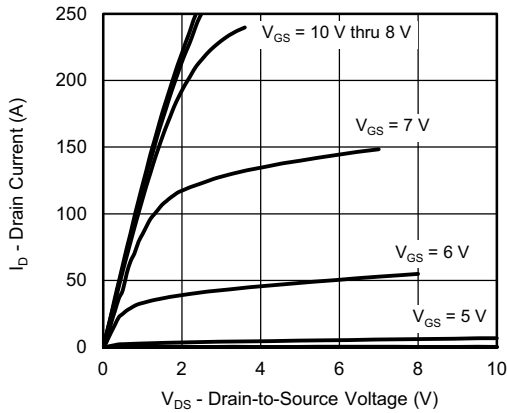
- Duty cycle ≤ 1 %.
- See SOA curve for voltage derating.
- When mounted on 1" square PCB (FR4 material).

SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	150	-	-	V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	3	-	5	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V	-	-	± 250	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 150 V, V _{GS} = 0 V	-	-	1	μA
		V _{DS} = 150 V, V _{GS} = 0 V, T _J = 125 °C	-	-	100	
		V _{DS} = 150 V, V _{GS} = 0 V, T _J = 175 °C	-	-	2	mA
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 10 V, V _{GS} = 10 V	90	-	-	A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 30 A	-	0.0085	-	Ω
		V _{GS} = 7.5 V, I _D = 30 A	-	0.0095	-	
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 30 A	-	52	-	S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 75 V, f = 1 MHz	-	3425	-	pF
Output Capacitance	C _{oss}		-	535	-	
Reverse Transfer Capacitance	C _{rss}		-	26	-	
Total Gate Charge ^c	Q _g	V _{DS} = 75 V, V _{GS} = 10 V, I _D = 60 A	-	63	95	nC
Gate-Source Charge ^c	Q _{gs}		-	19.5	-	
Gate-Drain Charge ^c	Q _{gd}		-	20.5	-	
Gate Resistance	R _g	f = 1 MHz	1.5	3	5	Ω
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 75 V, R _L = 1.25 Ω I _D ≅ 60 A, V _{GEN} = 10 V, R _g = 1 Ω	-	15	30	ns
Rise Time ^c	t _r		-	114	220	
Turn-Off Delay Time ^c	t _{d(off)}		-	28	56	
Fall Time ^c	t _f		-	8	16	
Drain-Source Body Diode Ratings and Characteristics ^b (T _C = 25 °C)						
Pulsed Current (t = 100 μs)	I _{SM}		-	-	240	A
Forward Voltage ^a	V _{SD}	I _F = 30 A, V _{GS} = 0 V	-	0.73	1.2	V
Reverse Recovery Time	t _{rr}	I _F = 30 A, di/dt = 100 A/μs	-	110	220	ns
Peak Reverse Recovery Charge	I _{RM(REC)}		-	10	20	A
Reverse Recovery Charge	Q _{rr}		-	0.5	1	μC

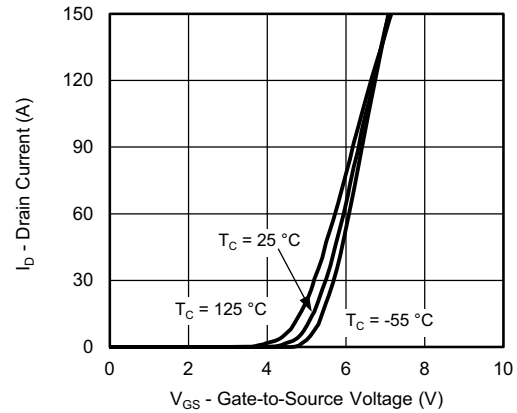
Notes

- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

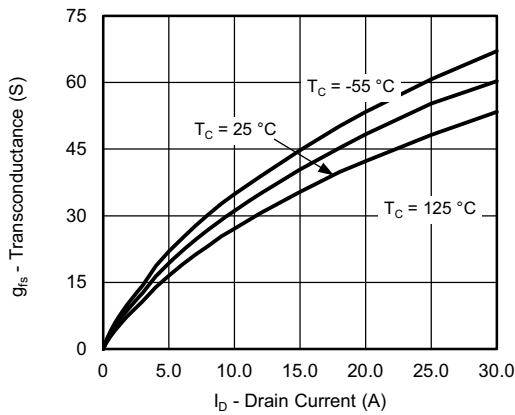
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)


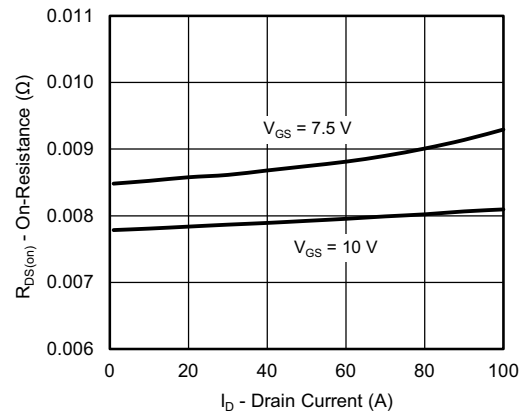
Output Characteristics



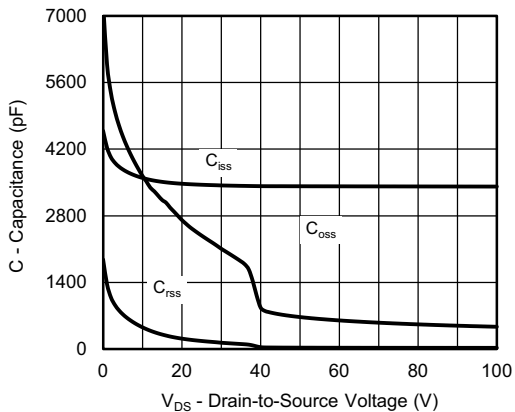
Transfer Characteristics



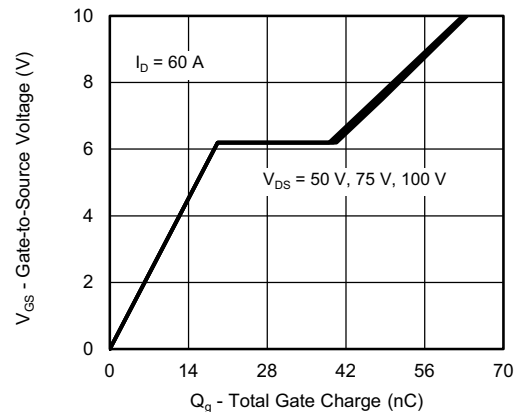
Transconductance



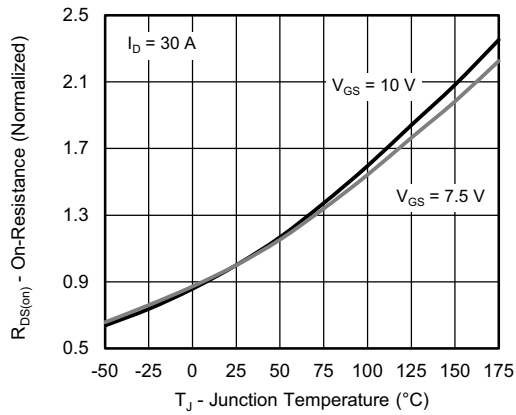
On-Resistance vs. Drain Current

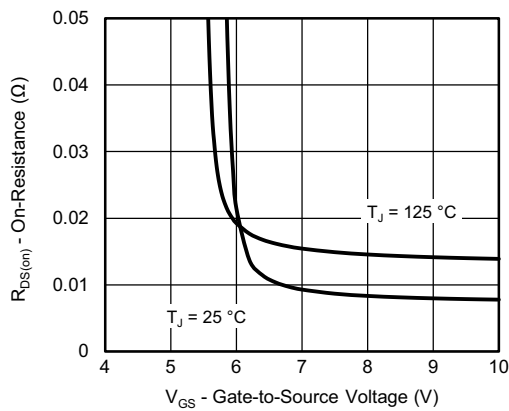


Capacitance



Gate Charge

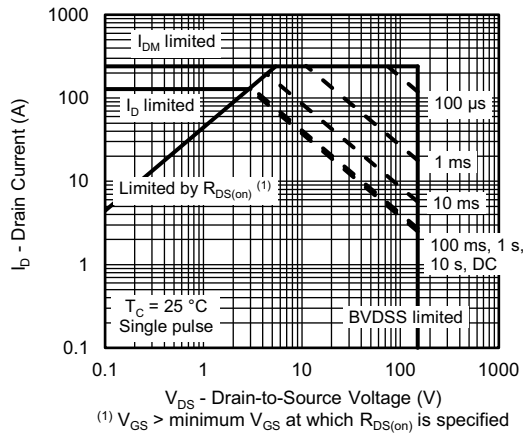
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)

On-Resistance vs. Junction Temperature

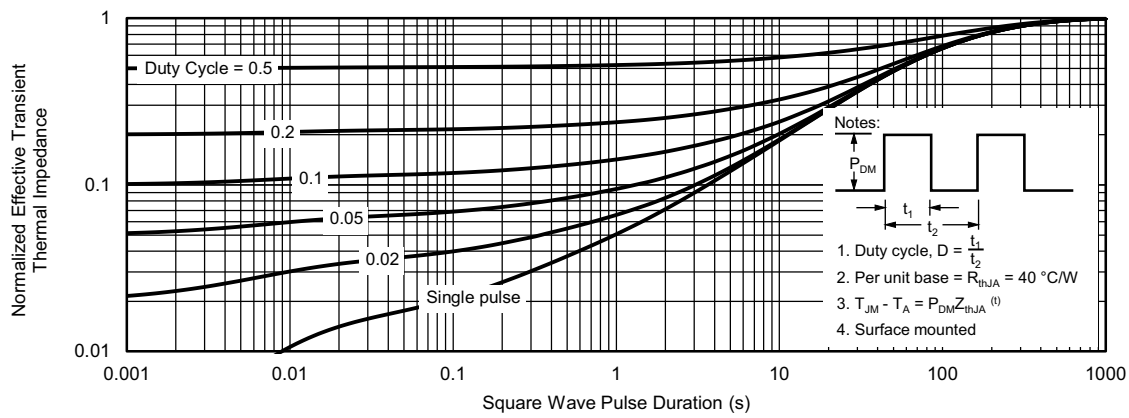
Threshold Voltage

On-Resistance vs. Gate-to-Source Voltage

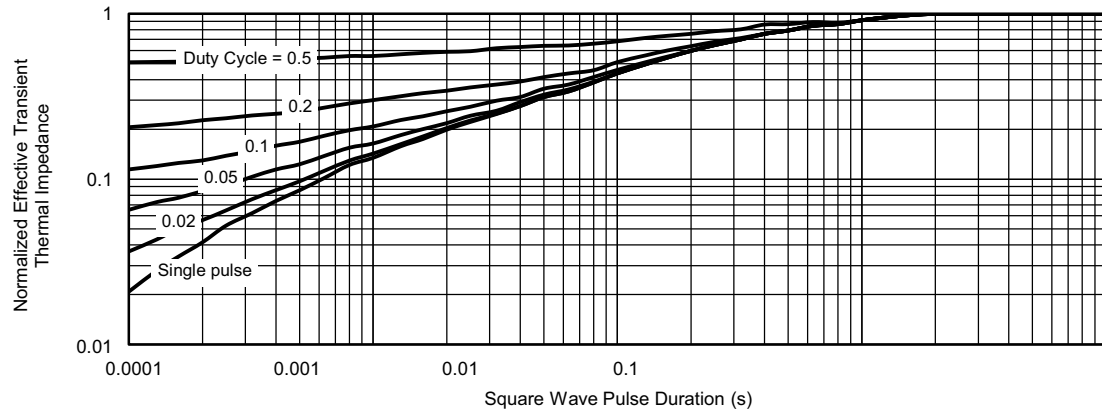
Drain Source Breakdown vs. Junction Temperature

Source Drain Diode Forward Voltage

Current De-Rating

THERMAL RATINGS ($T_A = 25^\circ\text{C}$, unless otherwise noted)

Safe Operating Area

 I_{DAV} vs. Time

Normalized Thermal Transient Impedance, Junction-to-Ambient

THERMAL RATINGS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)


Normalized Thermal Transient Impedance, Junction-to-Case

Note

- The characteristics shown in the two graphs
 - Normalized Transient Thermal Impedance Junction to Ambient ($25\text{ }^{\circ}\text{C}$)
 - Normalized Transient Thermal Impedance Junction to Case ($25\text{ }^{\circ}\text{C}$)
- are given for general guidelines only to enable the user to get a "ball park" indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board - FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions.

Technical drawing of a mechanical part, showing front and side views with dimensions.

Front View Dimensions:

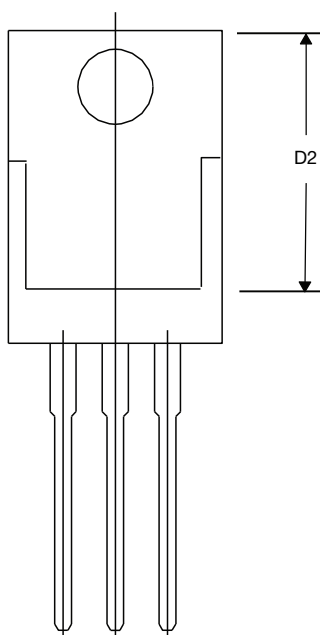
- E : Total width of the top flange.
- $H(1)$: Height of the upper section.
- Q : Thickness of the upper section.
- D : Total height of the part.
- $L(1)$: Height of the lower section.
- L : Total height of the lower section.
- $\varnothing P$: Diameter of the central hole.
- $1, 2, 3$: Labels for the three vertical sections of the lower part.
- M^* : Dimension of the upper part of the lower section.
- $b(1)$: Width of the lower section.
- b : Width of the base.
- e : Distance from the centerline to the edge of the base.
- $e(1)$: Distance from the centerline to the edge of the lower section.

Side View Dimensions:

- A : Total width of the side view.
- F : Width of the upper section.
- C : Width of the lower section.
- $J(1)$: Width of the base.

ECN: T14-0413-Rev. P, 16-Jun-14
DWG: 5471

* M = 1.32 mm to 1.62 mm (dimension including protrusion)
Heatsink hole for HVM



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